COMPUTER APPRENTICES WORKSHOP

This is the beginning of a series of articles to assist you to know more about processing or controlling your program. A computer program is seldom simple in concept let alone easy to write, but once done it must cover all eventualities that may arise.

The process of controlling your program is paramount to the success of the final product. Almost every program you will see in TI BASIC is written in a top-down mode. That is the program starts at the top (usually line 100) and you follow the instructions down till you reach the STOP statement on the last line, and the answer drops out. This type of program is usually very simple and carries out a simple function. An example of this type of program is this:-

```
100 REM  TOP-DOWN EXAMPLE
110 CALL CLEAR
120 PRINT "<ENTER> YOUR NAME
130 INPUT A$
140 PRINT "<ENTER> YOUR STRE
ET"
150 INPUT S$
160 PRINT "<ENTER> YOUR CITY
"
170 INPUT D$
180 PRINT "<ENTER> YOUR STAT
E"
190 INPUT F$
200 PRINT "<ENTER> YOU ZIP"
210 INPUT G
220 CALL CLEAR
230 PRINT "DO YOU LIKE LIVIN
G AT ";D$;"?"
240 PRINT "I THINK ALASKA IS
A BETTER PLACE TO LIVE."
250
260
```

Not a vary inspiring program, but a typical top-down structure. Not all computer languages follow a top-down order, but BASIC does. So since your TI computer follows the rules that are common among home computers we will not go into the realms of any other system of programming.

You may well say that the program above is an unreal example because everyone of your programs has at least one conditional or unconditional control statement. But do you remember your first programming steps?

About the most under rated instructions that we all use is the 'END' command. You may have never thought of this as a command statement, but it is. A 'STOP' statement can be interchanged with the 'END' statement in all places except in subroutines in EX-BASIC. The 'STOP' and 'END' statements are what are called terminating execution statements. In EX-BASIC you are not required to use an 'END' statement. The program automatically stops after it executes the highest numbered line. That will be of cold comfort if the 'END' is in the middle of the program.

It is good programming practice to include an 'END' or 'STOP' in every program you write.

The ability to label statements and then transfer control explicitly to that statement from another point in the program is common to almost all programming languages. The transfer of control is most often indicated by the use of a GOTO statement. The GOTO statement is simple to use and reflects a basic underlying structure of computers -from main frame to home computers- in which the program has the address -or line number- where to go, and the hardware has a built in jump instruction that transfers control to the designated address -line number.

```
100 PRINT "MY NAME IS HAL, W
HAT IS YOURS?
110 INPUT Q$
120 CALL CLEAR
130 PRINT "YOUR NAME IS ";Q$
140 PRINT IS THAT CORRECT?
 (Y/N)"
150 INPUT A$
160 IF A$="Y" THEN 999
170 IF A$="N" THEN GOTO 100
180 GOTO 150
999 ..... REST OF PROGRAM.
```

Line 170 has a conditional GOTO -or control- while line 180 has an unconditional GOTO -or control- statement. We shall cover the latter first.

An unconditional control statement means that you can predict with certainty what the next instruction to be executed will be. In this case you know that if line 180 is executed then the next line will be line 150.

There is only one other unconditional statement in BASIC and that is the NEXT statement.

```
100 FOR I=1 TO 100
110 PRINT I,I^2,I^2/I,I*I,I*
I/I
120 NEXT I
```

The example illustrates that when line 120 is executed, control is automatically passed to line 100: an unconditional control statement.

Before we leave unconditional statements there is one controversy that needs mentioning if you are thinking about becoming a serious programmer or thinking of going into computer science. There exists a GOTO controversy that has been about for quite some time is not about to go away any time soon.

In a number of new languages the use of GOTO's has either been sharply curtailed or simply eliminated. By looking at were the GOTO statement is used has provided an insight into the criteria for and importance of the other sequence control mechanisms provided by each language.

GOTO statements create difficulties for both the programmer and for the implementor. For programmers the heavy use of the GOTO statement is evidence of poor program design. A program that uses many GOTO statements is difficult to debug and even more difficult to understand and maintain -program maintenance will be covered in a forth coming issue of UNOFFICIAL.

When a group of GOTO statements is reached control may go off in any one of several directions and the relationship between the directions may never be known.

