Choosing The Best Educational Software

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The Leading Magazine Of Home, Educational, And Recreational Computing

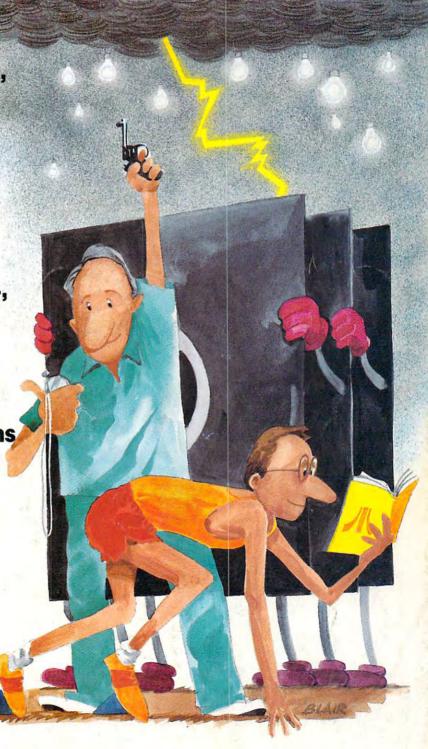
Two Exciting Games:
Missile Math For Apple,
IBM PC And PCjr, Atari,
Commodore 64, TI-99/4A,
And VIC-20
Lightsaver For
Commodore 64, IBM PC
And PCjr, VIC-20,
And Atari

Lightning And Bulldozer Sort: For Apple, Commodore 64, VIC-20, IBM PC And PCjr, And Atari

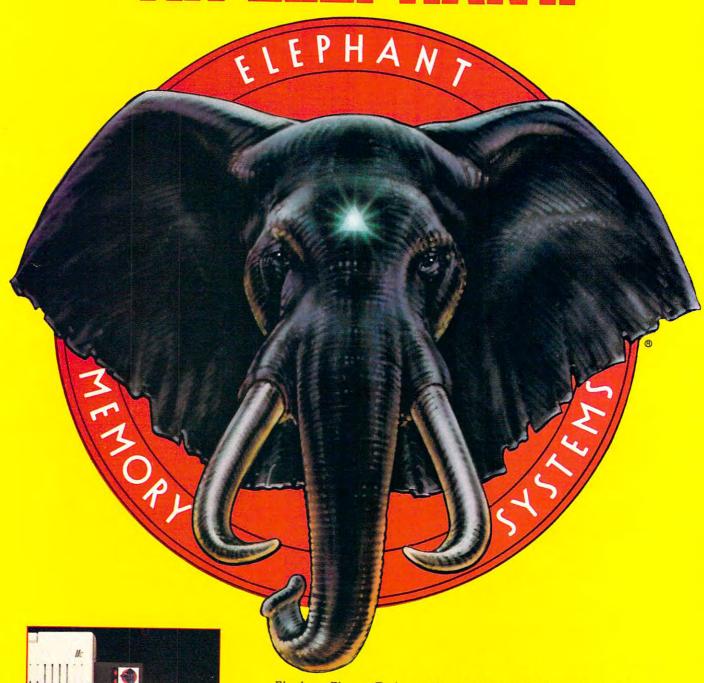
Autoboot For Commodore 64 And VIC-20: Load Programs And They RUN Themselves

Atari Speed-Reading: Improve Your Speed And Comprehension





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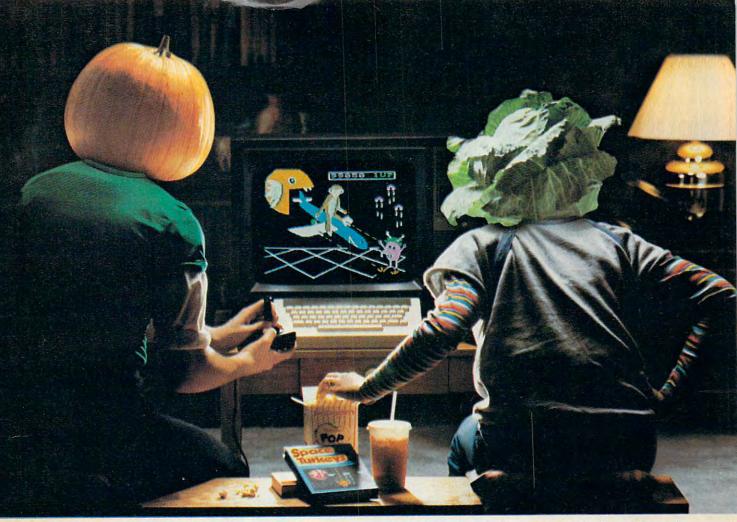


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Spinnaker Learning Adventure games are available for Apple,® Atari,® IBM® and Commodore 64™ home computers.



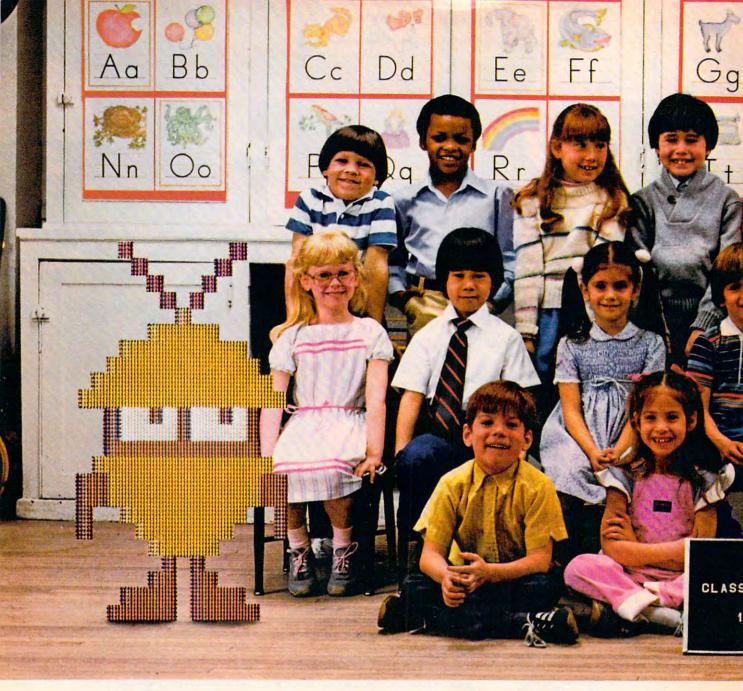
IN SEARCH OF THE MOST AMAZING THING."

It isn't easy to find — even in your B-liner. But you'll have help from your Uncle Smoke Bailey as you search the universe to find the Most Amazing Thing. Ages 10-Adult.



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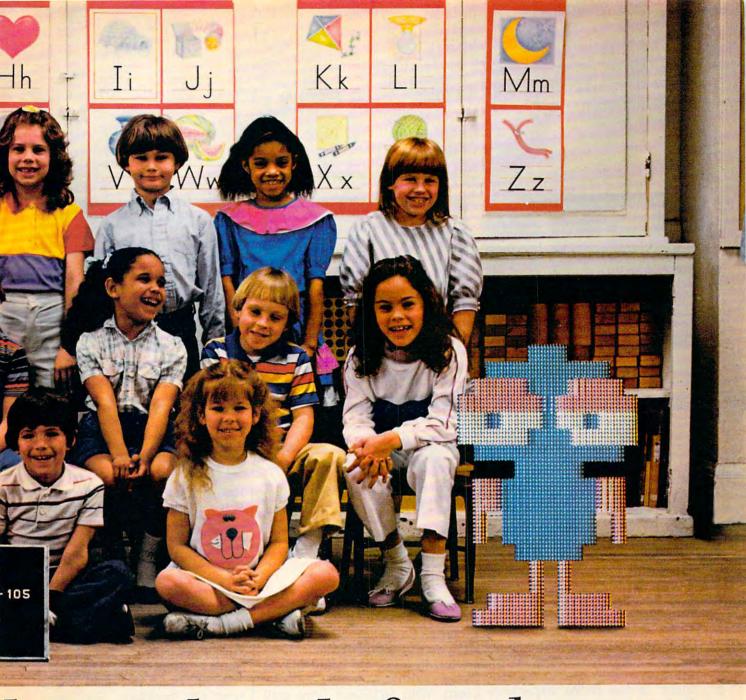
The beauty of Sprout software is how

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Knowing how to do all this isn't something Sprout learned overnight.

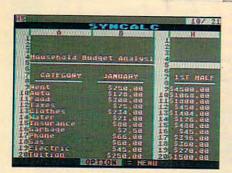
You see, we've got a hundred years of experience to lean on. (Our parent company is SFN, the country's #1 textbook publisher for elemen-

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Games that grow up. Instead of wear out.



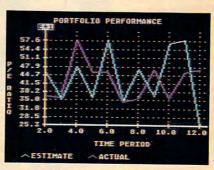
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SynCalc™



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Graphing and statistics

SynTrend™

Now your Atari computer gets down to business. late means and standard deviation linear and mult sions. It's pretty ed stand eh? And als

If you're a serious home manager, a student, or run a small business at home, now you can get sophisticated, integrated software for your ATARI computer with the same features as the more expensive IBM and Apple packages.

SynCalc makes a spreadsheet more manageable.

First, there's SynCalc, the most advanced spreadsheet program ever created for ATARI Home Computers. Not only does SynCalc help you get all your numbers down easily, it also comes with a sorting feature, and the ability to label and name your formulas like "beginning inventory + goods purchased-goods sold = inventory on hand," as well as standard entries. And SynCalc also comes with "expert" commands, to use once you've become more familiar with its procedures. Plus many other

features found in the more expensive programs.

SynFile + keeps information more organized.

SynFile+ can function as your database, your filing system. With SynFile+, you can reorganize and sort parts or whole files instantly. Not only can you enter text, you can calculate and update data as well. And files from both SynCalc and SynFile+ can also be used by the ATARI word processor, AtariWriter, for uses such as mail merge.

SynTrend gives you a more graphic way to look at data.

Next, there's SynTrend, which can be the graphing and statistical arm of your operation. SynTrend allows you to visualize your data from SynCalc or SynFile+ with either bar graphs, pie charts, line graphs or scatter plots. To do statistical analysis, you can quickly calcu-

late means and variances, standard deviations, or even linear and multiple regressions. It's pretty easy to understand, eh? And also pretty easy to operate because all three programs come replete with easy-to-understand "pop-up" menus, to take you through their paces step by step. And remember, all three programs can share data, which helps you get the job done even faster.

So get down to business with SynCalc, SynFile+, SynTrend, developed exclusively for ATARI by Synapse. And see for yourself why the cost of taking care of business doesn't have to put you out of it.

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NOTE: See page 69 before typing in programs.

> Commodore 64, TS Timex/ Sinclair, TI Texas Instruments, PCjr IBM PCjr, PC IBM PC, AD Coleco Adam, *All or several of the above.

AP Apple AT Atari, P PET/ CBM, V VIC-20, C Radio Shack Color Computer, 64

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EDITOR'S NOTES

We recently received a letter from a long-time subscriber that thoughtfully raises some concerns about the present composition of COMPUTE!. It is excerpted and addressed here.

"Dear Mr. Lock,

I felt compelled to write to you to express my feelings about the disappointing changes which have been coming over my once favorite magazine, COMPUTE!. I have been reading COMPUTE! since January 1981 and have a subscription which is paid through August 1985.

In recent months, since January 1984, you have been 'spread too thin' by attempting to cover so many types of computers that I feel none have been done adequately. The technical content of the magazine, for the Commodore computers, and computer use in the home, is what had interested me the most, and the quantity and the quality have dwindled so much . . . ".

Our reader goes on to discuss concerns in specific about the breadth of our articles, and the size of our columns. We thought this presented a good opportunity to address these concerns and hopefully explain some of what we see happening from here, and where it will take us.

The Case Of The **Dwindling Magazine**

In December of 1983, COMPUTE! had 392 pages. This issue, September 1984, has 160. The December issue had 215 pages of advertising; this issue has 60.5. During the course of 1984, we've seen a massive shakeout, not unexpected of course, in the industry. Where there once was an advertiser base of thousands

of companies, there is now an advertiser base measured in the hundreds. All well and good, you may say, but is it really a problem or concern for you, the readers? In the sense that we must attend to some economic realities in planning and publishing our magazines, the answer is yes. Do we subjugate our concerns to formula? No, absolutely not.

A typical rule of thumb for the publishing business is a 50/50 advertising mix. As size increases, this ratio gives over to an increased percentage of advertising. In our case, the December 1983 issue of COM-PUTE! was over 55 percent advertising. The September issue, by rule of thumb, should be at most 128 pages. Given the overhead we carry in fixed page content (i.e., everything from columns to MLX), this was not acceptable. The result is that our editorial percentage in this issue approaches 65 percent.

The Future

Certainly all of this makes sense, but it still doesn't solve the problem/question at hand: more content. What else can we do? We're working on it. In our "fixed overhead" areas, we're whittling down column sizes. We're trying to expand the scope of some columns so they're more useful to more of you. And we're evaluating all of our columns with an eye toward further reductions.

One of your complaints, in essence, is that some of the "meat" of our content is diminished. Upon reflection, I think that's an offshoot of our at-

tempts to provide continued breadth. We probably have a tendency to run shorter articles to enhance variety. The unfortunate by-product of this is that some of the more technical, lengthy articles are bypassed. This we can address immediately, and we will begin to do so with our October issue. We would welcome some additional input from readers. One suggestion here has been that we start to run some of our "fixed" material on an every-other-issue basis. This would mean that "Beginner's Guide To Typing In Programs," for example, might appear on alternate months. We are open to your thoughts. Your comments?

Editor In Chief

Nobert Jock

Your Personal

Its only business is managing your home finances. No program does it more quickly, more easily, more directly.

Your Personal Net Worth systematizes the management of your household income, expenses, credit cards and check books using methods tested for accuracy by Touche Ross, one of the nation's leading accounting firms.

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You'll find it at your favorite software retailer in the silver box with the real silver dollar on the front. It could be the single most valuable purchase you'll ever make.

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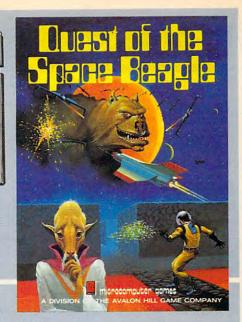
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Scott Lamb's Interactive Space Fantasy Adventure

The sequel to JUPITER MISSION 1999®

When the government agents knocked on your door early one morning (at the beginning of **JUPITER MISSION 1999**) and rudely whisked you away in the starship Space Beagle, you had no idea of what was to follow. As the lone survivor of Jupiter Mission and the Earth's savior from an impending alien invasion, you unwittingly thought the worst was behind you. SLIM CHANCE! A mysterious beam has cast you into the nether reaches of space; cold, lifeless, forbidding. You long for the amenities of Mother Earth, which you had always taken for granted . . . until now!

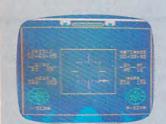


- Befriended by the Faunians, a peaceful race being invaded by the evil Gentuzians, they have decided that YOU must launch a pre-emptive strike against the Gentuzian homeworld. You must command 10 Faunian robot fighters against the Gentuzian battle fleet which outnumbers you four to one! It won't be easy; you'll need the right tactics and all the skill and patience you can muster.
- Assuming you are successful and conquer the Gentuzians, they will want you to become their Emperor. The only thing you want is to repair the Space Beagle and get back home. But they are insistent creatures; refuse the crown, and you can forget leaving. Reluctantly you accept and, to prove your claim, they drop you into the Labyrinth of Kamerra! Find your way out, and they'll let you go home as Emperor of Gentuza. No problem, you think, until you soon realize that Kamerra is a cruel maze deficient of adequate food and oxygen, yet aplenty with dangerous pits and "Ardillian Whipstingers."
- SHOOT THE STARS! Fortunately, you are able to save your game in progress every step of the way in QUEST OF THE SPACE BEAGLE.

Your greatest challenge is about to begin. As you settle into the commander's chair of the Space Beagle, you set your sights for home! But which way? Before you spans 200,000,000 light years of Superclusters. On board is an authentic matrix computer calibrated to simulate the actual dimensions of the universe. You must identify the one Supercluster containing Sol, and hyperwarp from one end of space to another. Once you lock into the right Supercluster, you must find the Milky Way Galaxy, your assurance that Mother Earth is within reach, and home sweet home!

THE QUEST OF THE SPACE BEAGLE is ready to run on your Atari® Home Computer with 48K memory, one disk drive and joystick. \$35.00

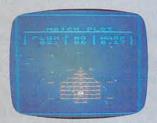
Available everywhere at computer and hobby stores, or call toll free **1-800-638-9200** for more information.



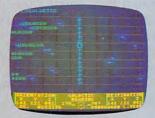
Space Battle Display



The Labyrinths of Kamerra



Hyperwarp Temporal Imbalance Sensor Grid



Galactic Starmap Display



READERS' FEEDBACK

The Editors and Readers of COMPUTE

Automatic Conversions?

Many of the programs you publish in COMPUTE! are for several different microcomputers. Do you have utilities that automatically convert a program to another type of computer? Are they available for sale?

J.B. Allen

We call the process of converting a computer program to another computer homogenization. Unfortunately, we do not have, nor have we seen, any utilities that will automatically homogenize a program.

We have a staff of talented programmers that manually goes through programs and homogenizes them. The process can be a laborious one, particularly with machine language programs which often require a byte-by-byte translation.

Missing Commodore Ribbons

I am the owner of a Commodore MPS-801 printer. Until recently, I have had trouble finding a replacement ribbon. It seems that the dealers selling the printers are not able to get the ribbons.

I have some good news for you to pass on to your readers. You can find a replacement ribbon at your local Radio Shack store. It is the ribbon for the DMP-110 printer, part number 26-1283. This ribbon is identical to the one for the MPS-801 printer.

Frank W. Fife

Many readers have mentioned difficulty locating replacement ribbons for the 801. Thanks for the tip.

Atari Monitor Hookup

I have ordered a BMC monitor and an Atari 800XL. Very recently, I was told that the Atari is designed for use with a standard TV set. How can I make the Atari work with the BMC monitor. Will the monitor be totally useless?

Benedict V. Sulit

Although optimized for use with a television set, the Atari 800XL looks even better on a composite color monitor. You can also hook up a black-and-white (monochrome) monitor. You'll need a special cable that plugs into the round, five-pin DIN plug on the back of your 800XL. For a color monitor, get a cable that feeds the chroma (composite video) signal into Video In on your monitor. For a monochrome screen, you'll get best results using the LUMA (luminance) signal. Some cables bring out all five pins to RCA phono jacks. With trial and error you can easily find which wire controls which signal. You can get a video cable at your local computer store or possibly a TV/video store.

Musical Apples

I am an Apple IIe user and would like to know how to program my computer to make music. Can you do it in Applesoft BASIC or do you need another language?

Denny Hays

It's a fairly simple matter to make elementary sounds on the Apple in BASIC. You can tweak the speaker by accessing location —16336 (i.e., POKE—16336,0) or ring the bell by PRINTing CHR\$(7). But to do much more than this, you need a short machine language (ML) routine. Fortunately, this ML routine can be POKEd in from BASIC.

You can find such an ML routine in an article by Blaine Mathieu (COMPUTE!, October and November 1983). The tutorial explains both fundamental and complex Apple sound generation.

More Open Commodore Files

The "64 Explorer" by Larry Isaacs in the March 1984 issue concerning the maximum number of files which can be open at one time on the 1541 disk drive caught my interest. I have discovered some further information.

The number of sequential files opened for writing can be increased to three if the filename is prefixed with a 0:. When this is not the case, the drive acts as Isaacs described.

Since the Disk Operating System was originally used on a dual disk drive, I always add the prefix 0: to any disk operation to insure that it will work properly.

Mitchell S. Comstock



Autobooting Atari

Is there any way you can make a program run right after it has been loaded into your computer from tape or disk? This would prevent anyone from seeing the special codes in the program.

Mark Zobel

We assume you are using a password or are disabling the break key and system reset. If the program didn't run automatically, anyone could LIST the program and remove the protection. Although you can't completely bar an experienced, enthusiastic invader, you can make a program run automatically from disk when you boot up your system. See "Automate Your Atari" in COMPUTE's Third Book of Atari.

Although it is possible to create a boot tape that does the same thing, we don't know of a specific program. There are techniques for making BASIC programs RUN automatically when LOADed on Commodore machines (for example, having the program load in memory low enough to change some vectors), but the technique is too involved to cover here. See "Commodore Autoboot" elsewhere in this issue.

TI Memory Maps

I write this in reply to the letter from Davin A. Trulsen in the May issue of COMPUTE!. If he or any other TI user wants a comprehensive memory map for the TI, they should write to Miller Graphics, 1475 West Cypress Avenue, San Dimas, CA 91773. Miller Graphics offers a monthly newsletter, called *The Smart Programmer*, for \$12.50 a year. They have published four so far and I have found them quite useful.

Bill Grant

Incomplete NEXTs

I have a VIC-20 and I have a question about the NEXT statement. I've seen some programs that had a NEXT statement with nothing after the next. For example:

FOR A=1TO10:NEXT

Why doesn't it include the variable after the NEXT as in:

FOR A=1TO10:NEXT A

Kevin Biebor

The NEXT statement increments or completes a loop that was started by a FOR statement. If a variable is placed after the NEXT, that loop is incremented. In the following example, the B loop will be incremented (and completed) ten times each time the A loop is incremented.

FOR A=1TO10 FOR B=1TO10 NEXT B NEXT A

If the NEXT statement is not followed by a variable name, the loop completed will be the one most recently started. In the following example, the NEXT will complete the B loop even though the A loop was the first one started.

FOR A=1TO10 FOR B=1TO10 NEXT

Nested loops (loops within other loops) should be written with care. If they're programmed incorrectly, one or more of the loops may not be completed. For instance, the B loop in the following example will never be completed.

FOR A=1TO10 FOR B=1TO10 NEXTA NEXTB

Don't Blame The Hardware

I am having a problem reading arrays on the Atari. This simple program is an example:

10 DIM X(5)

20 FOR I=1 TO 5

30 READ X(I)

40 PRINT X(I)

50 NEXT I

60 DATA 3,5,-2,7,4

I always get an error in line 30. I wonder if my computer memory has gone bad.

Lloyd R. Holmes

When faced with a particularly stubborn bug, most programmers start to suspect the hardware—but it's almost never the culprit.

As a general programming rule, never assume the hardware is bad except as a last resort. Some program bugs are so obscure, so hard to track down, that it becomes pretty tempting to blame the hardware. Nevertheless, true hardware errors almost always exhibit outrageous behavior, such as lockups when you turn the machine on, screens that suddenly go haywire, an eerie, inexplicable hum when you use SOUND, etc. Hardware errors are obvious, except when just a few bytes of RAM go bad. You can buy memory test programs, but it would probably be an unnecessary investment.

The specific problem you're having here is syntactic. On the Atari, you cannot READ a data item directly into an array. READ X(I) is just as illegal as INPUT X(I). It's a lamentable eccentricity, but it is easy to get around. Just read the item into a temporary variable, then assign that variable to

X(I). To wit: READ T:X(I)=T.

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ou are in the kitchen of seems to have been used of food. A passage leads it case can be seen leading to leads down and to the east open. On the table is an elong of hot peppers. A bottle

Take the sack then open it

Opening the brown sack reveals a lunch and a clove of

What the heck! You want make triends this way, but not is too triendly anyhow. Gulp!

> Walk west

Living Room

You are in the fiving room. There is a doorway to the east, a with strange gothic lettering to the west, which appears to be in trophy case and a closed trap door at your feet. Above the trange an elvish sword of great antiquity. A battery-powered broom the trange and elvish sword of great antiquity. is on the trophy case.

> Take all but the trophy case.

sword: Taken. brass lantern: Taken.

carpet. The rug is extremely heavy and cannot be carried.

> Examine the brass lantern. The lamp is turned off.

> Light the lamp.

The brass lantern is now on.

> Open the trap door and climb down

The door reluctantly opens to reveal a rickety staircase descending i

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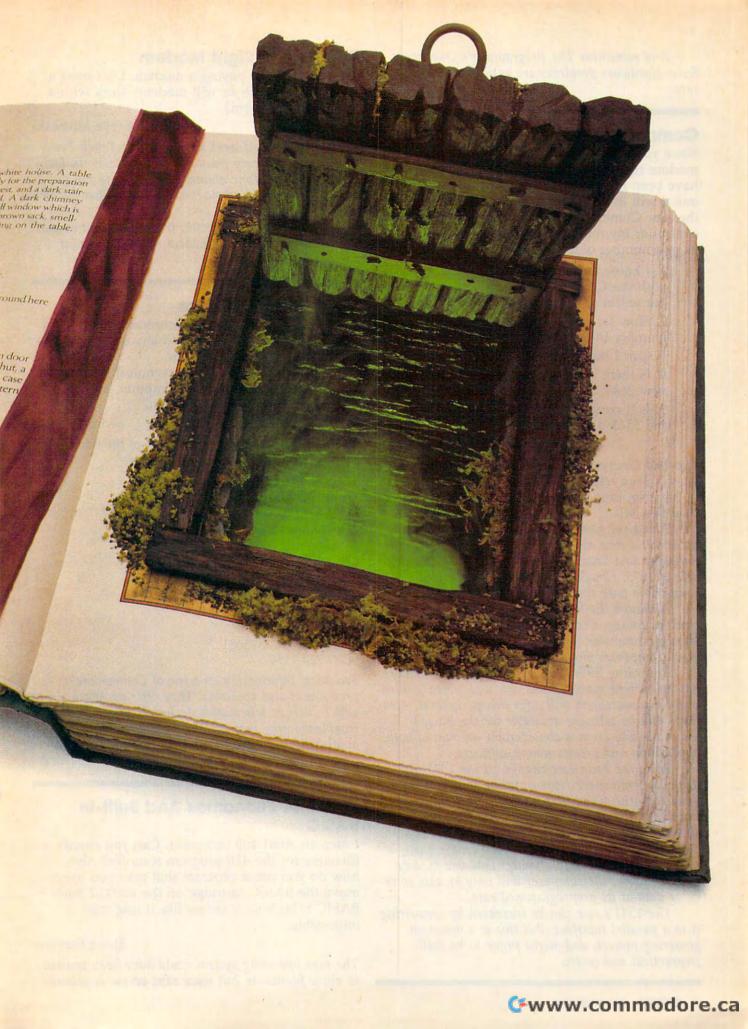
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And remember The Programmer's Debugging Rule: Hardware problems are as obvious as they are rare.

Commodore Plus/4

Since you published the article on the new Commodore computers (COMPUTE!, April 1984), I have been giving serious thought to purchasing one. I will be enrolling in college, and feel that the new Commodore 264 would be a good choice for my major: electronics. However, I have a number of questions about the 264.

- 1. I know that the 1541 disk drive works with the Commodore 64 and the VIC-20, but will it also be compatible with the 264?
- 2. How far can I expand the RAM or ROM memory in the 264?
- 3. Can I buy an Eprom burner for the 264?
- 4. Is there any software available for the new 264?
- 5. Is it possible to increase the baud rate of the 1541 disk drive?

Don Maxwell

The new Commodore Plus/4 (renamed from the 264) has not been released for sale as of this writing. It is, however, expected to hit the retail shelves sometime this fall.

About the same time, Commodore is planning to market a new disk drive, the SFS-481. SF stands for super fast because it has an advertised band rate of 1675. However, a 1541 disk drive will be compatible with the new Plus/4 as well.

Although the Plus/4 will support (memory) bank switching, Commodore has not announced any memory expansion for the Plus/4. However, thirdparty companies might eventually offer something.

Regarding EPROM burners, again Commodore has no current market plans, but undoubtedly thirdparty manufacturers will offer this peripheral. Also, there will be software available for the Plus/4. There already exists a considerable amount of both application and entertainment software.

As to the baud rate change on the 1541 disk drive, a Commodore representative said that the baud rate (the speed that information is transmitted to or from the disk drive) on the 1541 cannot be changed on the drive as is. The current baud rate is dictated by the serial port interface on the computer. In other words, no matter how you modify the disk drive, the computer will only be able to receive data at its preprogrammed rate.

The 1541's rate can be increased by converting it to a parallel interface. But this is a major engineering project, and might prove to be both impractical and costly.

Buying The Right Modem

I am thinking of buying a modem. Do I need a rotary-dial phone, or will modems work with a Touch-Tone system?

Steve Milewski

Most modems will work with both the Touch-Tone and the older rotary phones. Some modems, in fact, work on Touch-Tone phones by emulating the rotary system. The Commodore 1650 auto-dial modem is one.

Before buying, however, it's always best to ask your dealer, or call the modem manufacturer for further information.

Commodore Service

I am an electronics repair technician, and own a Commodore 64. I cannot find anyone in my area who can repair my computer.

Where can I obtain the technical information to service my Commodore computer, and all of its related peripheral equipment?

Gordon Bates

The addresses and phone numbers of the Commodore service centers are as follows:

1200 Wilson Drive West Chester, PA 19380 (215) 431-9105

2246 North Palmer Drive Schaumburg, Il 60195 (312) 397-0075

4350 Beltwood Parkway South Dallas, TX 75234 (214) 458-1000

3330 Scott Blvd. Santa Clara, CA 95051 (408) 727-1130

Technical information on some of Commodore's products is also available. They offer packages which include schematics, technical information, troubleshooting instructions, etc. For price and availability information, contact the parts department at the West Chester, PA, address listed above.

Cassette Filenames And Built-In BASIC

I own an Atari 400 computer. Can you specify a filename for the 410 program recorder? Also, how do you run a program that asks you to remove the BASIC cartridge on the 600XL? Since BASIC is built-in, it seems like it might be impossible.

Doug Stevens

The tape operating system could have been written to allow filenames, but since tape access is sequen-



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tial and so slow compared to a disk drive, filenames are not especially useful. You can instead use the tape counter to find and position programs. Be sure to leave plenty of space between programs, since the tape counter is not precise, and you could inadvertently write over a program.

Some programs require 48K, 8K of which is not available with a cartridge plugged in. These programs check for a cartridge and ask you to remove it before the program will run. The 600XL has only 16K, though, so this shouldn't be a problem. In any case, you can effectively remove (disable) the built-in BASIC by holding down the OPTION key while you turn on the computer.

6502/6510 Differences

I am a relatively new computer owner and I want to learn machine language programming. As far as I can tell, my Commodore 64 contains a 6510 chip rather than the more common 6502.

A phone call to Commodore's corporate offices revealed that the machine language for the two chips is not compatible. The *Programmer's Reference Guide* directs all its instructions to the 6502 processor.

I am unable to find anything in print on machine language programming using the 6510. I would appreciate it if you could help me out. Are the two chips incompatible? If so, can you tell me how and where I might learn machine language for the 6510?

Dean Lind

Unfortunately, the representative you talked to at Commodore was misinformed. The 6502 and the 6510 microprocessors are compatible. Both use the same instruction set (LDA, STA, etc.) and addressing format (low byte, high byte). Books on programming the 6502 also apply to the 6510.

The only major differences between the two processors are bytes one and two of the 6510. The

6510 allows you to bank switch memory.

The Commodore 64 has 20K of ROM, including the BASIC interpreter, Kernal, and Input/Output control programs. There is also 20K of usable RAM memory "underneath" this ROM memory. You can switch out the ROM and switch in the RAM memory by bank selecting blocks of memory. If you wished, you could turn your 64 into a computer with 64K of usable RAM memory by switching out all of the ROMs. However, you would have to supply your own BASIC interpreter, operating system, and I/O control programs. Without these, the computer would simply freeze, and you wouldn't be able to write or run BASIC or machine language programs. For more information on bank selection, refer to your Programmer's Reference Guide.

The VIC-20, which is equipped with the 6502 microprocessor, does not support bank selection of ROM/RAM memory.

A book on 6502 machine language programming will apply to the 6510. You might also want to take a look at the "Machine Language for Beginners" column in COMPUTE!'s GAZETTE, our sister publication.

Printer Device Number Changes

Is it possible to change the device numbers of a printer? I want to buy a second printer for my computer, but am unsure if I can use both printers at the same time.

Jacques Poulet

Usually the device number cannot be altered. It depends on the brand of printer, but most printers have no significant internal "intelligence" (no computer assistance inside). You could change the device number of a disk drive because it can be programmed from the computer; it is an intelligent device.

However, some models of printers do allow you to change device numbers via a switch on the printer itself. The new Commodore MPS 801, for example, has a three-position switch that allows you to choose between device numbers 4, 5, and 6. And some few printers can be software assigned.

DIM On Commodore

What happens to the data when it enters a DIM statement (array) from an INPUT statement or a sequential file?

I teach computer programming part-time at Tulsa Junior College. This is my first semester with micros. I have a Commodore 64 and a VIC 1541 disk drive. In advanced BASIC, sequential files are common, and are usually used for search and sort routines. When the data is read from DATA statements into the arrays, there is no problem. The sort or search never stops, but when that same data is brought into the arrays from a sequential file, the sort or processing stops many times, making a 16 to 30 minute program run for hours.

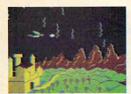
I have written my own sequential file program, and later discovered and used the one off the demonstration disk that came with the VIC 1541 disk drive. Both have these stops. I have tried about everything. If you could give me a clue, I would appreciate it.

Darrel Henry

The pauses you see in the program are the result of a process called "garbage collection." It's caused by moving strings around.

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 Here's what happens: As new strings are created, the old ones are not thrown away; they lie dead in memory. Eventually, memory fills up and the computer has to stop and collect the strings that are still live. This takes time; the pauses are quite noticeable and can be time-consuming.

Strings that are completely defined within a program—from DATA statements or from an assignment statement such as X\$="HELLO"—are used straight out of the program where they lie. These strings don't need to be collected; as you have noted, there's no garbage collection delay when you use these.

For your type of program—sorting and searching—there are two rules that will be very helpful in

eliminating delays:

1. Don't move strings. Instead of sorting by moving them around from one part of the array to another—which creates garbage—use an "index" to keep track of where a string belongs within a certain sequence. (More on this in a moment.)

2. When you have finished with a string, set it to a null string, for example, A\$(21)="". When you have disposed of almost all strings this way, and are ready to read in another set of strings from disk or tape, force a collection by using the FRE function, for example, code X=FRE(0). Garbage collection will run quickly if you have very few strings left. When you read in the next group of strings, they will come into the newly liberated memory space.

To illustrate point 1: Here's a program to sort an array of strings. It's a bubble sort, which is not very efficient. The point is this: After the strings are created, they are never moved. Only the index (A%) values move, and they are numbers, not strings, so there won't be any garbage.

90 REM BUBBLE SORT - INDEX DEMO

100 N=30:DIM A\$(100) 200 REM CREATE RANDOM STRINGS 210 FOR J=1 TO N 220 A\$(J) = CHR\$(RND(1)*26+65) + CHR\$(RND(1)*26+65) 230 NEXT 300 REM: CREATE INDEX 310 DIM A%(N) 320 FOR J=1 TO N 330 A%(J) = J340 NEXT J **400 REM: SORT INDEX** 410 FOR J=N-1 TO 1 STEP -1420 FOR K=1 TO J 430 REM: GET INDEX FOR K, K+1 440 X = A%(K) : Y = A%(K+1)450 REM: FLIP IF OUT OF ORDER 460 IF A\$(X)>A\$(Y) THEN A%(K+1)=X:A%(K)=Y470 NEXT K,J 500 REM: PRINT RESULTS

Study this program to see how the strings are sorted, but not moved.

There are other rules on how to handle garbage collection; the ones above will do the job for your application.

TI CALL KEY

I recently acquired a TI-99/4A and wondered if you would explain the use of the CALL KEY command?

David Stinchcomb

The CALL KEY statement has caused confusion for many TI users. The KEY subprogram, designed to return a single keystroke value, requires three parameters: a key unit, a return variable, and a status variable. The statement takes the format:

CALL KEY (n,K,ST)

where n is the key unit, K is the return variable, and ST is the status variable.

The key unit used in the CALL KEY statement determines the keyboard configuration assumed by the computer. Six key unit values (0–5), or keyboard configurations, are available on the TI-99/4A. The three key units generally used are 0, 1, and 2. A key unit of 0 refers to the console keyboard. Key units 1 and 2 map the console keyboard as split keyboards (a value of 1 to read the left side of the keyboard, a value of 2 to read the right), or read the fire buttons on joystick 1 and 2, respectively.

When a CALL KEY statement is executed with a key pressed, some value will be assigned to K (in our example above). The value given to K will depend on the key pressed and the key unit used in the CALL KEY statement. If you use a key unit of zero, K will correspond to the ASCII value of the key being pressed. For other keyboard configurations, the value of K will vary as noted in the TI User's Reference Guide (pp. II-87 to II-89). Eighteen in K signifies that the fire button was pressed.

The final parameter used in the CALL KEY statement is the status variable (ST). A nonzero value returned for ST indicates that a key was being pressed when the CALL KEY statement was executed.

CALL KEY can be used to get a desired response from the program user. If you want to test for any keystroke (with key unit 0), you would use the following two lines:

10 CALL KEY(0,K,ST) 20 IF ST=0 THEN 10

The program repeatedly loops back to line 10 until some key is pressed.

If you want the program to accept only a specific response from the user, such as Y for "yes," you could add these lines:

5 PRINT "TYPE THE Y KEY" 30 IF K<>89 THEN 10

Until the Y key is pressed, the program will loop back to 10.

530 NEXT J

510 FOR J=1 TO N 520 PRINT A\$(A%(J))



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Commodore Machine Language

I have been trying to develop a monitor program for the VIC-20 and am having a difficult time creating a routine to clear the screen. Is there any way to clear the screen without getting the READY prompt?

Stan Payne

There are several ways to clear the screen from machine language. The easiest way is to assemble the following:

LDA #\$93 ;the equivalent of CHR\$(147) ISR \$FFD2 ;print it

This routine will work on both the VIC and 64. Incidentally, you can also use it to home the cursor. Just replace the \$93 with \$13. The hex number 93 is the same as the character that clears the screen in BASIC and \$13 is the same as CHR\$(19) which homes the cursor.

Another way to accomplish the same result is to assemble the following:

JSR \$E55F ;clear the screen and home the cursor On the 64 the routine is located at a different location, thus the coding is different:

ISR \$E544; clear and home

If you just wanted to home the cursor on either machine you could JSR to \$E581 on the VIC or \$E566 on the 64. Although these are two quick, easy ways

to clear the screen, there is yet another. You could write your own routine to clear the screen. The routine would need to store a \$20 at every screen location. \$20 is the number for a blank character.

Commodore 1541 Drive Grounding

In your May issue you printed a letter from Jay Elmore regarding read errors on the 1541 disk drive. After buying a drive for my Commodore 64, I discovered that it was giving me error 23 and 27. Both are read errors. I returned the drive to the dealer and he tested it on a 64 and discovered no problems with it. I took the drive back home and carefully read the manual that comes with it and discovered that errors 23 and 27 can be caused by grounding problems. I checked the electrical outlet where the drive was plugged in and discovered that the ground plug was not properly connected. After fixing this, I haven't had any problems with my drive.

Ron Restivo

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Computers And Society

David D. Thornburg, Associate Editor

Discovery-Based Learning And Teenagers

On the Saturday before the Summer Consumer Electronics Show in Chicago, I was speaking at a Logo workshop in northern California. Much of the emphasis in one of my talks was on the importance of discovery-based learning for all ages, not just for the child in elementary school. While I have been emphasizing this topic in my talks for several months, most people seem content to let Logo be a tool for the younger computer user.

Educational Software

As I drove to the airport to catch my plane to Chicago, I wondered if this reluctance to bring the power of educational environments like Logo to older students was also evident in other educational software. After all, the mention of educational software usually conjures up visions of activities for the younger child. Whether these activities are drills associated with a specific subject or are open-ended activities designed to teach problem-solving skills, the fact remains that only 2 percent of the current educational software appears to be directed to teenagers. Some people might argue that, once a child has entered the teenage years, educational software isn't needed. If a teenager wants to use a computer, why not just let him or her write programs.

