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CLOAD
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This month my favorite program is the binary tree, an old favorite of mathematics types. I've seen several built with wooden pegs and steel balls. The setup consists of many (about 100) ball bearings or marbles which are rolled down onto a sort of pyramid of pegs such that as each ball hits each peg, it bounces to one side or the other, with an even chance for bouncing either way. After it bounces, it hits another peg at the next level down, and so on for as many levels as the "machine" has. If a ball bounces left, left, right, it arrives at the same place as if it had bounced left, right, left or right, left, left. When the balls reach the bottom level, they run into channels where they form a graph of the probability of reaching that particular channel.

You might ask what this is useful for and I might reply that I have no idea, but I can't say, as I can't hear you. As it turns out, the curve of probability that this critter generates is a sort of bell-shaped affair, which corresponds to a surprising number of things in the gross world of measurement.

"An example - give us an example".

I heard that. How about measuring the length of bricks in your old school building (say, to the nearest millimeter). If you measure a hundred of them, you'll see that most of them are a certain size, some are longer, and some are shorter. If you made a graph of your results (with the horizontal axis corresponding to length and the vertical axis corresponding to the number of bricks found with that length), you will see that the measurement data set (your group of measurements) has this same curve. Likewise if you had a hundred people measure the same brick. Also too if you were measuring the mass of a bunch of potatos, the number of peas in a bunch of pods, or the time it took Brand X to give a bunch of people fast, fast, fast relief. The size and shape of the Gaussian Distribution Curve (that's what they calls it) are measurements of their own (imagine that - a measurement of a measurement). If you are faced with the task of taking very expensive measurements, say the amount of heat liberated by burning diamonds (they burn, and the heat output has been measured), you will probably want to wring the last bit of significance out of your test data. Working with curves like this helps a great deal. If this seems interesting, check out a book on statistics and read it. If you find the book interesting, you're strange.

RACET Computes (702 Palmdale, Orange, CA 92665) has come out with a command processor which is a handy thing, especially for those of you who are using a disk system. What is a command processor? Glad you asked. When you start up your computer for another fun session of frustration and futility, there is inevitably a little question and answer session that you play to 1) bring in BASIC and the program to be executed, and 2) enter the "menu" choice or choices to select the function desired. Example (user response in lower case):

```
basic run maillist

WHAT IS THE INPUT FILE? bingoclb

WHAT'S YER PLEASURE: E=ENTER D=DELETE C=CHANGE ADDR P=PRINT? e
```

That wasn't difficult now, was it? Not for an experienced computer jockey such as yourself, but what about that new member of your bingo club who foolishly volunteered to help out with the mailing? We cannot assume that anyone who volunteers for this task is particularly brilliant, so we remove as many obstacles as possible. With a command processor, the lower-case responses in our example above are stored away in a file that is "patched in" to look like the keyboard. We can now simplify the introduction of the TRS-80 to our new bingo enthusiast and get useful work out of someone who might otherwise be petrified of a COMPUTER.

In our fight-computers-with-computers department this month, we'd like to announce the availability of an on-line data base that can be accessed by your TRS-80 via the telephone network. The company is the Telecomputing Corporation of America (1616 Anderson Rd, McLean VA 22102). They provide a fair amount of information (example: all of last week's UPI stories) as well as the service of electronic mail. The cost is $2.75 per connect hour (the length of time you are "signed on"), plus the telephone bill which you have the privilege of paying. Two catches: 1) access is from 6 PM to 7 AM local time, during the day it's $15.00 plus (possibly) a more expensive phone call, and 2) there's a $100.00 one time charge to set up an account, and a $5.00 minimum monthly bill.

It takes minimal strain on the little grey cells to see the potential of this sort of service. The ability to send mail by computer is something that will revolutionize our current telephone/mail system of communications, and the ability to sort through the news for items on a given topic or group of topics will help provide a better-informed public. Looking into my silicon dioxide ball, I see a proliferation of companies providing this service, with varying degrees of general interest - from Congressional Record (free) to Friends of the American Housefly (subscription cost: $40.00, donated to the Housefly Preserve).

On the same general subject, there is another computer center (Micronet 5000 Arlington Centre Blvd, Columbus OH 43320) which is also looking for night time customers. They have all the goodies which most computer centers have (more powerful languages, data storage, communications capability and user programs, but no data base). These cats are cheaper to sign up with, but more expensive to use ($9.00 signup, $5.00 per connect hour). CLOAD will be trying out both these services, if you're interested, tune in next month for a report.

To participate in this madness, you will need a modem and an RS-232 serial interface. It Would Be Nice (hint, hint) if there were a modem which would plug directly into the TRS-80's expansion port connector.

Chuck Schilling (7435 W.Silver Spring Apt 3 Milwaukee WI 53218 - 414-463-8276) sends us an interesting address in the level II ROMs, that of the system branch address. Ever wonder how the computer knows where to go when you type / <ENTER> at the SYSTEM level? What it does is look at the contents of address 40DF (hex) and 40E0 (hex) in the RAM area (that's the read/write type of memory) and form a two-byte address with them, then GO TO that address (JP for you assembly code hackers). How might this be used? Suppose you have a routine that you have POKEd into high memory, whose start address is 7000 (hex). 7000H is broken into two bytes, 00H and 70H (least significant byte first) and is converted to decimal, 0 and 112 respectively. These two bytes are POKEd into 16607 and 16608 (40DFH and 40E0H).