In owning a TI-99/4A computer you have TI-BASIC as standard with the option of buying EX-BASIC. TI-BASIC does not lend itself to good programming practices. Let us look at the following:-

```
100 IF <test> THEN GOTO L1 ELSE GOTO L2
```

In this statement you can determine only that control branches; there is no simple way that you can know if the two possible paths ever rejoin, much less

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which statements are executed in each case. This is how TI-BASIC handles its If-THEN-ELSE statements.

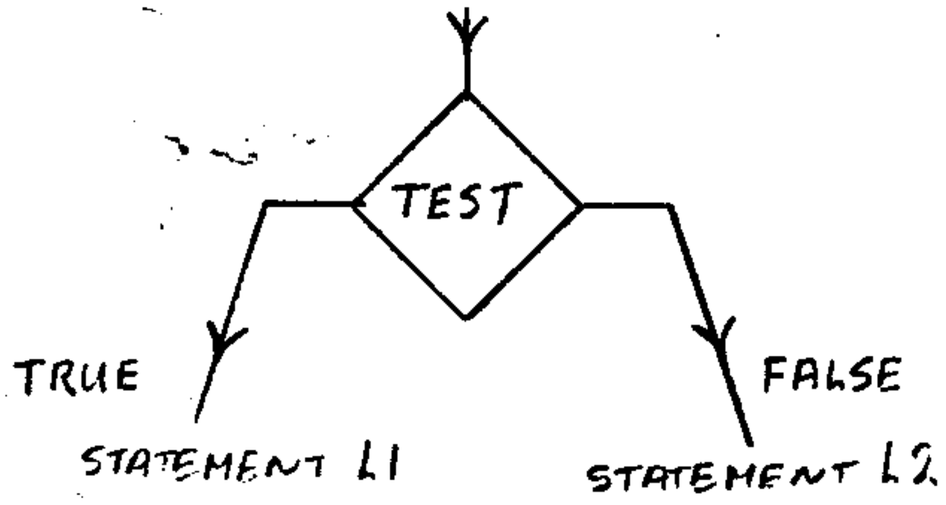
By looking at the elegant way EX-BASIC handles the same problem will, I hope, help you see the importance of structured programming.

100 IF <test> THEN <statements> ELSE <statements>

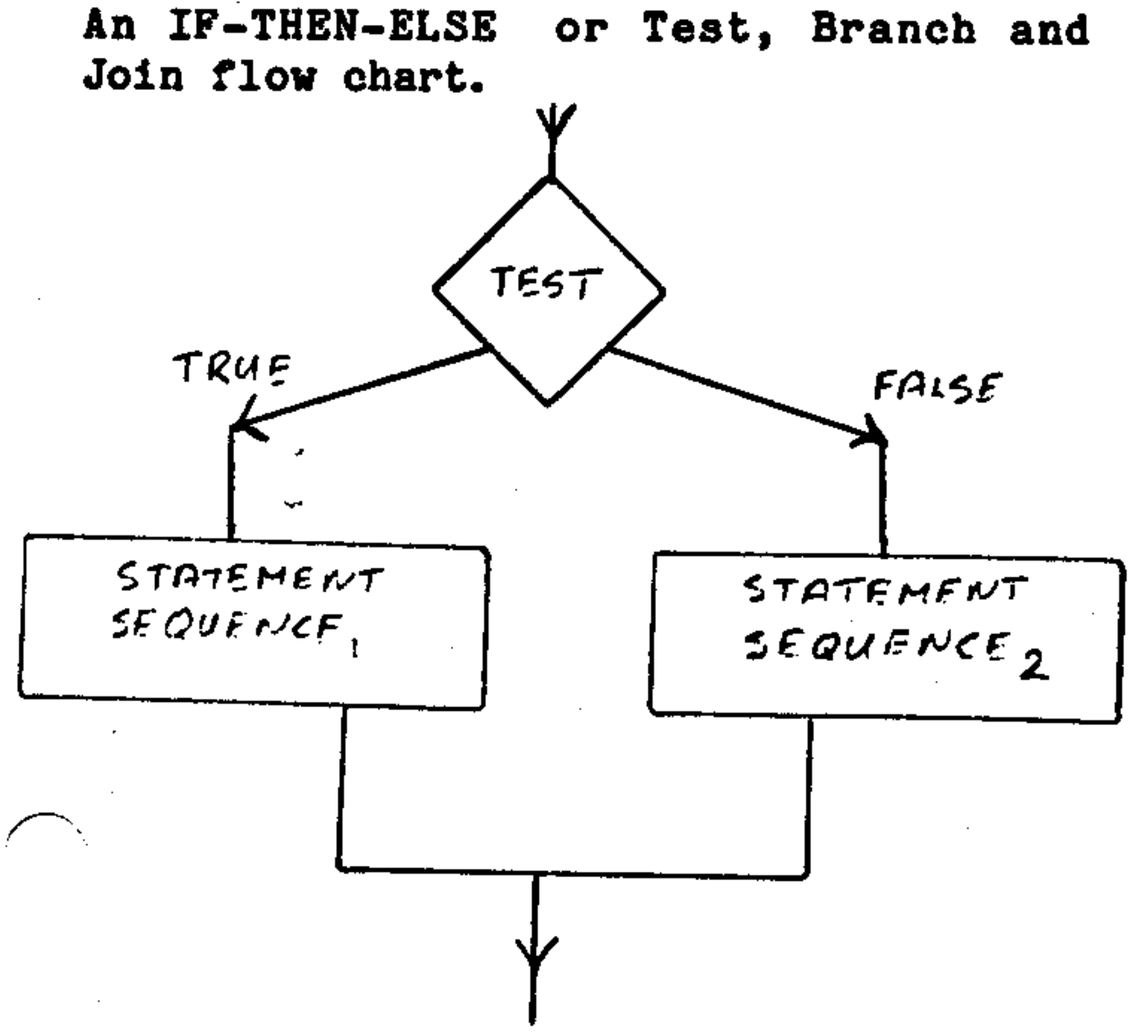
Because you can put multiple statements on one line can eliminate the use of GOTO statements of this type.