In fact, there are several reasons why teenagers should have access to good educational

David Thornburg is an author and speaker who has been heavily involved with the personal computer field since 1978. His main interest is in making computers responsive to people's needs. He is the inventor of the KoalaPad graphics tablet and is the author of nine books about programming including Computer Art and Animation: A User's Guide to Atari Logo, The KoalaPad Book, and Exploring Logo Without a Computer (Addison-Wesley). His 101 Ways to Use a Macintosh will appear soon from Random House. He has been called "an enthusiastic advocate for a humanistic computer revolution," and his editorial opinions have appeared in COMPUTE! since its inception.

software:

- 1. Teenagers are in the process of forming career decisions. Controlled exposure to computer environments can demonstrate the richness of this field in a way that transcends purely recreational applications of computers.
- 2. For those students who are already interested in computers, computer-based instruction in problem-solving methods and the development of programming style can help these students use computers more effectively in their jobs.
- **3.** Students of all ages benefit from becoming better problem solvers. So much of our focus has been on problem-solving software for the young (including such excellent programs as *The Factory* by Sunburst) that we can easily lose sight of the fact that the acquisition of problem-solving skills is important for learners of all ages.

To see what *can* happen to educational software for teenagers, we should first look at the other two areas where these children use computers—at home and at the arcade.

Interactive TV

As I look at popular computer activities in homes and arcades, there seems to be a major distinction emerging between the two. Arcade software has continued its focus on coordination and skill games. As the technology has advanced, these games have become more sophisticated. For example, several popular games use computer-controlled video disks. Except for advances in technology, however, these games seem to be stuck in a niche that one might characterize as interactive television.

Popular home software has taken a different approach. The home user is not able to run out and buy new technology every three months or so, and the challenge has thus been to make the existing technology become ever more useful

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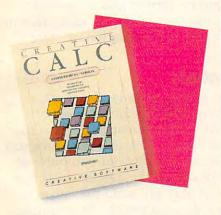
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9

0 w.commodore.ca with each new wave of products. While it is true that popular home titles continue to stress entertainment value, the most popular computer games appear to be those that let the player create his or her own levels or game fields. Anyone who doubts this need only look at the overwhelming popularity of Brøderbund's Lode Runner. Every Lode Runner enthusiast I know spends most of the game time creating new levels to play.

The Fourth Generation

The popularity of construction set software is not new, as readers of this column know. Programs like *Pinball Construction Set* (Electronic Arts), *Rocky's Boots* (The Learning Company [TLC]), and *Dancing Bear* (Koala Technologies) have been popular largely because they allow the user to make unique creations within the context of a predefined activity. The task of creating new games in *Lode Runner* or *Pinball Construction Set* is, quite simply, the task of creating a computer program. Construction sets are examples of fourth generation programming languages, and the fact that these programs are so popular in the home market is quite heartening.

These programs are helping their users develop problem-solving strategies and other higher-order thinking skills. Since they can (and are) developing these skills at home, they should probably also be able to develop them at school as well. Unfortunately, some teachers can't see past the game aspects of these programs, and have thus banned them from the classroom. This makes as much sense as banning humorous literature from the English classroom. Teachers should look for the deeper significance in the

newer computer games. With this background in mind, I walked through the massive computer exhibits at the CES looking for some sign of educational software that would appeal to the entertainment and cognitive skill levels of the teenage user. Not surprisingly, I found the answer at the home of Rocky's Boots—TLC. Long known for their support of the young computer user, TLC decided to create a product for the older child. The result of their effort is Robot Odyssey I, an entertaining adventure game that is also a sophisticated programming language. As the first product in TLC's "DigiWorld" series, it represents a significant contribution to open-ended educational software geared to the teenage (and older) market.

Players begin by falling into Robotropolis, a futuristic underground city inhabited by robots. The object is to escape this world and return to civilization. This is accomplished by constructing robots that help the players work their way upward through several layers of this underground

city. Each layer has new obstacles and antagonists that require robots with different skills to help in the escape. As players get closer to the top, the challenge becomes more difficult.

Complex Circuitry

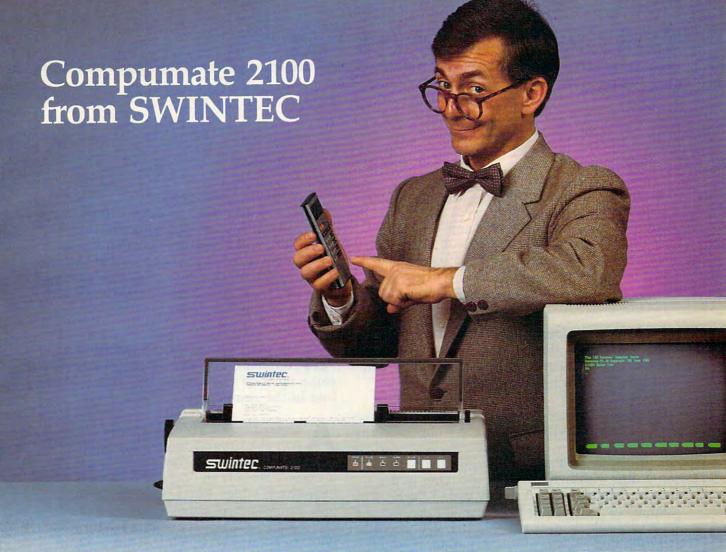
What distinguishes Robot Odyssey I from other multilevel adventure games is that the player must construct robots that are programmed to display certain behaviors needed to avoid or neutralize obstacles. The task of creating these robots involves learning how to "wire" the robots to perform certain tasks. A special environment called the Innovation Lab lets the player work on robot design. There are three robots at the player's disposal. Each robot resembles a spaceship and has four thrusters to move it in four directions. The robot also has a claw that can be used to pick up things, and bumpers to tell when the robot has bounced against a wall or other obstacle. By interconnecting the bumpers with the appropriate thrusters, the player can create a robot that solves simple mazes.

More elaborate programs can be created with the aid of integrated circuit chips built from standard logic elements (AND, OR, XOR, etc.). Once an array of these elements has been interconnected and brought to the desired pins on the chip, the resultant circuit is burned into a final chip that can be carried inside a robot to be connected with the rest of the circuitry. Amazingly, a finished chip can be carried inside another chip, and this recursive nesting can take place up to 40 times. This allows the creation of quite complex circuits.

Intelligent Robots

Each of the three robots becomes, in effect, a fully programmed entity. All three robots can carry out their tasks simultaneously. This is like having a word processor, a spreadsheet program, and a videogame running on your computer at the same time. But one of the neatest aspects of these robots is that they can send messages to one another using their antennae. For example, each robot could be programmed to look for fuel crystals. As soon as one robot finds a crystal, it can send a message to the other robots to stop looking for fuel and to find the first robot instead. This type of programming in which computational objects send messages to each other is reminiscent of the sorts of things one expects from Smalltalk, LISP, or Logo—not the sort of thing one expects from a videogame.

To properly explore *Robot Odyssey I* would take far more space than I have. Suffice it to say that if teenagers have only 2 percent of the educational software, this program shows that they won't need much more.



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Questions Beginners Ask

Tom R. Halfhill, Staff Editor

Are you thinking about buying a computer for the first time, but you don't know much about computers? Or maybe you just purchased a computer and are still a bit baffled. Each month in this column, COMPUTE! will answer some questions often asked by beginners.

How long does a floppy disk last? If I have some disks that are more than a year old, should I copy them onto new disks? How can you tell if a disk is wearing out?

A The lifetime of a floppy disk largely depends on how heavily it is used and how carefully it is handled.

It's doubtful that you would actually wear out a disk with normal home use. One wellknown manufacturer of floppy disks (3M-Scotch) guarantees its products for 3.5 million passes per track. 3M calculates that if you updated the disk (rewrote every track) once every hour, it would take more than 200 years to exceed 3.5 million passes. Not many home computer owners would use a disk that heavily. Some disk-intensive business programs which run 40 hours a week might approach that many passes in much less time than 200 years, in which case an alternative should be considered—perhaps a hard disk or a RAM disk. But the casual or moderate user has little to worry about. At COMPUTE! we have some disks that get fairly heavy use for storing word processing files, and after two years they're still going strong.

A floppy disk's lifetime can be drastically shortened, however, if it isn't handled and stored correctly. In careless hands a disk might not even last ten minutes. Disks are particularly vulnerable to magnetic fields from monitors and TV sets, spilled drinks, cigarette ashes, extremes of heat and cold, heavy weights, ballpoint pens used to mark on labels, and even chemical fumes.

Unfortunately, the first clue which indicates a disk is going bad probably will be a lost program or a lost file. One day you'll confidently slip the disk into the drive and discover that a certain file won't load. That's why you should always keep at least one backup copy of important

files on another disk or tape.

There is one clue you can watch for, though—if you regularly clean your disk drive's read/write head and notice one day that it's much dirtier than usual, it could mean that the magnetic coating on one of your disks is starting to flake off. It could also mean that you bought some poor quality disks.

On my Commodore 64, when using the command PRINT 7², the computer will come up with the answer 49.0000001. Is this a bug in the computer?

Not really. It's a rounding error caused by the way the Commodore 64 calculates exponentiation. When you ask the computer to figure 7², it doesn't actually multiply 7*7. Instead, it uses logarithmic tables. Rather than engaging in a long discussion of higher mathematics, let's just say that these tables sometimes lead the computer to an answer which is slightly off. If 49.0000001 isn't accurate enough for your purposes, you can either PRINT 7*7 or PRINT INT(7↑2), which extracts the integer from the result.

The Commodore 64 isn't the only microcomputer which suffers from this problem by any means. Certain math operations will result in very small rounding errors on anything from an Atari to an IBM PC. On an Atari with the BASIC cartridge, for example, PRINT 2^2 (equivalent to PRINT 2^2 on a Commodore) comes out to 3.99999996, while PRINT 2*2 yields the correct 4. The problem was fixed with the BASIC built into the Atari 600XL and 800XL.

The quirk which leads to this kind of problem is that computers perform all of their math in binary. When floating-point (moving decimal point) numbers are converted to binary and then back to decimal, small errors can accumulate.

I recently found several old 60-minute cassette tapes. Are the 60- and 30-minute cassette tapes acceptable for program recording? Is there any command or program which can be used to erase these tapes? They contain music and talk.

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*Titles available on IBM PC jr. are Ms. Pac-Man, Centipede, Donkey Kong, Moon Patrol⁷ and Typo Attack. Available on the VIC 20 is Typo Attack.

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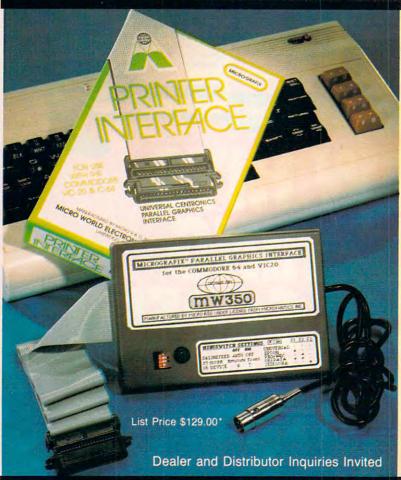
Theoretically, longer tapes are thinner and thus more susceptible to stretching and print-through (signals leaking through the tape and imprinting on adjacent layers of tape). But we've never had any problems saving programs on 30- or 60-minute cassettes. If they are goodquality tapes, they should work as well as the 10- or 20-minute cassettes generally sold for data recording. However, the longer tapes could be slightly less convenient if you store many programs on the same cassette. You'd have to wind the tape further to locate the program you want to load. But even this is a negligible problem if you jot down the tape counter numbers.

It isn't really necessary to erase the old material on the tape before recording your programs. The recorder's erase head will wipe it out as you record. However, your letter indicates you have an Atari 400 computer. The Atari Program Recorder has a stereo read/write head because the Atari can accommodate an audio track that plays through the TV speaker. When you load your program, you'll hear the old audio material along with the bleeps of the data. By typing POKE 65,0 before loading the tape, the bleeps will be silenced and you'll hear the audio only.

However, if you do want to erase a tape before using it, the best method is to use a bulk tape eraser (available at electronic supply stores). Another way is to insert the tape into an audio cassette recorder, press the record button, and disable the microphone by switching it off or sticking a null plug into the microphone jack. If the recorder has level controls, turn them all the way down.

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THE BEGINNER'S PAGE

Robert Alonso, Assistant Editor

ROM And RAM

Every group has its lingo. When you first start to get used to computers, there are a few words to learn, a bit of *computerese*. Two of the simplest, yet most misunderstood, of these terms are ROM (Read Only Memory) and RAM (Random Access Memory).

Absent-Minded Computer

Read only memory is called that way because it is a kind of memory in each computer which can only be read. No matter how many times you try, you may never write in ROM. Computers come equipped with ROM because they need to have instructions that tell them how to perform certain functions such as adding or subtracting or even how to send things to disk drives or printers. The ROM memory stores these vital instructions in chips that can't be erased by writing to them or by turning off the computer. Without ROM your computer would be useful only as a doorstop. Just imagine turning your computer off and having it forget how to work the next time you turned it on.

BASIC is usually a set of machine language routines stored in several ROM chips in each computer. Another set of important ROM routines are the input and output routines. These routines instruct your computer on how to communicate with external devices such as disk drives, cassette recorders, and printers. ROMs obviously contain important routines that are needed for doing any kind of work with your computer.

Extra ROM

Another useful and popular form of ROM is the game cartridge. Yes, those small black boxes that provide you with so many hours of fun are just preprogrammed read only memories. These ROMs in cartridge form are perhaps the fastest way to load a program into your computer. The reason they are so fast is that usually there is no

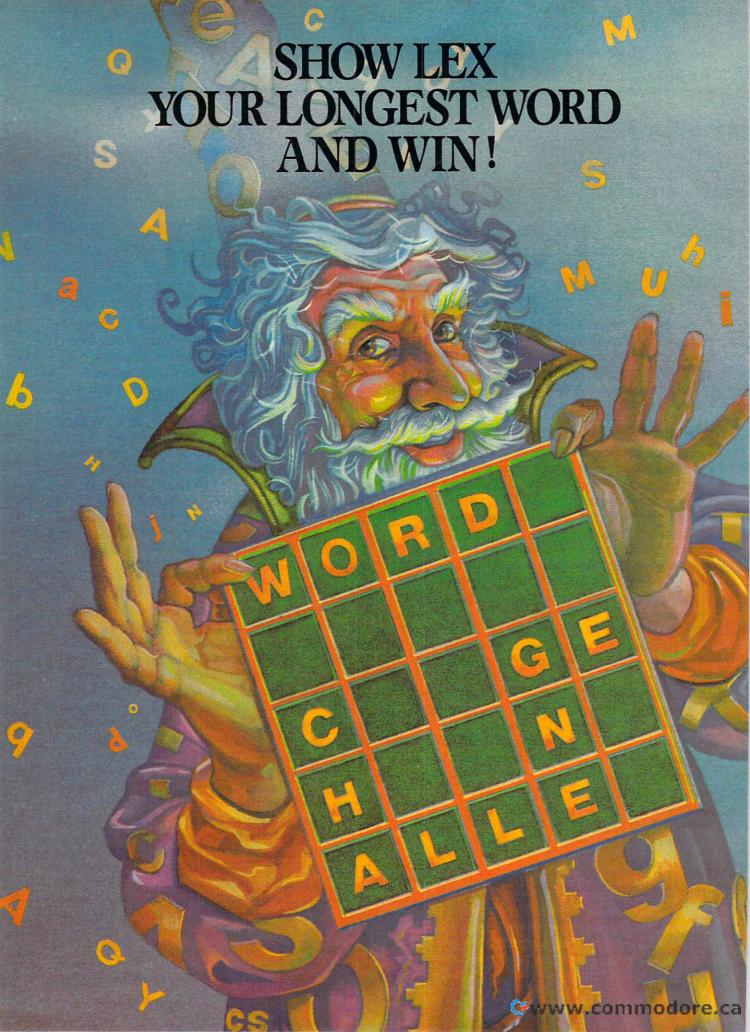
loading taking place. You plug in the cartridge, and it immediately becomes a part of the computer. The computer has immediate access to the programs and data stored on the cartridge.

RAM memory, although not as intrinsically important to the computer as ROM, serves important functions in the computer. It is the area of memory where user programs are typed in and run. RAM is also used by all the commercial software that comes on disk or cassette. The routines that are located in ROM often have to rely on pointers in RAM to function correctly. Without RAM memory, the computer might not have a screen display, and it would have no such thing as a keyboard buffer to hold extra keypresses. Graphics would not be available either.

Empty Boxes

All memory in the computer can be described as a series of boxes that can hold something. Let's say that you have 1024 different boxes in which to put things. You could choose to place objects in these boxes sequentially from box 0 on up to box 1023, or you could just decide to place objects into boxes in any haphazard way that you yourself could understand. RAM memory is just like a series of empty boxes that allow you to place numbers into them. The only restriction that these boxes impose on you is that you must never place a number over 256 into any one box. If you have a section of memory that has 1024 spaces, you can claim to have 1K of RAM memory. The difference between RAM and ROM when compared to boxes is that ROM memory is like a series of boxes that already have objects in them. Even more important, the boxes can't be emptied or altered by the user. The user can only look into the box to see what's in it. ROM could thus be compared to glass boxes. You can see in but can't remove anything without breaking something.

Any programs that run in RAM memory can



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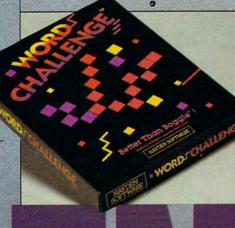
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be modified. For example, if you wrote a program in BASIC and then decided that you wanted to modify something in it, you could easily do so. One peculiarity of BASIC programs is that the RAM in which they are located must be continuous. If there were a gap of any sort, like a missing box, the program would not work properly.

Screen RAM

Perhaps one of the most interesting sections of RAM memory is the screen. It is one of the few RAM locations that are shared by both the central processing unit and the video chip in all computers. What this means is that there is a section of RAM-let's say a 1024 box sectionthat both the computer's main processing chip and the chip that produces the colorful TV image can look at. The reason it is shared is that you must be able to change the screen either by POKEing values into the screen RAM or by PRINTing values onto it. For you to be able to do this, the central processing unit must have access to it. The video chip needs to have access to the RAM because it needs to know what to display on the TV set. The video chip essentially scans screen RAM and evaluates what is stored there. Once it knows what is in the screen memory, it can reproduce an image of it on your TV.

One useful feature that many home computers come equipped with is that more RAM and ROM can usually be added by just plugging a cartridge into the side or back of the computer. In some computers you have to plug the RAM into the inside expansion areas, but this is usually an easy procedure. The reason expandability is such a desirable feature is that it enables the user to program or use larger programs with more functions and commands and that it facilitates the use of alternate computer languages or BASIC enhancements.

Memory Limitations

There is one limitation to the use of both RAM and ROM. Each microprocessor, the brain chip of each computer, can access only a predetermined amount of memory at any one time. For example, the popular 6502 processor found in the Apple, Atari, and Commodore computers can directly access only 64K of memory. The 8088 microprocessor found in the IBM PC and PCjr can access a little over one million bytes. There are other limitations that manufacturers either impose on their machines or are forced to adhere to. For example, Microsoft BASIC will only accept a program up to 64K long. An example of a self-imposed limitation is that IBM restricted the memory limits of the PCjr to 128K.





The Educational Software Explosion

Kathy Yakal, Editorial Assistant

Even if you didn't buy your home computer as an educational tool, you've probably learned a lot from your interaction with it. Games, home productivity packages, and other computer programs canteach, but recently there's been a proliferation of dedicated educational software. Software developers and publishers are vying for top positions in educational software, potentially a billion-dollar business.

Experts have said that it was pretty easy to predict who the first 6 percent of computer owners would be, says Marilyn Rosenblum, vice president for product development at CBS Software. They're the same people who have expensive hi-fi systems and Sony Walkmans, people who like new technology.

"The important issue for us and for the future of this industry is who the next 6 percent will be," she says. "The thing that's going to determine that is how truly useful we can make computers."

Software publishing firms have been scrambling over the last few years to figure out how they can influence the next 6 percent to buy. The bets right now are on education. "There's been a tremendous proliferation of manufacturers into the educa-

tional software market," says Jordan Levy, vice president of marketing at Software Distribution Services.

Levy and many others in the industry who attended last summer's Consumer Electronics Show are overwhelmed by the number of publishers who have either entered the market or added educational software to their already existing line. Future Computing predicts that consumers and schools will purchase 6,787,000 units of educational software this year.

Bringing School Home

"I think you can trace the recent popularity of educational software to penetration of the home computer," says Richard Khaleel, president of Scholastic, Inc.'s Software Group. Game software was popular initially, he says, due to the popularity of the VCS. "And with the penetration of the personal computer into the business market, we saw the explosion of business software."

Further, home computer sales took off partly because children were using them in schools. "The use of computers in schools is probably one of the main reasons for the popularity of home computers," says Khaleel. Market analysts at the Minnesota Educational Computing Consortium (MECC) agree.

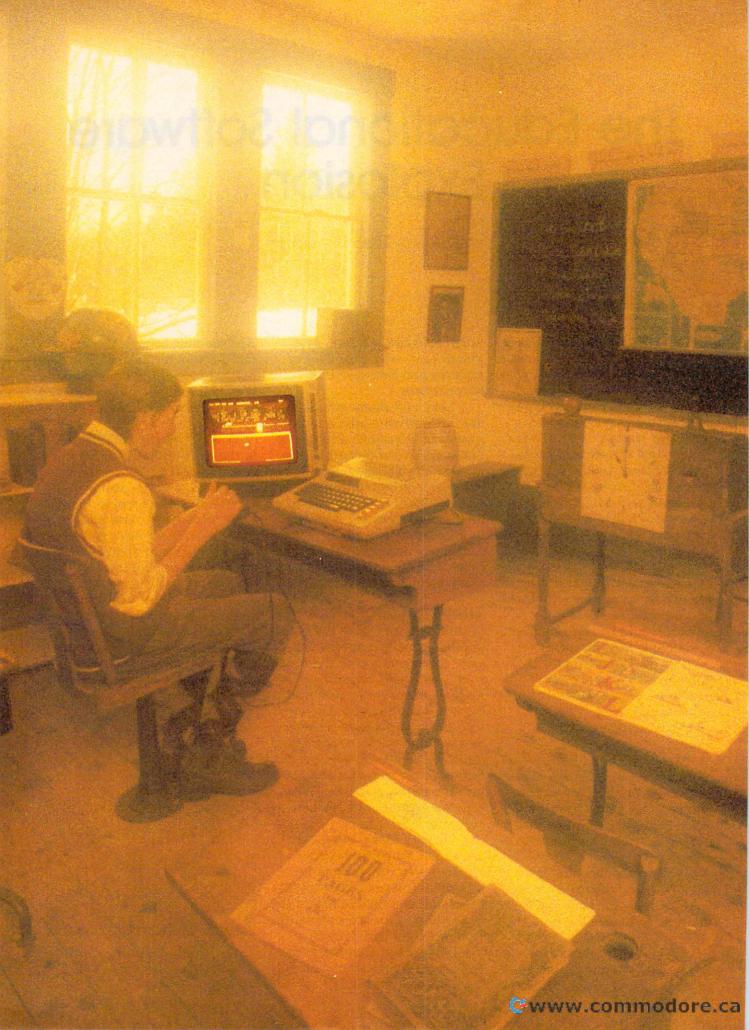
And as more school districts make computer literacy an important part of the daily curriculum, children are exposed in ever-increasing numbers.

Not Just A Shooting Star

In the rush to find uses for this newly installed base of home computers, a lot of potential applications and inappropriate game ideas have come and gone. With them have gone a lot of software companies. But the concept of education is no fad. "Everyone latched onto education because education doesn't change that much," says Marilyn Rosenblum. "The need to teach children to read and write well will always exist."



Marilyn Rosenblum, vice president for product development at CBS Software.



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Having worked in educational publishing for a number of years before coming to CBS, Rosenblum's perspective of this "explosion" is different. In educational book publishing, it wasn't so much an explosion as an ongoing event. Educational publishers began to add microcomputer software to their existing lines of books and audiovisual materials.

"What we're seeing here is that a lot of the stuff that's been used in the schools is perfectly appropriate for the home," she says. "A lot of the explosion is just recognizing a new market."

Pulling Away From The Pack

Jordan Levy thinks that many software companies sang a swan song at last summer's Consumer Electronics Show. "There will be a lot of people who won't be at the next CES," he says. "A lot of people are going to fall by the wayside, mostly entertainment."

The same thing is bound to happen with educational software over the next few years, say software publishers. But in 1989, consumers will buy about five times as much educational software as they're buying this year, says Future Computing. They predict that 35,072,000 units will be sold in that year.

Whose name is going to be on those packages? Those companies that have experience working with children, says Scholastic's Richard Khaleel. "People who have experience knowing how people learn have the best chance of creating software that is not really state of the art, but state of the mind," he says. "No new software publisher that does not have a consumer franchise in another market has been able to spend the kind of money yet to be able to establish a basis for consumer trust."

"It's very important for

people who know children, who have traditionally been selling educational materials to children, to get into the business," says Weekly Reader Software Manager Fritz Luecke. "You're going to find fewer unknowns entering the market," he says.

Though parents may feel comforted by familiar names, market analysts at MECC predict that the competitive situation in the educational software market will eliminate those without educational strength and technical skill, as well as adequate marketing ability. "The next 18 months will hold some very hard lessons for those publishers who think the educational buyer is an easy sell," says MECC's Ron Barnes.

No Fun

In all of the brouhaha over which educational software publishers will emerge as leaders, there's a basic problem that everyone's trying to solve: Who deems a program educational? How do you decide when the educational benefits balance the enjoyment?

The argument seems to focus on just how much emphasis there should be on the entertainment aspects of an educational program, if any. There aren't any real rules yet, though educators try to quantify and set standards, and software designers and publishers try to develop formats that they hope will please parents, teachers, and students.

Those formats vary tremendously. "My belief is that educational software should manifest itself in some kind of discernible change in behavior, like grades," says Thomas Garsh, president of American Educational Computer, Inc. "You don't get through high school by being a good games player or having superior cognitive skills. You get through high school by having good grades. And you do not get accepted



Thomas Garsh, president of American Educational Computer, Inc.

into college with superior kinds of thinking skills. You get into college by passing the SAT and having good high school grades.

"So what we've done is almost totally related our software to curriculum, by grade and subject," he says. "We've given up a few whistles and bangs, which may initially be a disadvantage because it doesn't look as flashy, but the subject is there. I'm not defending that. I'm just saying that is reality. That's our position. In this rush to the market, I don't see many companies taking that position."

Pupils Of Pac-Man?

Software developer Tom Snyder says it's too early to judge, that it's dangerous to impose restrictions or define too concretely right now. "Even *Pac-Man* would be educational if you could freeze the action," he says.

"If you freeze *Pac-Man* or any other game, a couple of things happen," he says. "You get to use your head instead of just knee-jerk reactions. You start verbalizing to yourself what the alternatives are and formalizing them a bit instead of having them remain in sort of an intuitive, physical reaction.

"Beyond that, it really opens the experience up to more

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Software developer Tom Snyder.

than one person. If you slow it down, everyone gathers around and you get five people talking to each other about what a decent strategy might be, and introducing the whole social element into it. That kind of interaction multiplies the learning instantly."

Keeping The Scales Steady

Somewhere between those two opposing viewpoints lie hundreds of software styles, with varying degrees of entertainment and learning. MECC Deputy Executive Director Ron Barnes contends that the learning objective of any piece of software should come first, with the game aspects then designed to increase the child's motivation to learn. Often, he says, educational software is developed the other way around.

DLM Teaching Resources publishes software which is designed to supplement curriculum as first priority. But, they say, what makes their software sell to both schools and homes is that it does not ignore the element of fun. "I think that what software producers are looking for is a correct combination of ingredients to combine into their instructional courses, to keep the interest and focus," says Jim

Hafer, product evaluation supervisor for MicroD.

"There seems to be a bit of a gray line there," he says. "Some have a theory that seems to be working, and that is to make education fun. But there's only so much that can be learned from a simple game as opposed to an in-depth program.

Richard Khaleel believes that we will see more segmentation between software that makes learning fun and software that is just drill and practice. "It all depends on the age," he says. "In grade school, homework is fun. It's only when things outside of school get more important that schoolwork competes with other interests. There's always room for both."

Pinning Down The Beast

In the meantime, educators and parents puzzle over how to decide. Not just on what kind of software or computer, but something more basic: whether or not the microcomputer can be used effectively as a teaching tool.

And they can be fooled, says Tom Snyder. "There is an erroneous promise, an implication that you're going to be able to do quantifiable things with it, testing how the education is," he says. "Therefore, it's excited educators and educational consultants who say finally, we can start pinning down this educational beast in general."

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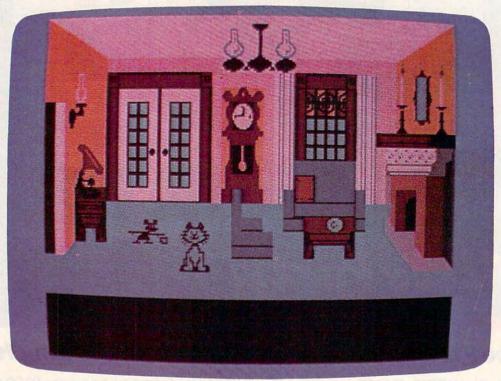
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The Latest In Learning:

New Trends In Educational Computing



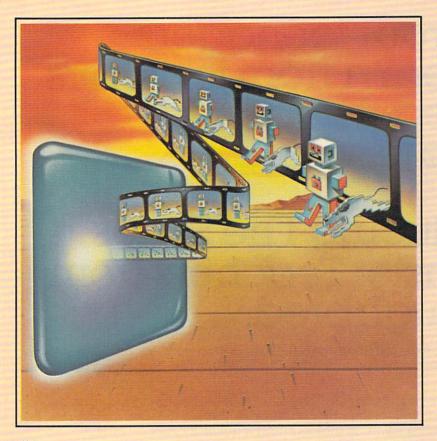
The House That Jill Built lets youngsters design, build, and animate a variety of houses. Developed by Joyce Hakansson Associates for CBS Software.

Selby Bateman, Features Editor

Construction sets, interactivity, networking—these are some of the trends in the quickly evolving educational software market. A swarm of new companies have entered the competition, and a variety of different educational approaches are being tried.

Few subjects will generate arguments faster in the microcomputer industry than what makes good educational software.

Interest in computer-based learning programs has never been greater, nor the debate over future directions more vocal. Parents and teachers are requesting more and better packages. Computer companies are courting software firms that specialize in educational products.



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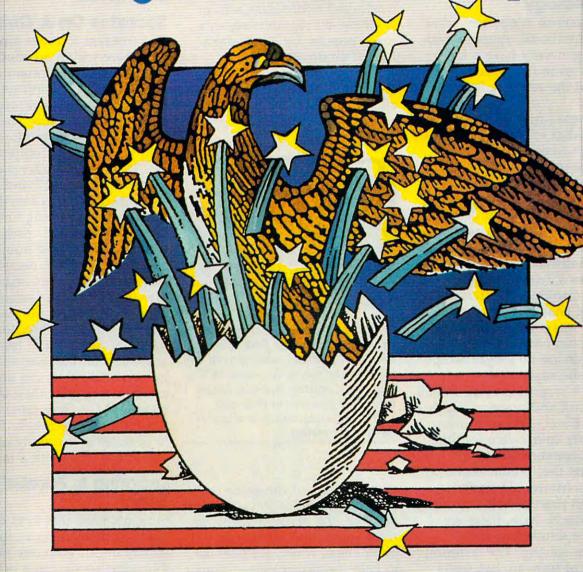
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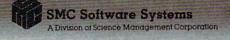
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And greater numbers of educators are getting involved in the production and distribution of these programs.

Increased competition in this growing field is creating several important trends that will directly affect both the quality and the kind of future computer learning programs.

Challenging The Technology

Even staunch supporters admit that educational computer programs generally have a long way to go to reach their potential, but the software is evolving

rapidly.

There's now "some clarity about what educational software is," says Marilyn Rosenblum, vice president of product development for CBS Software, a company that produces several lines of educational programs with such developers as Joyce Hakansson Associates and the CTW Software Group from Children's Television Workshop.

"I also think the technology is being challenged much more than it was a year ago. Things that would have been acceptable then are no longer accept-

able," she says.

"We're getting away from a lot of drill and practice," adds Marge Kosel, director of microcomputer courseware for Sunburst Communications, a company that produces educational software. "Designwise, drill and practice is the easiest [to produce]. Now, there are a lot more simulations and problem-solving. The technical quality of software has really improved."

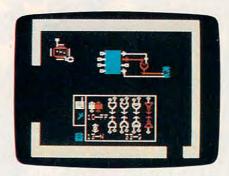
Design Your Own Robots

Greater emphasis is being placed on the amount of interaction that occurs between the student and the computer in several of the newer educational packages. And a higher level of sophistication has been built

into other programs, as some software developers reach for an older, teen-oriented educational market.

Take, for example, The Learning Company's new Robot Odyssey I (Apple II family, \$49.95). Inspired by the company's earlier, Rocky's Boots, the new package is both a game and an educational tool. It's one of a growing number of products called construction sets, or builders—a programming style made popular by Bill Budge's Pinball Construction Set.

Programs written in this style are highly interactive and allow the player to control



In Robot Odyssey I, players must build robots to escape from Robotropolis, a futuristic underground city inhabited by robots. Marketed by The Learning Company, Robot Odyssey I is the first program in their new DigiWorld series, which is aimed at the teenage market.

many aspects of the game environment. In *Robot Odyssey I*, for instance, the player actually designs robots and builds computer chips, which are later used to help the player escape from a futuristic robot-run city, Robotropolis. The program features built-in tutorials to teach the basics of digital logic and an Innovation Lab in which players design and test chips and robots.

Atari's Futuremakers And Milestone

New programs from Atari, Inc., also reflect the trend toward

greater sophistication. The company's Milestone Series from Atari Learning Systems and its Futuremakers simulation programs are quite interactive and feature a hands-on approach to learning. The AtariLab science packages, part of the Milestone Series, let youngsters simulate more than 100 different experiments using the computer and a laboratory kit.

Socrates On A Chip

The freedom to move almost anywhere within an educational program is an important aspect of the Arrakis Advantage, a family of educational software marketed by Prentice-Hall for Apple, Atari, Commodore, and IBM PC and PCjr computers.

Directed at students in grades 7 through 12, the Arrakis Advantage series is based on the Socrates Learning Environment—a dialectical teaching technique borrowed from the Greek philosopher, notes Charles de Martigny, managing director of Arrakis Systems.

"Where other programs operate in only one direction, Socrates [the system] can move in any direction the user wishes," he says. "Students can interrupt, ask questions, test themselves, review and explore other subjects and, in effect, talk directly to Socrates as naturally as they would converse with a teacher."

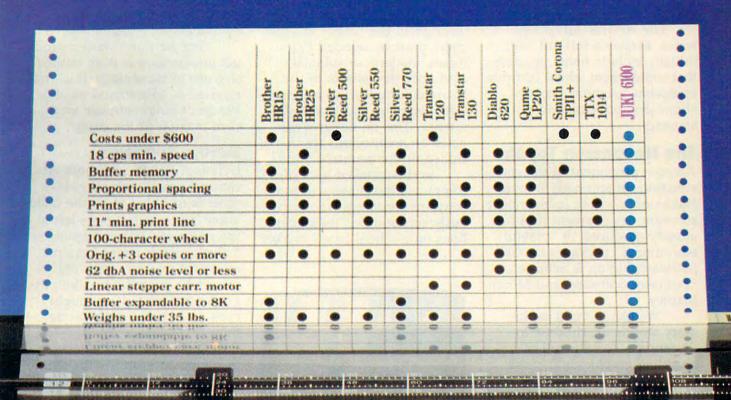
Learning Is Parallel, Not Serial

Students need that kind of flexibility since learning is not strictly linear, with one event following another in a predictable chain. Instead, information arrives in a parallel fashion, with information coming from a variety of complementary sources, points out Emiliano De Laurentiis, director of advanced research and development for Arrakis.

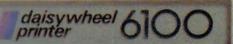
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you to interact on a normal level, to type in a sentence, to ask questions," he says. "The technology exists now. There's no reason why it shouldn't be implemented."

The Arrakis Advantage series, available this fall, will initially include home programs that complement school curricula in algebra, geometry, biology, chemistry, physics, and statistics.

The Hakansson Touch

Another proponent of the construction set approach is Joyce Hakansson, whose independent software development firm has already produced 19 "playful educational" packages for CBS Software, Simon & Schuster, Spinnaker Software, and Milton Bradley.

"We like to build exploratory worlds for children to investigate—worlds full of sparkling graphics and music and a good measure of giggles," she says. "I want every aspect of a program, even the most subtle, to serve an educational purpose. If a child builds words, then building words should be a powerful tool to make something happen so that the reward is inherent in the activity. We feel a program should validate and support a child's natural intuition and enthusiasm for discovery."

Among the newer programs developed by Joyce Hakansson Associates is *The House That Jill Built* (CBS Software), available now on disk for the Commodore 64 and this fall for the Apple II family.

Build It Your Way

Created for children five years of age and older, the program lets the player design and build a house from the ground up. Youngsters furnish, decorate, and animate the environments simply and easily, but the program also can be used by older children and even adults in

more complex ways.

Working from electronic blueprints, you choose one of a variety of four-story houses to build. Doors, windows, and stairways must be placed throughout the house. Exterior styles must be selected (Victorian, modern, or colonial). And once the outside of the house is complete, you then design, decorate, and furnish the interior. Tips on design and notes on architecture are included in the manual.

As the installed base of computers has increased, some software producers who previously concentrated their attentions on a school-based market



Youngsters count as many crops as they can before the sun sets in DLM's Number Farm.

are coming into the home with programs to supplement their curricular packages.

It's "Arcademic"

DLM Teaching Resources of Allen, Texas, currently offers hundreds of educational materials for schools. DLM has made the transition into the home software market as well with its Arcademic Skill Builders series in math, language arts, and other areas.

Educational software companies with strength both in the school and in the home will have the best chance of survival, says DLM's Karen McGraw, project editor for microcomputer software and a former teacher. DLM emphasizes content in its packages, she adds, but with a presentation that is also fun for the user and with programs that fully use the capabilities of the computer.

"But we don't want a product just because it is an innovative use of technology, if it's not married to educational validity. We don't build software and then make it fit the child."

Sunup, Sundown

In one of DLM's preschool educational games, for example, a timer is included to let the child know how much time is left in the program. Rather than using a clock, which might have no relevance to a four-year-old who can't yet tell time, the program employs a day-to-night cycle to accomplish the same thing.

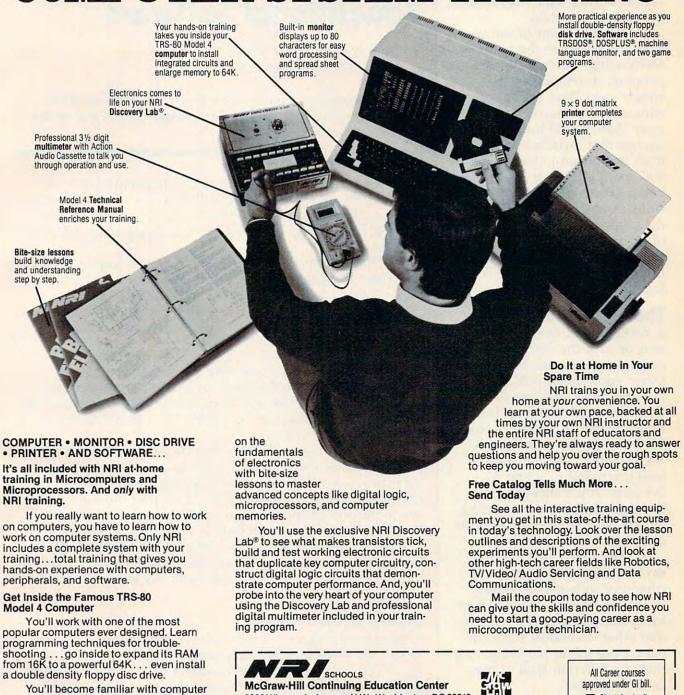
At the start of the game, the sun comes up. As the game progresses, the sun crosses the sky and then starts to come down as the game draws to a close. When the sun sets and night comes onto the screen, the game is over.