At this point, if you typed SYSTEM <ENTER> and then / <ENTER> the Z-80 would go to 7000H, would go directly to 7000H, would not pass GO and would not collect $200.

Another use is to force your way into a program that you know is there. Example: you load in a program (say, EDTASM) and before executing it, you bounce back to BASIC and PRINT PEEK(16607) + 256 * PEEK(16608). The number printed is the decimal representation of the execute address (the address to GO TO to start EDTASM). Now let's say you've edited, assembled and run your program, and (as always) found something that needs changing. If your program was written for an area of RAM which doesn't change the EDTASM package (a good habit to get into), you can bounce back to BASIC (your programs bounce back to BASIC, don't they?) and then type SYSTEM <ENTER> and / (number you printed with PEEKS) <ENTER>. Voila! you are back in EDTASM. If anything has been changed in the EDTASM package, you will probably get bounced out on your ear.

We get word that there is a drastic improvement in last month's "HOBBIT" program if the following additions are made:

```
1 ON ERROR GOTO 5000
5000 RESUME 0
```

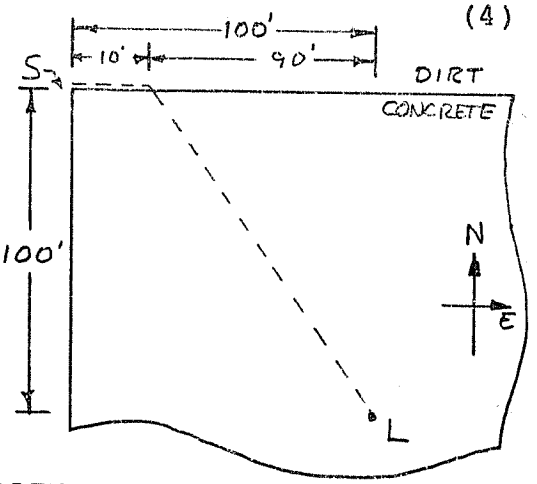
Our last announcement this month is that Bob Albrecht is starting up a community access program for little dragons in Menlo Park, California using the facilities of the local library system. The format will be close to that of school, except he feels that there is a possibility of encountering some education. He didn't specify whether the Dragonmaster or the dragonflies will be at the big end of that particular stick. If you are considering a similar program, drop him a line. His address is: The Large Green and Scaly One, PO Box E, Menlo Park CA 94025.

With the space I have left this month, I'd like to touch on the programming technique of Brute Strength and Awkwardness, or Keep on Runnin' That Play Till You Get It Right. It is handy when you can solve a problem "forwards" but are hazy on how to turn it around. For an example, let's pick an old chestnut, the venerable Dig the Ditch Into the Parking Lot problem. Two notes: we will be using the Pythagorean theorem to solve the diagonal of a triangle, and we will be using the U.S. standard unit of length, the foot. Overseas subscribers can visualize a foot as two-thirds of an Egyptian Royal Cubit.

The American Abercrombie Association has just been informed by the Council of Promotion of Parking Lot Safety that their concrete parking lot must have a tall street-type lamp installed in its center to meet new safety standards. Tall street-type lamps do not operate on batteries, they must be connected to the power company, which in turn means that a ditch must be dug to lay in electrical conduit and power lines.

You are, as Abercrombie's Vice President in Charge of Parking Lot Problems, given the task of planning the installation. Part of this involves determining the least expensive path for the electrical wiring. Checking around, you find that electrical conduit and wire of adequate size and quality will cost $6.00 a foot. Digging a ditch to the required depth will cost $10.00 a foot. Digging in the parking lot is a bit more expensive because the concrete must be sawed and then patched, so it is pegged at $40.00 a foot.

Armed with this exhorbitant data, you observe that a pathway through the dirt alongside the parking lot costs $16.00 a foot total (ditch plus conduit and wire), and that a pathway through the concrete costs $46.00 a foot. The problem is to find the cheapest path from the source of electricity ("S" in the drawing) to the required lamp position ("L").



The most direct path, directly from S to L, has a length of 141 feet (square root of (100 squared plus 100 squared)) and will cost $46.00 * 141 feet, or about $6486. If we dig ten feet along the edge (through dirt), we have 135 feet of concrete to dig (square root of (90 squared plus 100 squared)). This 135 feet will cost around $6210, and the additional cost of the dirt path is $160, for a total cost of $6370, a savings of $116 over the direct path. Hmm... let's switch from English to BASIC.

```
10 REM MINIMUM PATH THROUGH PARKING LOT PROBLEM
20 REM C=PATH LENGTH (FEET) THROUGH CONCRETE
30 REM D=PATH LENGTH ALONG EDGE (THROUGH DIRT)
40 FOR D=5 TO 100 STEP 5 : REM LONGEST DIRT PATH REASONABLE
50 E=100-D : REM E IS THE DISTANCE LEFT TO THE EAST
60 C=SQR( (E * E) + (100 * 100) ) : REM 100 FT TO SOUTH
70 M=(C*46) + (D*16) : REM MONEY=LENGTH (IN FEET) * COST PER FOOT
80 PRINT"FEET OF DIRT TYPE DITCH:";D,"COST OF TOTAL PATH:";M;
90 INPUT A$ : REM HOLD UP PRINTOUT TIL <ENTER> PRESSED
100 NEXT D : REM FIVE FEET AT A TIME
```

Hmm... saved almost $600 there with a little thinking, a little trigonometry, and a little computing. Calculus, the traditional tool for this problem, was unnecessary.

NEXT MONTH!

Ralph

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