What do these two methods of sequence control look like?

A Test and GOTO statement flow chart.



An IF-THEN-ELSE or Test, Branch and Join flow chart.



Yes there is advantages to using the GOTO statement. First and foremost is the fact that a GOTO and its corresponding line number are simple to implement and -theoretically- you need nothing else to make a program run. Without GOTO's and target line numbers you would have to substitute quite a few other mechanisms to do the simple job the GOTO does. Another important reason for using the GOTO statement is the fact that there is the direct hardware support of simple forms of this sequence control mechanism on conventional computers.

It is very doubtful if you can ever eliminate GOTO's, especially since some languages -especially Assembly- rely so heavily on GOTO's.

The TI-BASIC that you are using - and other BASIC versions- rely on GOTO's because BASIC is a relatively low level programming language. BASIC is for beginners -to a point- and is used on small memory machines.

Since GOTO's will be part of your life while using BASIC it will do you well to use then with care and in a logical method. What do I mean?

```
100 IF M=3 THEN GOTO 150 ELS
E 200
150 PP=A+C*9.998
160 A$="CATS ARE TOPS"
170 PRINT A$
180 GOTO 250
200 A$="CATS ARE CLEAN"
210 PRINT A$
250 ..... REST OF PROGRAM.
```

If you have EX-BASIC you could have written this example in less lines and use less memory doing it.

```
100 IF M=3 THEN PP=A+C*9.998
::A$="CATS ARE TOPS"::PRINT
A$ ELSE A$="CATS ARE CLEAN":
:PRINT A$
110 .....REST OF PROGRAM.
```

In both cases the IF-THEN-ELSE performs the same function, even though the EX-BASIC version is shorter and more

'structured'. The point being made is that even with TI-BASIC you can still 'structure' your program.

If you have the built in TI-BASIC your efforts to structure will take time and effort, but it will pay off in the long run.

Next time we will get into some of the essentials of program control. happy programming till then.

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LARGO: A WORD GAME

In the world of games for the 99/4A there are not too many word games. About the only company producing them is Milton Bradly and they cost too many pennies for my liking. In a recent issue of Rainbow (Aug 1983) there was a game written for the 16K Color Computer that took up almost all 16K -so the authors said. So being one for a challenge I have rewritten this program for the TI-99/4A computer.

As you can imagine there is more to rewriting a 16K program than meets the eye. First you can not get a 16K program into the 99/4A. The maximum amount of free space you have -with EX-BASIC plugged in- is 13.928K. The second problem you face is a constraint that says that a tape program can not be longer than 12K. Seems that we are going faster backwards than forwards.

Never being one to let a few minor problems to stand in the way a few chops and changes had to be made: what else could I do?

The second problem was easy to over come. Put all the data statements together and create a program that generates a file that you can load into the main program. What this does is eliminate having the information necessary for the program in data statements as well as in arrays. With a data file you can place the data right into the array so saving precious memory for the game.