"We use real-world things that are important to a child, that a child can understand," says McGraw. "Unless you really know about education, unless you really understand the mind of a child, you would never think of it." Drawing on its experiences as a curriculumbased, educational-software producer, American Educational Computer (AEC) is also among those school-oriented software companies which have entered the home market.

"Tested And Tried"

An educational program in the home can be much more effective if it's first been shown to be successful in the schools, argues AEC president, Thomas B. Garsh. "It's been tested and tried and is based on sound educational pedagogy," he says.

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"We know that if a parent buys it for a fifth-grade student and he or she gets better grades, then the parent comes back, says it worked, and buys it for the sixth-grade child."

The movement of software from the school to the home is accelerating. Control Data Corporation, developers of the widely used Plato system of educational software, now has more than 12,000 hours of courses that include everything from instruction in basic skills and computer literacy to educational games and advanced calculus. And the company is in the process of converting many of its packages for use on personal computers like the Apple II family, Atari, IBM, and Texas Instruments.

The More The Merrier

A related trend over the last year or so is the entry of large corporations, especially established educational publishers, into the home software field. Companies like Random House, Prentice-Hall (Arrakis Systems), SFN Companies (Mindscape), Xerox (Weekly Reader Software), Scholastic, Simon & Schuster, and Fisher-Price are bringing their talent, marketing muscle, and reputations into the computer learning field.

"And that's very good," says Fritz Luecke, manager of computer software for Weekly Reader Software. "Most of them bring something to the business that other traditional software companies might not bring, and that is a different kind of mar-

keting expertise.

"They also bring, in many cases, a new way of packaging, a new way of adding things to a program to make it a total program, which is what we feel we have done with our products," he adds.

What Children And Parents Want

Giving children items with

Choosing The Best Educational Software

Selby Bateman, Features Editor Sharon Darling, Research Assistant

Of the thousands of educational software programs available, which ones are worth your time and money? Here's a short lesson from the experts.

"One recommendation I always make to parents—one that not enough people are making—is that you should really begin to look for educational software for your three- or four-year old child," says William Bowman, chairman of Spinnaker Software.

"That's the time to begin thinking about buying a home computer and getting educational software. It's going to be easier for you to find things that are generally applicable to the learning skill areas of young children than it will be to find the more specific software for older kids," he adds.

Getting Involved

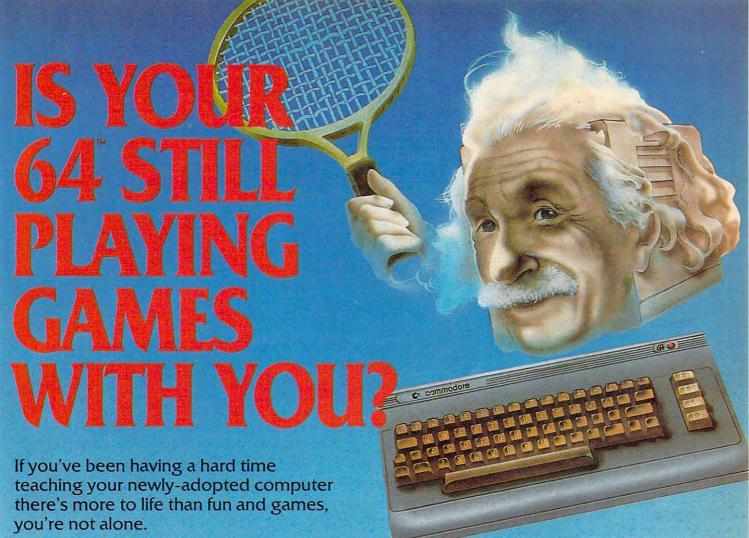
Spinnaker's educational software lines include the new Fisher-Price Learning Software for children from three to twelve years of age, as well as such best-selling programs as Kindercomp, Alphabet Zoo, In Search of the Most Amazing Thing, and Kids On Keys.

"The next real criterion is that the software's got to be fun," says Bowman. "If it's not fun to use, kids won't use it no matter what their ages are—and that's where an awful lot of educational software falls down. The next thing for a parent to do is to consider how much he or she is going to be involved with the child. A little involvement is always required. But some software, like Spinnaker's, really expects the parent to be more involved," he adds. "The software is a little bit deeper, it's a little more advanced in terms of what you can do with it."

Trying It On For Size

Getting educators and software developers to agree on a set of specific guidelines would be almost impossible, given the many conflicting views which abound in the computer-based learning field. But there are a few fundamental pieces of advice for anyone buying educational software. The following tips from educators, software houses, and leading independent program developers may be of help as you wade through the flood of educational software packages:

• Shop at a software store that allows you to run some programs prior to purchase, or that lets you buy packages on approval. Such stores may not be easy to find right now, but retailers are discovering that an increasing number of customers are demanding more than just the promises on the outside of a package to buy an educational software product.



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which they are familiar—books, stickers, posters—in addition to the software package makes it easier for the youngsters to relate to the product, Luecke says.

While numerous educational software companies are expanding their operations from school orientation to include the home market, the growth is very much a two-way street. Other companies, which have previously sold software strictly to the home, are approaching schools with their products. And the success which some microcomputer hardware manufacturers especially Apple Computerhave had in donating products to school systems, is now spurring more software companies to try similar tactics.

Using the slogan, "Be a hero, software your school," Scarborough Systems of Tarrytown, New York, is embarking on a major schooldonation project this fall.

Those who purchase Scarborough educational programs between September 15 and December 15 will find a coupon in each package enabling them to donate a piece of educational software to the school and teacher of their choice. The donated program does not have to be the same one purchased.

The purchaser sends the coupon and \$3.50 for postage and handling to Scarborough. The company will then donate the software to the school. A gift card telling the name of the donor and the name of the dealer where the software was purchased will be included in the donation.

"We think it's a unique program, and it may provide up to \$4 million in the value of computer software—that's 125,000 programs," says Sanford K. Bain, vice president of marketing for Scarborough Systems. The company has computer software for four machines—the Apple II family, Commodore 64, IBM PC/XT/jr, and the Atari

"Buying blind" is the way Dr. Sam Barkliss, chief executive officer of Computerose, Inc., an educational software firm, describes the predicament most parents and some teachers find themselves in when purchasing educational packages. They should be offered the opportunity to test the educational value of software before a purchase.

But What Does It Really Do?

• Determine what age and learning levels the software is designed for. Once that is established, find out exactly what the program intends to teach, says Leigh Mosley, an educational consultant at Peachtree Software. "A parent should ask, 'Is my son or daughter going to learn from it?"

Some companies are better than others at telling you who the target audience is, what level of learning is required, and what the goals of the packages are. Always keep in mind the software user—the child's age, learning level, interests, and dislikes.

• Be aware that the nature of "educational content" is often difficult to assess—and usually the subject of much debate among educators and software houses. Many educators and software producers believe that specific learning objectives are crucial in producing good computer-based educational products. Others stress the validity of programs which invite youngsters to explore and "play" in a less structured learning environment.

The General And The Specific

For example, software that stimulates a student's creativity might be more useful than a program that deals with a specific learning problem in school, notes Kent Kehrberg, director of software for the Minnesota Educational Computing Consortium.

"It may be difficult for a parent to match up a very specific program with a problem a child is having in, say, algebra," he says. "In a case like that, it's very difficult for someone besides the teacher to pinpoint [the problem]."

• Read published reviews and other articles about software packages and the goals of various software companies. The more knowledgeable you are about manufacturers and their products, the easier your task when picking out new software.

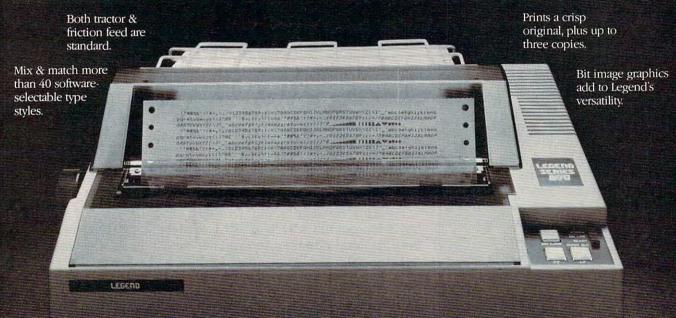
Tutorials, Simulations, And Drill-And-Practice

For example, when shopping for software, parents should know the three basic types of educational programs—tutorials, drill-and-practice, and simulations, notes Sherwin A. Steffin, vice president for research and development at Eduware Services, Inc.

"Tutorials help you attain a new skill or understanding," he says. "They generally ask the question, 'How to?' With drill-and-practice, you already know how, but want to know better, so you need repetitive exercises." Simulations can offer examples of the way things work in just about any field.

• Consider how much replay value, or depth, a product has. Will the child use the package a few times and tire of it, or is there enough variety and challenge to offer a stimulating environment?

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"Obviously, we're doing it because we think it reflects a favorable image for the company," Bain says. "We strongly believe the validity for these programs has to come from the schools. And our donation program allows schools to sample software without great expense on their part."

To Network Or Not To Network?

One school-based trend that disturbs DLM President Andrew W. Bingham is the tendency for schools to network their computers, which Bingham says can work against innovative use of the computers.

"It almost scares me, because I think the evolution may ultimately lead us to miss the revolutionary potential of software," he says. "When there are just two or three computers in a school, teachers will use them flexibly and individually.

"When the school gets more computers, they bring them all together into one room, because it's easier to control, easier to administer. Then they want a networking system," says Bingham. "What you get is students being marched to the computer for their 20 minutes of instruction and marched back to their seats."

Bingham urges parents and teachers to explore innovative uses of the computer rather than trying to emphasize convenience of management.

No matter what the area of computer-based educational programs, software companies and educators all agree that the field is still in its infancy in many ways. And expectations for the future are bright. "I think we're going to see an explosion in the next couple of years," says Sam Barkliss, chairman of Computerose, Inc., an educational software company. "I think we're going to see some astonishing things."

As William Bowman puts it, "Does the software provide multiple paths to creativity, and does it accept multiple paces from different children?"

The Price Tag For Learning

• Price and future availability of software from the same company can be important factors. Depending on the needs of the student and the goals of a company's software line, you may wish to purchase an entire series of complementary programs over time. How much this will cost you and its effects on the student's learning goals then become very important.

"A lot of people out there are getting too great a price for what they're selling, and for what the market will support," says George Esbensen, national sales coordinator for MicroEd, a Minnesota-based company which produces educational software. "A lot of what's being passed off as educa-

tional software is not."

• Take your child to the store when selecting software. This can be especially helpful—and save you later disappointments—if the child can actually see the program working in the store. If that's not possible, at least you can get a better idea of some of the likes and dislikes of the youngster for whom you're purchasing the program.

Sophistication, Power, And Interaction

• How flexible is the software program? Are there built-in options which allow a variety of challenges and motivational changes as the user works with the program? As computers become more powerful and software becomes more sophisticated, the level of interactivity between user and program is increasing dramatically. The best educational software takes advantage of that power and sophistication.

• Is the software both easy to use and error-free? Educational programs which freeze up or frustrate a user can immediately discourage users, especially younger children. Be aware of both potential problems as you evaluate software

you see or that you've purchased.

Fritz Luecke, manager of computer software for Weekly Reader Software, suggests that you determine how easy and helpful the program guide booklet is that comes with the package. Many parents, teachers, and students want to be able to insert a program into the computer and use it without having to use a guide, particularly if that guide is confusing or incomplete.

NEA Teacher Certified

Finally, you might want to look at the NEA catalog of educational software. With the proliferation of educational software packages, the job of separating the good from the mediocre gets tougher every day. For more than a year now, the National Education Association (NEA) has been trying to give some guidance in this area. Approximately 50 NEA reviewers have been testing educational programs submitted by software authors and publishers. Those which meet the NEA's stiff requirements are given an "NEA Teacher Certified" stamp of approval, and are included in a catalog of approved software.

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The Tester

Joseph Kattan

Multiple-choice tests have been standard for years. Now anyone who wants to create a multiple-choice test on his home computer can easily do so. Tests can be devised to teach youngsters anything from history to sports trivia. Just fill in the DATA statements with the questions and answers and the program will do the rest. Versions that work on the Commodore 64, VIC-20, PETs, Apples, Radio Shack Color Computer, Coleco Adam, IBMs and TI-99/4A are included.

One of the most frequently cited reasons for purchasing a personal computer is its great potential as an educational tool. The home computer is widely used to teach children to spell or perform simple arithmetic calculations and to drill adults on anything from foreign languages to organic chemistry. A well-designed instructional program can produce spectacular results in improving a student's command of a subject. A poorly designed program, on the other hand, will frustrate, rather than teach.

Computers, for better or worse, cannot yet think. If the programmer tells the computer that Washington is the capital of the United States, the program will be less than kind to the hapless user who responds that Washington, D.C., is the capital. If the programmer tells the computer that avoir means "to have," pity the French student who answers "to possess." These are, of course, soluble problems, but they illustrate one weakness in computerized instruction. No matter how well designed the program, there will always exist a correct answer to some question that the program will not recognize. You can instruct a program to accept Washington, Washington, D.C., and Washington, DC, as the answer to the capital question, but how do you cover all of the synonyms of a word like fantastic in a foreign language translation program?

No Ambiguity

There is one kind of testing that a computer handles exceptionally well, because it is not required to reason: multiple-choice. It takes little effort to insure that the answers to a multiplechoice test are free of ambiguity, which is why all of the standardized testing in our schools tends to be multiple-choice. These tests, moreover, require less effort on the part of the user than answer-oriented tests, and can be used together with the more rigorous answer-oriented tests to form a very effective instructional package.

Remembering To Answer

Designing an effective program for a multiplechoice test is no easy matter, however. A simple and commonly used algorithm selects a question from DATA statements at random and then reads four or five different answers from the DATA statement, together with a code that identifies the correct answer.

There are several deficiencies to this solution. For one, it consumes tremendous amounts of memory, as it gobbles up bytes both for the correct answer and for the dummy answers that have no use other than to serve as the incorrect choices. In addition, the program user is always presented with the same set of choices, and in the same order, for each question. The user may well get into the habit of remembering that the answer to a question is C without learning the answer itself.

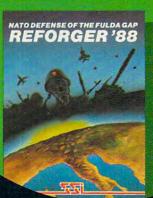
A more elegant solution should present truly random choices for each question. The user should rarely, if ever, encounter the same choices for a given question. The program, moreover, will be more compact because every answer in its DATA statements will be a correct answer to some question. With this method, the program will select a question from a DATA statement at random, will read the answer to that question from the same DATA statement, and then read four more answers at random to present as false choices. This method insures that the same answer is not presented as two separate choices (since random selection could cause that result) and arranges the order of the answers at random. The U.S. capital may be C on one run of the test, but A or B or D on another.

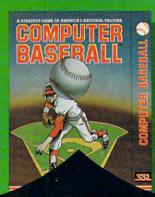
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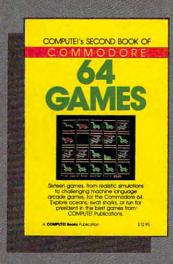
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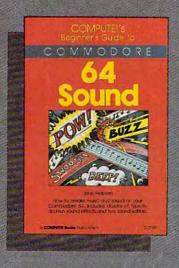


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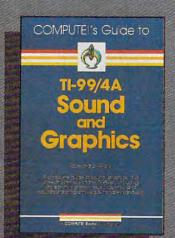


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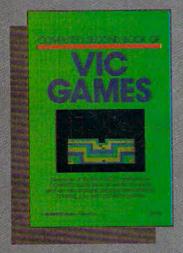


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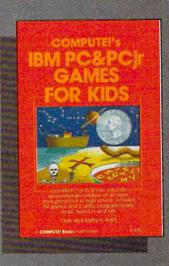


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Segregated Data

Even this method, however, has a potential pitfall, and the solution discussed here resolves it. Let's take a U.S. history test as an example. The answers to such a test may be George Washington, or Philadelphia, or 1776. Obviously, it would be quite absurd to present Philadelphia or 1776 as possible answers to a question calling for the name of the first president. The solution to this problem is to segregate the DATA statements containing the questions and answers into different areas of the program and to select answers to each question only from a valid area. For example, DATA statements between 1000 and 1999 could contain questions concerning names of persons; DATA statements between 2000 and 2999 could contain questions concerning places; and so forth. The program chooses an area at random and then stays in that area to present the incorrect answers. If the answer to the question selected is George Washington, the four incorrect answers will always be names of persons.

This solution has an added advantage. It allows for the inclusion of diverse subjects on a single test, with the testing either confined to a subject chosen by the user or mixed at random by the computer. This program is intended primarily for single-subject tests that require the segregation of answers by types, as in the U.S. history example above.

How It Works

The program relies on two arrays—Q, which stores the number of questions in each category, and T, which selects the answers at random. The variable N is used to store the group of questions and answers to be called. The question and answer are selected by the computer at line 300. Since answer groups are stored in DATA statements beginning with 1001, 2001, and so forth, the program adds that number to a random number from 1 to the number of questions for the appropriate group, as indicated in the Q array. For example, if the question and answer are to come from group 1, for which questions and answers are stored in lines 1001 through 1011, the program looks to the variable Q(1) to ascertain the range of random numbers to generate.

Once a question and answer have been read, the program uses the same random number formula to look up the incorrect answers. It stores the random numbers (data line numbers) in a T array (line 330) and makes sure that none of the numbers in that array is equal to the line number of the correct answer or to the number of another element in the array (line 335). At line 340, the program chooses where to place the correct answer, which can be any choice from one to

five, and then proceeds to place all of the choices on the monitor or television screen. Once an answer is entered, the program indicates whether or not it was correct. In the case of a correct answer, the program waits for two seconds (lines 400 and 410) and then constructs a new screen. If the answer entered is incorrect, the program waits for the RETURN key to be pressed before moving on to the next screen.

Screening Keys

One other matter is the little subroutine beginning at line 800. The entire subroutine could be replaced with a single INPUT statement. The advantage of the subroutine is that it screens out unwanted keys (in this case, anything but a number) and maintains the integrity of the screen display. In addition, the subroutine does not attach a question mark to a prompt, allowing you to insert it where it is appropriate and omit it where it is not. Study the DATA statements beginning at line 1001 and you can see the flexibility afforded by the subroutine.

This program is obviously meant to be modified. When modifying it for your own use, pay special attention to the Q array. The array should be DIMensioned to the number of answer categories in the program. The same number should be placed in the variable SUBJ. The elements of the Q array should be equated to one more than the number of questions in the appropriate category. Finally, the questions and answers should be placed on the same DATA statement, and the DATA statements should be arranged in increments of one beginning with a line number of N*1000+1, N being the number of the group. Make sure that neither the questions nor the answers contain any commas, since the BASIC interpreter will take the commas to indicate the end of a string.

Program 1: The Tester, Atari Version

Refer to the "Automatic Proofreader" article before typing this program in.

PN 10 REM THE TESTER

DK 20 REM MULTIPLE-CHOICE TEST MAKER

BL 40 REM THIS PROGRAM WILL GENERATE

N 50 REM MULTIPLE-CHOICE TESTS FOR ONE

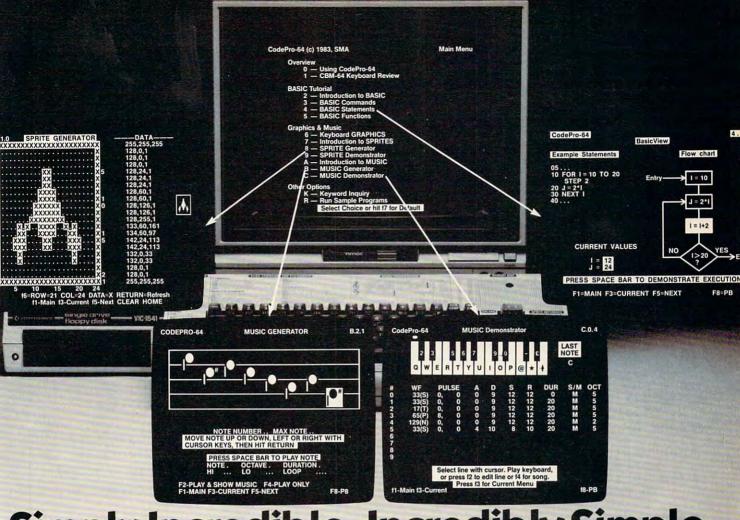
18 60 REM OR MORE SUBJECTS

CI 100 POKE 710,78:POKE 712,78:POKE 709,4:POKE 752,1:REM SET SCRE EN COLORS, TURN CURSOR OFF

MJ 110 OPEN #1,4,0,"K:"

JF 12Ø DIM TITLE\$(38),QUES\$(38),ANS\$
(3Ø),TEMP\$(3Ø),NUM\$(3),BL\$(3Ø
),Q(4),T(3)

N 130 TITLE\$=" ":TITLE\$(38)=TITLE\$: TITLE\$(2)=TITLE\$:QUES\$=TITLE\$:ANS\$=TITLE\$(1,30):TEMP\$=ANS\$:BL\$=ANS\$



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OL 140 Q(1)=11:Q(2)=11:Q(3)=11:Q(4)=
11:REM INSERT HERE ONE LESS T
HAN NUMBER OF QUESTIONS FOR E
ACH CATEGORY

N 200 ? "(CLEAR) (4 SPACES) PLEASE CH OOSE ONE SUBJECT: "

MC 205 SUBJ=4:REM SUBJ IS NUMBER OF SUBJECTS IN TEST

PK 210 ? :RESTORE 900:FOR I=1 TO SUB J:READ TITLE\$:? I;") ";TITLE\$:NEXT I:?

FP 22Ø GOSUB 8ØØ:IF N1<1 OR N1>4 THE N POSITION C,R:GOTO 22Ø

DN 230 N=N1:? :? "HOW MANY QUESTIONS ?":

NB 240 GOSUB 800:IF N1<1 THEN POSITI ON C,R:GOTO 240

HJ 250 TOTAL=N1:RESTORE 900:FOR I=1 TO N:READ TITLE\$:NEXT I:TITLE \$(LEN(TITLE\$)+1)=" TEST"

N6 31Ø ANS=N*1ØØØ+1+INT(RND(Ø)*Q(N))
:RESTORE ANS:READ QUES\$:? QUE
S\$:? :READ ANS\$

Al 320 FOR I = 0 TO 3

NH 33Ø T(I)=N*1ØØØ+1+INT(RND(Ø)*Q(N)):IF T(I)=ANS THEN 33Ø

PJ 335 FOR J=Ø TO 3:IF I<>J AND T(I) =T(J) THEN POP :GOTO 33Ø

DM 340 NEXT J:NEXT I:J=1+INT(RND(0) * 5):A=0:FOR I=1 TO 5:? I;") ";

AK 35Ø IF I<>J THEN RESTORE T(A):REA D QUES\$:READ TEMP\$:? TEMP\$:A= A+1:GOTO 37Ø

NO 360 ? ANS\$

JL 37Ø NEXT I:?

0380 GOSUB 800:IF N1<1 OR N1>5 THE N POSITION C,R:GOTO 380

DE 39Ø IF N1<>J THEN 43Ø

DH 400 SCORE=SCORE+1:? :POKE 85,18:? "GOOD !":POKE 20,0

6F 41Ø IF PEEK (2Ø) < 9Ø THEN 41Ø

6J 42Ø GOTO 46Ø

PK 430 ? :? "SORRY, THE ANSWER IS "; :IF LEN(ANS\$)>18 THEN ?

II 440 ? ANS\$:? :? "(6 SPACES)PRESS

PD 450 POKE 764,255:GET #1,A:IF A<>1 55 THEN 450

6C 46Ø NEXT COUNT

EI 500 ? "(CLEAR)":POKE 85, (40-LEN(T ITLE\$))/2:? TITLE\$:?

CM 510 ? "OUT OF ";TOTAL;" QUESTIONS , YOU ANSWERED":? SCORE;" COR RECTLY. YOUR SCORE IS ";

NN 520 ? INT((SCORE/TOTAL) *100+0.5);
"%."

HM 53Ø ? :? "REMIDEN: FOR ANOTHER TEST

0H 54Ø POKE 764,255:GET #1,A:IF A<>1 55 AND A<>42 THEN 54Ø

AD 550 IF A=155 THEN 200

KM 560 ? "(CLEAR)": END

KG 800 C=PEEK (85): R=PEEK (84)

NG 8Ø5 POSITION C,R:? BL\$:TRAP 8Ø5:Y =1:S=Ø:NUM\$=""

KH 81Ø POSITION C+Y-1,R:? "(T)";:POK E 764,255:GET #1,A:POSITION C +Y-1,R:IF A<>126 THEN 825

Microsoft And TI-99/4A Version Notes

Jeff Hamdani, Editorial Programmer

The Microsoft version of "The Tester" (Program 2) runs on the Commodore 64, the VIC-20, all PETs, the Apple II+, IIc, and IIe, the Radio Shack Color Computer, the Coleco Adam, and the IBM PC and PCjr. If you have a VIC without memory expansion, remove all REMs and spaces when typing in the program. With an IBM PC or PCjr, make the following minor changes:

Add line 100:

100 RANDOMIZE(0)

Change line 220 to:

220 PRINT:PRINT "YOUR CHOICE:";

Add line 225:

225 Z\$=INKEY\$:RD=RND:N=VAL(Z\$):IF Z\$="" OR (N<1 AND N>4) THEN 225 ELSE PRINT N

Last, in Program 2, line 930 contains a statement to clear the screen. Replace this with the appropriate statement for your computer. For instance, on the Apple, line 930 would read:

930 HOME:RETURN

The TI-99/4A version of The Tester (Program 3) will run in either Console or Extended BASIC.

AP815 IF Y>1 THEN Y=Y-1:? " ";:NUM\$ =NUM\$(1,Y)

6M 82Ø GOTO 81Ø

AI 825 IF A=155 THEN ? " ":GOTO 840

00 83Ø NUM\$(Y,Y)=CHR\$(A): IF Y=1 THEN S=A

00 835 ? CHR\$(A);:Y=Y+1:GOTO 810

NO 840 POKE ADR(NUM\$), S:N1=VAL(NUM\$)
:RETURN

EJ 900 DATA HISTORICAL FIGURES, WORLD CITIES, NEWSMAKERS, COMPUTERS

KM 1000 REM HISTORICAL FIGURES

NK 1001 DATA THE FIRST PRESIDENT, GEO RGE WASHINGTON

BK 1002 DATA FIRST CHIEF JUSTICE, JOH N JAY

EL 1003 DATA WHO INVENTED COTTON GIN ? ELI WHITNEY

GL 1004 DATA PRESIDENT OF THE CONFED ERACY, JEFFERSON DAVIS

FH 1005 DATA WHO DEBATED LINCOLN?, ST EPHEN DOUGLAS

FK 1006 DATA FAMOUS ABOLITIONIST, FRE DERICK DOUGLASS

N 1007 DATA BRITISH NAVIGATOR, FRANC IS DRAKE

IH 1008 DATA THE THIRD PRESIDENT, THO MAS JEFFERSON

| NF 1009 | DATA HE PRESIDED OVER THE NE | KE PLACE HERE, PAGE ZERO |
|--------------|---|--|
| | W DEAL, FRANKLIN DELAND ROOSE | 00 4Ø11 DATA A NUMBERING SYSTEM, HEXA |
| 1 1 G 1 G | DATA WHO WAS ASSASSINATED IN | DECIMAL |
| UN 12012 | DALLAS?, JOHN F. KENNEDY | Program 2: The Tester, Microsoft Version |
| PD 1011 | DATA RAILROAD MAGNATE, CORNEL | Refer to the "Automatic Proofreader" article before typing this |
| | IUS VANDERBILT | program in. |
| HP 2000 | REM WORLD CAPITALS | 20 REM *** MULTIPLE CHOICE TEST MAKER *** |
| IM 2001 | DATA WHAT IS THE CAPITAL OF | :rem 9 |
| 10.00 | JAPAN?, TOKYO | 110 DIM QA\$(44), AN\$(44): GOSUB 930: FOR I=1 |
| IP 2002 | DATA WHERE IS TRAFALGAR SQUA | TO 44 :rem 172 |
| FD D G G T | RE?,LONDON DATA WHERE IS THE WESTERN WA | 120 READ QA\$(I),AN\$(I):NEXT I:FORJ=1 TO 4 |
| EL 2003 | LL?, JERUSALEM | :Q(J)=10:READ TL\$(J):NEXT J :rem 38 |
| NH 2004 | DATA WHERE IS THE COLISEUM?, | 200 GOSUB 930:PRINT "PLEASE CHOOSE ONE SU BJECT:" :rem 96 |
| 1111 222 1 | ROME | BJECT:" :rem 96 210 PRINT:FOR I=1 TO 4:PRINT I;") ";TL\$(I |
| OH 2005 | DATA WHERE IS RED SQUARE?, MO |):NEXT I :rem 226 |
| | SCOW | 220 PRINT:PRINT "YOUR CHOICE";:INPUT Z\$:N |
| KC 2006 | DATA WHERE IS THE TAJ MAHAL? | =VAL(Z\$):IFN<1 OR N>4 THEN 200 |
| | , AGRA | :rem 198 |
| CF 2ØØ7 | DATA WHAT IS THE CAPITAL OF | 230 PRINT:PRINT:PRINT "HOW MANY QUESTIONS |
| AU 0000 | AFGHANISTAN?, KABUL DATA THE PARTHENON IS IN THI | ";:INPUT Z\$:N1=VAL(Z\$) :rem 13 240 IF N1=0 THEN 230 :rem 213 |
| HH ZEES | S CITY, ATHENS | 240 IF N1=0 THEN 230 :rem 213 |
| HD 2009 | DATA CITY LEASED BY ENGLAND | 300 TL=N1:SC=0:FOR CT=1 TO TL:GOSUB 930:P RINT TLS(N):" TEST" :rem 212 |
| | FROM CHINA, HONG KONG | RINT TL\$(N); " TEST" :rem 212 310 ANS=INT(RND(1)*Q(N))+(N*11)-10:PRINT: |
| KH 2010 | DATA WHERE IS THE LINCOLN ME | PRINT QA\$(ANS) :rem 202 |
| | MORIAL?, WASHINGTON | 320 FOR I=0 TO 3:GOSUB 800:J=0 :rem 75 |
| CF 2Ø11 | DATA THIS CITY IS FAMOUS FOR | 330 IF I > J AND T(I)=T(J) THEN GOSUB 800: |
| | ITS CANALS, VENICE | I-0.COTO 330 : rem 96 |
| KH 3000 | REM NEWSMAKERS DATA PRESIDENT OF FRANCE, MIT | 335 J=J+1:IF J<=3 THEN 330 :rem 76 |
| VE 2881 | TERAND | 340 NEXT I:J=1+INT(RND(1)*5):A=0:PRINT:PR |
| 00 3002 | DATA FORMER SECRETARY OF STA | INT:FOR I=1 TO 5:PRINT I;") ";:rem 86 |
| | TE UNDER REAGAN, HAIG | 350 IF I<>J THEN PRINT AN\$(T(A)):A=A+1:GO TO 370 :rem 60 |
| 10 3003 | DATA SOVIET FOREIGN MINISTER | TO 370 :rem 60 360 PRINT AN\$(ANS) :rem 12 |
| | , GROMYKO | 370 NEXT I:PRINT :rem 233 |
| NA 3004 | DATA GERMAN CHANCELLOR, KOHL | 380 PRINT: PRINT "ENTER YOUR ANSWER"; : INPU |
| EB 3005 | DATA SECRETARY OF TREASURY, R | m 70.N1-VAI (70) • rem 251 |
| VN 300A | DATA CHAIRMAN OF SOVIET COMM | 390 IF N1<1 OR N1>5 THEN 380 : rem 116 |
| KII CEEC | UNIST PARTY, CHERNENKO | 395 IF N1<>J THEN 430 :rem 57 |
| EB 3ØØ7 | DATA CANADIAN PRIME MINISTER | 400 SC=SC+1:PRINT:PRINTTAB(9) "GOOD!":FO R I=1 TO 1000:NEXT I:GOTO 460:rem 225 |
| | , TRUDEAU | 430 PRINT: PRINT "SORRY, THE ANSWER IS: ":P |
| JA 3008 | DATA JAPANESE PRIME MINISTER | RINT ANS(ANS) :rem 46 |
| WF 7 7 7 7 7 | , NAKASONE | 440 PRINT: PRINT " < RETURN > TO CONTINUE" |
| NE 3009 | DATA SECRETARY OF STATE, SHUL | :rem 146 |
| HI 3010 | DATA MAYOR OF NEW YORK, KOCH | 45Ø INPUT Z\$:rem 167 |
| FL 3Ø11 | DATA BRITISH PRIME MINISTER, | 460 NEXT CT :rem 112 |
| | THATCHER | 500 GOSUB 930:PRINT TL\$(N); " TEST" |
| | REM COMPUTERS | :rem 154 |
| ME 4001 | DATA THE BRAIN OF THE COMPUT | 510 PRINT:PRINT:PRINT "TOTAL QUESTIONS "; TL:PRINT "CORRECT ANSWERS ";SC:rem 48 |
| | ER IS CALLED, CENTRAL PROCESS | 520 PRINT "YOUR SCORE IS "; INT((SC/TL)*10 |
| AN AGGG | ING UNIT P DATA THE FASTEST WAY TO PROC | Ø+.5);"%" :rem 233 |
| HN 4 KI KI Z | ESS DATA, MACHINE LANGUAGE | 530 PRINT: PRINT "WANT ANOTHER TEST(Y/N)" |
| CN 4003 | DATA A SIMPLE COMPUTER LANGU | :rem 226 |
| | AGE, BASIC | 540 Z\$="":INPUT Z\$:IF Z\$<>"Y" AND Z\$<>"N" |
| CI 4004 | DATA USES REVERSE POLISH NOT | THEN 530 :rem 98 |
| | ATION, FORTH | 550 IF Z\$="Y" THEN 200 :rem 66 560 GOSUB 930:END :rem 200 |
| | DATA 8 BITS ON THE 6502, BYTE | 800 T(I)=INT(RND(1)*Q(N))+(N*11)-10:IF T(|
| PM 4006 | DATA A 16-BIT MICROPROCESSOR | I)=ANS THEN 800 :rem 0 |
| CE AGG | ,68000 | 810 RETURN :rem 121 |
| or 41919/ | ORY TO CPU, BUS | 900 REM THIS SUBROUTINE CLEARS THE SCREEN |
| AA 400F | B DATA DATA ARE PUSHED AND PUL | . FOR APPLE COMPUTERS USE "HOME" |
| | LED HERE, STACK | :rem 195 |
| 00 4005 | DATA USED FOR INDEXING, X REG | 910 REM FOR IBM PC AND PCJR., :rem 44 |
| | ISTER | 920 REM AND TRS-80 COLOR COMPUTERS USE "C |
| NG 4Ø12 | DATA FASTEST COMPUTATIONS TA | LS" STATEMENT: rem 23 |