That program is short and simple but can be the down fall of the game. To load the data into the main program takes about 10 minutes. Yes TEN minutes. The only way around this is to fire up your disk system and get going in seconds. This time problem is the only flaw to a good game. I have altered the game so you do not get killed too often, but you can get kicked out if you foul up badly enough. Be careful.

Now came the tough part, to get the overall program down to size without losing anything.

I had to remove a save feature that allowed you to save what you have done and come back to that position tomorrow. I also removed the ability to tell your score. No big problem since you can still get to it by using a BREAK and a print command. Some other 'bells and whistles' had to go that you will not miss too badly. I managed to find out -the hard way- that the program needs about 70 bytes in which to operate; that meant more trimming. The program is within 200 bytes of filling up your TI-99/4A.

The original program -called Enrak- was originally written by Ken Ostrer and Mike Smith. It took these two high school students nine months to write and get right. They claim that this adventure is a semi-difficult game. That fact I doubt since there were some very illogical moves needed. There are about 50 locations and 10 treasures to get with the help of about 80 words. If you want to write to Ken Ostrer send a letter to P.O. BOX 61542, Vancouver, Wash., 98666.

To get this program on the road you will need to have entered in both programs and have run the data program. Thus creating a data file that you will

read in to the main program. If you have the tapes available place the main program on a separate tape from the data rogram and use a third tape for the data file. This separation is a word from the wise.

For you adventure you will need some words that will help you. Of course you could use the listing of the program to find all the words you need, but they are listed here for your convenience.

VERBS YOU NEED

Move	Ask	Throw	I
Help	Save *	Dig	Get
Quit	Call	Feed	Say
Sing	Give	Score *	Buy
Shoot	Load	Insert	Read
Crack	Show	Smell	Wear
Unlock	Dip	Open	L
Drop	Touch	Light	Pour

Save and Score are there but not functioning. More about these two commands later. 'I' will give you an Inventory of what you are carrying and 'L' will regenerate the screen that you are on.

NOUNS YOU NEED

Cross	Safe	Largo	Beaker
Dracula	Drunk	Tombstone	Sign
Tablet	Ember	Shovel	Rose
Oyster	Compass	Disk	Clock
Rubies	Emeralds	Pearl	Jewels
Bracelet	Lantern	Nuggets	Key
Bullet	Strainer	Portrait	Picture
Box	Stick	Bottle	Algae
Portrait	Picture	Strainer	Beaker

To move about on your adventure just use N, S, E, & W.