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| - | A STATE OF THE STA | | |
|--|--|--|---|
| 930 | PRINT"{CLR}":RETURN :rem 26 | LLED, CENTRAL PROCESSING UNIT: rem 19 | 6 |
| 1000 | REM HISTORICAL FIGURES : rem 172 | 4002 DATA THE FASTEST WAY TO PROCESS DAT | A |
| | DATA THE FIRST PRESIDENT, GEORGE WASH | , MACHINE LANGUAGE :rem 1 | |
| | INGTON :rem 218 | 4003 DATA A SIMPLE COMPUTER LANGUAGE, BAS | |
| 1002 | DATA FIRST CHIEF JUSTICE, JOHN JAY | | |
| 1002 | | | |
| 1000 | :rem 26 | 4004 DATA USES REVERSE POLISH NOTATION, F | |
| 1003 | DATA WHO INVENTED COTTON GIN, ELI WHI | RTH :rem 4 | |
| | TNEY :rem 12 | 4005 DATA 8 BITS ON THE 6502, BYTE: rem 24 | 8 |
| 1004 | DATA PRESIDENT OF CONFEDERACY, JEFFER | 4006 DATA A 16-BIT MICROPROCESSOR, 68000 | |
| | SON DAVIS :rem 138 | :rem 25 | 2 |
| 1005 | DATA WHO DEBATED LINCOLN?, STEPHEN DO | 4007 DATA TRANSFER DATA FROM MEMORY TO C | |
| | UGLAS :rem 87 | | |
| 1006 | DATA FAMOUS ABOLITIONIST, FREDERICK D | • L C.III L | |
| 1000 | | 4008 DATA DATA ARE PUSHED AND PULLED HER | E |
| | OUGLASS :rem 90 | ,STACK :rem | Ø |
| 1007 | DATA BRITISH NAVIGATOR, FRANCIS DRAKE | 4009 DATA USED FOR INDEXING, X REGISTER | |
| - Amelia | :rem 59 | :rem 6 | 2 |
| 1008 | DATA THE THIRD PRESIDENT, THOMAS JEFF | 4010 DATA FASTEST COMPUTATIONS TAKE PLAC | |
| | ERSON :rem 135 | HERE, PAGE ZERO :rem 21 | |
| 1009 | DATA HE PRESIDED OVER THE NEW DEAL, F | | |
| | RANKLIN DELANO ROOSEVELT : rem 213 | 4011 DATA A NUMBERING SYSTEM, HEXADECIMAL | |
| 1010 | | :rem 23 | |
| 1010 | DATA WHO WAS ASSASSINATED IN DALLAS? | 5000 DATA HISTORICAL FIGURES, WORLD CITIES | S |
| | , JOHN F. KENNEDY : rem 156 | , NEWSMAKERS, COMPUTERS : rem 11 | 7 |
| 1011 | DATA RAILROAD MAGNATE, CORNELIUS VAND | LOUIS TO BE A SHADOW THAT AND A TO A STANCE OF | |
| | ERBILT :rem 243 | Program 3: The Tester, TI-99/4A Version | |
| 2000 | REM WORLD CITIES :rem 243 :rem 239 | | |
| 2001 | DATA WHAT IS THE CAPITAL OF JAPAN?, T | 100 REM EXTENDED BASIC NOT REQUIRE | = |
| 2001 | | D | |
| 0000 | OKYO :rem 140 | | |
| 2002 | DATA WHERE IS TRAFALGAR SQUARE?, LOND | 110 DIM QA\$ (44), AN\$ (44) | |
| | ON :rem 143 | 112 CALL CLEAR | |
| 2003 | DATA WHERE IS THE WESTERN WALL?, JERU | 114 FOR I=1 TO 44 | |
| | SALEM :rem 66 | 120 READ QA\$(I), AN\$(I) | |
| 2004 | DATA WHERE IS THE COLISEUM?, ROME | 122 NEXT I | |
| 200. | :rem 215 | 123 SUBJ=4 | |
| ogar | | 124 REM SET SUBJ TO # OF CATEGORIE | |
| 2005 | DATA WHERE IS RED SQUARE?, MOSCOW | | - |
| | :rem 231 | S OF QUESTIONS | |
| 2006 | DATA WHERE IS THE TAJ MAHAL?, AGRA | 125 FOR J=1 TO SUBJ | |
| | :rem 162 | 126 Q(J)=1Ø | |
| 2007 | DATA WHAT IS THE CAPITAL OF AFGHANIS | 128 READ TL\$(J) | |
| | TAN?, KABUL :rem 37 | 129 NEXT J | |
| 2000 | | 200 CALL CLEAR | |
| 2000 | DATA THE PARTHENON IS IN THIS CITY, A | 202 PRINT "PLEASE CHOOSE ONE SUBJECT | |
| | THENS : rem 7 | | • |
| 2009 | DATA CITY LEASED BY ENGLAND FROM CHI | T:":: | |
| | NA, HONG KONG :rem 126 | 210 FOR I=1 TO 4 | |
| 2010 | DATA WHERE IS THE LINCOLN MEMORIAL?, | 212 PRINT I;") ";TL\$(I) | |
| 2010 | WASHINGTON :rem 167 | 214 NEXT I | |
| 2011 | | 220 PRINT | |
| 2011 | DATA THIS CITY IS FAMOUS FOR ITS CAN | 222 PRINT "YOUR CHOICE"; | |
| | ALS, VENICE :rem 37 REM NEWSMAKERS :rem 167 | 224 INPUT N | |
| 3000 | REM NEWSMAKERS : rem 167 | 226 IF (N<1)+(N>4) THEN 224 | |
| 3001 | DATA PRESIDENT OF FRANCE, MITTERAND | | |
| | :rem 164 | 23Ø PRINT :::: | |
| 3002 | DATA FORMER SECRETARY OF STATE UNDER | 232 INPUT "HOW MANY QUESTIONS ?":N1 | 1 |
| 5552 | REAGAN, HAIG :rem 227 | 234 IF N1=Ø THEN 232 | |
| 2002 | DATA SOVIET FOREIGN MINISTER, GROMYKO | 300 TL=N1 | |
| 3003 | A STATE OF THE PARTY OF THE PAR | 3Ø2 SC=Ø | |
| | :rem 131 | 304 FOR CT=1 TO TL | |
| 3004 | | | |
| 3005 | DATA GERMAN CHANCELLOR, KOHL : rem 208 | 304 CALL CLEAR | |
| | DATA GERMAN CHANCELLOR, KOHL : rem 208 DATA SECRETARY OF TREASURY, REGAN | 3Ø6 CALL CLEAR | |
| | DATA GERMAN CHANCELLOR, KOHL :rem 208 DATA SECRETARY OF TREASURY, REGAN :rem 65 | 306 CALL CLEAR 308 PRINT TL\$(N); " TEST" | |
| 2006 | DATA SECRETARY OF TREASURY, REGAN : rem 65 | 306 CALL CLEAR 308 PRINT TL\$(N);" TEST" 310 RANDOMIZE | |
| 3006 | DATA SECRETARY OF TREASURY, REGAN: rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 | |
| | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: | |
| | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) | |
| 3ØØ7 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU : rem 65 | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) | |
| 3ØØ7 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) 320 FOR I=0 TO 3 | |
| 3ØØ7 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU : rem 65 | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) 320 FOR I=0 TO 3 322 GOSUB 800 | |
| 3ØØ7 3ØØ8 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU : rem 65 DATA JAPANESE PRIME MINISTER, NAKASON E : rem 144 | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) 320 FOR I=0 TO 3 322 GOSUB 800 324 J=0 | |
| 3ØØ7 3ØØ8 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU : rem 65 DATA JAPANESE PRIME MINISTER, NAKASON E : rem 144 DATA SECRETARY OF STATE, SHULTZ | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) 320 FOR I=0 TO 3 322 GOSUB 800 324 J=0 330 IF (I=J)+(T(I)<>T(J))THEN 335 | |
| 3ØØ7 3ØØ8 3ØØ9 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU : rem 65 DATA JAPANESE PRIME MINISTER, NAKASON E : rem 144 DATA SECRETARY OF STATE, SHULTZ : rem 196 | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) 320 FOR I=0 TO 3 322 GOSUB 800 324 J=0 330 IF (I=J)+(T(I)<>T(J))THEN 335 332 GOSUB 800 | |
| 3007 3008 3009 3010 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU : rem 65 DATA JAPANESE PRIME MINISTER, NAKASON E : rem 144 DATA SECRETARY OF STATE, SHULTZ : rem 196 DATA MAYOR OF NEW YORK, KOCH : rem 123 | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) 320 FOR I=0 TO 3 322 GOSUB 800 324 J=0 330 IF (I=J)+(T(I)<>T(J))THEN 335 332 GOSUB 800 333 J=0 | |
| 3007 3008 3009 3010 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU : rem 65 DATA JAPANESE PRIME MINISTER, NAKASON E : rem 144 DATA SECRETARY OF STATE, SHULTZ : rem 196 DATA MAYOR OF NEW YORK, KOCH : rem 123 DATA BRITISH PRIME MINISTER, THATCHER | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) 320 FOR I=0 TO 3 322 GOSUB 800 324 J=0 330 IF (I=J)+(T(I)<>T(J))THEN 335 332 GOSUB 800 333 J=0 334 GOTO 330 | |
| 3007 3008 3009 3010 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU : rem 65 DATA JAPANESE PRIME MINISTER, NAKASON E : rem 144 DATA SECRETARY OF STATE, SHULTZ : rem 196 DATA MAYOR OF NEW YORK, KOCH : rem 123 | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) 320 FOR I=0 TO 3 322 GOSUB 800 324 J=0 330 IF (I=J)+(T(I)<>T(J))THEN 335 332 GOSUB 800 333 J=0 334 GOTO 330 | |
| 3007 3008 3009 3010 3011 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU : rem 65 DATA JAPANESE PRIME MINISTER, NAKASON E : rem 144 DATA SECRETARY OF STATE, SHULTZ : rem 196 DATA MAYOR OF NEW YORK, KOCH : rem 123 DATA BRITISH PRIME MINISTER, THATCHER : rem 91 | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) 320 FOR I=0 TO 3 322 GOSUB 800 324 J=0 330 IF (I=J)+(T(I)<>T(J))THEN 335 332 GOSUB 800 333 J=0 334 GOTO 330 335 J=J+1 | |
| 3007 3008 3009 3010 3011 4000 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU : rem 65 DATA JAPANESE PRIME MINISTER, NAKASON E : rem 144 DATA SECRETARY OF STATE, SHULTZ : rem 196 DATA MAYOR OF NEW YORK, KOCH : rem 123 DATA BRITISH PRIME MINISTER, THATCHER : rem 91 REM COMPUTERS : rem 106 | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) 320 FOR I=0 TO 3 322 GOSUB 800 324 J=0 330 IF (I=J)+(T(I)<>T(J))THEN 335 332 GOSUB 800 333 J=0 334 GOTO 330 335 J=J+1 337 IF J<=3 THEN 330 | |
| 3007 3008 3009 3010 3011 4000 4001 | DATA SECRETARY OF TREASURY, REGAN : rem 65 DATA CHAIRMAN OF SOVIET COMMUNIST PA RTY, CHERNENKO : rem 173 DATA CANADIAN PRIME MINISTER, TRUDEAU : rem 65 DATA JAPANESE PRIME MINISTER, NAKASON E : rem 144 DATA SECRETARY OF STATE, SHULTZ : rem 196 DATA MAYOR OF NEW YORK, KOCH : rem 123 DATA BRITISH PRIME MINISTER, THATCHER : rem 91 | 306 CALL CLEAR 308 PRINT TL\$(N); "TEST" 310 RANDOMIZE 312 ANS=INT(RND*Q(N))+(N*11)-10 314 PRINT :: 316 PRINT QA\$(ANS) 320 FOR I=0 TO 3 322 GOSUB 800 324 J=0 330 IF (I=J)+(T(I)<>T(J))THEN 335 332 GOSUB 800 333 J=0 334 GOTO 330 335 J=J+1 | |

1011 DATA RAILROAD MAGNATE, CORNELIU 341 RANDOMIZE S VANDERBILT 342 J=1+INT(RND*5) 2000 REM WORLD CITIES 344 A=Ø 2001 DATA WHAT IS THE CAPITAL OF JA 346 PRINT :: PAN?, TOKYO 348 FOR I=1 TO 5 2002 DATA WHERE IS TRAFALGAR SQUARE 349 PRINT I;") "; ?, LONDON 350 IF I=J THEN 360 2003 DATA WHERE IS THE WESTERN WALL 352 PRINT ANS(T(A)) ?, JERUSALEM 354 A=A+1 2004 DATA WHERE IS THE COLISEUM?, RO 356 GOTO 37Ø ME 360 PRINT ANS (ANS) 2005 DATA WHERE IS THE RED SQUARE?, 37Ø NEXT I MOSCOW 372 PRINT 2006 DATA WHERE IS THE TAJ MAHAL?, A 38Ø PRINT 382 INPUT "ENTER YOUR ANSWER: ":N1 GRA 2007 DATA WHERE IS THE CAPITAL OF A 39Ø IF (N1<1)+(N1>5)THEN 38Ø FGHANISTAN?, KABUL 395 IF N1<>J THEN 43Ø 2008 DATA THE PARTHENON IS IN THIS 400 SC=SC+1 CITY, ATHENS 402 PRINT 2009 DATA CITY LEASED BY ENGLAND FR 4Ø4 PRINT TAB(9); "GOOD !" OM CHINA, HONG KONG 406 FOR I=1 TO 500 2010 DATA WHERE IS THE LINCOLN MEMO 408 NEXT I RIAL?, WASHINGTON 41Ø GOTO 46Ø 2011 DATA THIS CITY IS FAMOUS FOR I 43Ø PRINT TS CANALS, VENICE 432 PRINT "SORRY, THE ANSWER IS:" 3000 REM NEWSMAKERS 434 PRINT ANS (ANS) 3001 DATA PRESIDENT OF FRANCE, MITTE 44Ø PRINT RAND 442 PRINT "HIT (ENTER) TO CONTINUE" 3002 DATA FORMER SECRETARY OF STATE 45Ø INPUT Z\$ UNDER REAGAN, HAIG 46Ø NEXT CT 3003 DATA SOVIET FOREIGN MINISTER, G 500 CALL CLEAR ROMYKO 502 PRINT TL\$(N) 3004 DATA GERMAN CHANCELLOR, KOHL 51Ø PRINT :::: 3005 DATA SECRETARY OF TREASURY, REG 512 PRINT "TOTAL QUESTIONS ";TL 514 PRINT "CORRECT ANSWERS "; SC 3006 DATA CHAIRMAN OF SOVIET COMMUN 520 PRINT "YOUR SCORE IS ON THE ";T L\$(N); " TEST IS"; INT ((SC/TL) \$10 IST PARTY, CHERNENKO 3007 DATA CANADIAN PRIME MINISTER, T Ø+.5); "%." RUDEAU 53Ø PRINT 3008 DATA JAPANESE PRIME MINISTER, N 532 INPUT "WANT ANOTHER TEST (Y/N)? AKASONE 534 IF (Z\$<>"Y") * (Z\$<>"N") THEN 530 3009 DATA SECRETARY OF STATE, SHULTZ 3010 DATA MAYOR OF NEW YORK, KOCH 55Ø IF Z\$="Y" THEN 2ØØ 3011 DATA BRITISH PRIME MINISTER, TH 560 CALL CLEAR 562 STOP ATCHER BØØ RANDOMIZE 4000 REM COMPUTERS 8Ø1 T(I)=INT(RND*Q(N))+(N*11)-1Ø 4001 DATA THE BRAIN OF THE COMPUTER 802 IF T(I) = ANS THEN 800 IS CALLED, CENTRAL PROCESSING 81Ø RETURN UNIT 4002 DATA THE FASTEST WAY TO PROCES HISTORICAL FIGURES 1000 REM S DATA, MACHINE LANGUAGE 1001 DATA THE FIRST PRESIDENT, GEORG 4003 DATA A SIMPLE COMPUTER LANGUAG E WASHINGTON 1002 DATA FIRST CHIEF JUSTICE, JOHN E, BASIC 4004 DATA USES REVERSE POLISH NOTAT JAY ION, FORTH 1003 DATA INVENTED THE COTTON GIN, E 4005 DATA 8 BITS ON THE 6502, BYTE LI WHITNEY 1004 DATA PRESIDENT OF CONFEDERACY, 4006 DATA A 16-BIT MICROPROCESSOR, 6 JEFFERSON DAVIS 8000 4007 DATA TRANSFER DATA FROM MEMORY 1005 DATA WHO DEBATED LINCOLN?, STEP TO CPU, BUS HEN DOUGLAS 1006 DATA FAMOUS ABOLITIONIST, FREDE 4008 DATA DATA ARE PUSHED AND PULLE RICK DOUGLASS D HERE, STACK 4009 DATA USED FOR INDEXING, X REGIS 1007 DATA BRITISH NAVIGATOR, FRANCIS DRAKE TER 4010 DATA FASTEST COMPUTATIONS TAKE 1008 DATA THE THIRD PRESIDENT, THOMA PLACE HERE, PAGE ZERO S JEFFERSON DATA HE PRESIDED OVER THE NEW 4011 DATA A NUMBERING SYSTEM, HEXADE CIMAL DEAL, F. D. ROOSEVELT 5000 DATA HISTORICAL FIGURES, WORLD DATA WHO WAS ASSASSINATED IN D 1010 ALLAS?, JOHN F. KENNEDY CITIES, NEWSMAKERS, COMPUTERS @

C-W WANTEORN INTEREST

A Beginner's Guide To Typing In Programs

What Is A Program?

A computer cannot perform any task by itself. Like a car without gas, a computer has potential, but without a program, it isn't going anywhere. Most of the programs published in COMPUTE! are written in a computer language called BASIC. BASIC is easy to learn and is built into most computers (on some computers, you have to purchase an optional BASIC cartridge).

BASIC Programs

Each month, COMPUTE! publishes programs for many machines. To start out, type in only programs written for your machine, e.g., "TI Version" if you have a TI-99/4. Later, when you gain experience with your computer's BASIC, you can try typing in and converting certain programs from one computer to yours.

Computers can be picky. Unlike the English language, which is full of ambiguities, BASIC usually has only one "right way" of stating something. Every letter, character, or number is significant. A common mistake is substituting a letter such as O for the numeral 0, a lowercase I for the numeral 1, or an uppercase B for the numeral 8. Also, you must enter all punctuation such as colons and commas just as they appear in the magazine. Spacing can be important. To be safe, type in the listings *exactly* as they appear.

Braces And Special Characters

The exception to this typing rule is when you see the braces, such as {DOWN}. Anything within a set of braces is a special character or characters that cannot easily be listed in a printer. When you come across such a special statement, refer to the appropriate key for your computer. For example, if you have an Atari, refer to the "Atari" section in "How To Type COMPUTE!'s Programs."

About DATA Statements

Some programs contain a section or sections of DATA statements. These lines provide information needed by the program. Some DATA statements contain actual programs (called machine language); others contain graphics codes. These lines are especially sensitive to errors.

If a single number in any one DATA statement is mistyped, your machine could "lock up," or "crash." The keyboard, break key, and RESET (or STOP) keys may all seem "dead," and the screen

may go blank. Don't panic – no damage is done. To regain control, you have to turn off your computer, then turn it back on. This will erase whatever program was in memory, so always SAVE a copy of your program before you RUN it. If your computer crashes, you can LOAD the program and look for your mistake.

Sometimes a mistyped DATA statement will cause an error message when the program is RUN. The error message may refer to the program line that READs the data. The error is still in the DATA statements, though.

Get To Know Your Machine

You should familiarize yourself with your computer before attempting to type in a program. Learn the statements you use to store and retrieve programs from tape or disk. You'll want to save a copy of your program, so that you won't have to type it in every time you want to use it. Learn to use your machine's editing functions. How do you change a line if you made a mistake? You can always retype the line, but you at least need to know how to backspace. Do you know how to enter inverse video, lowercase, and control characters? It's all explained in your computer's manuals.

A Quick Review

- 1. Type in the program a line at a time, in order. Press RETURN or ENTER at the end of each line. Use backspace or the back arrow to correct mistakes.
- 2. Check the line you've typed against the line in the magazine. You can check the entire program again if you get an error when you RUN the program.
- 3. Make sure you've entered statements in braces as the appropriate control key (see "How To Type COMPUTE!'s Programs" elsewhere in the magazine).

We regret that we are no longer able to respond to individual inquiries about programs, products, or services appearing in COMPUTE! due to increasing publication activity. On those infrequent occasions when a published program contains a typo, the correction will appear on the CAPUTE! page, usually within eight weeks. If you have specific questions about items or programs which you've seen in COMPUTE!, please send them to Readers' Feedback, P.O. Box 5406, Greensboro, NC 27403.

How To Type COMPUTE!'s Programs

Many of the programs which are listed in COMPUTE! contain special control characters (cursor control, color keys, inverse video, etc.). To make it easy to tell exactly what to type when entering one of these programs into your computer, we have established the following listing conventions. There is a separate key for each computer. Refer to the appropriate tables when you come across an unusual symbol in a program listing. If you are unsure how to actually enter a control character, consult your computer's manuals.

Atari 400/800

Characters in inverse video will appear like: DECORDE Enter these characters with the Atari logo key, (A).

| When you see | Туре | See | |
|--------------|------------------|-----|------------------|
| (CLEAR) | ESC SHIFT < | - | Clear Screen |
| (UP) | ESC CTRL - | * | Cursor Up |
| (DOWN) | ESC CTRL = | + | Cursor Down |
| (LEFT) | ESC CTRL + | + | Cursor Left |
| (RIGHT) | ESC CTRL # | - | Cursor Right |
| (BACK S) | ESC DELETE | 4 | Backspace |
| (DELETE) | ESC CTRL DELETE | 13 | Delete character |
| (INSERT) | ESC CTRL INSERT | 13 | Insert character |
| (DEL LINE) | ESC SHIFT DELETE | G | Delete line |
| (INS LINE) | ESC SHIFT INSERT | | Insert line |
| (TAB) | ESC TAB | | TAB key |
| (CLR TAB) | ESC CTRL TAB | G | Clear tab |
| (SET TAB) | ESC SHIFT TAB | Đ | Set tab stop |
| (BELL) | ESC CTRL 2 | L3 | Ring buzzer |
| (ESC) | ESC ESC | €. | ESCape key |
| | | | |

Graphics characters, such as CTRL-T, the ball character • will appear as the "normal" letter enclosed in braces, e.g. (T).

A series of identical control characters, such as 10 spaces, three cursor-lefts, or 20 CTRL-R's, will appear as {10 SPACES}, {3 LEFT}, {20 R}, etc. If the character in braces is in inverse video, that character or characters should be entered with the Atari logo key. For example, (***) means to enter a reverse-field heart with CTRL-comma, {5 m} means to enter five inverse-video CTRL-U's.

Commodore PET/CBM/VIC/64

Generally, any PET/CBM/VIC/64 program listings will contain words within braces which spell out any special characters: {DOWN} would mean to press the cursor down key. {5 SPACES} would mean to press the space bar five times.

To indicate that a key should be *shifted* (hold down the SHIFT key while pressing the other key), the key would be underlined in our listings. For example, S would mean to type the S key while holding the shift key. If you find an underlined key enclosed in braces (e.g., {10 N}), you should type the key as many times as indicated (in our example, you would enter ten shifted N's). Some graphics characters are inaccessible from the keyboard on CBM Business models (32N, 8032).

Rarely, you'll see in a Commodore 64 program a solitary letter of the alphabet enclosed in braces. These characters can be entered by holding down the CTRL key while typing the letter in the braces. For example, {A} would indicate that you should press CTRL-A.

About the *quote mode*: you know that you can move the cursor around the screen with the CRSR keys. Sometimes a programmer will want to move the cursor under program control. That's why you see all the {LEFT}'s, {HOME}'s, and {BLU}'s in our programs. The only way the computer

can tell the difference between direct and programmed cursor control is the quote mode.

Once you press the quote (the double quote, SHIFT-2), you are in the quote mode. If you type something and then try to change it by moving the cursor left, you'll only get a bunch of reverse-video lines. These are the symbols for cursor left. The only editing key that isn't programmable is the DEL key; you can still use DEL to back up and edit the line. Once you type another quote, you are out of quote mode.

You also go into quote mode when you INSerT spaces into a line. In any case, the easiest way to get out of quote mode is to just press RETURN. You'll then be out of quote mode and you can cursor up to the mistyped line and fix it.

Use the following tables when entering special characters:

VIC And 64

| When You | | | When You | | | | |
|----------|--------------------|----------|----------|-------|-------|------|------|
| Read: | Pres | is: | See: | Read: | Pre | ess: | See: |
| (CLR) | SHIFT | CLR/HOME | | (GRN) | CTRL | 6 | # |
| {HOME} | | CLR/HOME | | {BLU} | CTRL | 7 | |
| {UP} | SHIFT | CRSR | | [YEL] | CTRL | 8 | |
| (DOWN) | THE REAL PROPERTY. | CRSR • | | {F1} | f1 | | |
| {LEFT} | SHIFT | CRSR - | | [F2] | f2 | | |
| (RIGHT) | | CRSR - | | {F3} | f3 | | |
| [RVS] | CTRL | 9 | | {F4} | f4 | | |
| {OFF} | CTRL | 0 | | {F5} | f5 | | |
| [BLK] | CTRL | 1 | | [F6] | f6 | | |
| {WHT} | CTRL | 2 | E | [F7] | f7 | | |
| {RED} | CTRL | 3 | F | [F8] | f8 | | |
| {CYN} | CTRL | 4 | | 4 | - | | * |
| [PUR] | CTRL | 5 | ** | 1 | SHIFT | 4 | m |

All Commodore Machines

| Clear Screen {CLR} | Cursor Left {LEFT} |
|----------------------|-------------------------|
| Home Cursor [HOME] | Insert Character [INST] |
| Cursor Up {UP} | Delete Character {DEL} |
| Cursor Down [DOWN] | Reverse Field On [RVS] |
| Cursor Right [RIGHT] | Reverse Field Off [OFF] |

Apple II / Apple II Plus

All programs are in Applesoft BASIC, unless otherwise stated. Control characters are printed as the "normal" character enclosed in braces, such as {D} for CTRL-D. Hold down CTRL while pressing the control key. You will not see the special character on the screen.

Texas instruments 99/4

The only special characters used are in PRINT statements to indicate where two or more spaces should be left between words. For example, ENERGY {10 SPACES} MANAGE-MENT means that ten spaces should be left between the words ENERGY and MANAGEMENT. Do not type in the braces or the words 10 SPACES. Enter all programs with the ALPHA LOCK on (in the down position). Release the ALPHA LOCK to enter lowercase text.

The Automatic Proofreader For VIC, 64, And Atari

Charles Brannon, Program Editor

At last there's a way for your computer to help you check your typing. ''The Automatic Proofreader'' will make entering programs faster, easier, and more accurate.

The strong point of computers is that they excel at tedious, exacting tasks. So why not get your computer

to check your typing for you?

With "The Automatic Proofreader" nestled in your VIC-20, Commodore 64, or Atari computer, every line you type in will be verified. It displays a special code, called a *checksum*, at the top of the screen. The checksum, either a number (VIC/64) or a pair of letters (Atari), corresponds to the line you've just typed. It represents every character in the line summed together. A matching code in the program listing lets you compare it to the checksum which the Proofreader displays. A glance is all it takes to confirm that you've typed the line correctly.

Entering The Automatic Proofreader

Commodore (VIC/64) owners should type in Program 1. Program 2 is for Atari users. Since the Proofreader is a machine language program, be especially diligent. Watch out for typing extra commas, or a letter O for a zero, and check every number carefully. If you make a mistake when typing in the DATA statements, you'll get the message "Error in DATA statements" when you RUN the program. Check your typing and try again.

When you've typed in The Automatic Proofreader, SAVE it to tape or disk at least twice before running it for the first time. If you mistype the Proofreader, it may cause a system crash when you first run it. By SAVEing a copy beforehand, you can reLOAD it and hunt for your error. Also, you'll want a backup copy of the Proofreader because you'll use it again and again—every time you enter a program from COMPUTE!.

When you RUN the Proofreader, the program will be POKEd safely into memory, then it will activate itself. If you ever need to reactivate it (RUN/STOP—RESTORE or SYSTEM RESET will disable it), just enter the command SYS 886 (VIC/64) or PRINT USR(1536) for the Atari.

Using The Proofreader

Now, let's see how it works. LIST the Proofreader program, move the cursor up to one of the lines, and press RETURN. If you've entered the Proofreader correctly, a checksum will appear in the top-left corner of your screen.

Try making a change in the line and hit RETURN. Notice that the checksum has changed. All VIC and 64 listings in COMPUTE! now have a number appended to the end of each line, for example, :rem 123. Don't

enter this statement. It is just for your information. The rem is used to make the number harmless if someone does type it in. It will, however, use up memory if you enter it, and it will cause the checksum displayed at the top of the screen to be different, even if you entered the rest of the line correctly.

The Atari checksum is found immediately to the left of each line number. This makes it impossible to type in the checksum accidentally, since a program

line must start with a number.

Just type in each line (without the printed checksum), and check the checksum displayed at the top of the screen against the checksum in the listing. If they match, go on to the next line. If they don't, there's a mistake. You can correct the line immediately, instead of waiting to find the error when you RUN the program.

The Proofreader is not picky with spaces. It will not notice extra spaces or missing ones. This is for your convenience, since spacing is generally not important. Occasionally proper spacing is important, but the article describing the program will warn you to be careful in these cases.

Nobody's Perfect

Although the Proofreader is an important aid, there are a few things to watch out for. If you enter a line by using abbreviations for commands, the checksum will not match up. This is because the Proofreader is very literal: It looks at the individual letters in a line, not at tokens such as PRINT. There is a way to make the Proofreader check such a line. After entering the line, LIST it. This makes the computer spell out the abbreviations. Then move the cursor up to the line and press RETURN. It should now match the checksum. You can check whole groups of lines this way. Atari users should beware of using? as an abbreviation for PRINT—they're not the same thing in the Proofreader's eyes.

The checksum is a sum of the ASCII values of the characters in a line. VIC and 64 owners may wonder why the numbers are so small, never exceeding 255. This is because the addition is done only in eight bits. A result over 255 will roll over past zero, like an odometer past 99999. On the Atari, the number is turned into two letters, both for increased convenience and to make the Proofreader shorter. For the curious, the letters correspond to the values of the left and right nybbles added to 33 (to offset them into the alphabet). This number is then stored directly into screen memory.

Due to the nature of a checksum, the Proofreader will not catch all errors. Since 1+3+5=3+1+5, the Proofreader cannot catch errors of transposition. In fact, you could type in the line in any order, and the Proofreader wouldn't notice. Anytime the Proofreader

seems to act strange, keep this in mind. Since the ASCII values of the number 18 (49 + 56) and 63 (54 + 51) both equal 105, these numbers are equal according to the Proofreader. There really is no simple way to catch these kinds of errors. Fortunately, the Proofreader will catch the majority of the typing mistakes most people make.

If you want the Proofreader out of your way, just press SYSTEM RESET or RUN/STOP—RESTORE. If you need it again, enter SYS 828 (VIC/64) or PRINT USR(1536) (Atari). You must disable the Proofreader before doing any tape operations on the VIC or 64.

Hidden Perils

The Proofreader's home in the VIC and 64 is not a very safe haven. Since the cassette buffer is wiped out during tape operations, you need to disable the Proofreader with RUN/STOP—RESTORE before you SAVE your program. This applies only to tape use. Disk users or Atari owners have nothing to worry about.

Not so for VIC and 64 owners with tape drives. What if you type in a program in several sittings? The next day, you come to your computer, LOAD and RUN the Proofreader, then try to LOAD the partially completed program so you can add to it. But since the Proofreader is trying to hide in the cassette buffer, it is wiped out!

What you need is a way to LOAD the Proofreader after you've LOADed the partial program. The problem is, a tape load to the buffer destroys what it's supposed to load.

After you've typed in and RUN the Proofreader, enter the following lines in direct mode (without line numbers) exactly as shown:

```
A$="PROOFREADER.T": B$="{10 SPACES}": FOR
   X = 1 TO 4: A$=A$+B$: NEXTX
```

FOR X = 886 TO 1018: A\$=A\$+CHR\$(PEEK(X)): NEXTX

OPEN 1,1,1,A\$:CLOSE1

After you enter the last line, you will be asked to press record and play on your cassette recorder. Put this program at the beginning of a new tape. This gives you a new way to load the Proofreader. Anytime you want to bring the Proofreader into memory without disturbing anything else, put the cassette in the tape drive, rewind, and enter:

OPEN1:CLOSE1

You can now start the Proofreader by typing SYS 886. To test this, PRINT PEEK(886) should return the number 173. If it does not, repeat the steps above, making sure that A\$ ("PROOFREADER.T") contains 13 characters and that B\$ contains 10 spaces.

You can now reload the Proofreader into memory whenever LOAD or SAVE destroys it, restoring your

personal typing helper.

Incidentally, you can protect the cassette buffer on the Commodore 64 with POKE 178, 251. This POKE should work on the VIC, but it has caused numerous problems, probably due to a bug in the VIC operating system. With this POKE, the 64 will not wipe out the cassette buffer during tape LOADs and SAVEs.

Program 1: VIC/64 Proofreader

- 100 PRINT"{CLR}PLEASE WAIT...":FORI=886TO 1018: READA: CK=CK+A: POKEI, A: NEXT
- IF CK<>17539 THEN PRINT"{DOWN}YOU MAD E AN ERROR": PRINT" IN DATA STATEMENTS. ": END
- 120 SYS886:PRINT"{CLR}{2 DOWN}PROOFREADER ACTIVATED.": NEW
- 886 DATA 173,036,003,201,150,208
- 892 DATA ØØ1, Ø96, 141, 151, ØØ3, 173
- 898 DATA Ø37, ØØ3, 141, 152, ØØ3, 169
- 904 DATA 150,141,036,003,169,003
- 910 DATA 141,037,003,169,000,133
- 916 DATA 254,096,032,087,241,133
- 922 DATA 251,134,252,132,253,008
- 928 DATA 201,013,240,017,201,032
- 934 DATA 240,005,024,101,254,133
- 940 DATA 254,165,251,166,252,164
- 946 DATA 253,040,096,169,013,032
- 952 DATA 210,255,165,214,141,251
- 958 DATA 003,206,251,003,169,000
- 964 DATA 133,216,169,019,032,210
- 970 DATA 255,169,018,032,210,255
- 976 DATA 169,058,032,210,255,166
- 982 DATA 254,169,000,133,254,172
- 988 DATA 151,003,192,087,208,006
- 994 DATA Ø32,2Ø5,189,Ø76,235,ØØ3 1000 DATA 032,205,221,169,032,032
- 1006 DATA 210,255,032,210,255,173
- 1012 DATA 251,003,133,214,076,173
- 1018 DATA 003

Program 2: Atari Proofreader

- GRAPHICS Ø 100
- FOR I=1536 TO 1700: READ A: POKE I A: CK=CK+A: NEXT
- IF CK<>19072 THEN ? "Error in DA TA statements. Check typing": END
- 13Ø A=USR(1536)
- 14Ø ? :? "Automatic Proofreader now activated."
- 15Ø END
- 1536 DATA 104,160,0,185,26,3
- 1542 DATA 201,69,240,7,200,200
- 1548 DATA 192,34,208,243,96,200
- 1554 DATA 169,74,153,26,3,200 1560 DATA 169,6,153,26,3,162
- 1566 DATA Ø, 189, Ø, 228, 157, 74
- DATA 6,232,224,16,208,245 1572
- 1578 DATA 169,93,141,78,6,169
- 1584 DATA 6,141,79,6,24,173
- 1590 DATA 4,228,105,1,141,95
- 1596 DATA 6,173,5,228,105,0
- DATA 141,96,6,169,0,133 1602
- 1608 DATA 203,96,247,238,125,241
- DATA 93,6,244,241,115,241 1614
- 1620 DATA 124,241,76,205,238,0
- 1626 DATA 0,0,0,0,32,62
- 1632 DATA 246, 8, 201, 155, 240, 13
- 1638 DATA 201,32,240,7,72,24
- 1644 DATA 101,203,133,203,104,40
- 1650 DATA 96,72,152,72,138,72
- 1656 DATA 160,0,169,128,145,88
- 1662 DATA 200,192,40,208,249,165
- 1668 DATA 203,74,74,74,74,24
- 1674 DATA 105,161,160,3,145,88
- 1680 DATA 165,203,41,15,24,105
- 1686 DATA 161,200,145,88,169,0
- 1692 DATA 133,203,104,170,104,168 1698 DATA 104,40,96

Missile Math

Garry S. Wick

Educational programs are usually designed to reward correct answers. "Missile Math" does this, but also gives extra points for speed. Here's an entertaining way for young students to learn their math. Versions for the Atari, Commodore VIC-20 and 64, the TI-99/4A, Apple, and IBM PC/PCjr.

"Missile Math" starts with an animated introduction screen, then a joystick-controlled menu appears on the screen. You have a choice of addition and subtraction or multiplication and division at a slow or fast speed. Using the joystick to select the menu item eliminates possible errors from incorrect typing. The joystick does not give any unacceptable entries when the fire button is pressed to start the game.

Different Difficulty Levels

After a short pause for the initialization of the player/missile figures, the player sees a screen that displays ENTERING LEVEL 1. As you advance from one level to the next, the math problems become increasingly difficult.

The problem appears at the top of the screen. On the bottom there are five possible answers, together with a missile gun which you control with the joystick. The object is to position the gun over the correct answer and launch a missile so that it destroys an enemy spaceship as it traverses the screen. On the upper left corner of the screen are spades representing the number of remaining guns. You begin with three guns. The score is displayed in the upper right corner of the screen.

A special kind of problem appears in random locations. For example, you could see 3+4=? or 3+?=7 or ?+4=7. Addition and subtraction are combined. It is similar for multiplication and division. The correct answer randomly appears in one of five possible locations, so the player never knows in advance where to position the gun. The values of the incorrect answers are chosen so that the correct answer is not obvious. This discourages guessing.

A Feisty UFO

The UFO moves across the screen at three different heights. The first height is near the top of the screen, and on the two successive flights, the UFO moves closer to the position of the gun. Of course, if the player destroys the UFO on the first pass, it does not appear at the lower altitudes. Instead a new problem appears, and the UFO starts again at the highest position.

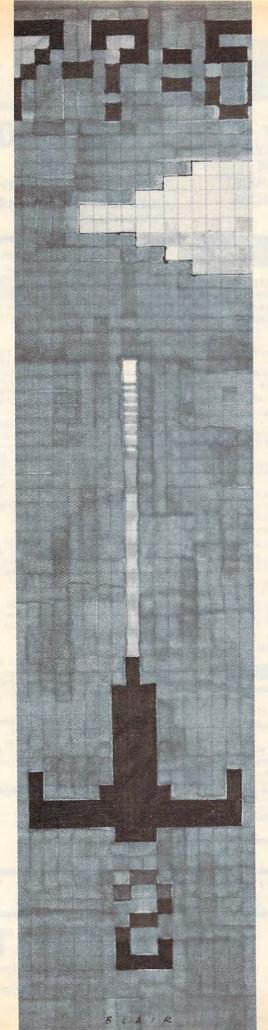
It is most difficult to destroy the UFO at the highest altitude because there is less time to calculate the correct answer and to fire the missile at the right time to hit the UFO. Destroying the UFO at the middle altitude is easier, and at the lowest altitude, it is easiest. Thus the player gets 25 points for a correct hit on the first pass, 10 points for the second pass, and 5 points for the third pass. When the gun is positioned over the correct answer and scores a hit, the UFO explodes with sound effects, disappears, and the number of points earned appears in its place. Then a new problem appears on the screen.

If you score a direct hit on the UFO, but have the gun over an incorrect answer, the UFO briefly changes colors, makes a funny sound and continues on its way. You must then try again on the next pass of the UFO. Three consecutive misses or incorrect answers and the UFO destroys the gun and one of the spades disappears. Sound effects accompany the disappearance of the spade and the correct answer blinks on and off as an encouraging message flies onto the screen. The game ends when all three guns have been destroyed.

To advance to the next level, you must score 50 points. If the present level is too easy, you can enter the next level by solving as few as two problems, receiving 25 points for each correct answer. If you only succeed in destroying the UFO on its third pass each time, then you will have to solve ten problems before moving to the next level. Thus you get more practice on problems that stretch your abilities. You can quickly pass by the problems that you find easy.

Bonus Points

You can earn the 50 points necessary to advance to higher levels with any combination of 5, 10, or 25 points, but you can earn bonus points for speed and accuracy. If the average score for the problems solved in a level is 25, the player receives 50 bonus points. The only way to get 50 bonus points is to score correct hits on the first two problems in a level during the first pass of



the UFO. If you average ten points or better per problem (but less than 25), you will earn 25 bonus points. There are no bonus points if you average less than ten points per problem. Bonus points are displayed with suitable fanfare.

There are a few features of Program 1 that require special mention. The joystick-controlled menu appears in Program 1 at lines 5000 through 5230. It uses screen memory locations to identify the choices available so that it is impossible to make an incorrect entry and cause an error

Player/Missile Machine Language

The UFO is Atari Player 1 and the explosion character is Player 3. In order to rapidly exchange them when a correct hit has occurred, it is necessary that the two players always be at the same vertical position. (Then it is easy to POKE the UFO horizontally off the screen and to POKE the explosion at the former position of the UFO.)

BASIC was too slow to move both players vertically. A machine language program to move two players vertically lower on the screen is in lines 4000–4060. The parameters for the current location and length of the players are set by the subroutine at line 3500.

It is a little tricky and not at all obvious how to determine when the gun is over the correct answer. The playfield characters (the answers) and the players use different coordinate systems. It is necessary to establish an equation that maps one coordinate system to the other. The appropriate equations are:

$$X(P/M) = 4*X(Playfield) + 45$$

 $Y(P/M) = 4*Y(Playfield) + 17$

where X and Y are the horizontal and vertical coordinates respectively. The X equation is used in line 2510 to determine whether the gun is over the correct answer, and the Y equation is used in line 3025 to position the number of points earned at the same height as the explosion of the UFO.

Program 1: Atari Missile Math

Refer to the "Automatic Proofreader" article before typing this program in.

JB 10 DIM M\$(20), MIS\$(13), BL\$(40), A\$
(6), B\$(6), C\$(6), CH(5), KEEP\$(21)

HL 15 GRAPHICS 2+16

BD 20 BL\$=" ":BL\$(20)=" ":BL\$(2)=BL\$

BB 30 MIS\$="MISSILE MATH "

AN 60 FOR I=1 TO 15

BK 70 BL\$(20-I, 20)=MIS\$
AI 80 SOUND 0,75-I,8,I

PA 90 POSITION 0,5:? #6; BL\$: NEXT I

HM 100 RESTORE 110:FOR I=1 TO 35: REA
D A:SOUND 0,A,10,8:FOR J=1 TO
45: NEXT J:NEXT I

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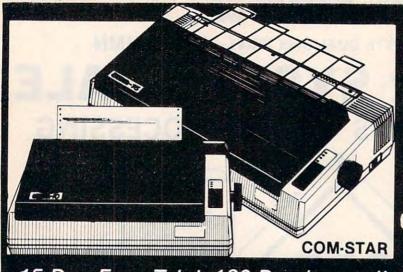
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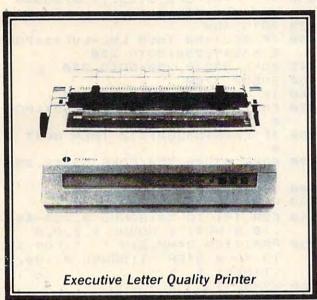
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PE 110 DATA 81,81,81,60,60,60,60,60, $X1 < 21\emptyset$): X1 = X1 - 4*((ST=11) + (X1)60,60,60,60,81,81,81,60,68,72 >4Ø)):POKE 53249,X1 BN 410 IF STRIG(0) = 0 AND SHT=0 THEN ,81,81,81,81,81,81,81 CP 111 DATA Ø, 81, 81, 81, 81, 60, 60, 60, 6 GUN=1:POKE PMBASE+384+Y1,Ø:Y1 0,60,60,60 =102:XM1=X1+7:POKE 53253,XM1: N 120 FOR I=0 TO 15 SHT=1 PC 415 IF GUN=1 THEN GOSUB 2000 J6 13Ø BL\$=BL\$(2,2Ø-I):SOUND Ø,75-I, IF HIT=1 THEN HIT=0:GOTO 440 AE 420 8, I CE 43Ø NEXT XØ: POKE 53253, 25Ø: SOUND POSITION Ø,5:? #6;BL\$:NEXT I: SOUND Ø, Ø, Ø, Ø Ø, Ø, Ø, Ø: GUN=Ø 60 435 GOTO 45Ø DA 150 FOR I=1 TO 250: NEXT I MH 440 IF SCL>=50 THEN LVL=LVL+1:POK NL 160 GOSUB 4000 E 53249,250:GOTO 220 GOSUB 5000 NN 170 JO 445 POKE 53249,250:GOTO 230 NI 175 ? CHR\$(125):? :? "TD PLAY: ":? "POSITION GUN OVER CORREC 00 45Ø GOSUB 37ØØ IC 46Ø IF YØ<1ØØ THEN GOTO 38Ø T ANSWER": ? "AND SHOOT THE UF AM 470 FOR X0=205 TO 30 STEP -DX:POK 0. " ? :? :? "BE CAREFUL NOT TO WA E 53248, XØ 60 180 ED 480 IF PEEK (53260) <> 2 THEN NEXT X STE SHOTS." ? :? :? :? "PLEASE WAIT A Ø OL 185 OE 490 POKE 53248,250:POKE 53249,250 MOMENT...." : POKE 53250, XØ NH 200 GOSUB 5500 NP 500 GOSUB 2800 CN 210 LVL=1:SC=0:NP=3:HIT=0:GUN=0:X EM 53Ø POSITION 2*NP, 2:? "*" 1=165 IB 540 FOR I=1 TO 30: SOUND 0, 250-4*I MM 220 ? CHR\$(125):POKE 752,1:POSITI , 10,8:NEXT I:SOUND Ø,Ø,Ø,Ø ON 12,10:SETCOLOR 2,2,10:SETC OLOR 1,2,0:? "ENTERING LEVEL POSITION 2*NP, Z:? " ":FOR I= "; LVL 15 TO Ø STEP -1: SOUND Ø, 100, Ø CB 225 PB=Ø:SCL=Ø , I:NEXT I HC 56Ø NP=NP-1 IF 226 RESTORE 110:FOR I=1 TO 35:REA D A: SOUND Ø, A, 1Ø, 8: FOR J=1 TO EC 565 FOR I=1 TO 10 20: NEXT J: NEXT I: SOUND 0,0,0 FF 57Ø POSITION 6*DT, 21:? " . 0 {4 SPACES}" FK 575 K=INT (RND (Ø) *15) JE 23Ø A=INT(RND(Ø) *4+1) +4*(LVL-1) KI 580 FOR J=40 TO 25 STEP -1: SOUND IM 235 B=INT(RND(Ø) *4*LVL+1) DE 24Ø IF MENU=1 THEN C=A+B:GOTO 255 Ø, J-K, 1Ø, 8: NEXT J PF 59Ø POSITION 6*DT, 21:? ANS ME 250 C=A*B AJ 255 A\$=STR\$(A):B\$=STR\$(B):C\$=STR\$ FN 600 K=INT(RND(0) *15): FOR J=40 TO (C) 25 STEP -1:SOUND Ø, J-K, 10,8:N NC 26Ø RP=INT(RND(Ø) *4)+1 EXT J:NEXT I:SOUND Ø,Ø,Ø,Ø FB 61Ø BL\$=" ":BL\$(38)=" ":BL\$(2)=BL\$ FO 27Ø IF RP=1 THEN ANS=A: A\$=CHR\$(63 6E 62Ø KEEP\$="KEEP TRYING " 6C 28Ø IF RP=2 THEN ANS=B:B\$=CHR\$(63 HK 63Ø FOR I=1 TO 23:BL\$(38-I,38)=KE EP\$ BK 29Ø IF RP=3 OR RP=4 THEN ANS=C:C\$ 60 64Ø SOUND Ø, 9Ø-I, 8, INT (1/2)+3:POS =CHR\$ (63) ITION Ø, 9:? BL\$: NEXT I 60 295 FOR I=1 TO 500:NEXT I:? CHR\$(FF 65Ø BL\$=" ":BL\$(38)=" ":BL\$(2)=BL 125): POSITION 13,5: SETCOLOR 1 , Ø, 14: SETCOLOR 2, Ø, 2 ON 660 KEEP\$="I KNOW YOU CAN DO IT " EJ 300 IF MENU=1 THEN ? A\$;" 10 670 FOR I=1 TO 28:BL\$(38-I,38)=KE " = ";C\$:GOTO 320 EP\$ A0 31Ø ? A\$; " X "; B\$; " = "; C\$ FK 68Ø SOUND Ø, 1ØØ-I, 8, INT(I/2): POSI EJ 32Ø FOR I=1 TO NP: POSITION 2*I, 2: TION Ø, 11:? BL\$: NEXT I ? CHR\$(123):NEXT I IJ 690 RESTORE 110: FOR I=1 TO 35: REA NC 34Ø POSITION 25,2:? "SCORE ";SC:P D A: SOUND Ø, A, 10, B: FOR J=1 TO 10:NEXT J:NEXT I:SOUND Ø,Ø,Ø B=PB+1 60 345 IF ANS>9Ø THEN DEL=10:GOTO 36 , Ø IF NP=Ø THEN GOTO 715 D6 700 DA 346 IF ANS>20 THEN DEL=5:GOTO 360 GN 71Ø SOUND Ø, Ø, Ø, Ø: GOTO 23Ø AF 35Ø DEL=INT((ANS/1Ø)+1) DH 715 GRAPHICS 18: POSITION 5,2:? #6 "SCORE "; SC MK 36Ø DT=INT(RND(Ø) *5)+1 F0 37Ø FOR I=1 TO 5:CH(I)=ANS+(I-DT) PI 720 POSITION 4,6:? #6; "PUSH TRACE *DEL:POSITION 6*I,21:? CH(I): EE": POSITION 3,7:? #6; "TO PLE NEXT I Y BEEFEL!" KI 740 IF STRIG(0) = 0 THEN SOUND 0,0, OH 375 GOSUB 3500 M6 38Ø POKE 53278,1:SHT=Ø Ø, Ø: GOTO 17Ø AM 390 FOR X0=200 TO 25 STEP -DX:POK II 750 RESTORE 110: FOR I=1 TO 35: REA E 53248, XØ D A: SOUND Ø, A, 10, 8: FOR J=1 TO OC 400 ST=STICK(0): X1=X1+4*((ST=7)+(12: NEXT J: NEXT I: SOUND Ø, Ø, Ø, Ø

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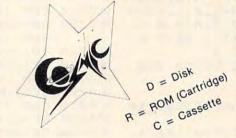


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| Data Basa (D) Word Processor(b) | \$6 | | ore. | ca |
| | - | | THE REAL PROPERTY. | 1 |

IK 3120 POSITION 30,2:? " ":SC HB 760 GOTO 740 HF 77Ø END KH 313Ø RETURN EB 1999 REM MISSILE MOVEMENT AG 3499 REM CHANGE UFO HEIGHT FL 2000 YH1=Y1 PB 3500 FOR I=PMBASE+512+Y01 TO PMBA SE+518+YØ1:GOSUB 36ØØ:POKE I HG 2010 Y1=Y1-5 PF 2020 IF Y1 (5 THEN GUN=0: SOUND 0.0 .Ø: NEXT I .Ø.Ø:RETURN AF 351Ø FOR I=PMBASE+768+YØ1 TO PMBA 61 2030 POKE PMBASE+384+YH1, Ø: POKE P SE+776+YØ1:GOSUB 3600:POKE I MBASE+384+Y1,4:SOUND Ø,Y1,8, .Ø: NEXT I PE 3520 $Y\emptyset = 4\emptyset$ JB 2035 IF PEEK (53257) <>3 THEN RETURN 61 353Ø RESTORE 3535: FOR I=PMBASE+51 AN 2040 GOSUB 2500 2+YØ TO PMBASE+518+YØ:GOSUB MA 2050 POKE 77,0 3600: READ A: POKE I, A: NEXT A6 2100 POKE PMBASE+384+Y1, 0:GUN=0:P FO 3535 DATA 24,60,255,255,255,60,24 OKE 53278,1:SOUND Ø,Ø,Ø,Ø:RE HN 354Ø RESTORE 3545: FOR I=PMBASE+76 TURN 8+YØ TO PMBASE+776+YØ:GOSUB MG 2499 3600: READ A: POKE I, A: NEXT I REM CHECK COLLISION KL 2500 REM 6F 3545 DATA 16,68,82,137,66,161,34, CL 251Ø XCOR=4*6*DT+45 68,16 PH 252Ø IF XM1<XCOR+15 AND XM1>XCOR-FC 3546 YØ1=YØ 3 THEN GOSUB 3000: HIT=1:GOTO IJ 355Ø PM1=PMBASE+512+YØ:PM2=PMBASE 2540 +768+YØ BD 253Ø GOSUB 27ØØ JK 3560 POKE 204, INT (PM1/256): POKE 2 Ø7, INT (PM2/256) DM 254Ø GUN=Ø: RETURN HI 2699 REM UFO CLUNKS OK 357Ø POKE 203, PM1-(PEEK (204) *256) CE 2700 POKE 704,14 -1:POKE 206,PM2-(PEEK(207) *2 E0 2710 FOR I=1 TO 25: SOUND 0.150+I. 56)-1 68 358Ø POKE 2Ø5,7:POKE 2Ø8,9 10.8: NEXT I PN 2720 SOUND 0,0,0,0:POKE 704,24:PO LB 359Ø RETURN KE 53278,1 BH 3600 ST=STICK(0): X1=X1+4*((ST=7)+ KM 273Ø RETURN $(X1<21\emptyset)): X1=X1-4*((ST=11)+($ AJ 2799 REM EXPLOSION SOUND X1>4Ø)):POKE 53249,X1 BF 2800 FOR I=1 TO 2:N=INT(10*RND(0) KK 3610 RETURN 08 3699 REM UFO DOWN +1) *10 KG 3700 Y0=Y0+20 M 2810 FOR L=15 TO Ø STEP -1:SOUND 60 371Ø FOR I=1 TO 2Ø Ø, N, Ø, L: SOUND 1, N+1, Ø, L: SOUN PM 372Ø AB=USR (1536): BA=USR (1551): GO D 2, N+2, Ø, L: SOUND 3, N/2, Ø, L PH 2820 FOR J=1 TO 10: NEXT J: NEXT L SUB 3600: NEXT I FB 3725 YØ1=YØ CE 283Ø POKE 53258, 3: NEXT I IM 2840 POKE 53258, 1: POKE 53250, 250 KN 373Ø RETURN LP 3999 REM VERTICAL MOVEMENT DOWN KP 285Ø RETURN GB 2999 REM DIRECT HIT LB 4000 RESTORE 4050 AF 3000 POKE 53248,250:POKE 53250, X0 HF 4010 FOR I=1536 TO 1565 :POKE 53253,250 AE 4020 READ A: POKE I, A: NEXT I 60 3Ø25 POSITION 6*DT, INT((YØ-14)/4) KH 4030 RETURN JK 3030 IF Y0=40 THEN SC=SC+25:SCL=S NI 4050 DATA 104,164,205,177,203,200 CL+25:? "25" ,145,203,136,136,16,247,230, IL 3040 IF Y0=60 THEN SC=SC+10:SCL=S 203,96 CL+10:? "10" OF 4060 DATA 104, 164, 208, 177, 206, 200 AK 3050 IF Y0=80 THEN SC=SC+5:SCL=SC ,145,206,136,136,16,247,230, L+5:? "5" 206,96 BH 3055 GOSUB 2800 PI 4999 REM MENU 68 3060 POSITION 30,2:? " ";SC:FOR I AN 5000 GRAPHICS 0:? CHR\$ (125):POKE 752,1 =1 TO 250: NEXT I AJ 3070 IF SCL>=50 AND SCL/PB>20 THE POSITION 11,2:? "MISSILE MAT 00 5020 N POSITION 13,12:HU=5:? "5Ø H MENU" BONUS POINTS": SC=SC+5Ø: GOTO MM 5030 ? :? "MOVE JOYSTICK AND PUSH 3090 TRIGGER": ? "TO SELECT GAME" EJ 3Ø8Ø IF SCL>=5Ø AND SCL/PB>=1Ø TH BC 5060 Ms="(Q)(W)(E)(DOWN)(3 LEFT) EN POSITION 13,12:HU=4:? "25 (A) (D) (DOWN) (3 LEFT) (Z) (X) (C)" BONUS POINTS": SC=SC+25: GOTO 3090 SE 5070 POSITION 8, 11:? "ADDITION & NA 3Ø85 GOTO 313Ø (4 SPACES) MULTIPLICATION" EA 3090 FOR I=1 TO 3 KD 5075 POSITION 8,12:? "SUBTRACTION KF 3100 SETCOLOR 2, HU, 4: SOUND 0, 25, 1 (3 SPACES) & DIVISION" Ø,8:FOR J=1 TO 50:NEXT J ? :? :? "SLOW(4 SPACES)(UP)" EP 5080 AN 3110 SETCOLOR 2,0,2:SOUND 0,75,10 ,8:FOR J=1 TO 50:NEXT J:NEXT ? :? :? "FAST(4 SPACES)(UP)" DN 5Ø85 I:SOUND Ø,Ø,Ø,Ø:SOUND 1,Ø,Ø,Ø : M\$

LK 5090 POSITION 25,14:? M\$:POSITION 25,18:? M\$ HF 5100 SCR=PEEK(88)+256*PEEK(89):XC =611:MENU=1:DX=1 BN 5110 POKE SCR+XC, 83: FOR DLY=1 TO 50: NEXT DLY 00 512Ø POKE SCR+XC, Ø: FOR DLY=1 TO 5 Ø: NEXT DLY AB 513Ø IF STRIG(Ø) = Ø THEN GOTO 523Ø LB 5135 ST=STICK (Ø) DK 514Ø IF ST=7 AND XC=611 THEN XC=6 26: MENU=2 NB 515Ø IF ST=13 AND XC=611 THEN XC= 771:DX=3 NO 516Ø IF ST=13 AND XC=626 THEN XC= 786: DX=3 GH 517Ø IF ST=11 AND XC=626 THEN XC= 611: MENU=1 ND 518Ø IF ST=14 AND XC=771 THEN XC= 611:DX=1 EN 519Ø IF ST=7 AND XC=771 THEN XC=7 86: MENU=2 GP 5200 IF ST=11 AND XC=786 THEN XC= 771: MENU=1 NJ 521Ø IF ST=14 AND XC=786 THEN XC= 626: DX=1 MJ 522Ø GOTO 511Ø KK 523Ø RETURN JP 5499 REM INITIALIZE PM GRAPHICS JA 5500 X1=250:Y1=95:X0=250:Y0=40 00 551Ø J=PEEK(1Ø6)-8:POKE 54279, J:P MBASE=256*J AE 552Ø POKE 559,46:POKE 53277,3 LN 553Ø POKE 53256, 1: POKE 53257, 1: PO KE 53258,1:POKE 53260,1 LK 554Ø FOR I=PMBASE+384 TO PMBASE+8 96: POKE I, Ø: NEXT I P6 557Ø RESTORE 558Ø: FOR I=PMBASE+64 Ø+Y1 TO PMBASE+649+Y1:READ A :POKE I, A: NEXT I AA 5580 DATA 8,8,8,8,8,28,127,127,54 ,54 IC 5610 POKE 704, 24: POKE 705, 200: POK E 706,14 PH 5620 POKE 53248, X0: POKE 53249, X1: POKE 53250, XØ KO 563Ø RETURN

Program 2:

VIC Missile Math, Machine Language

Refer to the "Automatic Proofreader" article before typing this program in.

12288 :160,000,141,106,003,152,050 12294 :153,064,003,200,192,120,226 12300 :208,248,169,001,141,068,079 12306 :003,032,102,048,096,032,075 12312 :001,049,173,062,003,072,128 12318 :168,169,035,153,206,017,010 12324 : 200, 169, 036, 153, 206, 017, 049 12330 :200,169,037,153,206,017,056 12336 :104,168,162,000,173,068,211 12342 :003,153,206,149,200,232,229 12348 :224,003,208,244,172,062,205 12354 :003,096,172,062,003,162,052 12360 :000,169,032,153,206,017,137 12366 : 200, 232, 224, 003, 208, 245, 166 12372 :172,062,003,200,169,032,210 12378 :153,184,017,169,007,153,005

12384 :184,149,172,062,003,096,250 12390 :169,207,141,019,145,173,188 12396 :017,145,141,070,003,169,141 12402 :127,141,034,145,173,032,254 12408 :145,073,255,041,128,013,007 12414 :070,003,041,176,141,074,119 12420 :003,169,255,141,034,145,111 12426 :173,074,003,201,048,240,109 12432 :054,201,016,208,019,173,047 12438 :112,003,205,100,003,240,045 12444 :005,169,001,141,092,003,055 12450 :173,100,003,141,112,003,182 12456 :173,074,003,201,032,208,091 12462 :010,172,078,003,192,000,117 12468 : 240,003,206,078,003,201,143 12474 :176,208,010,172,078,003,065 12480 :192,003,176,003,238,078,114 12486 :003,172,078,003,185,252,123 12492 :048,141,062,003,072,152,170 12498 : 072, 032, 023, 048, 104, 168, 145 12504 : 104,172,078,003,204,066,075 12510 :003,240,012,172,066,003,206 12516 :185,252,048,141,062,003,151 12522 :032,068,048,172,078,003,123 12528 :140,066,003,173,092,003,205 12534 :240,003,032,065,049,096,219 12540 :003,007,011,015,019,024,075 12546 :173,062,003,105,206,133,172 12552 :253,169,017,105,000,133,173 12558 : 254,056,165,253,233,021,228 12564 :133,253,165,254,233,000,034 12570 :133,254,024,165,253,105,192 12576 :000,133,253,165,254,105,174 12582 :132,133,254,169,002,160,120 12588 :000,145,253,056,165,253,148 12594 : 233,000,133,253,165,254,064 12600 :233,132,133,254,169,038,247 12606 :145,253,096,169,022,141,120 12612 :104,003,162,005,160,021,011 12618 :189,021,050,133,163,189,051 12624 :253,049,133,164,202,189,046 12630 :021,050,133,168,189,253,132 12636 :049,133,169,032,212,050,225 12642 :177,163,201,038,144,061,114 12648 :201,040,176,057,072,177,059 12654 :168,201,057,144,013,104,029 12660 :140,110,003,032,203,049,141 12666 :172,110,003,076,129,049,149 12672 :104,145,168,024,165,168,134 12678 : 105,000,133,168,165,169,106 12684 :105,132,133,169,169,002,082 12690 :145,168,056,165,168,233,057 12696 :000,133,168,165,169,233,252 12702 :132,133,169,169,032,145,170 12708 :163,136,016,183,232,232,102 12714 : 224,023,208,154,206,104,065 12720 :003,173,104,003,016,144,107 12726 :169,032,141,092,016,141,005 12732 :096,016,141,100,016,141,186 12738 :104,016,136,169,000,141,248 12744 :092,003,096,072,173,133,001 12750 :003,205,078,003,208,015,206 12756 :032,228,050,104,169,000,027 12762 :072,169,003,141,132,003,226 12768 :076,231,049,104,177,168,005 12774 : 072, 104, 096, 024, 169, 206, 133 12780 :109,062,003,133,253,169,197 12786 :017,105,000,133,254,169,152 12792 :000,141,065,049,096,016,103

| 12798 | |
|-----------|--|
| 12804 | :016,016,016,016,016,017,101 |
| 12810 | :017,017,017,017,017,017,112 |
| 12816 | :017,017,017,017,017,000,101 |
| 12822 | :022,044,066,088,110,132,228 |
| 12828 | :154,176,198,220,242,008,002 |
| 12834 | :030,052,074,096,118,140,032 |
| 12840 | :162,184,206,228,250,173,219 |
| 12846 | :106,003,208,029,169,110,159 |
| 12852 | :133,251,169,016,133,252,238 |
| 12858 | :160,019,140,096,003,169,133 |
| 12864 | :005,141,098,003,169,001,225 |
| 12870 | :141,106,003,169,000,141,118 |
| 12876 | :100,003,096,173,100,003,039 |
| 12882 | :201,003,144,013,169,000,100 |
| 12888 | :141,106,003,169,002,141,138 |
| 12894 | :132,003,076,211,050,172,226 |
| 12900 | :096,003,169,058,145,251,054 |
| 12906 | :200,169,060,145,251,200,107 |
| 12912 | :169,062,145,251,172,096,239 |
| 12918 | :003,200,200,200,169,032,154 |
| 12924 | :145,251,200,145,251,200,036 |
| 12930 | :145,251,172,096,003,024,053 |
| 12936 | :165,251,105,000,133,251,017 |
| 12942 | |
| 12948 | :165,252,105,132,133,252,157 |
| 5 1 1 1 1 | :173,098,003,145,251,200,250 :145,251,200,145,251,056,178 |
| 12954 | :145,251,200,145,251,056,178 |
| 12960 | :165,251,233,000,133,251,169 |
| 12966 | :165,252,233,132,133,252,053 |
| 12972 | :206,096,003,173,096,003,237 |
| 12978 | :208,031,169,032,145,251,246 |
| 12984 | :136,145,251,136,145,251,224 |
| 12990 | :024,165,251,105,132,133,232 |
| 12996 | :251,165,252,105,000,133,078 |
| 13002 | :252,160,019,140,096,003,104 |
| 13008 | :238,100,003,096,072,152,101 |
| 13014 | :072,138,072,160,050,136,074 |
| 13020 | :208,253,104,170,104,168,203 |
| 13026 | :104,096,169,015,141,014,253 |
| 13032 | :144,169,128,141,013,144,203 |
| 13038 | :162,255,032,212,050,202,127 |
| 13044 | :208,250,169,000,141,014,002 |
| 13050 | :144,169,032,145,168,172,056 |
| 13056 | :096,003,200,169,000,145,101 |
| 13062 | :251,200,169,000,145,251,254 |
| 13068 | :200,169,000,145,251,024,033 |
| 13074 | :165,251,105,000,133,251,155 |
| 13080 | :165,252,105,132,133,252,039 |
| 13086 | :172,096,003,200,145,251,129 |
| 13092 | :200,145,251,200,145,251,204 |
| 13098 | :056,165,251,233,000,133,112 |
| 13104 | :251,165,252,233,132,133,190 |
| 13110 | :252,162,255,032,212,050,249 |
| 13116 | :202,208,250,202,208,253,103 |
| 13122 | :096,160,000,185,000,128,123 |
| 13128 | :153,000,020,200,208,247,132 |
| 13134 | :160,000,185,000,129,153,193 |
| 13140 | :000,021,200,208,247,160,152 |
| 13146 | :000,185,000,130,153,000,046 |
| 13152 | :022,200,208,247,160,000,165 |
| 13158 | :185,000,131,153,000,023,082 |
| 13164 | :200,208,247,160,007,185,091 |
| 13170 | :172,051,153,000,020,136,134 |
| 13176 | :016,247,160,031,185,180,171 |
| 13182 | :051,153,024,021,136,016,015 |
| 13188 | :247,160,007,185,212,051,226 |
| 13194 | :153,208,021,136,016,247,151 |
| 13200 | :160,007,185,220,051,153,152 |
| 13206 | :224,021,136,016,247,160,186 |
| 13200 | . 227,021,130,010,247,100,100 |

| 13212 | :007,185,228,051,153,240,252 |
|-------|------------------------------|
| 13218 | :021,136,016,247,169,205,188 |
| 13224 | :141,005,144,096,146,073,005 |
| 13230 | :164,073,018,164,146,000,227 |
| 13236 | :000,000,001,003,031,063,022 |
| 13242 | :112,240,024,255,255,255,047 |
| 13248 | :255,255,000,000,000,000,190 |
| 13254 | :128,192,248,252,014,015,023 |
| 13260 | :000,033,030,030,030,033,104 |
| 13266 | :000,000,000,000,000,007,217 |
| 13272 | :031,063,127,127,000,000,052 |
| 13278 | :000,255,255,255,255,255,217 |
| 13284 | :001,007,031,255,255,255,008 |
| 13290 | :255,255,013,013,013,013,028 |
| | |

Program 3: VIC Missile Math, BASIC

Refer to the "Automatic Proofreader" article before typing this program in.

```
5 POKE 36879,8:POKE56,48:CLR:SYS65017
                                   :rem 156
10 PRINT" {CLR} {2 DOWN} {WHT}": AS="MISSILE
   [SPACE] MATH": GOSUB900
                                   :rem 159
15 POKE36869,192
                                    :rem 109
20 PRINT" [3 DOWN] [5 RIGHT] [RED] DO YOU WAN
   T TO:"
                                   :rem 186
30 PRINT" {2 DOWN } {RIGHT } {CYN } ADD&
   [7 SPACES] [WHT] MULTIPLY"
                                   :rem 134
40 PRINT" {CYN} {DOWN} {RIGHT} SUBTRACT
   {3 SPACES}{WHT}& DIVIDE"
                                    :rem 74
50 PRINT" {2 DOWN } {GRN } SLOW": PRINT"
   {2 DOWN}{CYN}FAST{YEL}":G=15:H=5
                                   :rem 107
55 H=5 :G=15:GF=20
                                   :rem 174
60 V1=37139: REM DDR FOR SWITCH UPDNLFTFIR
                                    :rem 37
61 R1 =37137:REM PORTAB2=UP; B3=DN; B4=LFT:
   B5=FIRE
                                   :rem 141
62 V2=37154:REM DDR FOR RIGHT
                                   :rem 142
63 R2= 37152:REM PORTB; B7= RIGHT :rem 64
64 POKE37139,195:J1=PEEK(37137):POKE37139
65 POKE37154,127:J2=PEEK(37152)AND128:POK
   E37154,255
                                :rem 114
66 B=J10RJ2
7Ø IF B= 156THEN 9Ø
8Ø IFB=172THENH=5
81 IFB=60THENH=14
82 IFB=184THENG=15:GF=20
                                  :rem 148
83 IFB=18ØTHENG=18:GF=1Ø
                                  :rem 147
84 POKE781, G: POKE782, H: POKE783, Ø: SYS65520
   :PRINT"Q"
                                   :rem 170
85 IF OG<>G OR OH<>H THENPOKE781,OG:POKE7
   82, OH: POKE783, Ø: SYS6552Ø: PRINT"
                                   :rem 135
86 OG=G:OH=H:GOTO6Ø
                                   :rem 183
9Ø L=1:SC=Ø:S=3
                                    :rem 93
100 PRINT"{CLR}{3 DOWN}{2 RIGHT}{WHT}POSI
    TION GUN OVER [7 SPACES] CORRECT ANSWER
                                   :rem 228
105 BN=0:BO=0:B=0:SH=0:SYS13123
                                    :rem 41
110 PRINT" [4 DOWN] [4 RIGHT] AND SHOOT UFO"
                                   :rem 101
120 PRINT" {3 DOWN } {4 RIGHT } { WHT } BE CAREFU
    L NOT [8 SPACES] TO WASTE SHOTS": rem 66
130 PRINT" {2 DOWN} {3 RIGHT} {CYN} ENTERING
    {SPACE } LEVEL" ; L
                                   :rem 216
135 GOSUB 1000
                                   :rem 218
140 FORI=1T05000:NEXT
                                    :rem 20
141 PRINT" {CLR} {11 SPACES} {WHT} SCORE {RED}
```

"SC" {HOME } {BLU }";

:rem 222

| 142 | FORI=1TOS: PRINT" { RIGHT } A"; :NE | XT |
|--|--|--|
| | | :rem 200 |
| 150 | $A = INT(RND(\emptyset)*4+1)+4*(L-1)$ | :rem 243 |
| | | :rem 231 |
| 160 | | :rem 74 |
| 170 | IFH=5THENC=A+B:GOTO18Ø | |
| 175 | | :rem 202 |
| 18Ø | A\$=STR\$(A):B\$=STR\$(B):C\$=STR\$ | |
| | | :rem 6 |
| 190 | $RP=INT(RND(\emptyset)*4)+1$ | :rem 212 |
| 200 | IFRP=1THENANS=A:A\$=" ?" | :rem 31 |
| 210 | IFRP=2THENANS=B:B\$=" ?" | :rem 35 |
| 220 | IFRP>2THENANS=C:C\$=" ?" | :rem 39 |
| 230 | PRINT" [HOME] [2 DOWN] [4 RIGHT] | ";:IFH=5 |
| 230 | THENPRINTAS" +"B\$" ="C\$:GOTO2 | 50 |
| | THEMPRINIAS + BS = CS:GOIOZ | |
| | DDTIME OF THEORY HOO | :rem 181 |
| 240 | PRINTA\$" X"B\$" = "C\$ | :rem 114 |
| 25Ø | IFANS>90THENDEL=10:GOTO270 | :rem 93 |
| 26Ø | IFANS>20THENDEL=5:GOTO270 | :rem 43 |
| 265 | DEL=INT((ANS/10)+1) | :rem 10 |
| 270 | $DT = INT(RND(\emptyset)*4)+1$ | :rem 201 |
| 275 | PRINT" [HOME] [21 DOWN]" | :rem 231 |
| 277 | | :rem 164 |
| 280 | FORI=1TO4:CH(I)=ANS+(I-DT)*DE | |
| 200 | AB((1*4)-2)STR\$(CH(I));"{2 LE | |
| | | |
| | XT | :rem 92 |
| 285 | FORI=1TO4:IFCH(I)=ANSTHENPOKE | |
| | | :rem 236 |
| 286 | NEXT: POKE880, 255 | :rem 176 |
| 290 | W=PEEK(868):SYS 12307:FORQ=1T | OGF*10:N |
| | EXT: IF PEEK (900) THEN 300 | :rem 47 |
| 293 | SYS12845 | :rem 161 |
| 295 | GOTO 290 | :rem 116 |
| 300 | X=PEEK(900):SH=SH+1 | :rem 64 |
| | | :rem 175 |
| 310 | IFX=3THEN500 | |
| 32Ø | IFX=2THEN600 | :rem 176 |
| 500 | IFW=ØTHENB=25 | :rem 253 |
| 51Ø | IFW=1THENB=10 | :rem 249 |
| E 0.0 | | |
| 520 | IFW=2THENB=5 | :rem 207 |
| 100000000000000000000000000000000000000 | | :rem 207 |
| 525 | BN=BN+B | :rem 207 :rem 102 |
| 100000000000000000000000000000000000000 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} | :rem 102 |
| 525 526 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B | :rem 102 :rem 125 |
| 525 526 53Ø | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 | :rem 102 :rem 125 :rem 1 |
| 525 526 53Ø 55Ø | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 | :rem 102 :rem 125 :rem 1 :rem 104 |
| 525 526 53Ø 55Ø 6ØØ | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 |
| 525 526 53Ø 55Ø | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 ="KEEP T |
| 525 526 53Ø 55Ø 6ØØ | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 ="KEEP T :rem 151 |
| 525 526 53Ø 55Ø 6ØØ | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 ="KEEP T :rem 151 |
| 525 526 53Ø 55Ø 6ØØ 6Ø1 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 ="KEEP T :rem 151 |
| 525 526 530 550 600 601 602 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="I KNOW YOUT":GOSUB 9ØØ | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 |
| 525 526 530 550 600 601 602 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="THE ANSWE | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 CR WAS":G |
| 525 526 530 550 600 601 602 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="I KNOW YOUR IT":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="THE ANSWE OSUB9ØØ:PRINT"{PUR}{DOWN}":A\$ | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 ER WAS":G S=STR\$(AN |
| 525 526 53Ø 55Ø 6ØØ 6Ø1 6Ø2 6Ø3 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="THE ANSWE OSUB9ØØ:PRINT"{PUR}{DOWN}":A\$ S):GOSUB9ØØ | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 CR WAS":G S=STR\$(AN :rem 210 |
| 525 526 53Ø 55Ø 6ØØ 6Ø1 6Ø2 6Ø3 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="I KNOW YOUR IT":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="THE ANSWE OSUB9ØØ:PRINT"{PUR}{DOWN}":A\$ S):GOSUB9ØØ FORI=1TO1ØØØ:NEXT:GOTO14Ø | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 ER WAS":G S=STR\$(AN :rem 210 :rem 26 |
| 525 526 53Ø 55Ø 6ØØ 6Ø1 6Ø2 6Ø3 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="THE ANSWE OSUB9ØØ:PRINT"{PUR}{DOWN}":A\$ S):GOSUB9ØØ | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 CR WAS":G =STR\$(AN :rem 210 :rem 26 :rem 137 |
| 525 526 53Ø 55Ø 6ØØ 6Ø1 6Ø2 6Ø3 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="I KNOW YOUR IT":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="THE ANSWE OSUB9ØØ:PRINT"{PUR}{DOWN}":A\$ S):GOSUB9ØØ FORI=1TO1ØØØ:NEXT:GOTO14Ø | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 ER WAS":G S=STR\$(AN :rem 210 :rem 26 |
| 525 526 53Ø 55Ø 6ØØ 6Ø1 6Ø2 6Ø3 61Ø 7ØØ 71Ø | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="THE ANSWE OSUB9ØØ:PRINT"{PUR}{DOWN}":A\$ S):GOSUB9ØØ FORI=1TO1ØØØ:NEXT:GOTO14Ø BO=INT(BN/SH+.5) IFBO>=25THENBO=5Ø:GOTO75Ø | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 CR WAS":G =STR\$(AN :rem 210 :rem 26 :rem 137 |
| 525 526 53Ø 55Ø 6ØØ 6Ø1 6Ø2 6Ø3 61Ø 70Ø 71Ø 72Ø | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {1Ø RIGHT}"B IFBN>=5ØTHENL=L+1:GOTO7ØØ GOTO 14Ø S=S-1:IFS=ØTHEN8ØØ PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="I KNOW YOUR IT":GOSUB 9ØØ PRINT"{2 DOWN}":A\$="THE ANSWE OSUB9ØØ:PRINT"{PUR}{DOWN}":A\$ S):GOSUB9ØØ FORI=1TO1ØØØ:NEXT:GOTO14Ø BO=INT(BN/SH+.5) IFBO>=25THENBO=5Ø:GOTO75Ø IFBO>=1ØTHENBO=25:GOTO75Ø | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 6="KEEP T :rem 151 DU CAN DO :rem 133 CR WAS":G =STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 |
| 525 526 530 550 600 601 602 603 610 700 710 720 730 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1T01000:NEXT:GOT0140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOT0750 IFBO>=10THENBO=25:GOT0750 GOTO 760 | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 CR WAS":G S=STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 |
| 525 526 53Ø 55Ø 6ØØ 6Ø1 6Ø2 6Ø3 61Ø 70Ø 71Ø 72Ø | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1TO1000:NEXT:GOTO140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOTO750 IFBO>=10THENBO=25:GOTO750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 6="KEEP T :rem 151 DU CAN DO :rem 133 :R WAS":G :STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :PB{CYN}O |
| 525 526 530 550 600 601 602 603 610 700 710 720 730 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1T01000:NEXT:GOT0140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOT0750 IFBO>=10THENBO=25:GOT0750 GOTO 760 | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 CR WAS":G S=STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :]B{CYN}O |
| 525 526 530 550 600 601 602 603 610 710 720 730 750 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1TO1000:NEXT:GOTO140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOTO750 IFBO>=10THENBO=25:GOTO750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT} {GRN}N{YEL}U{BLU}S"BO:SC=SC+E | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 CR WAS":G S=STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :]B{CYN}O 30 :rem 240 |
| 525 526 530 550 600 601 602 603 610 710 720 730 750 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1T01000:NEXT:GOT0140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOT0750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT} {GRN}N{YEL}U{BLU}S"BO:SC=SC+E | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 :R WAS":G :STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :}B{CYN}O :rem 240 :rem 32 |
| 525 526 530 550 600 601 602 603 610 710 720 730 750 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YOUR IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1TO1000:NEXT:GOTO140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOTO750 IFBO>=10THENBO=25:GOTO750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT}{GRN}N{YEL}U{BLU}S"BO:SC=SC+E FORI=1TO5000:NEXT:GOTO 1000 PRINT"{CLR}{3 DOWN}{6 RIGHT}{6} | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 :R WAS":G :STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :B{CYN}O :rem 240 :rem 32 [CYN}SCOR |
| 525 526 530 550 600 601 602 603 610 710 720 730 750 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1T01000:NEXT:GOT0140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOT0750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT}{6 GRN}N{YEL}U{BLU}S"BO:SC=SC+E FORI=1T05000:NEXT:GOTO 100 PRINT"{CLR}{3 DOWN}{6 RIGHT}{6} E ":SC | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 :R WAS":G :STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :B{CYN}O :rem 240 :rem 32 [CYN}SCOR :rem 201 |
| 525 526 530 550 600 601 602 603 610 710 720 730 750 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YOUR IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1TO1000:NEXT:GOTO140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOTO750 IFBO>=10THENBO=25:GOTO750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT}{GRN}N{YEL}U{BLU}S"BO:SC=SC+E FORI=1TO5000:NEXT:GOTO 1000 PRINT"{CLR}{3 DOWN}{6 RIGHT}{6} | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 6="KEEP T :rem 151 DU CAN DO :rem 133 :R WAS":G :STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :B{CYN}O :rem 240 :rem 32 [CYN}SCOR :rem 201 GAME OVER |
| 525 526 530 550 600 601 602 603 610 710 710 730 750 760 800 805 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1TO1000:NEXT:GOTO140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOTO750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT}{GRN}N{YEL}U{BLU}S"BO:SC=SC+E FORI=1TO5000:NEXT:GOTO 100 PRINT"{CLR}{3 DOWN}{6 RIGHT}{BLU}OWN} E ";SC PRINT"{3 DOWN}{6 RIGHT}{BLU}OWN} " | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 6="KEEP T :rem 151 0U CAN DO :rem 133 CR WAS":G =STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 ?B{CYN}O 00 :rem 240 :rem 32 (CYN}SCOR :rem 201 GAME OVER :rem 196 |
| 525 526 530 550 600 601 602 603 610 710 710 730 750 760 800 805 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1TO1000:NEXT:GOTO140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOTO750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT}{GRN}N{YEL}U{BLU}S"BO:SC=SC+E FORI=1TO5000:NEXT:GOTO 100 PRINT"{CLR}{3 DOWN}{6 RIGHT}{BLU}OWN} E ";SC PRINT"{3 DOWN}{6 RIGHT}{BLU}OWN} " | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 6="KEEP T :rem 151 0U CAN DO :rem 133 CR WAS":G =STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 ?B{CYN}O 00 :rem 240 :rem 32 (CYN}SCOR :rem 201 GAME OVER :rem 196 |
| 525 526 530 550 600 601 602 603 610 710 710 730 750 760 800 805 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1T01000:NEXT:GOT0140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOT0750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT}{GRN}N{YEL}U{BLU}S"BO:SC=SC+E FORI=1T05000:NEXT:GOT0 100 PRINT"{CLR}{3 DOWN}{6 RIGHT}{6} E ";SC PRINT"{5 DOWN}{4 RIGHT}{CYN}E | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 :R WAS":G :STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :B{CYN}O :rem 240 :rem 240 :rem 201 :rem 201 :rem 201 :rem 201 :rem 201 :rem 196 :rem 196 |
| 525 526 530 550 600 601 602 603 610 710 710 730 750 760 800 805 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YO IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1TO1000:NEXT:GOTO140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOTO750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT}{GRN}N{YEL}U{BLU}S"BO:SC=SC+E FORI=1TO5000:NEXT:GOTO 100 PRINT"{CLR}{3 DOWN}{6 RIGHT}{BLU}OWN} E ";SC PRINT"{3 DOWN}{6 RIGHT}{BLU}OWN} " | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 6="KEEP T :rem 151 DU CAN DO :rem 133 :R WAS":G :STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :B{CYN}O :rem 240 :rem 32 [CYN}SCOR :rem 201 GAME OVER :rem 196 PRESS ANY AGAIN" |
| 525 526 530 550 600 601 602 603 610 710 720 730 750 800 805 820 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YOUR IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1TO1000:NEXT:GOTO140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOTO750 IFBO>=10THENBO=25:GOTO750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT}{GRN}N{YEL}U{BLU}S"BO:SC=SC+E FORI=1TO5000:NEXT:GOTO 100 PRINT"{CLR}{3 DOWN}{6 RIGHT}{6} E ";SC PRINT"{5 DOWN}{4 RIGHT}{CYN}E KEY {DOWN}{8 SPACES}TO PLAY | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 CR WAS":G S=STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :PB{CYN}O :rem 240 :rem 32 [CYN}SCOR :rem 201 GAME OVER :rem 196 PRESS ANY AGAIN" :rem 123 |
| 525 526 530 550 600 601 602 603 610 710 720 730 750 800 805 820 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YOUR IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1TO1000:NEXT:GOTO140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOTO750 IFBO>=10THENBO=25:GOTO750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT}{GRN}N{YEL}U{BLU}S"BO:SC=SC+E FORI=1TO5000:NEXT:GOTO 100 PRINT"{CLR}{3 DOWN}{6 RIGHT}{6} E ";SC PRINT"{5 DOWN}{4 RIGHT}{CYN}E KEY {DOWN}{8 SPACES}TO PLAY POKE198,0 | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 CR WAS":G S=STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :PB{CYN}O :rem 240 :rem 32 [CYN}SCOR :rem 201 GAME OVER :rem 196 PRESS ANY AGAIN" :rem 123 :rem 200 |
| 525 526 530 550 600 601 602 603 610 710 720 730 750 800 805 820 830 835 | BN=BN+B SC=SC+B:PRINT"{HOME}{8 DOWN} {10 RIGHT}"B IFBN>=50THENL=L+1:GOTO700 GOTO 140 S=S-1:IFS=0THEN800 PRINT"{HOME}{BLU}{8 DOWN}":A\$ RYING":GOSUB 900 PRINT"{2 DOWN}":A\$="I KNOW YOUR IT":GOSUB 900 PRINT"{2 DOWN}":A\$="THE ANSWE OSUB900:PRINT"{PUR}{DOWN}":A\$ S):GOSUB900 FORI=1TO1000:NEXT:GOTO140 BO=INT(BN/SH+.5) IFBO>=25THENBO=50:GOTO750 IFBO>=10THENBO=25:GOTO750 GOTO 760 PRINT"{HOME}{14 DOWN}{5 RIGHT}{GRN}N{YEL}U{BLU}S"BO:SC=SC+E FORI=1TO5000:NEXT:GOTO 100 PRINT"{CLR}{3 DOWN}{6 RIGHT}{6} E ";SC PRINT"{5 DOWN}{4 RIGHT}{CYN}E KEY {DOWN}{8 SPACES}TO PLAY | :rem 102 :rem 125 :rem 1 :rem 104 :rem 39 S="KEEP T :rem 151 DU CAN DO :rem 133 CR WAS":G S=STR\$(AN :rem 210 :rem 26 :rem 137 :rem 11 :rem 8 :rem 112 :PB{CYN}O :rem 240 :rem 32 [CYN}SCOR :rem 201 GAME OVER :rem 196 PRESS ANY AGAIN" :rem 123 |

| 900 X=LEN(A\$):A\$=A\$+"{2 SPACES}" | :rem 115 |
|-------------------------------------|-----------|
| 91Ø FORI=1TOX+1Ø-INT(X/2+.5):POK | E211,21-I |
| :PRINTMID\$(A\$,1,I); | :rem 249 |
| 915 FOR T=1TO60:NEXTT:NEXTI | :rem 224 |
| 920 RETURN | :rem 123 |
| | |
| 999 END | :rem 130 |
| 1000 POKE36878, 15:S2=36876:POKE3 | 6877,127 |
| | :rem 218 |
| 1005 RESTORE | :rem 234 |
| 1010 READ P, LE | :rem 235 |
| 1020 IF P=-5THENPOKES2,0:RETURN | :rem 154 |
| | |
| 1025 POKES2,P | :rem 248 |
| 1030 FOR T= 1 TO LE*2:NEXT | :rem 118 |
| 1040 GOTO1010 | :rem 192 |
| 1050 DATA 173,50,127,50,173,50,1 | 92.200.12 |
| | :rem 205 |
| 7,100,192,200,127,100 | |
| 1060 DATA 192,200,192,50,189,50, | 181,50,17 |
| 3,100,173,50,192,300,-5,-5 | :rem 201 |
| 2,22,2.2,20,22,2,00,00 | |

Programmer's Notes: VIC Version

The VIC-20 version of "Missile Math" requires at least an 8K expander. To make it easier to enter this version, the machine language portion of the program has been listed in MLX format. To enter Missile Math, you must enter Program 2 using the VIC MLX Program elsewhere in this issue. The starting address is 12288 and the ending address is 13295. After you have entered and saved Program 2, enter Program 3 as you would a normal BASIC program and save it to tape or disk.