Before you go at it, two clues. The first comes from Ken and Mike, "The key to success is wide open experience." The second comes from me, "At any funeral you need to keep the roses watered to smell nice." Actually that is two important clues for the price of one.

```
100 REM FILE MAKER
110 DIM A$(50),B$(3),RM(50,4
),IS(50),IT$(50),JT$(50),RT$
(5)
120 FOR I-1 TO 4 :: READ D$(
I):: NEXT I
130 FOR I-1 TO 50 :: READ A$
(I):: NEXT I
140 FOR I-1 TO 50 :: FOR J=1
TO 4 ::READ RM(I,J):: NEXT J
 :: NEXT I
150 FOR I=1 TO 35 :: READ IT
$(I),JT$(I),IS(I):: NEXT I
160 READ RT$(3),RT$(4),RT$(5
)
170 READ B$(1),B$(2),B$(3)
180 OPEN #10:"CS1",SEQUENTIA
L,INTERNAL,OUTPUT,FIXED
190 PRINT #10:D$(1),D$(2),D$
(3),D$(4)
200 FOR I=1 TO 50
210 PRINT #10:A$(I),iT$(I)
220 PRINT #10:JT$(I),IS(I),R
M(I,1),RM(I,2),RM(I,3),RM(I,
4)
230 NEXT I
240 PRINT #10:RT$(3),RT$(4),
RT$(5)
250 PRINT #10:B$(1),B$(2),B(
3)
260 CLOSE #10
270 STOP
280 END
290 DATA NORTH,SOUTH,EAST,WE
ST
300 DATA "NORTH OF A FOREST,
 THERE IS A CAVE TO THE EAST
"
310 DATA "IN A CAVE","ON A W
INDING MOUNTAIN PASS","ON A
FOREST TRAIL"
320 DATA "AT A THREE-WAY INT
ERSECTION OF PASSAGES","AT A
 TURN IN THE PASSAGE","IN A
LARGE CAVERN","IN A SMALL CA
VERN"
330 DATA "AT A BLOCKED PASSA
GE","AT THE BRINK OF A DEEP
PIT","ON A FOREST TRAIL","NE
AR A SMALL MOUND IN A CLEARI
NG"
340 DATA "IN THE HEART OF A
DARK FOREST","AT A RIVER'S E
STUARY","IN A FOREST","ON A
FOREST PATH"
350 DATA "ON A FOREST PATH",
"ON A JAGGED ROAD","ON A DAR
```

```
K ROAD","NORTH OF A MINING T
OWN","IN A MINING TOWN"
360 DATA "AT A TOWN MARKETPL
ACE","IN A PUB","AT A VERY Q
UIET GRAVEYARD","AT AN ENTRA
NCE WAY"
370 DATA "IN A VERY LONG COR
RIDOR","IN THE MAIN LIBRARY"
,"IN A VERY LONG CORRIDOR 2"
,"IN A GIANT LABORATORY"
380 DATA "IN A TORTURE ROOM"
,"IN A TIME ROOM.","IN A DIN
ING ROOM","IN A SOUND PROOF
ROOM","IN THE DUNGEON"
390 DATA "IN AN ANIMAL CAGE"
,"IN A BEDROOM","IN THE MAIN
 KITCHEN","IN A CIRCULAR ROO
M","IN A STORE ROOM"
400 DATA "IN A ROOM THAT RES
EMBLES A  MORTUARY","AT A VE
RY LONG AND NARROW FOYER",C
410 DATA "OUTSIDE OF A STORE
 ROOM","IN A TRIANGULAR SHAP
ED ROOM",B
420 DATA "AT A LEDGE. THE MO
ON IS FULL TONIGHT","AT A VA
MPIRE BAT CLUB HOUSE","IN FR
ONT OF A GLOWING FIREPLACE",
"IN A MUSTY, DARK ROOM"
430 DATA "IN LARGO'S DEN  **
HING...  lARGO EXISTS IN A G
ASEOUS FORM"
440 DATA 0,4,2,3,0,5,0,1,1,1
1,15,0,1,13,0,0,2,10,6,0,0,7
,0,5,6,9,8,0,0,9,0,7,8,0,0,7
450 DATA 5,0,0,0,3,19,12,0,0
,14,0,11,4,14,0,0,13,0,16,12
,0,0,0,3,0,17,0,14,16,0,0,18
460 DATA 0,0,17,20,11,20,0,0
,19,21,18,0,20,23,22,0,0,24,
0,21,21,0,24,0,22,0,0,23,26
470 DATA 0,0,24,0,25,27,29,0
,0,0,28,0,30,26,25,0,0,26,0,
28,0,31,40,39,32,33,30,31
480 DATA 0,0,0,38,34,35,31,3
3,0,0,0,37,36,0,33,35,0,0,0,
0,35,0,0,0,33,0,0,0,31,0,0,0
490 DATA 41,30,42,40,46,48,0
,0,43,40,0,42,45,0,44,0,47,4
3,0,43,0,46,0,41,0,0,45,44
500 DATA "COUNT DRACULA",DRA
CULA,25,"THE TOWN DRUNK",DRU
NK,23,"BROKEN TOMBSTONE",TOM
BSTONE,24
```

```
520 DATA "A FADED SIGN",SIGN
,8,"STONE TABLET",TABLET,0,"
GLOWING EMBER",EMBER,48,"WOO
DEN SHOVEL",SHOVEL,15
530 DATA "ROSE BUD",ROSE,10,
"***MAGIC OYSTER***",OYSTER,
46,"***SILVER COMPASS***",CO
MPASS,0
540 DATA "***DISK OF THE GOD
S***",DISK,38,"***TURQUOISE
CROSS***"CROSS,7,"***ANTIQU
E CLOCK***",CLOCK,0
550 DATA "***SOME GLOWING RU
BIES***",RUBIES,0,"***PERUVI
AN EMERALDS***",EMERALDS,0
560 DATA "***PEARL STUDDED K
EY***",PEARL,0,"***CROWN JEW
ELS OF BAVARIA***",JEWELS,0
570 DATA "***SILVER BRACELET
***",BRACELET,0,"LANTERN AND
 OIL",LANTERN,22,"GOLD NUGGE
TS",NUGGETS,0
580 DATA "DIAMOND KEY",KEY,0
,"STRANGE LOOKING BOX",BOX,2
0,"HOLLOW STICK",STICK,24,"W
HISKY BOTTLE",BOTTLE,0
590DATA "EINSTEIN'S PORTRAI
T",PORTRAIT,49,"NEWTON'S PIC
TURE",PICTURE,49,"METAL STRA
INER",STRAINER,17
600 DATA "SOME ALGAE",ALGAE,
14,"BEAKER OF WATER",BEAKER,
29,"MAGIC GLOVE",GLOVE,0,"TH
E HIDEOUS LARGO",LARGO,0
610 DATA "LARGE EGG",EGG,0,R
EVOLVER,REVOLVER,0,"A BULLET
",BULLET,35,"WALL SAFE",SAFE
,0
620 DATA "THE DUKE OF 'BONE'
 786-835","IQVQ QRGP","TREAS
URES ARE QUIET"
630 DATA LEFT,RIGHT,LEFT
```