To run Missile Math, you must first enter these POKEs.

POKE 43,1:POKE 44,24:POKE 641,0:POKE 642,24:POKE 6144,0

Type NEW and load Program 2, bypassing the normal relocator by adding ,1 to the LOAD command. Here's how your LOAD command should look:

From tape:

LOAD "filename",1,1

From disk:

LOAD "filename", 8,1

Now type NEW, then load and run Program 3.

Program 4: 64 Missile Math

Refer to the "Automatic Proofreader" article before typing this program in.

| Ø GOSUB 1000 | :rem | 113 |
|--|-------|------|
| 1 V=54272:FORI=ØTO24:POKEV+I,Ø:NEX | XT | |
| | :rem | 176 |
| 5 POKE 53280,0:POKE 53281,0 | :rem | 138 |
| 10 PRINT" {CLR} {4 DOWN} {BLU}": A\$="1 | MISSI | ILE |
| {SPACE}MATH":GOSUB900:GOSUB 950 | | |
| 15 PRINT" (DOWN) (9 RIGHT) USE JOYST | ICK : | IN P |
| ORT #2" | :rem | 219 |
| 20 PRINT" {3 DOWN } {13 RIGHT } {RED } P | LEASI | E SE |

| LECT:" :rem 17 | 601 PRINT" [HOME] [7] [9 DOWN] ": A\$= "KEEP TRY |
|---|---|
| 30 PRINT"{2 DOWN}{5 RIGHT}{CYN}ADDITION | ING":GOSUB 900 :rem 35 |
| (7 cpaces) Erangument reamons | |
| {7 SPACES} [7] MULTIPLICATION" :rem 19: | |
| 40 PRINT" (5 RIGHT) (CYN) SUBTRACTION | IT":GOSUB 900 :rem 150 |
| [9 SPACES] [7]& DIVISION" :rem 216 | |
| | oss Inthi (2 bonn) . Ay Int Andubit Was: : |
| 50 PRINT"{2 DOWN}{GRN}SLOW":PRINT" | GOSUB900:PRINT"{PUR}":A\$=STR\$(ANS):GO |
| <pre>{2 DOWN}&63FAST{YEL}":G=18:H=9:POKE836</pre> | SUB900 :rem 251 |
| ,H:POKE831,G :rem 92 | |
| | old GOSUB950:1FS=0THEN800 :rem 5 |
| 60 X=PEEK(56320):J=XAND15:B=XAND16:rem 14 | 620 GOTO140 :rem 102 |
| 70 IFB=0THEN90 :rem 6 | 700 BO=INT(BN/SH+.5) :rem 137 |
| 80 IFJ=11THENH=9 :rem 205 | 700 DO-INI (DR/SH1.5) |
| | |
| 81 IFJ=7THENH=29 :rem 213 | 720 IFBO>=10THENBO=25:GOTO750 :rem 8 |
| 82 IFJ=14THENG=18 :rem : | 730 GOTO 760 :rem 112 |
| 82 IFJ=14THENG=18 :rem : 83 IFJ=13THENG=21 :rem 25: | 750 0010 700 :112 |
| | |
| 84 POKE828, H: POKE829, G: SYS49152 : rem 110 | |
| 85 GOT060 :rem 12 90 L=1:SC=0:S=3 :rem 93 | 0:SC=SC+BO :rem 230 |
| 90 L=1:SC=0:S=3 :rem 93 | 7.00 TORT 1 TORTOGO 17.00 |
| | |
| 100 POKE 53269,0:PRINT"{CLR}{8 DOWN} | 800 POKE53269,0:PRINT"{CLR}{3 DOWN} |
| {4 RIGHT} [8] POSITION GUN OVER CORRECT | {15 RIGHT}{CYN}SCORE:{PUR}";SC |
| ANSWER" :rem 215 | (10 MICHI) (CIM) BOOKE. (TOK) /BC |
| | :1em 114 |
| 105 BN=0:BO=0:B=0:SH=0 :rem 246 | |
| 110 PRINT"{2 DOWN}{14 RIGHT}AND SHOOT UFO | |
| " :rem 101 | , I Cili TO |
| | OLD PRINT (3 DOWN) (10 RIGHT) OVER : I'em 22/ |
| 120 PRINT"{3 DOWN}{5 RIGHT}[3]BE CAREFUL | 820 PRINT" [5 DOWN] [6 RIGHT] [GRN] PRESS |
| {SPACE}NOT TO WASTE SHOTS" : rem 246 | YEL ANY KEY [GRN] TO PLAY AGAIN" |
| • | (IED)ANI REI(GRN) TO PLAI AGAIN |
| 130 PRINT"{2 DOWN}{12 RIGHT}{PUR}ENTERING | |
| LEVEL";L :rem 218 | 830 POKE198,0 :rem 200 |
| 135 GOSUB 950 :rem 183 | |
| The state of the s | 11 130/1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |
| | 0.10 00.100 |
| 141 PRINT" {CLR} {30 SPACES} {GRN} SCORE {RED} | 900 X=LEN(A\$):A\$=A\$+"{24 SPACES}":rem 115 |
| "SC"{HOME}{BLU}"; :rem 247 | |
| | |
| 142 FORI=1TOS:PRINT" {RIGHT}A";:NEXT | :PRINTMID\$(A\$,1,I);:NEXT I :rem 205 |
| :rem 200 | |
| 15Ø A=INT(RND(Ø)*4+1)+4*(L-1) :rem 243 | |
| | 336 V-342/2:FOREV124,13:FOREV13,6:FOREV10 |
| 160 B=INT(RND(0)*4*L+1) :rem 231 | : 1 Em 110 |
| 170 IFH=9THENC=A+B:GOTO180 :rem 78 | 955 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 |
| 175 C=A*B :rem 202 | TO300:NEXT:POKEV+4,32 :rem 75 |
| 18Ø A\$=STR\$(A):B\$=STR\$(B):C\$=STR\$(C) | 10300: NEX1: POREV +4, 32 : 1em /3 |
| | 960 POKEV+1,33:POKEV,135:POKEV+4,33:FORI= |
| :rem 6 | 110900 : NEAT : PUREV T4 : 32 : I EIII 130 |
| 190 RP=INT(RND(0)*4)+1 :rem 212 | 970 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 |
| 200 IFRP=1THENANS=A:A\$=" ?" :rem 31 | TO400:NEXT:POKEV+4,32 :rem 73 |
| 21Ø IFRP=2THENANS=B:B\$=" ?" :rem 35 | |
| | JOS TOREVITIONEVITOS FOREVITIONE |
| 220 IFRP>2THENANS=C:C\$=" ?" :rem 39 | 1TO100:NEXT:POKEV+4,32 :rem 124 |
| 230 PRINT" [HOME] [4 DOWN] [15 RIGHT] [PUR]"; | 990 POKEV+1,29:POKEV,223:POKEV+4,33:FORI= |
| | |
| *IFH=9THENPRINTAS" +"RS" ="C\$*GOTO250 | |
| :IFH=9THENPRINTA\$" +"B\$" ="C\$:GOTO256 | 1TO100:NEXT:POKEV+4,32 :rem 128 |
| :rem 182 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4.33:FORI=1 |
| | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 114 250 IFANS>90THENDEL=10:GOTO270 :rem 93 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 114 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 270 DT=INT(RND(0)*5)+1 :rem 202 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 270 DT=INT(RND(0)*5)+1 :rem 202 275 PRINT"{HOME}{21 DOWN}{YEL}" :rem 133 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 270 DT=INT(RND(0)*5)+1 :rem 202 275 PRINT"{HOME}{21 DOWN}{YEL}" :rem 133 280 FORI=1TO5:CH(I)=ANS+(I-DT)*DEL:PRINTT | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV,135:POKEV+4,33:FORI= |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 270 DT=INT(RND(0)*5)+1 :rem 202 275 PRINT"{HOME}{21 DOWN}{YEL}" :rem 133 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,33:FORI= |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 270 DT=INT(RND(0)*5)+1 :rem 202 275 PRINT"{HOME}{21 DOWN}{YEL}" :rem 133 280 FORI=1TO5:CH(I)=ANS+(I-DT)*DEL:PRINTT AB(I*5)CH(I);:NEXT :rem 135 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 270 DT=INT(RND(0)*5)+1 :rem 202 275 PRINT"{HOME}{21 DOWN}{YEL}" :rem 133 280 FORI=1TO5:CH(I)=ANS+(I-DT)*DEL:PRINTT AB(I*5)CH(I);:NEXT :rem 135 285 FORI=1TO5:IFCH(I)=ANSTHENPOKE901,I-1 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 270 DT=INT(RND(0)*5)+1 :rem 202 275 PRINT"{HOME}{21 DOWN}{YEL}" :rem 133 280 FORI=1TO5:CH(I)=ANS+(I-DT)*DEL:PRINTT AB(I*5)CH(I);:NEXT :rem 135 285 FORI=1TO5:IFCH(I)=ANSTHENPOKE901,I-1 :rem 237 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV,135:POKEV+4,33:FORI= 1TO600:NEXT:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 270 DT=INT(RND(0)*5)+1 :rem 202 275 PRINT"{HOME}{21 DOWN}{YEL}" :rem 133 280 FORI=1TO5:CH(I)=ANS+(I-DT)*DEL:PRINTT AB(I*5)CH(I);:NEXT :rem 135 285 FORI=1TO5:IFCH(I)=ANSTHENPOKE901,I-1 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 1TO600:NEXT:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 270 DT=INT(RND(0)*5)+1 :rem 202 275 PRINT"{HOME}{21 DOWN}{YEL}" :rem 133 280 FORI=1TO5:CH(I)=ANS+(I-DT)*DEL:PRINTT AB(I*5)CH(I);:NEXT :rem 135 285 FORI=1TO5:IFCH(I)=ANSTHENPOKE901,I-1 :rem 237 286 NEXT :rem 223 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 270 DT=INT(RND(0)*5)+1 :rem 20 275 PRINT"{HOME}{21 DOWN}{YEL}" :rem 13 280 FORI=1TO5:CH(I)=ANS+(I-DT)*DEL:PRINTT AB(I*5)CH(I);:NEXT :rem 13 285 FORI=1TO5:IFCH(I)=ANSTHENPOKE901,I-1 :rem 23 286 NEXT :rem 223 286 NEXT :rem 223 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 |
| 182 240 PRINTA\$" X"B\$" ="C\$:rem 182 :rem 125 :rem 1 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV,135:POKEV+4,33:FORI= 1TO600:NEXT:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 |
| 240 PRINTA\$" X"B\$" ="C\$:rem 182 250 IFANS>90THENDEL=10:GOTO270 :rem 93 260 IFANS>20THENDEL=5:GOTO270 :rem 43 265 DEL=INT((ANS/10)+1) :rem 10 270 DT=INT(RND(0)*5)+1 :rem 20 275 PRINT"{HOME}{21 DOWN}{YEL}" :rem 13 280 FORI=1TO5:CH(I)=ANS+(I-DT)*DEL:PRINTT AB(I*5)CH(I);:NEXT :rem 13 285 FORI=1TO5:IFCH(I)=ANSTHENPOKE901,I-1 :rem 23 286 NEXT :rem 223 286 NEXT :rem 223 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 |
| 182 240 PRINTA\$" X"B\$" ="C\$:rem 182 :rem 1 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 |
| 182 240 PRINTA\$" X"B\$" ="C\$:rem 182 :rem 1 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": |
| 182 240 PRINTA\$" X"B\$" ="C\$:rem 182 :rem 125 :rem 1 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": STOP |
| 182 240 PRINTA\$" X"B\$" ="C\$:rem 182 :rem 1 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": STOP :rem 28 |
| 182 240 PRINTA\$" X"B\$" ="C\$:rem 182 :rem 125 :rem 1 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": STOP :rem 28 1040 RETURN :rem 165 |
| 182 240 PRINTA\$" X"B\$" ="C\$:rem 182 :rem 1250 IFANS>90THENDEL=10:GOTO270 :rem 93 :rem 260 IFANS>20THENDEL=5:GOTO270 :rem 43 :rem 265 DEL=INT((ANS/10)+1) :rem 160 :rem 267 DT=INT(RND(0)*5)+1 :rem 267 :rem 268 :rem 133 :rem 134 :rem 135 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": STOP :rem 28 1040 RETURN :rem 165 1050 DATA 174,63,3,172,62,3 :rem 41 |
| 182 182 240 PRINTAS X"B\$" = "C\$ 182 182 182 183 250 184 185 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": STOP :rem 28 1040 RETURN :rem 165 1050 DATA 174,63,3,172,62,3 :rem 41 |
| :rem 182 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": STOP :rem 28 1040 RETURN :rem 165 1050 DATA 174,63,3,172,62,3 :rem 41 1060 DATA 24,32,240,255,169,32 :rem 191 |
| :rem 182 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": STOP :rem 28 1040 RETURN :rem 165 1050 DATA 174,63,3,172,62,3 :rem 41 1060 DATA 24,32,240,255,169,32 :rem 191 1070 DATA 32,210,255,174,61,3 :rem 136 |
| 182 182 240 PRINTA\$" X"B\$" = "C\$ 182 182 182 183 250 183 183 260 183 260 183 260 183 260 183 260 183 260 183 260 183 260 183 260 183 260 183 260 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": STOP :rem 28 1040 RETURN :rem 165 1050 DATA 174,63,3,172,62,3 :rem 41 1060 DATA 24,32,240,255,169,32 :rem 191 1070 DATA 32,210,255,174,61,3 :rem 136 1080 DATA 172,60,3,24,32,240 :rem 83 |
| :rem 182 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": STOP :rem 28 1040 RETURN :rem 165 1050 DATA 174,63,3,172,62,3 :rem 41 1060 DATA 24,32,240,255,169,32 :rem 191 1070 DATA 32,210,255,174,61,3 :rem 136 1080 DATA 172,60,3,24,32,240 :rem 83 |
| 182 182 240 PRINTA\$" X"B\$" = "C\$ 182 182 182 183 250 183 183 260 183 260 183 260 183 260 183 260 183 260 183 260 183 260 183 260 183 260 183 260 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": STOP :rem 28 1040 RETURN :rem 165 1050 DATA 174,63,3,172,62,3 :rem 41 1060 DATA 24,32,240,255,169,32 :rem 191 1070 DATA 32,210,255,174,61,3 :rem 136 1080 DATA 172,60,3,24,32,240 :rem 83 1090 DATA 255,169,209,32,210,255 :rem 43 |
| 182 240 PRINTA\$" X"B\$" ="C\$:rem 182 :rem 125 :rem 1 | 1TO100:NEXT:POKEV+4,32 :rem 128 992 POKEV+1,28:POKEV,49:POKEV+4,33:FORI=1 TO100:NEXT:POKEV+4,32 :rem 87 994 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO700:NEXT:POKEV+4,32 :rem 82 996 FORI=1TO100:NEXT :rem 243 998 POKEV+1,25:POKEV,30:POKEV+4,33:FORI=1 TO360:NEXT:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32 :rem 88 999 POKEV+1,33:POKEV+4,32:RETURN:rem 165 1000 PRINT"{CLR}{10 DOWN}{8 RIGHT}LOADING MACHINE LANGUAGE":I=49152:CK=0 :rem 232 1010 READ A:IF A=256 THEN 1030 :rem 246 1020 POKE I,A:CK=CK+A:I=I+1:GOTO 1010 :rem 65 1030 IFCK<>80338THENPRINT"ERROR IN DATA": STOP :rem 28 1040 RETURN :rem 165 1050 DATA 174,63,3,172,62,3 :rem 41 1060 DATA 24,32,240,255,169,32 :rem 191 1070 DATA 32,210,255,174,61,3 :rem 136 1080 DATA 172,60,3,24,32,240 :rem 83 1090 DATA 255,169,209,32,210,255 :rem 43 1000 DATA 173,61,3,141,63,3 :rem 31 |

Notes On The Commodore 64, TI, Apple, And IBM PC/PCjr Versions

Instructions for all these versions are included within the programs themselves. The 64 version (Program 4) requires a joystick in port 2. The TI-99/4A version (Program 5) requires Extended BASIC and may be played with either a joystick or the keyboard. The Apple version (Program 6) requires a paddle controller. The IBM PC/PCjr version (Program 7) is controlled from the keyboard.

```
:rem 239
                                              1800 DATA 212,169,129,141,4,212
                                              1810 DATA 169,10,141,76,3,173
                                                                                :rem 146
                                              1820 DATA 70,3,201,1,240,5
                                                                                :rem 234
1120 DATA 96,32,106,194,169,2
                                   :rem 149
                                                                                 :rem 55
                                              1830 DATA 169,5,141,71,3,96
1130 DATA 141,64,3,169,0,141
                                    :rem 84
                                              1840 DATA 174,77,3,160,0,136
                                                                                 :rem 97
                                    :rem 45
1140 DATA 65,3,169,1,141,66
                                                                                  :rem 44
                                              1850 DATA 208,253,202,208,250,96
                                    :rem 87
1150 DATA 3,169,100,141,67,3
                                                                                :rem 143
                                              1860 DATA 173,30,208,141,72,3
                                     :rem Ø
1160 DATA 169,250,141,248,7,169
                                                                                  :rem 42
                                              1870 DATA 41,1,141,73,3,173
1170 DATA 251,141,249,7,169,252
                                   :rem 252
                                              1880 DATA 72,3,41,2,74,141
                                                                                :rem 251
1180 DATA 141,250,7,169,7,141
                                   :rem 145
                                              1890 DATA 74,3,173,72,3,41
                                                                                   :rem 2
                                   :rem 150
1190 DATA 21,208,169,6,141,39
                                              1900 DATA 4,74,74,141,75,3
                                                                                :rem 255
                                   :rem 191
 1200 DATA 208,169,8,141,40,208
                                              1910 DATA 173,73,3,45,74,3
                                                                                  :rem Ø
 1210 DATA 169,15,141,41,208,169
                                   :rem 245
                                                                                  :rem 36
                                              1920 DATA 201,1,208,3,76,31
                                    :rem 82
1220 DATA 0,141,23,208,169,2
                                                                                :rem 111
                                              1930 DATA 194,173,74,3,45,75
                                    :rem 41
1230 DATA 141,29,208,169,255,141
                                              1940 DATA 3,201,1,208,3,76
                                                                                :rem 245
1240 DATA 27,208,141,68,3,169
                                   :rem 151
                                                                                   :rem 9
                                              1950 DATA 52,194,96,169,253,141
1250 DATA 0,141,70,3,173,30
                                    :rem 28
                                              1960 DATA 248,7,169,1,141,21
                                                                                :rem 101
1260 DATA 208,169,0,162,24,157
                                   :rem 197
                                              1970 DATA 208,169,1,141,132,3
                                                                                 :rem 145
1270 DATA 0,212,202,224,255,208
                                   :rem 231
                                              1980 DATA 169,0,141,68,3,96
                                                                                  :rem 62
 1280 DATA 248, 169, 15, 141, 24, 212
                                   :rem 246
                                                                                  :rem 96
                                              1990 DATA 173,133,3,205,71,3
1290 DATA 173,61,3,201,21,208
                                   :rem 135
                                                                                  :rem 40
                                              2000 DATA 208,16,169,253,141,249
1300 DATA 8,169,15,141,77,3
                                    :rem 47
                                              2010 DATA 7,169,2,141,132,3
                                                                                  :rem 33
1310 DATA 76,164,192,169,22,141
                                   :rem 249
                                              2020 DATA 169,0,141,68,3,96
                                                                                  :rem 48
1320 DATA 77,3,32,227,192,32
                                    :rem 94
                                              2030 DATA 169,1,141,40,208,96
                                                                                :rem 143
1330 DATA 54,193,32,160,193,32
                                   :rem 193
                                              2040 DATA 70,70,70,70,110,110
                                                                                :rem 124
1340 DATA 230,193,32,218,193,173
                                    :rem 40
                                              2050 DATA 110,110,150,150,150,150 :rem 57
1350 DATA 68,3,208,236,169,17
                                   :rem 157
                                              2060 DATA 190,190,190,190,230,230
                                                                                 :rem 80
1360 DATA 141,5,212,141,6,212
                                   :rem 129
                                              2070 DATA 230,230,100,133,167,200
                                                                                 :rem 65
1370 DATA 169,129,141,4,212,169
                                   :rem 252
                                              2080 DATA 162,0,189,118,194,157
                                                                                   :rem Ø
1380 DATA 1,141,1,212,169,30
                                    :rem 82
                                              2090 DATA 128,62,232,208,247,96
                                                                                   :rem 1
1390 DATA 141,76,3,32,218,193
                                   :rem 150
                                                                                 :rem 217
                                              2100 DATA 0,0,0,0,0,0
 1400 DATA 206,76,3,208,248,169
                                   :rem 203
                                              2110 DATA 0,24,0,0,24,0
                                                                                  :rem 70
1410 DATA 0,170,157,0,212,232
                                   :rem 125
                                              2120 DATA 0,24,0,0,24,0
                                                                                  :rem 71
                                   :rem 255
1420 DATA 224,25,208,248,96,174
                                              2130 DATA 0,24,0,0,24,0
                                                                                  :rem 72
1430 DATA 64,3,189,82,194,141
                                   :rem 155
                                              2140 DATA 0,24,0,0,24,0
                                                                                  :rem 73
1440 DATA 0,208,169,200,141,1
                                   :rem 130
                                              2150 DATA 0,60,0,0,60,0
                                                                                  :rem 74
                                    :rem 93
1450 DATA 208,173,67,3,141,2
                                                                                  :rem 75
                                              2160 DATA 0,60,0,0,60,0
 1460 DATA 208,173,66,3,10,141
                                   :rem 140
                                              2170 DATA 1,255,128,15,255,240
                                                                                 :rem 192
.1470 DATA 16,208,174,65,3,189
                                   :rem 159
                                              2180 DATA 127,255,254,127,0,254
                                                                                :rem 247
1480 DATA 102,194,141,3,208,173
                                   :rem 242
                                              2190 DATA 112,0,14,96,0,6
                                                                                :rem 192
 1490 DATA 70,3,201,1,240,14
                                    :rem 29
                                              2200 DATA 96,0,6,192,0,0
                                                                                :rem 139
 1500 DATA 174,64,3,189,82,194
                                   :rem 159
                                              2210 DATA 0,0,0,0,0,0
                                                                                :rem 219
1510 DATA 141,4,208,169,200,141
                                   :rem 233
                                              2220 DATA 0,0,0,0,0,0
                                                                                :rem 220
 1520 DATA 5,208,173,76,3,240
                                    :rem 94
                                              2230 DATA 0,0,255,0,1,255
                                                                                :rem 182
 1530 DATA 20,206,76,3,173,76
                                    :rem 97
                                              2240 DATA 128,7,255,224,31,255
                                                                                :rem 196
1540 DATA 3,10,10,141,1,212
                                    :rem 17
                                              2250 DATA 248,255,255,255,255;rem 105
1550 DATA 201,0,208,5,169,128
                                   :rem 142
                                              2260 DATA 255,255,255,255,255;rem 104
 1560 DATA 141,4,212,96,173,67
                                   :rem 152
                                              2270 DATA 255,31,255,248,7,255
                                                                                :rem 206
1570 DATA 3,208,3,206,66,3
                                   :rem 250
                                              2280 DATA 224,1,255,128,0,255
                                                                                :rem 142
 1580 DATA 206,67,3,173,66,3
                                    :rem 54
                                              2290 DATA 0,0,0,0,0,0
                                                                                :rem 227
 1590 DATA 24,109,67,3,201,0
                                    :rem 40
                                              2300 DATA 0,0,0,0,0
                                                                                :rem 219
1600 DATA 208,23,238,65,3,169
                                   :rem 151
                                              2310 DATA 0,164,0,24,0,0
                                                                                :rem 125
```

1610 DATA 1,141,66,3,169,80

1630 DATA 70,3,169,8,141,40

1650 DATA 3,41,8,240,18,173

1660 DATA 69,3,41,4,208,21

1620 DATA 141,67,3,169,0,141

1640 DATA 208, 173, 0, 220, 141, 69

1670 DATA 173,64,3,240,16,206

1680 DATA 64,3,76,137,193,173

1690 DATA 64,3,201,16,240,3

1700 DATA 238,64,3,173,70,3

1710 DATA 201,1,208,15,206,5

1730 DATA 208,5,169,2,141,70

1750 DATA 16,201,0,208,36,173

1760 DATA 70,3,208,31,169,1

1770 DATA 141,70,3,173,64,3 1780 DATA 74,74,141,71,3,169

1790 DATA 17,141,5,212,141,6

1740 DATA 3,96,173,69,3,41

1720 DATA 208,173,5,208,201,30

:rem 44

:rem 91

:rem 44

:rem 44

:rem 191

:rem 251

:rem 145

:rem 162

:rem

:rem 38

:rem 80

:rem 95

:rem 6

:rem 186

:rem 139

:rem 45

:rem 45

:rem 109

:rem 91

45

| 2320 | DATA 24,0,0,0,0,0 | :rem 19 | 290 | RANDOMIZE :: YØ=4 :: PF=5 :: A= |
|---|---|--|---|--|
| 2330 | DATA 0,0,0,0,0,0 | :rem 222 | - , - | INT (RND*4+1)+4*(LEVEL-1):: B=IN |
| | DATA Ø,Ø,Ø,Ø,Ø | :rem 223 | | |
| 2350 | DATA 0,0,0,0,0,0 | | | T(RND*4*LEVEL+1) |
| 2250 | DATA 0,0,0,0,0,0 | :rem 224 | | IF MENU=1 THEN C=A+B ELSE C=A*B |
| 2300 | DATA Ø,Ø,Ø,Ø,Ø | :rem 225 | 310 | A\$=STR\$(A):: B\$=STR\$(B):: C\$=ST |
| 23/0 | DATA 0,0,0,0,0 | :rem 226 | | R\$(C) |
| 2380 | DATA Ø,Ø,Ø,Ø,Ø | :rem 227 | 320 | RANDOMIZE :: RP=INT(RND*4)+1 |
| 2390 | DATA Ø,Ø,Ø,Ø,Ø | :rem 228 | | IF RP=1 THEN ANS=A :: A\$=CHR\$(6 |
| 2400 | DATA 0,0,0,0,0,0 | :rem 220 | 332 | |
| 2/10 | DATA Ø,Ø,Ø,Ø,Ø,247 | | | 3) |
| 2410 | DATA 0,0,0,0,0,24/ | :rem 74 | 340 | IF RP=2 THEN ANS=B :: B\$=CHR\$(6 |
| 2420 | DATA Ø,Ø,Ø,Ø,32,Ø | :rem 19 | | 3) |
| 2430 | DATA 40,128,64,0,136,0 | :rem 34 | 350 | IF (RP=3)+(RP=4) THEN ANS=C :: C |
| 2440 | DATA 2,2,0,130,33,128 | :rem 233 | | \$=CHR\$(63) |
| | DATA 2,18,196,16,168,0 | :rem 50 | 710 | |
| | DATA 17,11,0,1,169,0 | :rem 189 | 200 | CALL CLEAR :: CALL SCREEN(15) |
| | | | 370 | D\$=" + " :: IF MENU=2 THEN D\$=" |
| | DATA 1,45,72,17,146,8 | :rem 1 | | z " |
| 2480 | DATA Ø,136,144,Ø,8,8 | :rem 199 | 380 | DISPLAY AT (4, 10): A\$; D\$; B\$; " = " |
| 2490 | DATA 8,120,0,2,24,128 | :rem 243 | | ;C\$ |
| 2500 | DATA 16,8,16,0,0,32 | :rem 136 | 700 | |
| | DATA 2,3,0,1,32,0 | :rem 25 | 346 | FOR I=1 TO NP :: CALL HCHAR(1, I |
| | DATA Ø, Ø, Ø, 193, 256 | :rem 93 | | *2+1,112):: NEXT I |
| | 21111 2/0/0/195/250 | . I em 95 | 400 | DISPLAY AT(1,17): "SCORE: "; SC :: |
| Pro | gram 5: TI-99/4A Missile Math | | | PB=PB+1 |
| | | chauf man | 410 | IF ANS>90 THEN DEL=10 :: GOTO 4 |
| 90 1 | REM EXTENDED BASIC REQUI | RED | 712 | |
| 100 | DIM NOTE (14) , DUR (14) :: (| GOSUB 99 | | 40 |
| | Ø :: GOTO 15Ø | | 420 | IF ANS>20 THEN DEL=5 :: GOTO 44 |
| 110 | | KEVII K | | Ø |
| 112 | CALL KEY(Ø,K,ST):: CALL | KEY(1,K | 430 | DEL=INT((ANS/1Ø)+1) |
| | K,S):: IF ST=Ø THEN CALL | _ JOYST (| | RANDOMIZE :: DT=INT(RND*5)+1 |
| | 1, X, Y) ELSE X=(K=83) - (K=6 | 58):: Y= | | |
| | (K=69)-(K=88) | | | X1=256 :: X2=1 |
| 170 | RETURN | | 460 | FOR I=1 TO 5 :: CH(I) = ANS+(I-DT |
| | | + + | |) *DEL :: LOK(I)=5*I-1 :: DISPLA |
| 130 | FOR I=1 TO L :: B\$=SEG\$ | | | Y AT(24, LOK(I)):STR\$(CH(I));:: |
| | :: DISPLAY AT(Y, X-I):B\$ | | | NEXT I |
| | SOUND (-10, -6, 4) :: NEXT I : | :RETURN | 170 | CALL SPRITE(#2,96,6,150,LOK(PF) |
| 1 4 4 | FOR T 4 TR 44 | | 4/2 | CHLL SEKITE(#2.76.6.150.LUK(PF) |
| | FIR I I III IA I CI I GI | HIMD COUR | | |
| 140 | FOR I=1 TO 14 :: CALL SO | JUND (DUR | | *8+4) |
| 140 | (I), NOTE(I), 3):: NEXT I | :: RETU | 480 | |
| | (I), NOTE(I), 3):: NEXT I RN | :: RETU | 48Ø | *8+4) SHT=Ø :: SP=14 :: FOR XØ=X1 TO |
| | (I), NOTE(I), 3):: NEXT I | :: RETU | 48Ø | *8+4) SHT=Ø :: SP=14 :: FOR XØ=X1 TO X2 STEP -DX :: CALL SPRITE(#1,1 |
| 15ø | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" | :: RETU | | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP |
| 15Ø 16Ø | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR | JUND(DUR :: RETU | | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-10,2000,3):: GOSUB |
| 15Ø 16Ø 17Ø | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) | : RETU | | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF |
| 15Ø 16Ø 17Ø | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: | GOSUB 1 | | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-10,2000,3):: GOSUB |
| 15Ø 16Ø 17Ø 18Ø | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 30 :: FOR T=1 TO 100 :: | GOSUB 1 | | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF |
| 15Ø 16Ø 17Ø 18Ø | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: | GOSUB 1 | 490 | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø |
| 15Ø 16Ø 17Ø 18Ø | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 30 :: FOR T=1 TO 100 :: | GOSUB 1 | 490 | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN |
| 15Ø 16Ø 17Ø 18Ø | (I); NOTE(I); 3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T | GOSUB 1 NEXT T 300 :: | 490 | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P |
| 15Ø 16Ø 17Ø 18Ø | (I); NOTE(I); 3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12:: X=25:: L=16:: 30:: FOR T=1 TO 100:: GOSUB 140:: FOR T=1 TO NEXT T FOR I=16 TO 24:: DISPLA | GOSUB 1 NEXT T 300 :: | 490 | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(PF)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, |
| 15Ø 16Ø 17Ø 18Ø | (I), NOTE(I), 3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 | 490 | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-10,2000,3):: GOSUB 110:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=0)*5:: CALL LOCATE(# 2,150,LOK(PF)*8+4):: GOSUB 110 IF ((KK=18)+(K=32))*(SHT=0)THEN CALL SPRITE(#3,124,2,150,LOK(P |
| 15Ø 16Ø 17Ø 18Ø | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS | 49Ø 5ØØ | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(PF)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ,-6,3):: GUN=1:: SHT=1 |
| 15Ø 16Ø 17Ø 18Ø | (I), NOTE(I), 3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS | 49Ø 5ØØ | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D |
| 15Ø 16Ø 17Ø 18Ø 19Ø 2ØØ | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS | 49Ø 5ØØ | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(PF)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ,-6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (DR<1Ø)+(DR>192)THEN CALL DELSPRI |
| 150 160 170 180 190 200 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS | 49Ø 5ØØ 51Ø | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(PF)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ,-6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (DR<1Ø)+(DR>192)THEN CALL DELSPRITE(#3) |
| 150 160 170 180 190 200 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I | 49Ø 5ØØ 51Ø | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T |
| 150 160 170 180 190 200 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": : : F | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I EN(3):: PRINT "P | 49Ø 5ØØ 51Ø | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(PF)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ,-6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (DR<1Ø)+(DR>192)THEN CALL DELSPRITE(#3) |
| 150 160 170 180 190 200 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I EN(3):: PRINT "P | 49Ø 5ØØ 51Ø 52Ø | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T |
| 150 160 170 180 190 200 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": : : F | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I EN(3):: PRINT "P | 49Ø 5ØØ 51Ø 52Ø 53Ø | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 |
| 150 160 170 180 190 200 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I EN(3):: PRINT "P | 49Ø 5ØØ 51Ø 52Ø 53Ø | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ:: IF HIT=1 THEN HIT=Ø |
| 150 160 170 180 190 200 210 220 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": : : F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOTO": : | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I EN(3):: PRINT "P T": ::: T THE UF | 49Ø 5ØØ 51Ø 52Ø 53Ø | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ:: IF HIT=1 THEN HIT=Ø :: GOTO 55Ø ELSE CALL DELSPRITE |
| 150 160 170 180 190 200 210 220 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": : : F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": : PRINT "WITH FIREBUTTON O | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I EN(3):: PRINT "P T": :: T THE UF | 49Ø 5ØØ 51Ø 52Ø 53Ø | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ:: IF HIT=1 THEN HIT=Ø |
| 150 160 170 180 190 200 210 220 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12:: X=25:: L=16:: 30:: FOR T=1 TO 100:: GOSUB 140:: FOR T=1 TO NEXT T FOR I=16 TO 24:: DISPLA ,25-I):B\$:: NEXT I :: F TO 13:: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 840 CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": PRINT "WITH FIREBUTTON CE BAR.": : : PRINT "E | GOSUB 1 NEXT T 300: AY AT(12 FOR I=2 2):: DIS FI EN(3):: PRINT "P FI:::: THE UF DR SPACE | 49Ø 50Ø 51Ø 52Ø 53Ø 54Ø | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ:: IF HIT=1 THEN HIT=Ø :: GOTO 55Ø ELSE CALL DELSPRITE (#3):: GUN=Ø:: GOTO 57Ø |
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| 150 160 170 180 190 200 210 220 230 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": PRINT "WITH FIREBUTTON O BAR.": :: :: PRINT "E UL NOT TO WASTE": :: F HOTS.": :: PRINT "FIRE OR (ENTER) T "": :: :: GOSUB 11Ø :: IF (KK<>18) | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS FI EN(3):: PRINT "P F": :: FTHE UF DR SPACE BE CAREF PRINT "S | 49Ø 50Ø 51Ø 52Ø 53Ø 54Ø 55Ø | *8+4) SHT=Ø:: SP=14 :: FOR XØ=X1 TO X2 STEP -DX :: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5 :: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(PF)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ,-6,3):: GUN=1 :: SHT=1 CALL POSITION(#3,DR,DC):: IF (DR<1Ø)+(DR>192)THEN CALL DELSPRITE(#3) CALL COINC(#1,#3,15,C):: IF C THEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ :: IF HIT=1 THEN HIT=Ø :: GOTO 55Ø ELSE CALL DELSPRITE(#3):: GUN=Ø :: GOTO 57Ø IF (SCL>=5Ø)THEN LEVEL=LEVEL+1 :: CALL DELSPRITE(#1,#3):: GOTO 29 |
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| 150 160 170 180 190 200 210 220 230 240 250 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": PRINT "WITH FIREBUTTON O BAR.": :: :: PRINT "E UL NOT TO WASTE": :: F HOTS.": :: PRINT "FIRE OR <enter> T .": :: GOSUB 11Ø :: IF (KK<>18))THEN 25Ø LEVEL=1 :: SC,HIT,GUN=Ø</enter> | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I EN(3):: PRINT "P THE UF DR SPACE BE CAREF PRINT "S TO START * (K<>13 :: NP=3 | 490 500 510 520 530 540 550 560 570 | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ:: IF HIT=1 THEN HIT=Ø :: GOTO 55Ø ELSE CALL DELSPRITE (#3):: GUN=Ø:: GOTO 57Ø IF (SCL>=5Ø)THEN LEVEL=LEVEL+1 :: CALL DELSPRITE(ALL):: GOTO 2 7Ø CALL DELSPRITE(#1,#3):: GOTO 29 Ø YØ=YØ+4 IF YØ<13 THEN CALL DELSPRITE(#1 |
| 150 160 170 180 190 200 210 220 230 240 250 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": PRINT "WITH FIREBUTTON O BAR.": :: :: PRINT "E UL NOT TO WASTE": :: F HOTS.": :: PRINT "FIRE OR (ENTER) T ": :: : GOSUB 11Ø :: IF (KK<>18))THEN 25Ø LEVEL=1 :: SC,HIT,GUN=Ø :: PT(1)=25 :: PT(2)=16 | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I EN(3):: PRINT "P THE UF DR SPACE BE CAREF PRINT "S TO START * (K<>13 :: NP=3 | 49Ø 50Ø 51Ø 52Ø 53Ø 54Ø 55Ø 55Ø 56Ø 57Ø 58Ø | *8+4) SHT=Ø :: SP=14 :: FOR XØ=X1 TO X2 STEP -DX :: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø :: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5 :: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1 :: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ :: IF HIT=1 THEN HIT=Ø :: GOTO 55Ø ELSE CALL DELSPRITE (#3):: GUN=Ø :: GOTO 57Ø IF (SCL>=5Ø)THEN LEVEL=LEVEL+1 :: CALL DELSPRITE(ALL):: GOTO 2 7Ø CALL DELSPRITE(#1,#3):: GOTO 29 Ø YØ=YØ+4 IF YØ<13 THEN CALL DELSPRITE(#1)):: GOTO 48Ø |
| 150 160 170 180 190 200 210 220 230 240 250 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": PRINT "WITH FIREBUTTON O BAR.": :: :: PRINT "E UL NOT TO WASTE": :: F HOTS.": :: PRINT "FIRE OR <enter> T .": :: GOSUB 11Ø :: IF (KK<>18))THEN 25Ø LEVEL=1 :: SC,HIT,GUN=Ø</enter> | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I EN(3):: PRINT "P THE UF DR SPACE BE CAREF PRINT "S TO START * (K<>13 :: NP=3 | 49Ø 50Ø 51Ø 52Ø 53Ø 54Ø 55Ø 55Ø 56Ø 57Ø 58Ø | *8+4) SHT=Ø :: SP=14 :: FOR XØ=X1 TO X2 STEP -DX :: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø :: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5 :: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1 :: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ :: IF HIT=1 THEN HIT=Ø :: GOTO 55Ø ELSE CALL DELSPRITE (#3):: GUN=Ø :: GOTO 57Ø IF (SCL>=5Ø)THEN LEVEL=LEVEL+1 :: CALL DELSPRITE(ALL):: GOTO 2 7Ø CALL DELSPRITE(#1,#3):: GOTO 29 Ø YØ=YØ+4 IF YØ<13 THEN CALL DELSPRITE(#1):: GOTO 48Ø FOR XØ=X1 TO X2 STEP -DX :: CAL |
| 150 160 170 180 190 200 210 220 230 240 250 260 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": PRINT "WITH FIREBUTTON O BAR.": :: :: PRINT "E UL NOT TO WASTE": :: F HOTS.": :: PRINT "FIRE OR (ENTER) T ": :: : GOSUB 11Ø :: IF (KK<>18))THEN 25Ø LEVEL=1 :: SC,HIT,GUN=Ø :: PT(1)=25 :: PT(2)=16 | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I EN(3):: PRINT "P THE UF DR SPACE BE CAREF PRINT "S TO START * (K<>13 :: NP=3 0 :: PT(| 49Ø 50Ø 51Ø 52Ø 53Ø 54Ø 55Ø 55Ø 56Ø 57Ø 58Ø | *8+4) SHT=Ø :: SP=14 :: FOR XØ=X1 TO X2 STEP -DX :: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø :: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5 :: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1 :: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ :: IF HIT=1 THEN HIT=Ø :: GOTO 55Ø ELSE CALL DELSPRITE (#3):: GUN=Ø :: GOTO 57Ø IF (SCL>=5Ø)THEN LEVEL=LEVEL+1 :: CALL DELSPRITE(ALL):: GOTO 2 7Ø CALL DELSPRITE(#1,#3):: GOTO 29 Ø YØ=YØ+4 IF YØ<13 THEN CALL DELSPRITE(#1)):: GOTO 48Ø |
| 150 160 170 180 190 200 210 220 230 240 250 260 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": PRINT "WITH FIREBUTTON O BAR.": : : : PRINT "E UL NOT TO WASTE": : : F HOTS.": : : PRINT "FIRE OR <enter> T .": : : GOSUB 11Ø :: IF (KK<>18))THEN 25Ø LEVEL=1 :: SC,HIT,GUN=Ø :: PT(1)=25 :: PT(2)=16 3)=5 :: SPR=136 CALL CLEAR :: CALL SCREE</enter> | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS T I EN(3):: PRINT "P THE UF DR SPACE BE CAREF PRINT "S TO START * (K<>13 :: NP=3 0 :: PT(| 490 500 510 520 530 540 550 560 570 580 590 | *8+4) SHT=Ø :: SP=14 :: FOR XØ=X1 TO X2 STEP -DX :: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø :: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5 :: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(PF)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ,-6,3):: GUN=1 :: SHT=1 CALL POSITION(#3,DR,DC):: IF (DR<1Ø)+(DR>192)THEN CALL DELSPRITE(#3) CALL COINC(#1,#3,15,C):: IF C THEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ :: IF HIT=1 THEN HIT=Ø :: GOTO 55Ø ELSE CALL DELSPRITE(#3):: GUN=Ø :: GOTO 57Ø IF (SCL>=5Ø)THEN LEVEL=LEVEL+1 :: CALL DELSPRITE(ALL):: GOTO 27Ø CALL DELSPRITE(#1,#3):: GOTO 29 Ø YØ=YØ+4 IF YØ<13 THEN CALL DELSPRITE(#1):: GOTO 48Ø FOR XØ=X1 TO X2 STEP -DX :: CALL LOCATE(#1,15Ø,XØ) |
| 150 160 170 180 190 200 210 220 230 240 250 260 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": PRINT "WITH FIREBUTTON O BAR.": : : : PRINT "E UL NOT TO WASTE": : : F HOTS.": : : PRINT "FIRE OR (ENTER) T ": : : : GOSUB 11Ø :: IF (KK<>18))THEN 25Ø LEVEL=1 :: SC,HIT,GUN=Ø :: PT(1)=25 :: PT(2)=16 3)=5 :: SPR=136 CALL CLEAR :: CALL SCREE DISPLAY AT(12,7): "ENTER | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS FI EN(3):: PRINT "P F": :: FTHE UF DR SPACE BE CAREF PRINT "S TO START * (K<>13 :: NP=3 # :: PT(EN(11):: RING LEV | 490 500 510 520 530 540 550 560 570 580 590 | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-10,2000,3):: GOSUB 110:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,150,LOK(PF)*8+4):: GOSUB 110 IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,150,LOK(P F)*8+4,-20,Ø):: CALL SOUND(200, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<10)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 730 IF HIT=1 THEN XØ=X2 NEXT XØ:: IF HIT=1 THEN HIT=Ø :: GOTO 550 ELSE CALL DELSPRITE (#3):: GUN=Ø:: GOTO 570 IF (SCL>=50)THEN LEVEL=LEVEL+1 :: CALL DELSPRITE(ALL):: GOTO 2 70 CALL DELSPRITE(#1,#3):: GOTO 29 0 YØ=YØ+4 IF YØ<13 THEN CALL DELSPRITE(#1) :: GOTO 480 FOR XØ=X1 TO X2 STEP -DX:: CAL L LOCATE(#1,150,XØ) CALL COINC(#1,#2,10,C):: IF C T |
| 150 160 170 180 190 200 210 220 230 240 250 260 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": PRINT "WITH FIREBUTTON O BAR.": : : :: PRINT "E UL NOT TO WASTE": : : F HOTS.": : : PRINT "FIRE OR <enter> ": : : : GOSUB 11Ø :: IF (KK<>18))THEN 25Ø LEVEL=1 :: SC,HIT,GUN=Ø :: PT(1)=25 :: PT(2)=16 3)=5 :: SPR=136 CALL CLEAR :: CALL SCREE DISPLAY AT(12,7): "ENTER EL"; LEVEL :: GOSUB 14Ø ::</enter> | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS FI EN(3):: PRINT "P F": :: FTHE UF DR SPACE BE CAREF PRINT "S TO START * (K<>13 :: NP=3 # :: PT(EN(11):: RING LEV | 490 500 510 520 530 540 550 550 570 580 590 600 | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-10,20ØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ:: IF HIT=1 THEN HIT=Ø :: GOTO 55Ø ELSE CALL DELSPRITE (#3):: GUN=Ø:: GOTO 57Ø IF (SCL>=5Ø)THEN LEVEL=LEVEL+1 :: CALL DELSPRITE(ALL):: GOTO 2 7Ø CALL DELSPRITE(#1,#3):: GOTO 2 9Ø YØ=YØ+4 IF YØ<13 THEN CALL DELSPRITE(#1) :: GOTO 48Ø FOR XØ=X1 TO X2 STEP -DX:: CAL L LOCATE(#1,15Ø,XØ) CALL COINC(#1,#2,1Ø,C):: IF C T HEN CALL DELSPRITE(#2):: XØ=X2 |
| 150 160 170 180 190 200 210 220 230 240 250 260 270 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": PRINT "WITH FIREBUTTON O BAR.": :: :: PRINT "E UL NOT TO WASTE": :: F HOTS.": :: PRINT "FIRE OR (ENTER) T ": :: GOSUB 11Ø :: IF (KK<>18))THEN 25Ø LEVEL=1 :: SC,HIT,GUN=Ø :: PT(1)=25 :: PT(2)=16 3)=5 :: SPR=136 CALL CLEAR :: CALL SCREE DISPLAY AT(12,7): "ENTER EL"; LEVEL :: GOSUB 14Ø :: =1 TO 1ØØ :: NEXT T | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS FI EN(3):: PRINT "P F": :: FTHE UF DR SPACE BE CAREF PRINT "S TO START * (K<>13 :: NP=3 # :: PT(EN(11):: RING LEV :: FOR T | 490 500 510 520 530 540 550 550 570 580 590 600 610 | *8+4) SHT=Ø:: SP=14 :: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-1Ø,2ØØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(PF)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ,-6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (DR<1Ø)+(DR>192)THEN CALL DELSPRITE(#3) CALL COINC(#1,#3,15,C):: IF C THEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ:: IF HIT=1 THEN HIT=Ø:: GOTO 55Ø ELSE CALL DELSPRITE(#3):: GUN=Ø:: GOTO 57Ø IF (SCL>=5Ø)THEN LEVEL=LEVEL+1: CALL DELSPRITE(ALL):: GOTO 27Ø CALL DELSPRITE(#1,#3):: GOTO 29 Ø YØ=YØ+4 IF YØ<13 THEN CALL DELSPRITE(#1):: GOTO 48Ø FOR XØ=X1 TO X2 STEP -DX:: CALL LOCATE(#1,15Ø,XØ) CALL COINC(#1,#2,1Ø,C):: IF C THEN CALL DELSPRITE(#2):: XØ=X2 NEXT XØ |
| 150 160 170 180 190 200 210 220 230 240 250 260 270 | (I),NOTE(I),3):: NEXT I RN E\$="MISSILE MATH" CALL CLEAR CALL SCREEN(5) Y=12 :: X=25 :: L=16 :: 3Ø :: FOR T=1 TO 1ØØ :: GOSUB 14Ø :: FOR T=1 TO NEXT T FOR I=16 TO 24 :: DISPLA ,25-I):B\$:: NEXT I :: F TO 13 :: B\$=SEG\$(E\$,I,12 PLAY AT(12,1):B\$:: NEXT GOSUB 84Ø CALL CLEAR :: CALL SCREE PRINT "TO PLAY:": :: F OSITION GUN OVER CORRECT PRINT "ANSWER AND SHOOT O": PRINT "WITH FIREBUTTON O BAR.": : : :: PRINT "E UL NOT TO WASTE": : : F HOTS.": : : PRINT "FIRE OR <enter> ": : : : GOSUB 11Ø :: IF (KK<>18))THEN 25Ø LEVEL=1 :: SC,HIT,GUN=Ø :: PT(1)=25 :: PT(2)=16 3)=5 :: SPR=136 CALL CLEAR :: CALL SCREE DISPLAY AT(12,7): "ENTER EL"; LEVEL :: GOSUB 14Ø ::</enter> | GOSUB 1 NEXT T 300 :: AY AT(12 FOR I=2 2):: DIS FI EN(3):: PRINT "P F": :: FTHE UF DR SPACE BE CAREF PRINT "S TO START * (K<>13 :: NP=3 # :: PT(EN(11):: RING LEV | 490 500 510 520 530 540 550 550 570 580 590 600 610 | *8+4) SHT=Ø:: SP=14:: FOR XØ=X1 TO X2 STEP -DX:: CALL SPRITE(#1,1 28,SP,YØ*8,XØ):: SP=24-SP CALL SOUND(-10,20ØØ,3):: GOSUB 11Ø:: PF=PF+SGN(X):: PF=PF+(PF =6)*5-(PF=Ø)*5:: CALL LOCATE(# 2,15Ø,LOK(PF)*8+4):: GOSUB 11Ø IF ((KK=18)+(K=32))*(SHT=Ø)THEN CALL SPRITE(#3,124,2,15Ø,LOK(P F)*8+4,-2Ø,Ø):: CALL SOUND(2ØØ, -6,3):: GUN=1:: SHT=1 CALL POSITION(#3,DR,DC):: IF (D R<1Ø)+(DR>192)THEN CALL DELSPRI TE(#3) CALL COINC(#1,#3,15,C):: IF C T HEN GOSUB 73Ø IF HIT=1 THEN XØ=X2 NEXT XØ:: IF HIT=1 THEN HIT=Ø :: GOTO 55Ø ELSE CALL DELSPRITE (#3):: GUN=Ø:: GOTO 57Ø IF (SCL>=5Ø)THEN LEVEL=LEVEL+1 :: CALL DELSPRITE(ALL):: GOTO 2 7Ø CALL DELSPRITE(#1,#3):: GOTO 2 9Ø YØ=YØ+4 IF YØ<13 THEN CALL DELSPRITE(#1) :: GOTO 48Ø FOR XØ=X1 TO X2 STEP -DX:: CAL L LOCATE(#1,15Ø,XØ) CALL COINC(#1,#2,1Ø,C):: IF C T HEN CALL DELSPRITE(#2):: XØ=X2 |

- 150, LOK (PF) *8+4):: CALL SCREEN (I):: CALL SOUND (-1 Ø+I*10, -5,3) :: NEXT I
- 63Ø CALL DELSPRITE(#1)
- 64Ø CALL HCHAR(1, NP*2+1, 42):: FOR I =1 TO 3Ø STEP 3 :: FOR T=1 TO 3 Ø :: NEXT T :: CALL SOUND (10,22 Ø, I):: NEXT I :: CALL HCHAR(1, N P*2+1,32)
- 65Ø NP=NP-1 :: FOR T=1 TO 5 :: DISP LAY AT (24, LOK (DT)): "(3 SPACES)" ;:: CALL SOUND (30, 220, 3):: CALL SOUND (40,440,3):: DISPLAY AT (2 4, LOK (DT) -1): ANS;
- 66Ø CALL SOUND (3Ø, 22Ø, 3):: NEXT T 67Ø E\$="KEEP TRYING !" :: X=25 :: Y =12 :: L=16 :: GOSUB 13Ø
- 68Ø E\$="I KNOW YOU CAN DO IT !" :: X=26 :: L=22 :: Y=14 :: GOSUB 1 30
- 69Ø GDSUB 14Ø :: IF NP=Ø THEN 7ØØ E LSE 290
- 700 DISPLAY AT(16,6): "FINAL SCORE " ;SC :: DISPLAY AT(18,9): "PLAY A GAIN?" :: DISPLAY AT (20,4):"(<F IRE> OR PRESS 'Y')"
- 71Ø GOSUB 11Ø :: IF (KK<>18) * (K<>89) THEN 7.10 ELSE 210
- 720 REM CHECK COLLISION
- 73Ø IF ANS=CH(PF) THEN CALL DELSPRIT E(#3):: GOSUB 770 :: HIT=1 :: G **OTO 75Ø**
- 740 CALL COLOR(#1,2):: CALL SOUND(1 ØØ,147,4,587,4,294,4,-1,3):: CA LL COLOR(#1,14)
- 75Ø GUN=Ø :: RETURN
- 76Ø REM DIRECT HIT
- 77Ø FOR I=1Ø TO 3Ø STEP 5 :: SPR=27 6-SPR :: CALL SCREEN(I/10+8):: CALL SOUND (-100, -6, I):: CALL SPRITE(#1, SPR, 2+1/4, YØ*8, XØ):: NEXT I
- 780 CALL SCREEN(15):: I=Y0/4 :: SC= SC+PT(I):: SCL=SCL+PT(I):: DISP LAY AT(14,9):PT(I); "POINTS"
- 79Ø IF (SCL>=5Ø) * (SCL/PB>2Ø) THEN DI SPLAY AT(16,7): "50 BONUS POINTS :: SC=SC+5Ø :: GOTO 82Ø
- 800 IF (SCL>=50) * (SCL/PB>=10) THEN D ISPLAY AT(16,7): "25 BONUS POINT S" :: SC=SC+25 :: GOTO 820
- 81Ø GOTO 83Ø
- 820 FOR I=15 TO 3 STEP -1 :: CALL S 1090 RETURN CREEN(I):: NEXT I :: FOR I=3 TO 15 :: CALL SCREEN(I):: NEXT I
- 83Ø DISPLAY AT(1,23):SC;:: FOR I=1 TO 350 :: NEXT I :: CALL DELSPR ITE(ALL):: RETURN
- 840 CALL CLEAR :: CALL SCREEN(14):: PRINT TAB(6); "MISSILE MATH MEN 5 U": : : :
- 850 PRINT "POSITION BALL WITH JOYST ICK/": :
- 86Ø PRINT "ARROW KEYS AND FIRE/ENTE 15 R TO": :
- 870 PRINT "SELECT GAME.": :
- 88Ø PRINT "TO:": ::: PRINT TAB(7); 25 "ADD &"; TAB(18); "MULTIPLY &"

- -SPR :: CALL SPRITE(#1,SPR,I+1, 890 PRINT TAB(7); "SUBTRACT"; TAB(18) ; "DIVIDE": : : :
 - 900 PRINT "SLOW": : : :: PRINT "F AST": :
 - 91Ø FOR J=17 TO 21 STEP 4 :: FOR CO L=11 TO 13 :: CALL VCHAR(J, COL, 120,3):: CALL VCHAR(J, COL+11,12 Ø,3):: NEXT COL :: NEXT J
 - 72Ø FOR J=18 TO 22 STEP 4 :: CALL H CHAR(J, 12, 32):: CALL HCHAR(J, 23 ,32):: NEXT J
 - 93Ø KHAR=122 :: PX=12 :: PY=18 :: M ENU=1 :: DX=9
 - 94Ø CALL HCHAR(PY, PX, KHAR):: GOSUB 11Ø :: KHAR=154-KHAR
 - 95Ø IF ((SGN(X)=Ø)*(SGN(Y)=Ø))THEN 970
 - 960 CALL HCHAR(PY, PX, 32):: IF (SGN(X)<>Ø)THEN MENU=3-MENU :: PX=35 -PX ELSE PY=4Ø-PY :: DX=27-DX
 - 97Ø IF (KK=18)+(K=13)THEN RETURN EL SE 940
 - 980 REM DEFINE CHARS, COLORS, & MUS ICAL SCORE
 - 990 CALL CHAR(120, RPT\$("F", 16), 112, "ØØØØ183C7E7E183C",122,"8142241 818244281")
 - 1000 CALL CHAR (96, "00000000003030303 Ø3Ø3Ø3ØF3F3F1818"&RPT\$("Ø",22) &"CØFØFØ6Ø6Ø"):: REM BASE
 - 1010 CALL CHAR (124, RPT\$ ("0", 11) & RPT \$("10",6)&RPT\$("0",51)):: REM MISSILE
 - 1020 CALL CHAR(136, "0000201000000002 80051030008"&RPT\$("0",14)&"C4C ØØØACØ88"&RPT\$("Ø",12)):: REM EXPLOSION 1
 - 1030 CALL CHAR(140, "00100100000000000 ØØ1ØØØØ2"&RPT\$("Ø",18)&"8ØØ4ØØ @@@@@@@2@@@@@@@@@"):: REM EXPLOSION 2
 - 1040 CALL CHAR(128, "000000000000001F7 FFFE6E67F1F"&RPT\$("Ø",18)&"F8F EFF6767FEF8ØØØØØØ"):: REM UFO
 - 1050 CALL MAGNIFY(4):: CALL COLOR(1 1,13,1)
 - 1060 FOR I=1 TO 14 :: READ NOTE(I), DUR(I):: NEXT I :: RETURN
 - DATA 392, 100, 392, 100, 392, 100, 5 23,900,392,100,392,100,392,100
 - DATA 523, 100, 466, 100, 440, 100, 3 92,700,40000,100,392,360,523,6 ØØ

Program 6: Apple Missile Math

- HOME : VTAB 10: HTAB 14: PRINT "LOAD ING DATA"
- **GOSUB 1000**
- HOME
- VTAB 4: A\$ = "MISSILE MATH": GOSUB 9 10 00
- PRINT 11
- VTAB 6: PRINT " USE PAD DLE O"
- 20 VTAB 8
- PRINT : PRINT " PRESS SPACE TO SELECT"

PRINT : PRINT " PRESS RETURN 500 IF X = 25 THEN B = 5 TO START" 510 IF X = 15 THEN B = 10 VTAB 15: PRINT " 30 ADDITION & 520 IF X = 5 THEN B = 25 MULTIPLICATION" 521 HOME 40 PRINT " SUBTRACTION & DIVI 525 BN = BN + B SION" 526 SC = SC + B: VTAB 23:A\$ = STR\$ (B) 45 G = 0 + " POINTS": GOSUB 900 VTAB 18 49 IF BN > = 50 THEN L = L + 1: GOTO 530 50 PRINT : PRINT "SLOW 700 550 **BOTO 260** 60 PRINT : PRINT "FAST 600 B = B - 1 601 HTAB 1: VTAB 21: PRINT " 70 IF G = O THEN VTAB 19: HTAB 9 ": : A\$ = 71 IF G = 1 THEN VTAB 21: HTAB 9 "KEEP TRYING": GOSUB 900 72 IF G = 2 THEN VTAB 19: HTAB 29 602 PRINT : A\$ = "I KNOW YOU CAN DO IT" 73 IF G = 3 THEN VTAB 21: HTAB 29 I GOSUB 900 PRINT : A\$ = "THE ANSWER WAS: ": GOSUB 74 PRINT "#" 603 80 POKE - 16368,0 900: PRINT : A\$ = STR\$ (ANS): GOSUB IF PEEK (- 16384) < 128 THEN 90 90 900 GET As: IF As = CHR\$ (13) THEN 20 FOR I = 1 TO 1000; NEXT 610 IF S = 0 THEN BOO 620 IF A\$ < > " " THEN BO 110 630 **GOTO 260** 700 BO = INT (BN / SH + .5)120 G = G + 1: IF G = 4 THEN G = 0 710 IF BO > = 25 THEN BO = 50: GOTO 7 130 **GOTO 49** 50 200 L = 1:SC = 0:S = 3 720 IF BO > = 10 THEN BO = 25: GOTO 7 IF G = 0 OR G = 2 THEN POKE 768,1 50 40: GOTO 210 206 730 **GOTO 760** POKE 768,80 TEXT : HOME : VTAB 7: PRINT " VTAB 21 750 755 A\$ = "BONUS: " + STR\$ (BO): GOSUB OSITION GUN OVER CORRECT ANSWER" 220 BN = 0:B0 = 0:B = 0:SH = 0 900:SC = SC + BO 230 PRINT : PRINT : PRINT 760 FOR I = 1 TO 5000: NEXT : GOTO 210 AND SHOOT UFO" 800 TEXT : HOME : VTAB 5: PRINT " PRINT : PRINT : PRINT " BE CAR SCORE: "SC 240 EFUL NOT TO WASTE SHOTS" PRINT : PRINT : HTAB 18: PRINT "GA 810 250 PRINT : PRINT : PRINT " ME": PRINT : PRINT : HTAB 18: PRINT ENTERING LEVEL ":L "OVER" 260 FOR I = 1 TO 5000: NEXT 820 VTAB 20: HTAB 5: PRINT "PRESS ANY 270 GR : HOME : VTAB 23: HTAB 25: PRINT KEY TO PLAY AGAIN" "SHIPS: ":S 830 POKE - 16368,0 HTAB 25: PRINT "SCORE: "; SC 280 840 IF PEEK (- 16384) < 128 THEN 840 290 A = INT (RND (1) * 4 + 1) + 4 * (850 GET A\$: GOTO 5 L-1)900 X = LEN (A\$) 1A\$ = A\$ + " " 291 B = INT (RND (1) * 4 * L + 1) 910 FOR I = 1 TO X + 19 - INT (X / 2 +IF G < 2 THEN C = A + B: GOTO 294 .5) 293 C = A * B 920 HTAB 39 - I: PRINT MID\$ (A\$,1,I); 294 A\$ = STR\$ (A) | B\$ = STR\$ (B) | C\$ = 930 NEXT I STR\$ (C) 940 RETURN 295 RP = INT (RND (1) * 4) + 1 1000 CK = 0 IF RP = 1 THEN ANS = A:A\$ = "?" 300 1010 FOR I = 24576 TO 25329; READ A:CK IF RP = 2 THEN ANS = B:B\$ = "?" 310 = CK + A: POKE I, A: NEXT IF RP > 2 THEN ANS = C:C\$ = "?" 320 IF CK < > 73926 THEN PRINT "ERR 1020 VTAB 23: IF G < 2 THEN PRINT A\$"+ 330 OR IN DATA": END "B\$"="C\$: GOTO 340 1030 RETURN PRINT A\$"X"B\$"="C\$ 1100 335 DATA 76,22,96,255,160,160,232,16 340 IF ANS > 90 THEN DL = 10: GOTO 370 IF ANS > 20 THEN DL = 5: GOTO 370 DATA 201, 197, 160, 160, 176, 165, 162 350 1110 ,160 360 DL = INT ((ANS / 10) + 1) 370 DT = INT (RND (1) * 5) + 11120 DATA 128, 6, 10, 14, 18, 22, 32, 46 375 VTAB 21 1130 DATA 96, 32, 86, 96, 32, 216, 97, 32 FOR I = 1 TO 5: CH(I) = ANS + (I -111,98,32,175,98,173,16,96 380 1140 DATA DT) * DL: HTAB I * 4 + 4: PRINT CH 208, 239, 32, 212, 98, 96, 169, 1 1150 DATA 141, 16, 96, 141, 4, 96, 169, 2 (I) : NEXT 1160 DATA 385 FOR I = 1 TO 5: IF CH(I) = ANS THEN 1170 DATA 141, 5, 96, 169, 33, 141, 7, 96 1180 DATA 141,8,96,169,5,141,12,96 POKE 800, I - 1 NEXT 1190 DATA 141, 1, 3, 169, 0, 141, 13, 96 386 CALL 24576 1200 DATA 169, 9, 141, 14, 96, 96, 173, 4 390 1210 DATA 96, 205, 5, 96, 240, 34, 169, 0 395 SH = SH + 1400 X = PEEK (769): IF X = 35 THEN 600 1220 DATA 32,100,248,173,4,96,141,3

```
1230
       DATA
              96, 32, 43, 97, 169, 6, 32, 100
1240
       DATA
              248, 173, 5, 96, 141, 3, 96, 32
1250
       DATA
              43, 97, 173, 5, 96, 141, 4, 96
1260
       DATA
               169,0,32,100,248,173,7,96
1270
       DATA
               141, 6, 96, 173, 12, 96, 141, 9
1280
       DATA
              96, 32, 126, 97, 173, 14, 96, 32
1290
       DATA
              100, 248, 173, 8, 96, 141, 6, 96
1300
       DATA
               173, 1, 3, 141, 9, 96, 32, 126
1310
       DATA
              97, 173, 8, 96, 141, 7, 96, 173
1320
       DATA
              1,3,141,12,96,173,13,96
1330
       DATA
              201,1,208,68,169,0,32,100
1340
       DATA
              248, 172, 2, 3, 185, 17, 96, 24
1350
       DATA
               105, 2, 168, 173, 10, 96, 32, 0
1360
       DATA
              248, 172, 2, 3, 185, 17, 96, 24
1370
       DATA
               105, 2, 168, 173, 11, 96, 32, 113
       DATA
              248, 201, 0, 208, 28, 169, 15, 32
1380
1390
       DATA
               100, 248, 172, 2, 3, 185, 17, 96
1400
       DATA
              24, 105, 2, 168, 173, 11, 96, 32
1410
       DATA
              0,248,173,11,96,141,10,96
              96, 173, 32, 3, 205, 2, 3, 240
1420
       DATA
              6, 169, 15, 141, 14, 96, 96, 169
1430
       DATA
1440
              0, 141, 16, 96, 169, 15, 141, 14
       DATA
1450
              96, 173, 14, 96, 32, 100, 248, 32
       DATA
               126, 97, 32, 187, 98, 206, 14, 96
1460
       DATA
               208, 239, 96, 174, 3, 96, 189, 17
1470
       DATA
1480
       DATA
              96, 24, 105, 2, 168, 169, 36, 133
              45, 169, 34, 32, 40, 248, 174, 3
1490
       DATA
1500
       DATA
               96, 189, 17, 96, 168, 200, 24, 105
1510
       DATA
               3, 133, 44, 169, 37, 32, 25, 248
1520
       DATA
               174, 3, 96, 189, 17, 96, 168, 24
1530
       DATA
               105, 4, 133, 44, 169, 38, 32, 25
1540
       DATA
               248, 174, 3, 96, 189, 17, 96, 168
1550
       DATA
               200, 169, 39, 32, 0, 248, 174, 3
       DATA
1560
               96, 189, 17, 96, 168, 200, 200, 20
1570
       DATA
               169, 39, 32, 0, 248, 96, 173, 6
1580
       DATA
               96, 168, 24, 105, 5, 133, 44, 173
1590
               9,96,200,32,25,248,173,6
       DATA
1600
       DATA
               96, 168, 24, 105, 6, 133, 44, 173
1610
       DATA
               9, 96, 24, 105, 1, 32, 25, 248
1620
       DATA
               173, 6, 96, 168, 24, 105, 6, 133
1630
       DATA
               44, 173, 9, 96, 24, 105, 2, 32
1640
       DATA
               25, 248, 173, 6, 96, 168, 24, 105
1650
               6, 133, 44, 173, 9, 96, 24, 105
       DATA
1660
       DATA
               3, 32, 25, 248, 173, 6, 96, 168
1670
       DATA
               24, 105, 5, 133, 44, 200, 173, 9
1680
       DATA
               96, 24, 105, 4, 32, 25, 248, 96
1690
       DATA
               162,0,32,30,251,152,201,50
       DATA
1700
               144, 17, 201, 100, 144, 18, 201, 1
      50
1710
       DATA
               144, 19, 201, 200, 144, 20, 169, 4
1720
       DATA
               76, 7, 98, 169, 0, 76, 7, 98
1730
               169, 1, 76, 7, 98, 169, 2, 76
       DATA
1740
       DATA
               7, 98, 169, 3, 76, 7, 98, 141
1750
       DATA
               5, 96, 173, 8, 96, 240, 6, 206
1760
       DATA
               8, 96, 76, 55, 98, 169, 33, 141
1770
       DATA
               8, 96, 32, 84, 98, 169, 9, 141
               14, 96, 169, 0, 141, 13, 96, 173
1780
       DATA
1790
       DATA
               1,3,24,105,10,141,1,3
1800
       DATA
               201, 35, 208, 3, 76, 147, 98, 173
1810
               13, 96, 201, 1, 208, 48, 173, 11
       DATA
               96, 201, 2, 144, 15, 206, 11, 96
1820
       DATA
1830
               206, 11, 96, 206, 11, 96, 206, 11
       DATA
1840
       DATA
               96, 76, 110, 98, 169, 2, 141, 13
1850
       DATA
               96, 169, 0, 32, 100, 248, 172, 2
1860
       DATA
               3, 185, 17, 96, 24, 105, 2, 168
1870
       DATA
               173, 10, 96, 32, 0, 248, 96, 173
1880
       DATA
               97, 192, 48, 1, 96, 173, 13, 96
1890
       DATA
               201,0,208,22,169,33,141,10
```

```
1900
       DATA
               96, 141, 11, 96, 169, 1, 141, 13
1910
       DATA
               96, 173, 4, 96, 141, 2, 3, 32
1920
       DATA
               198, 98, 96, 169, 0, 141, 16, 96
1930
       DATA
               169, 15, 141, 14, 96, 173, 14, 96
1940
       DATA
               32, 100, 248, 32, 43, 97, 32, 187
1950
       DATA
               98, 206, 14, 96, 208, 239, 96, 174
1960
       DATA
               0,3,160,0,200,208,253,202
1970
       DATA
               208, 250, 96, 162, 10, 160, 0, 200
1980
       DATA
               208, 253, 202, 208, 250, 96, 162,
      15
1990
       DATA
               173, 48, 192, 169, 4, 32, 168, 252
       DATA
               202, 208, 245, 96, 169, 16, 141, 1
2000
      5
2010
       DATA
               96, 160, 1, 162, 1, 169, 80, 32
2020
       DATA
               168, 252, 173, 48, 192, 232, 208,
      253
2030
       DATA
               136, 208, 240, 206, 15, 96, 208, 2
      33
2040
       DATA
               96, 255, 0, 0, 255, 255, 0, 0
```

Program 7: PC/PCjr Missile Math

10 WIDTH 40:KEY OFF:SCREEN 0,1:DEF SEG=0 : POKE 1047, 64: DEFINT A-Z 20 GOSUB 610:GOSUB 450:GOSUB 480:GOSUB 5 1Ø:GOTO 11Ø 3Ø IF Y2=N21 THEN RETURN ELSE C\$=INKEY\$: IF C\$="." AND H<N28 THEN LOCATE N21,H:PR INT " ": H=H+N5 4Ø IF C\$="," AND H>N9 THEN LOCATE N21,H: PRINT " ":H=H-N5: Z=RND(1) 5Ø IF C\$=CHR\$(N32) AND FIRE =NØ AND FI=N Ø THEN FIRE=N1:FI=N1:Y=N2Ø:X=H+N1:PANS=C H((H-N3)/N5):NS=NS+N1:Z=RND(1):RETURN 60 LOCATE N21, H: COLOR N3: PRINT BASE\$: RET URN 7Ø X2=X2-N1:IF X2=N1 THEN LOCATE Y2, X2+N ": Y2=Y2+N5: X2=N35: FI=NØ: R=N 1:PRINT " 4 8Ø SP=SCREEN(Y2, X2):IF SP=21 THEN FL=2:K =S:RETURN:ELSE IF SP=202 THEN FL=3:K=S:R ETURN 90 LOCATE Y2, X2: COLOR R: PRINT SPCE\$: RET URN 100 COL=COL+1: IF COL=8 THEN COL =2 110 COLOR COL:CLS:W\$="ENTERING LEVEL"+ST R\$(LVL):YY=12:GOSUB 590:GOSUB 630 120 IF NS THEN IF NS<3 THEN W\$="50 POINT BONUS": YY=14: GOSUB 600: ELSE IF NS<6 THE N W\$="25 POINT BONUS": YY=14:GOSUB 600 13Ø FOR TD=1 TO 1000:NEXT:SCL=0:NS=0 14Ø CLS:LOCATE 2,1:FOR J=1 TO NM:COLOR 1 3:PRINT CHR\$(6)" ";:NEXT 150 LOCATE 2,29: PRINT"SCORE "SC 16Ø X2=36:Y2=6:T=INT(RND(1)*2Ø)+4Ø:FL=1: FI=Ø:FIRE=Ø:R=4 17Ø A=INT(RND(1)*4+1)+4*(LVL-1) 18Ø B=INT(RND(1)*4*LVL+1) 19Ø IF P\$="A" THEN C=A+B:GOTO 21Ø 200 C=A*B 21Ø A\$=STR\$(A):B\$=STR\$(B):C\$=STR\$(C) 22Ø RP=INT(RND(1)*4)+1 23Ø IF RP=1 THEN ANS=A: A\$=CHR\$ (63) 24Ø IF RP=2 THEN ANS=B:B\$=CHR\$(32)+CHR\$(63) 25Ø IF RP=3 OR RP=4 THEN ANS=C:C\$=CHR\$(3 2) +CHR\$ (63) 260 IF P\$="A" THEN LOCATE 4,14:COLOR 7:P RINT A\$" +"B\$" ="C\$:GOTO 28Ø

27Ø COLOR 7:LOCATE 4,14:PRINT A\$" X"B\$" ="C\$ 28Ø IF ANS>9Ø THEN DEL=10:GOTO 32Ø 29Ø IF ANS>2Ø THEN DEL=5:GOTO 32Ø 3ØØ DEL=INT((ANS/10)+1)

31Ø DT=INT(RND(Ø) *5)+1
32Ø FOR I=1 TO 5:CH(I)=ANS+(I-DT) *DEL:LO
CATE 22,5*I+3:PRINT CH(I):NEXT I

33Ø GOSUB 3Ø:GOSUB 41Ø:T=T-N1:IF T<NØ TH EN FOR K=N1 TO S:GOSUB 41Ø:GOSUB 7Ø:NEXT :GOSUB 41Ø

340 ON FL GOTO 330,350,370

350 R=N7:FL=N1:IF ANS<>PANS THEN 330 ELS E FOR TI=N1 TO N3:COLOR TI:LOCATE Y2-N1, X2:PRINT E1\$:LOCATE Y2,X2:PRINT E2\$:LOCATE Y2+N1,X2:PRINT E3\$:LOCATE Y2+N2,X2:PRINT P(Y2)" POINTS":FOR TD=37 TO 45:SOUND TD,.5:NEXT TD,TI:FIRE=0:FOR TD=1 TO 900:NEXT

36Ø SC=SC+P(Y2):SCL=SCL+P(Y2):IF SCL>=5Ø THEN LVL=LVL+1:SCL=Ø:GOTO 1ØØ:ELSE 14Ø 37Ø NM=NM-1:SOUND 1ØØ,2Ø:FOR TD=1 TO 6ØØ:NEXT:SOUND 37,2Ø:FOR TI=1 TO 5:FOR TD=1 TO 6ØØ:NEXT:LOCATE 22,5*DT+3:PRINT "

":FOR TD=1 TO 60:NEXT:LOCATE 22,5*DT+3: COLOR 4:PRINT CH(DT):FOR TD=1 TO 60:NEXT:NEXT

380 IF NM>0 THEN W\$="KEEP TRYING": YY=10: GOSUB 590:GOSUB 630:GOTO 140

390 LOCATE 2,1:PRINT " ":W\$="PLAY AGAIN ?(Y/N)":YY=10:GOSUB 590

400 I\$=INKEY\$:IF I\$="Y" THEN RUN ELSE IF I\$="N" THEN CLS:END:ELSE 400

410 IF FIRE=NØ THEN FOR TD=1 TO 10:NEXT:RETURN

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420 Y=Y-1:IF Y=5 THEN FIRE=0:LOCATE Y+1, X:PRINT" ":RETURN

43Ø SP=SCREEN(Y,X):IF SP <>32 THEN FL=2 44Ø SOUND 2ØØ-Y*3,.1:LOCATE Y,X:COLOR 14 :PRINT MISS*:RETURN

450 CLS:W\$="MISSILE MATH !":YY=10:COLOR 2:GOSUB 590:FOR TD=1 TO 800:NEXT

460 COLOR 3:W\$="< MOVES YOU LEFT":YY=12: GOSUB 590:COLOR 4:W\$="> MOVES YOU RIGHT" :YY=14:GOSUB 600:LOCATE 16,11:COLOR 7:PR INT "SPACE BAR TO FIRE":GOSUB 630:RETURN 470 FOR TD=1 TO 2000:NEXT:CLS:RETURN

48Ø SPCE\$=CHR\$(17)+STRING\$(2,219)+CHR\$(174)+CHR\$(32)+CHR\$(32):BASE\$=CHR\$(32)+CHR\$(32)+CHR\$(202)+CHR\$(32):MISS\$=CHR\$(21)+CHR\$(31)+CHR\$(29)+CHR\$(32):E1\$=CHR\$(92)+STRING\$(2,179)+CHR\$(47):E2\$=CHR\$(196)+STRING\$(2,32)+CHR\$(196)+CHR\$(32)

49Ø E3\$=CHR\$(47)+STRING\$(2,179)+CHR\$(92)
5ØØ H=28:LVL=1:NM=3:N1=1:N21=21:N32=32:N
28=28:NØ=Ø:N2=2:N3=3:N2Ø2=2Ø2:N5=5:N9=9:
N32=32:N2Ø=2Ø:N35=35:N4=4:N7=7:DIM P(16):P(6)=25:P(11)=1Ø:P(16)=5:COL=2:RETURN
51Ø CLS:LOCATE 8,8,Ø:COLOR 7:PRINT "(A)D
DITION AND SUBTRACTION":LOCATE 1Ø,19:PRI
NT"OR"

520 LOCATE 12,7 :PRINT"(M)ULTIPLICATION AND DIVISION"

53Ø P\$=INKEY\$:IF P\$<>"A"AND P\$<>"M" THEN 53Ø

540 LOCATE 15,12:PRINT "(F)AST OR (S)LOW

55Ø S\$=INKEY\$:IF S\$="S" THEN S=1 ELSE IF S\$="F" THEN S=2 ELSE 55Ø

560 LOCATE 21,11:PRINT "HIT ANY KEY TO S TART"

570 Z=RND(1):I\$=INKEY\$:IF I\$=""THEN 570 580 RETURN

590 W=LEN(W\$):NW\$=W\$+STRING\$(20-W/2,32): FOR K=1 TO LEN(NW\$):LOCATE YY,39-K,0:PRI NT LEFT\$(NW\$,K):NEXT:RETURN

600 W=LEN(W\$):NW\$=STRING\$(18-W/2,32)+W\$: FOR K=1 TO LEN(NW\$):LOCATE YY,1:PRINT RI GHT\$(NW\$,K):NEXT:RETURN

610 DIM NO(14,2):FOR A=1 TO 14:FOR B=1 T O 2:READ NO(A,B):NEXT B,A:RETURN

62Ø DATA 196,1,196,1,196,1,261,9,196,1,1 96,1,196,1,261,1,232,1,22Ø,1,196,7,32ØØØ ,1,196,3,261,6

63Ø FOR R1=1 TO 14:SOUND NO(R1,1),NO(R1, 2)*1.5:FOR TD=1 TO NO(R1,2)*9Ø :NEXT:NEX T:RETURN

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Lightsaver

Jon Rhees

The world is depending on you to save its supply of light bulbs. A quick eye and an even faster hand are the only two things that will help you. This arcadestyle action game uses machine language for fast action. Versions are included for the Commodore 64 and VIC-20, the Atari home computers, and the IBM PC/PCjr.