So far so good. What you should do is check and recheck this program before running it. The program will use the computer commands for loading the file onto your tape. I use a fifteen minute tape for the data since there is so much of it. When creating the data file listen to the computer and you could follow each line being saved and even come to know what sound goes with which statement.

Now for the rest of the story...

```
100 DIM B$(3),C(3),A$(50),D$
(4),RM(50,4),IT$(50),JT$(50)
,IS(50),RT$(5):: E$="NSEW" :
: R=1 :: LT=500
110 OPEN #10:"CS1",INTERNAL,
INPUT, FIXED :: INPUT #10:D$
(1),D$(2),D$(3),D$(4)
120 FOR I=1 TO 50 :: INPUT #
10:A$(I),IT$(I)
130 INPUT #10:JT$(I),IS(I),R
M(I,1),RM(I,2),RM(I,3),RM(I,
4)
140 NEXT I
150 INPUT #10:RT$(3),RT$(4),
RT$(5)
160 INPUT #10:B$(1),B$(2),B$
(3)
170 CLOSE #10
180 A$(45)="NEAR A CLOSED CO
FFIN" :: A$(42)="IN FRONT OF
 A LOCKED DOOR"
190 IF R>=26 AND AA=0 THEN C
ALL CLEAR :: PRINT "A DARK M
IST COVERS THE ROOM" :: GOTO
 340
200 IF FG=-1 THEN IT$(29)="A
N EMPTY BEAKER"
210 DISPLAY AT(12,2)ERASE AL
L:"YOU ARE ";A$(R)
220 PRINT "OBVIOUS DIRECTION
S ARE"
230 FOR I=1 TO 4 :: IF RM(R,
I)<>0 THEN PRINT D$(I),"->"
240 NEXT I
250 X=0 :: PRINT "YOU SEE" :
: IF R=2 THEN PRINT "OLD HER
MIT" :: X=1
260 IF R=21 AND ZZ<>-1 THEN
PRINT "GUNFIGHTER WITH THE M
AGIC GLOVE" :: X=1
270 FOR I=1 TO 35 :: IF IS(I
)=R THEN X=1 :: PRINT IT$(I)
280 NEXT I
290 IF X=0 THEN PRINT "NOTHI
NG"
300 IF YD=99 THEN PRINT "THE
 POISON OF LARGO WAS FATAL"
:: GOTO 1640
310 IF ZZ<>-1 AND R=21 THEN
GOTO 1710
320 RANDOMIZE :: Y=INT(35*RN
D)+1
330 IF (INT(40*RND)+1)=1 AND
 IS(Y)=-1 AND Y<>19 THEN PRI
NT "A GIANT VULTURE HAS CARR
IED OFF YOUR?" :: IS(Y)=INT(
24*RND)+1 :: J=J-1
340 INPUT Q$ :: IF AA=-1 THE
N LT=LT-1 :: IF LT=0 THEN PR
INT "YOUR LIGHT HAS RUN OUT"
 :: GOTO 1640
350 IF SEG$(Q$,1,4)="MOVE" T
HEN GOTO 1330 ELSE IF SEG$(Q
$,1,4)="HELP" THEN GOTO 1730
 ELSE IF SEG$(Q$,1,4)="QUIT"
THEN END
360 IF SEG$(Q$,1,4)="SING" T
HEN GOTO 1770 ELSE IF SEG$(Q
$,1,5)="SHOOT" THEN GOTO 167
0 ELSE IF SEG$(Q$,1,5)="CRAC
K" THEN GOTO 1650
370 IF SEG$(Q$,1,4)="WEAR" T
HEN GOTO 1560 ELSE IF SEG$(Q
$,1,5)="TOUCH" THEN GOTO 158
0 ELSE IF SEG$(Q$,1,3)="DIP"