Technology has backfired again! A dangerous power surge has transformed the light fixture in your room into a devilish lamp, which is trying to rid the world of light bulbs by tossing them to the ground. Only you can stop the lamp from carrying out its horrid plan. You must catch the bulbs in your baskets before they hit the ground and break. The more bulbs you save, the more angry the lamp will become, and the faster it will drop bulbs. How long can you survive the wrath of the lamp?

"Lightsaver" is a fast-action, arcade-style game which utilizes many of the capabilities of the Commodore 64. Most of the action in this game is written in machine language for speed, while the scoring and setup routines are written in BASIC. The game requires a set of paddle controllers, which should be plugged into port 1.

The object of the game is simple: catch as many light bulbs as you can without missing or dropping any. You must catch each bulb in your baskets. At the beginning of a game you start out with three baskets, stacked atop each other. You position the baskets by turning the paddle controller. Each time you miss a bulb, you lose a basket, and are set back one level. Each consecutive level has more bulbs to catch and faster action. Bonus baskets are awarded every 2000 points, but you can have only three baskets at a time. Also, the higher the level you are on, the more points each bulb you catch is worth.

There are 16 skill levels in Lightsaver and two basket sizes. The higher the skill level you choose, the faster the game. Bulbs are easier to catch with a large basket than with a small one. A large basket is twice as wide as a small one. You can change the basket size during the game by pressing the f1 key. Press the paddle fire button to start a new round.

Lightsaver takes advantage of the sprite, redefined character, color, and sound capabilities of the 64. It contains two separate machine language routines—one for the game action, and another to quickly copy the character ROM into RAM for programmable characters. A demo mode is also included. The computer plays a game against itself if left alone. All eight sprites are used, as well as a redefined character set. The first two voices of the SID (Sound Interface Device) chip are used for sound effects, and the third voice is used as a random number generator for the machine language routine.

If you'd rather not type in the program, you can obtain tape or disk copies (64 version only). Send an SASE, a disk or tape, and \$3 to:

Jon Rhees 1660 S. Duneville Las Vegas, NV 89102

Program 1: 64 Lightsaver

Refer to the "Automatic Proofreader" article before typing this program in.

- 1 GOSUB550 :rem 75 2 Z=646:POKE53280,0:POKE53281,0:POKEZ,1:X =58692:SYSX:V=53248 :rem 89
- 3 G=54272:POKEG+6,Ø:POKEG+5,Ø:POKEG+4,Ø:P OKEG+6,240:POKEG+4,17:POKEG+24,143
- :rem 122 4 POKEG+6,240:NS\$="000000":GOSUB400
- :rem 187 10 T=49152:H=54273:B=832:C=1022:E=49550:F
- ORA=BTOC: READM: POKEA, M: POKEH, M: NEXT
 :rem 131
 20 B-V+30.FORA-TTOF: PFADM: POKEA M: POKEH M
- 2Ø B=V+39:FORA=TTOE:READM:POKEA,M:POKEH,M
 :POKEB,M:NEXT:POKEG+5,186:POKEG+6,.
 :rem 124
- 26 POKE252,208:POKE251,.:POKE253,.:BL=872 :POKE254,48 :rem 240
- 28 POKE56334, .: POKE1,51:SYS49490:POKE4951 3,56:POKE49500,145:POKE49501,253 :rem 208
- 29 POKE49502,200:POKE49503,234:SYS49490:P OKE1,55:POKE56334,1:GOTO600 :rem 214
- 60 POKE53280,3:SYSX:PRINT" [5 DOWN]
 [7 SPACES] SELECT SKILL LEVEL (A-P) ";
 :rem 232
- 61 GETA\$:SL=ASC(A\$+" ")-59:IFSL<6 OR SL>2 1 THEN 61 :rem 170
- 62 PRINTA\$:POKE5328Ø,14:PRINT:PRINT"
 {3 DOWN}{7 SPACES}SELECT BASKET SIZE (
 S/L) ";:P=. :rem 95

Notes For VIC-20, Atari, And IBM PC/PCjr Versions

In "Lightsaver," you must catch light bulbs that fall from a lamp at the top of the screen.

The VIC Version

Program 2, for the unexpanded VIC-20, is written entirely in machine language and offers five levels of play. The level selected affects the speed of the falling bulbs at the beginning of play. The speed increases when a light bulb is caught in your basket and decreases when light bulbs crash to the bottom of the screen. The game ends when three bulbs have been missed.

You move your baskets under the falling bulbs by using a paddle plugged into the con-

Since the VIC version is written in machine language, you must use a special technique to enter the program. You must first type in the "Tiny MLX" program found elsewhere in this issue, and then use this program to type VIC Lightsaver. Be sure you read and understand the Tiny MLX article before you begin typing Lightsaver. Also, remove or disable any memory expanders. Once you have typed in Lightsaver, and saved it to tape or disk using MLX, you can load and run the program just as you would a BASIC program.

The Atari Version

To catch bulbs in the Atari version of Lightsaver, you must move your basket with the paddle controller and touch the bulbs before they hit the bottom of the screen. If a light bulb reaches the bottom of the screen, it will break and you will lose one of your three baskets. The number of points awarded for catching a bulb is equal to the current level. For instance, on the fourth level, every bulb that you catch is worth four points. You are given an additional basket every 2000 points. Each time you complete five levels, the speed of the light bulbs increases.

Atari Lightsaver has been split into two programs so it will work on 16K computers with DOS. Load and run Program 3. This program loads two machine language subroutines and the redefined character set. When finished, this program will load and run Program 4. Program 4 (the main program) contains the player missile graphics and the main game loop. Since Program 3 loads and runs Program 4, disk users must save both programs on the

same disk. Program 4 must be saved with filename LIGHTSAVER.

Cassette users must change line 1046 in Program 3 to:

1046 READ A: IF A = -1 THEN PRINT "HIT RETURN TO LOAD LIGHTSAVER": RUN "C:"

Next, rewind a tape to a blank section, press the PLAY and RECORD buttons, and enter SAVE "C:" to store Program 3. When the cassette is finished, type in Program 4. Save Program 4 immediately following Program 3 by once again entering SAVE "C:". To load and run the two programs, rewind the tape to the start of Program 3 and type RUN "C:".

The IBM Version

In the IBM version of Lightsaver (Program 5), you must catch bulbs before they fall below basket level. The IBM version has only one difficulty level and a constant basket size. Game play consists of several rounds, each consisting of a barrage of dropping bulbs. Between 10 and 20 bulbs are dropped before the round ends. Each additional round increases the motion of the lamp which drops the bulbs and increases the number of points awarded. The formula is simple: The number of points awarded equals the number of bulbs caught, multiplied by the difficulty level.

You can catch a bulb only if it drops into the basket from above. It is possible to break a bulb by hitting it with the rim of your basket. If you let a bulb break, the round ends and the difficulty level decreases by one.

IBM Lightsaver will run on PCs with Advanced BASIC (BASICA) and PCjrs with DOS and Cartridge BASIC. A Color/Graphics Monitor Adapter card is needed on PCs. A joystick is required to control the left-right movement of the baskets.

Since the video display processor of the IBM PC may refresh the screen while we are using the PUT statement to place graphics on the screen, a short machine language routine has been included to synchronize PUT with the vertical retrace interval.

CHECKPORT IN AX,DX AND AX,8

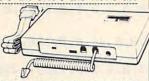
JZ CHECKPORT RETF

This machine language routine reduces flicker when the baskets are moved around the screen.

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| The second secon | |
|--|---|
| 63 GETS\$:IFS\$<>"S"ANDS\$<>"L"THEN63 :rem 253 | 112 DATA 21,85,84,170,170,170,0,0,0,0,0 :rem 90 |
| 64 PRINTS\$"{5 DOWN}":POKE53280,6:LV=.:POK E209,88:POKE210,6:IFBW=141THENGOSUB500 | 113 DATA Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,Ø,24,Ø,Ø,6Ø,Ø :rem 247 |
| :rem 146 65 PRINT"PRESS <f1> TO CHANGE BASKET SIZE</f1> | 114 DATA Ø,60,0,0,36,0,0,126,0,0,126,0 :rem 21 |
| IN PLAY":GOSUB700 :rem 22 67 POKE63,.:POKE65,.:POKE67,.:SYSX:NS\$="0" | 115 DATA Ø,255,Ø,1,255,128,1,255,128,3 :rem 60 |
| 00000":GOSUB202 :rem 60 68 POKEV+29,-(S\$="L"):GOSUB340:GOTO71 | 116 DATA 253,192,1,253,128,1,251,128,0 :rem 66 |
| 7Ø GOSUB2ØØ :rem 121 | 117 DATA 255,0,0,60,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0, |
| 71 PRINT" [HOME] [17 DOWN] [2 SPACES] [GRN] PR ESS FIRE BUTTON WHEN READY!" : rem 226 | 118 DATA 120,173,2,220,72,169,192,141,2 :rem 117 |
| 72 N=244-PEEK(54297):N=N*-(N>=24)-24*(N<2 4):POKEV,N :rem 93 73 POKEV+29,(PEEK(V+29)-(PEEK(197)=4))AND | 119 DATA 220,169,64,141,0,220,160,128 :rem 19 |
| 1:IF(PEEK(56321)AND4)THEN72 :rem 158 74 PRINT"{UP}{31 SPACES}":POKE254,::SYST: | 120 DATA 234,136,16,252,56,169,220,237 :rem 79 |
| IFPEEK(68) THEN8Ø :rem 252 76 M=54273:POKEF+11,.:N=5:I=125:J=5328Ø:F | 121 DATA 25,212,176,2,169,0,24,105 :rem 122 |
| ORA=NTOISTEP3:POKEJ,A :rem 15 77 POKEM,AAND(LV+5)*2:NEXT:POKEF+5,186:PO | 122 DATA 24,141,0,208,104,141,2,220,88 :rem 54 |
| KEF+6,.:POKEF+12,186:POKEF+13,.:rem 54 79 POKEJ,.:GOTO70 :rem 29 | 123 DATA 172,30,208,169,8,133,253,162,2 :rem 123 |
| 8Ø POKEF+11,.:POKEF+4,.:POKEF+1,186:POKEF +4,129:POKEF+5,188:POKEF+6,.:rem 3Ø | 124 DATA 254,5,208,189,4,208,240,33,169 :rem 135 |
| 81 POKEV+4, PEEK((PEEK(781)+4)+V):POKEV+5, 232:B=50:D=9:E=V+3:F=10264 :rem 175 | 125 DATA 188,56,253,5,208,176,13,152,37 :rem 139 |
| 82 FORA=BTO.STEPD:POKEE, A:N=RND(.)*21:M=N *1.4:POKEN+BL, PEEK(N+BL)ANDRND(.)*256 | 126 DATA 253,240,8,169,0,157,4,208,76 :rem 35 |
| :rem 23 83 POKEM+F, PEEK(M+F)ORRND(.)*256:POKE78Ø, | 127 DATA 14,193,189,5,208,201,232,208,5 :rem 128 |
| M:SYS4954Ø:NEXT:POKEV+41,Ø:POKE53281,Ø:rem 47 | 128 DATA 169,1,133,68,96,232,232,6,253 :rem 88 |
| 84 LV=LV-2:P=P+1:POKEV+2,::LV=LV*-(LV>-1) :FORA=BLTOBL+20:POKEA,::rem 197 | 129 DATA 224,12,240,3,76,51,192,234,164 :rem 125 |
| 85 NEXT:BL=BL-20:IFBW=141THENGOTO600 :rem 1 | 130 DATA 197,192,4,208,17,165,255,201 :rem 32 |
| 86 GOSUB200:IFP<3THENGOSUB340:GOTO71 :rem 41 | 131 DATA 64,208,11,169,1,24,109,29,208 :rem 75 |
| 88 IFVAL(NS\$)=VAL(HS\$)ANDVAL(NS\$)>ØTHENGO TO9ØØ :rem 99 | 132 DATA 41,1,141,29,208,132,255,164,64 :rem 120 |
| 90 POKEV+21,.:PRINT" {HOME} {7 DOWN} {CYN} "S PC(9)" ** GAME OVER **":BL=872:P=. | 133 DATA 240,99,132,64,173,2,208,24,101 :rem 120 134 DATA 254,141,2,208,198,2,16,84,169 |
| 96 GOSUB800:GOTO600 :rem 144 | :rem 86 135 DATA 31,160,0,133,2,173,27,212,133 |
| 100 DATA 255,255,255,109,182,218,27 :rem 192 101 DATA 109,180,13,182,216,11,109,176 | :rem 55 |
| 102 DATA 7,255,224,0,0,0,255,255,255 | 136 DATA 254,56,237,2,208,176,8,173,2 :rem 37 |
| 102 DATA 7,233,224,0,0,0,233,253,253 :rem 220 103 DATA 91,109,182,45,182,216,27,109 | 137 DATA 208,56,229,254,160,1,74,74,74 :rem 91 |
| :rem 33 104 DATA 176,13,182,208,7,255,224,0,0,0 | 138 DATA 74,74,133,254,56,233,4,176,225 :rem 140 |
| :rem 109 105 DATA 255,255,255,109,182,218,27,109 | 139 DATA 192,1,208,9,165,254,169,0,56 :rem 41 140 DATA 229,254,133,254,230,66,230,66 |
| :rem 139 106 DATA 180,13,182,216,11,109,176,7 | 141 DATA 166,66,224,10,208,4,162,0,134 |
| :rem 231 107 DATA 255,224,0,0,0,0,0,60,0,0,60,0 | :rem 65 142 DATA 66,169,80,157,7,208,173,2,208 |
| :rem 22 108 DATA 0,60,0,0,60,0,0,60,0,0,60,0,0 | :rem 90 143 DATA 157,6,208,234,234,206,64,0 |
| :rem 11 109 DATA 60,0,0,60,0,0,60,0,0,60,0,0,60 | :rem 183 144 DATA 169,146,133,150,198,150,165 |
| :rem 66 110 DATA 0,0,60,0,0,60,0,0,60,0,0,60,0 | :rem 247 145 DATA 150,141,1,212,230,9,165,9,141 |
| :rem 4 111 DATA Ø,20,0,0,85,0,1,85,64,5,85,80 | :rem 63 146 DATA 8,212,201,30,208,3,141,11,212 |
| 94 COMPUTE September 1984 | :rem 50 |

```
210 PRINTCHR$(5)NS$:POKEZ,8:PRINTSPC(76)"
147 DATA 172,52,3,32,204,255,32,204,255
                                                  HI "SPC(76) "SCORE: "SPC(74) CHR$ (5) HS$
                                   :rem 120
                                                                                  :rem 89
148 DATA 136,192,0,208,248,76,0,192,165
                                              211 PRINTSPC(34);:POKEZ,6:PRINT"*";:POKEZ
                                   :rem 138
                                                   ,10:PRINTHU$;:POKEZ,6:PRINT"*"
149 DATA 251,248,24,101,67,133,67,169,0
                                                                                  :rem 252
                                   :rem 135
                                              212 POKEZ, 14: PRINTSPC(74) "LEVEL: "SPC(75)C
15Ø DATA 101,65,133,65,169,0,101,63,133
                                                  HR$(5)LV$:F=54272:POKEF+20,128
                                   :rem 113
                                                                                  :rem 194
151 DATA 63,216,162,4,181,63,72,41,15
                                              216 POKE2040,13:POKE2041,14:POKEF+19,.
                                    :rem 23
                                                                                  :rem 125
152 DATA 24,105,48,157,19,5,104,74,74
                                              220 POKEV+1, 205: POKEV+3, 50: POKEV+23, 3: POK
                                    :rem 33
                                                  EV+28,2:POKEV+39,7:POKEF+18,.:rem 156
153 DATA 74,74,24,105,48,157,18,5,202
                                              222 FORA=4TO14STEP2:POKEV+A, .: POKEV+A+1, A
                                    :rem 32
                                                   *8+140:POKE2040+A/2,15:NEXT
154 DATA 202,16,230,169,129,141,11,212
                                    :rem 65
                                              223 FORA=10240T010303:POKEA, .: NEXT:POKE20
155 DATA 169,0,133,9,198,252,208,3,133
                                                   42,160:POKE66,.:POKE2,.
                                    :rem 84
                                               226 POKEV+37,12:POKEV+38,14:FORA=41TO46:P
156 DATA 68,96,76,92,192,160
                                   :rem 122
                                                   OKEV+A,1:NEXT:POKEV+21,255:POKEF+19,.
157 DATA Ø,177,251,17,253,145,253,177,251
                                                                                  :rem 238
    ,74,200,145,253,208,242
                                    :rem 86
                                               228 POKEF+11, Ø: POKEF+7, Ø: POKEF+13, 128: POK
158 DATA 230,252,230,254,165,254,201,52
                                                   EF+12, .: K=260-SL*LV: POKEF+20,128
                                   :rem 123
                                                                                  :rem 248
159 DATA 208,230,96,234,238,0,201,174,0
                                              23Ø POKE64, LV*2+9: POKE252, LV*2+9: LN=LV: PO
                                   :rem 124
                                                   KEF+15,255:IFLN>100THENLN=100:rem 208
160 DATA 201,189,0,200,168,138,105,109
                                               232 POKE251, INT(LN/10)*16+LN-INT(LN/10)*1
                                     :rem 71
                                                   Ø:POKEF+14,.:POKEF+18,129:IFK<1THENK=
161 DATA 170,173,2,208,157,0,200,234,140,
                                                                                  :rem 113
    141,41,208,141,32,208,141,33,208,96,3
                                               233 POKEF+1, .: POKEF+4, .: POKEF+5, .: POKEF+6
                                    :rem 22
                                                   ,128:POKEF,.:POKEF+24,143:POKEF+4,33
162 DATA 48,126,103,103,103,103,103,127
                                                                                   :rem 24
                                   :rem 106
                                               234 POKE820, K: POKEV+41, .: RETURN
                                                                                  :rem 156
163 DATA 63,49,28,60,124,28,28,28,127
                                               300 F=54272:POKEF+4,.:POKEF+5,128:POKEF+6
                                    :rem 41
                                                   ,128:POKEF+4,17:REM EXTRA BASKET
164 DATA 63,50,126,103,7,127,112,115,127
                                                                                   :rem 45
                                   :rem 166
                                               3Ø1 FORA=1TO4:ST(A)=PEEK(62+A):NEXT:BL=BL
165 DATA 63,51,126,103,7,63,7,103 :rem 81
                                                                                   :rem 17
                                                   +20*AA:IFBL>872THENBL=872
166 DATA 127,63,52,6,15,27,51,127,127
                                                                                  :rem 251
                                               3Ø3 P=P-AA:P=P*-(P>.):RESTORE
                                     :rem 32
                                               310 RESTORE: FORA=832T0832+20*(3-P): READM:
167 DATA 7,15,53,126,96,126,103,7,103
                                                   POKEA+1, .: POKEA, M
                                                                                   :rem 18
                                     :rem 29
                                               33Ø POKEF+1, INT(RND(.)*256):NEXT:FORA=1TO
168 DATA 127,63,54,126,103,96,126,103
                                                   4:POKE62+A,ST(A):NEXT:POKEF+1,.:RETUR
                                     :rem 34
                                                                                  :rem 179
169 DATA 103,127,63,55,126,103,7,14,28
                                               34Ø POKEF+4, .: POKEF+5, 128: POKEF+6, 128: POK
                                     :rem 78
                                                   EF+4,33:B=28+INT(RND(.)*8)*32:C=.
170 DATA 28,28,28,56,126,103,103,127
                                                                                  :rem 216
                                    :rem 234
                                               345 FORA=CTOB:POKEV+2, A:POKEF+1, AAND10:NE
171 DATA 103,103,127,63,57,126,103,103
                                                   XT: POKEF+4,.
                                                                                   :rem 63
                                     :rem 63
172 DATA 127,7,103,127,63,104,0,0,0,0
                                               350 POKEF+6,128:POKEF+5,.:POKEF+4,33:POKE
                                                   F+1, .: RETURN
                                                                                  :rem 189
                                   :rem 253
                                               400 PRINT" [CLR] [6 DOWN] [2] [RVS] [*]
173 DATA 239,239,85,254
                                   :rem 125
200 NS$="":FORA=1298T01303:NS$=NS$+CHR$(P
                                                   [8 RIGHT] [CYN] ":PRINT" [2] [RVS]
                                                   [8 RIGHT] [CYN] [4 RIGHT] [6] ":POKE204
                                     :rem 99
    EEK(A)):NEXT
201 AA=INT(VAL(NS$)/2000)-INT(Q/2000):IFA
                                                                                  :rem 114
                                                   Ø,15
    ATHENGOSUB300
                                               410 PRINT"[2] [RVS] [8 RIGHT] [CYN]
                                   :rem 176
202 Q=VAL(NS$):IFQ>=VAL(HS$)THENHS$=NS$
                                                   {4 RIGHT} [6] ":POKEV+1,101:POKEV+39,1
                                   :rem 147
                                                   :POKEV, 32:POKEV+21,1
                                                                                   :rem 39
204 POKE53280, .: LV=LV+1: LV$=STR$(LV)+"
                                              420 PRINT" [2] {RVS} {RIGHT} {YEL} {RIGHT}
                                                   E53£[3 SPACES] [RIGHT] [CYN] £
     {2 SPACES}":IFLV>1THEN2Ø8
                                   :rem 151
                                                                                  E*3E63
    FORA=1024T01057STEP2:POKEA,95:POKEA+1
                                                   {OFF} [*] {RVS} {2 SPACES} {RIGHT} {PUR} £
                                                    2 SPACES | (OFF | £ (RVS) | RIGHT | (RED ) £
    ,105:POKE54272+A,4:POKE54273+A,10:NEX
                                                   {2 SPACES} * [RIGHT] {BLU} {2 RIGHT}
                                   :rem 199
                                                   {RIGHT} {GRN} £ [*] {RIGHT} [3] £[*]":P
207 FORA=1984TO2023:POKEA, 104:POKEA+54272
                                                   OKEV+29
                                                                                   :rem 26
     ,12:NEXT
                                   :rem 138
                                               430 PRINT"[2][RVS] [RIGHT][YEL] [RIGHT]
    PRINTCHR$(19)CHR$(159)CHR$(18)SPC(34)
208
    CHR$(169) "LIGHT"CHR$(146); : POKEZ, 13
                                                   [5] {2 RIGHT} {RIGHT}{CYN} {OFF}£
                                                   {RVS}{RIGHT} {RIGHT} [6] {2 RIGHT}
                                     :rem 86
209 PRINTSPC(34)CHR$(127)CHR$(18)"SAVER":
                                                   {PUR}{OFF} [ * ] [ @ ] {2 RIGHT } {RVS } {RIGHT }
    POKEZ, 7: PRINTSPC (74) "SCORE: "SPC (74);
                                                   {RED} {2 RIGHT} {RIGHT}{BLU}
                                                   {2 RIGHT} {RIGHT} {GRN} {OFF} EP3 {RVS}
                                   :rem 152
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| | {SPACE} {RIGHT [3] {OFF } £ [*] " : POKEV+2 |
|------------|---|
| - | 3,. :rem 185 |
| 440 | |
| | <pre>[53] {2 RIGHT} {RIGHT}{CYN} {2 RIGHT} {SPACE}{RIGHT}E63 {RIGHT}£{2 RIGHT}</pre> |
| | {PUR}{OFF}ET3{RVS}E*3{RIGHT}{RED} |
| | {2 RIGHT} {RIGHT}{BLU}{OFF}E*}{RVS} |
| | [*]£(OFF)£(RVS){RIGHT}{GRN} |
| | [3 RIGHT] [3] " :rem 87 |
| 450 | |
| | [RIGHT] [5][*] [RVS] [3 SPACES] [RIGHT] |
| | [CYN] [2 RIGHT] [RIGHT] [6] [OFF] [*] |
| | [RVS] {OFF}£{RVS}{PUR}£{2 SPACES} {OFF}£{RIGHT}{RED}[**]{RVS} {OFF}£ |
| | [RVS] {2 RIGHT}{BLU}{OFF}E*3£ |
| | [2 RIGHT][GRN][*][RVS] [OFF] [RIGHT] |
| | [RVS][3] " :rem 18 |
| 460 | |
| | <pre>[23]{RVS} {3 RIGHT}E53[OFF]E*3[RVS] {2 SPACES}{OFF}£":PRINT"E23[RVS}</pre> |
| | {4 SPACES}{\(\forall F \) \(\forall |
| 470 | PRINT" {WHT} {4 SPACES}USE PADDLES IN P |
| 410 | ORT ONE TO PLAY.": RETURN : rem 58 |
| 500 | QW=49164:RW=49517 :rem 172 |
| 51Ø | FORAW=.TO22:BW=PEEK(AW+QW):POKEAW+QW, |
| 2200 | PEEK(AW+RW):POKEAW+RW,BW:NEXT:rem 109 |
| 52Ø | IFBW=141THENPOKE49262,96:POKE49230,63 |
| | :POKE49378,52:POKE49379,3:GOTO540 :rem 129 |
| 530 | POKE49262,165:POKE49230,14:POKE49378, |
| | 64:POKE49379,0:POKE49481,252:RETURN |
| | :rem 199 |
| 54Ø 55Ø | POKE49481,255:RETURN :rem 180 IFPEEK(51457)=114THENGOTO560 :rem 123 |
| 552 | HS\$="000000":HU\$="C-64":GOSUB590 |
| | :rem 170 |
| 56Ø | HT\$="":FORA=51458T051467:HT\$=HT\$+CHR\$ |
| | (PEEK(A)):NEXT :rem 208 |
| 562 | HS\$=LEFT\$(HT\$,6):HU\$=RIGHT\$(HT\$,4) :rem 166 |
| 564 | RETURN :rem 166 |
| 590 | HT\$=HS\$+HU\$+" ":FORA=1TOLEN(HT\$):POKE |
| | 51457+A, ASC(MID\$(HT\$,A,1)):NEXT:RETUR |
| | N :rem 179 |
| ממט | POKE53269,.:IFPEEK(49164)=141THENGOSU B500:IFSL=0THENSYSX:NS\$="000000" |
| | :rem 129 |
| 6Ø5 | POKE53272, 28: PRINT" [HOME] [12 DOWN] |
| | [YEL] [6 SPACES] PRESS <f1> TO START</f1> |
| can | :rem 36 |
| 607 | IFSL=ØTHENSL=6:GOSUB7ØØ :rem 2Ø2 GOSUB2Ø2:GOSUB34Ø:POKE254,Ø:POKE82Ø,2 |
| отр | 55:POKE68,0:SYST :rem 231 |
| 620 | IFP=2THENP=1:BL=BL+20 :rem 243 |
| 63Ø | 大学 は 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 |
| 640 | BL=872:SYSX:POKE54296,Ø:POKE53269,Ø:P |
| 700 | OKE5328Ø,Ø:GOSUB8ØØ:GOTO6Ø:rem 38 RESTORE:B=589:FORA=.TOB:READM:NEXT:FO |
| משו | RA=.TOIØ:READM:J=M*8+12288 :rem 252 |
| 71Ø | FORB - TO7: READM: POKEB+J, M: NEXTB, A: RET |
| | URN :rem 132 |
| 800 | RESTORE: FORA=832T0895: READM: POKEA, M:N |
| 000 | EXT:POKE54273,.:RETURN :rem 98 |
| ששפ | F=54272:FORA=ØTO24:POKEF+A,.:NEXT:A\$= "* HIGH SCORER *":POKE646,6:GOSUB99Ø |
| | :rem 15 |
| 910 | POKE646,7:POKEF+6,240:POKEF+4,17:POKE |
| | F+24,143 :rem 68 |
| 920 | FORA=1TOLEN(A\$):FORB=.TO200STEP10:POK |
| | EF+1,B:NEXT:PRINTMID\$(A\$,A,1)"{RIGHT} |

```
"; :NEXT
                                    :rem 85
93Ø POKEF+24,14Ø:A=1397
                                   :rem 239
940 PRINT, "{13 DOWN}{CYN} TURN PADDLE TO
    {SPACE}CHOOSE LETTERS.. {DOWN}"
                                   :rem 253
941 PRINT" PUSH BUTTON TO MOVE CURSOR"
                                    :rem 67
942 PRINT" [HOME] [9 DOWN] [6] [15 SPACES] [6]
     E03 E03":HU$=""
                                    :rem 29
943 POKEA+40,30:POKEA+F+40,10:POKEF+A,1
                                   :rem 221
945 B=29-PEEK(54297)/9:POKEA, B:POKE646, (P
    EEK(646)+1)AND255:GOSUB990
                                   :rem 125
95Ø POKEF+1, B*8+15:IFPEEK(56321) AND4THENG
    OTO945
                                    :rem 33
955 POKEF+4,129:FORC=ØTO9ØSTEP1.5:POKEF+1
    ,C:NEXT:POKEF+4,17:POKEA+40,32:rem 75
960 A=A+2:HU$=HU$+CHR$(B+64):IFA<1405THEN
                                   :rem 231
962 PRINT" [4 DOWN] ": POKEF+4, Ø: POKE51457, 1
    14
                                    :rem 81
965 GOSUB590:PRINT" [HOME] ":FORA=1TO13
                                   :rem 183
970 PRINT" [32 SPACES] ":NEXT:GOTO90
                                   :rem 198
990 PRINT" [HOME] [2 DOWN] [RIGHT] U********
    *******************I"SPC(9)"B"SPC(29
    )"B"
                                    :rem 65
995 PRINT" {RIGHT} J*****************
    *****K{HOME} 3 DOWN 2 RIGHT "; : RETU
                                   :rem 191
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The player just missed a light bulb in the 64 version of "Lightsaver."

Program 2: VIC Lightsaver/MLX

Be sure to read the "Tiny MLX" article before typing. Version by Gregg Peele, Assistant Programming Supervisor

Refer to the "Automatic Proofreader" article before typing this program in.

6430 :011,016,000,000,158,052,011
6436 :049,048,057,000,000,100,190
6442 :169,000,141,092,003,141,076
6448 :093,003,169,024,141,015,237
6454 :144,032,078,020,032,100,204
6460 :016,032,236,017,032,042,179
6466 :017,169,007,141,074,003,221
6472 :169,003,141,064,003,173,113

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6904 :142,105,003,133,142,074,079
6478 :076,003,016,024,032,203,176
6484 :017,172,074,003,196,251,029
                                             6910 :074,056,233,012,176,252,033
6490 :208,003,076,077,016,032,246
                                             6916 :105,015,133,251,096,169,005
                                             6922 :128,141,019,145,169,255,099
6496 :015,019,032,246,018,169,083
                                             6928 :141,034,145,169,147,032,172
6502 :010,141,076,003,206,076,102
                                             6934 :210,255,162,011,160,005,057
6508 :003,032,108,017,032,125,169
                                             6940 :024,032,240,255,160,000,227
6514 :016,032,038,019,032,179,174
                                             6946 :185,193,019,032,210,255,160
     £019,173,072,003,208,207,034
652Ø
                                             6952 :200,192,012,208,245,169,042
6526 :076,205,018,169,000,141,223
                                             6958 :014,032,210,255,162,013,220
     :060,003,141,061,003,141,029
                                             6964 :160,005,024,032,240,255,000
6538 :074,003,032,042,017,169,219
                                             6970 :160,000,185,205,019,032,147
6544 :003,141,072,003,169,010,030
6550 :141,076,003,096,169,000,123
                                             6976 :210,255,200,192,012,208,117
6556 :141,019,145,169,127,141,130
                                             6982
                                                  :245,032,228,255,240,251,041
6562 :034,145,173,008,144,074,228
                                             6988 : 201,049,144,247,201,054,204
6568 :074,074,074,073,015,056,022
                                             6994 :176,243,056,233,048,073,143
6574 :233,003,016,002,169,000,085
                                             7000 :255,141,063,003,169,147,098
6580 :141,064,003,168,162,002,208
                                             7006 :032,210,255,174,063,003,063
6586 :185,162,031,208,008,169,181
                                             7012 :024,169,000,105,048,202,136
6592 :032,153,162,031,032,023,113
                                             7018 :208,251,141,082,003,162,185
7024 :003,160,016,024,032,240,075
6598 :017,185,184,031,208,008,063
6604 :169,032,153,184,031,032,037
                                             7030 :255,160,000,185,010,020,236
6610 :023,017,185,206,031,208,112
                                             7036 :032,210,255,200,192,007,252
6616 :008,169,032,153,206,031,047
                                             7042 :208,245,162,006,160,016,159
6622 :032,023,017,200,202,016,200
                                             7048 :024,032,240,255,160,000,079
6628 :213,172,064,003,196,252,104
                                             7054 :185,017,020,032,210,255,093
6634 :240,071,164,252,169,032,138
                                             7060 : 200, 192, 012, 208, 245, 162, 143
6640 :162,003,153,184,031,153,158
                                             7066 :010,160,016,024,032,240,124
6646 :206,031,200,202,016,246,123
                                             7072 :255,160,000,185,029,020,041
6652 :172,064,003,169,027,153,072
                                             7078 :032,210,255,200,192,007,038
     :184,031,153,206,031,132,227
6658
                                             7084 : 208, 245, 162, 013, 160, 016, 208
     :252,169,000,153,184,151,149
6664
                                             7090 :024,032,240,255,160,000,121
6670
     :153,206,151,200,169,028,153
                                             7096 :185,036,020,032,210,255,154
6676
     :153,184,031,153,206,031,010
                                             7102 :200,192,015,208,245,162,188
     :169,000,153,184,151,153,068
6682
                                             7108 :022,160,001,024,032,240,163
     :206,151,200,169,029,153,172
6688
                                             7114 :255,160,000,185,059,020,113
     :184,031,153,206,031,169,044
6694
                                             7120 :032,210,255,200,192,019,092
     :000,153,184,151,153,206,123
6700
                                             7126 :208,245,173,017,145,041,019
67Ø6
     :151,096,173,082,003,240,027
                                             7132 :016,208,249,160,021,169,019
6712
     :003,206,082,003,238,060,136
                                             7138 :032,153,228,031,136,208,246
6718
     :003,173,060,003,208,003,000
                                             7144 : 248,096,160,002,162,022,154
6724
     :238,061,003,162,004,160,184
                                             7150 :024,032,240,255,160,000,181
673Ø
     :016,024,032,240,255,174,047
                                             7156 :185,217,019,032,210,255,138
     :060,003,173,061,003,032,156
6736
                                             7162 :200,192,018,208,245,032,121
     :205,221,056,173,060,003,036
6742
                                             7168 :228,255,240,251,201,089,240
6748
     :237,092,003,133,170,173,132
6754
     :061,003,237,093,003,005,244
                                             7174 :240,007,201,078,240,006,010
     :170,144,012,173,060,003,154
                                             7180 :076,226,018,076,029,016,197
6760
                                             7186 :000,164,251,140,074,003,138
7192 :162,001,024,032,240,255,226
6766 :141,092,003,173,061,003,071
6772
     :141,093,003,162,008,160,171
                                             7198 :160,000,185,235,019,032,149
     :016,024,032,240,255,174,095
                                             7204 :210,255,200,192,016,208,093
6784 :092,003,173,093,003,032,012
                                             7210 :245,096,172,074,003,162,026
679Ø
     :205,221,096,169,206,133,140
                                             7216 :001,024,032,240,255,160,248
     :167,169,031,133,168,173,213
6796
                                             7222 :000,185,251,019,032,210,239
     :141,002,208,251,169,228,121
6802
                                              7228 : 255, 200, 192, 014, 208, 245, 150
6808 :133,170,169,031,133,171,191
                                             7234 :096,160,021,185,228,031,019
6814 :169,228,133,180,169,151,164
6820 :133,181,162,021,160,021,074
                                             7240 :208,028,169,036,153,228,126
                                             7246 :031,169,000,153,228,151,042
6826 :177,167,208,012,072,169,207
                                             7252 :072,152,072,032,142,019,061
6832 :032,145,167,104,145,170,171
                                             7258 :032,179,019,104,168,104,184
6838 :169,000,145,180,136,016,060
                                             7264 : 206,072,003,076,076,019,036
6844 :237,056,165,167,233,022,044
6850 :133,167,165,168,233,000,036
                                             7270 :136,208,220,169,032,153,252
6856 :133,168,056,165,170,233,101
                                             7276 :228,031,162,011,160,016,204
                                              7282 :024,032,240,255,173,082,152
6862
     :022,133,170,165,171,233,076
     :000,133,171,056,165,180,149
                                              7288
                                                   :003,205,084,003,240,013,156
6868
                                                   :160,000,185,051,020,032,062
6874
     :233,022,133,180,165,181,108
                                             7300 :210,255,200,192,008,208,181
6880 :233,000,133,181,202,016,221
6886 :193,096,032,148,224,165,064
                                             7306 :245,173,082,003,141,084,098
6892 :142,162,003,010,202,208,195
                                             7312 :003,056,073,255,170,169,102
6898 :252,024,101,142,010,101,104
                                             7318 :000,032,205,221,162,015,017
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