 THEN 1440
380 IF SEG$(Q$,1,3)="ASK" TH
EN GOTO 1200 ELSE IF SEG$(Q$
,1,4)="SAVE" THEN GOTO 340 E
LSE IF SEG$(Q$,1,4)="CALL" T
HEN 1610
390 IF SEG$(Q$,1,4)="GIVE" T
HEN GOTO 1290 ELSE IF SEG$(Q
$,1,4)="LOAD" THEN GOTO 1790
 ELSE IF SEG$(Q$,1,4)="SHOW"
THEN 1060
400 IF SEG$(Q$,1,4)="POUR" T
HEN GOTO 1520 ELSE IF SEG$(Q
$,1,6)="UNLOCK" THEN GOTO 13
50 ELSE IF SEG$(Q$,1,4)="OPE
N" THEN 1160
410 IF SEG$(Q$,1,5)="THROW"
THEN GOTO 1230 ELSE IF SEG$(
Q$,1,3)="DIG" THEN GOTO 1090
 ELSE IF SEG$(Q$,1,4)="FEED"
 THEN 1470
420 IF SEG$(Q$,1,5)="SCORE"
THEN GOTO 340 ELSE IF SEG$(Q
$,1,6)="INSERT" THEN GOTO 15
00 ELSE IF SEG$(Q$,1,5)="SME
LL" THEN 1130
430 IF SEG$(Q$,1,5)="LIGHT"
THEN GOTO 950 ELSE IF SEG$(Q
$,1,4)="DROP" THEN GOTO 750
ELSE IF SEG$(Q$,1,1)="L" THE
N 190
440 IF SEG$(Q$,1,1)="I" THEN
 GOTO 650 ELSE IF SEG$(Q$,1,
3)="GET" THEN GOTO 530 ELSE
IF SEG$(Q$,1,3)="SAY" THEN 1
020
450 IF SEG$(Q$,1,3)="BUY" TH
EN GOTO 910 ELSE IF SEG$(Q$,
1,4)="READ" THEN GOTO 860
```

```
460 IF RM(25,3)=0 AND Q$="N"
 AND R=25 THEN PRINT "THE CO
UNT IS IN YOUR WAY" :: GOTO
340
470 FOR I=1 TO 4
480 IF SEG$(E$,I,1)=Q$ THEN
510
490 NEXT I
500 PRINT "WHAT ??" :: GOTO
340
510 IF RM(R,I)=0 THEN PRINT
"YOU CAN'T GO THAT WAY" :: G
OTO 340
520 R=RM(R,I):: GOTO 190
530 G$=SEG$(Q$,5,20)
540 IF R=49 AND G$=JT$(25)OR
 R=45 AND G$=JT$(26)THEN PRI
NT "IT CAN NOT BE TAKEN OFF
THE WALL" :: GOTO 340
550 IF G$=JT$(19)AND R=22 AN
D BU<>1 THEN PRINT "THE LANT
ERN COSTS MONEY" :: GOTO 340
560 IF G$=JT$(31)AND R=50 AN
D IS(31)=50 OR G$=JT$(22)AND
 R=20 THEN PRINT "THAT IS NO
T WITHIN YOUR POWER" :: GOTO
 340
570 IF UP<>-1 AND G$=JT$(8)A
ND R=10 THEN PRINT "A SEMI-F
ORCE FIELD IS GUARDING THE R
OSE" :: GOTO 340
580 IF NF<>-1 AND G$=JT$(6)A
ND R=48 THEN PRINT "IT'S TOO
 HOT" :: GOTO 340
590 IF G$=JT$(34)AND R=35 AN
D AG<>-1 THEN PRINT "THE GOR
ILLA WON'T LET YOU TAKE IT"
:: GOTO 340
600 FOR I=3 TO 34
610 IF I>8 AND I<19 AND IS(I
)=33 AND R=33 AND G$=JT$(I)T
HEN MS=MS-10
620 IF J=8 THEN 850 ELSE IF
G$=JT$(I)AND IS(I)=R THEN J=
J+1 :: IS(I)=-1 :: PRINT "OK
" :: GOTO 340
630 NEXT I
640 PRINT "I DON'T FEEL LIKE
 IT" :: GOTO 340
650 DISPLAY AT(23,2)ERASE AL
L:"YOU ARE CARRYING:"
660 IF AA=-1 THEN LA$="LIT"
ELSE LA$="UNLIT"
670 IF IS(19)=-1 THEN PRINT
LA$;" ";IT$(19)
680 X=0 :: FOR I=3 TO 34
690 IF IS(19)=-1 THEN X=1
700 IF I=19 THEN X=20
710 IF IS(I)=-1 THEN X=1 ::
PRINT IT$(I)
720 NEXT I
730 IF X=0 THEN PRINT "NOTHI
NG"
740 GOTO 340
750 G$=SEG$(Q$,6,20)
760 IF G$=JT$(19)AND IS(18)=
-1 THEN AA=0
770 IF G$=JT$(30)AND IS(30)=
-1 THEN PRINT "IT IS A PART
OF YOU NOW" :: GOTO 340
780 FOR I=3 TO 34
790 IF I>8 AND I<19 AND IS(I
)=-1 AND R=33 AND G$=JT$(I)T
HEN MS=MS+10
800 IF IS(I)=-1 AND G$=JT$(I
)THEN 830
810 NEXT I
820 GOTO 640
830 J=J-1 :: PRINT "OK" :: I
S(I)=R
840 IF MS=100 THEN PRINT "YO
U HAVE DONE IT" :: GOTO 1700
 ELSE 340
850 PRINT "YOU CAN'T CARRY A
NYTHING ELSE" :: GOTO 340
860 g$=SEG$(Q$,6,20)
870 FOR I=3 TO 5
880 IF IS(I)=-1 AND G$=JT$(I
)THEN PRINT RT$(I):: GOTO 34
0
890 NEXT I
900 GOTO 640
910 G$=SEG$(Q$,5,20)
920 IF R=22 AND BU=1 THEN PR
INT "WE'RE ALL OUT" :: GOTO
340
930 IF G$=JT$(19)AND R=22 AN
D IS(20)=-1 AND J<>6 THEN BU
=1 :: GOTO 600
940 GOTO 640
950 G$=SEG$(Q$,7,20)
960 IF IS(19)=-1 AND G$="ON"
 THEN 980 ELSE IF IS(19)=-1
AND G$="OFF" THEN 1000
970 GOTO 640
980 IF AA=-1 THEN PRINT "IT'
S ALREADY ON" :: GOTO 340
990 AA=-1 :: GOTO 190
1000 IF AA=0 THEN PRINT "IT'
S ALREADY OFF" :: GOTO 340
1010 AA=0 :: GOTO 190
1020 G$=SEG$(Q$,5,20)
1030 IF RM(24,4)=0 THEN 1050
```

```
1040 IF R=24 AND G$="BONE" T
HEN RM(24,4)=0 :: RM(24,3)=2
5 :: GOTO 210
  50 PRINT "OK ";G$ :: GOTO
 340
1060 G$=SEG$(Q$,6,20)
1070 IF RM(25,3)=0 AND G$=JT
$(12)AND IS(12)=-1 AND R=25
THEN PRINT "THE COUNT FLIES
AWAY IN PAIN" :: IS(1)=0 ::
RM(25,3)=28 :: GOTO 340
1080 GOTO 640
1090 IF IS(7)<>-1 THEN PRINT
 "NO SHOVEL" :: GOTO 340
1100 IF R=10 AND IS(31)=-2 A
ND IS(32)=0 THEN IS(32)=10 :
: GOTO 210
1110 IF R=12 AND IS(21)=0 TH
EN IS(21)=12 :: GOTO 210
1120 PRINT "NOTHING HERE" ::
 GOTO 340
1130 G$=SEG$(Q$,7,25)
1140 IF IS(5)=0 AND G$=JT$(8
)AND R=45 AND OP=-1 AND IS(8
)=-1 THEN IS(5)=45 :: IS(10)
=16 :: GOTO 210
1150 IF G$=JT$(8)AND IS(8)=-
1 THEN PRINT "AH WHAT BEAUTY
" :: GOTO 340 ELSE PRINT "MY
 NOSE IS STUFFED UP" :: GOTO
 340
1160 G$=SEG$(Q$,6,25)
1170 IF IS(13)=0 AND G$=JT$(
22)AND IS(23)=0 AND R=20 THE
N IS(24)=20 :: IS(13)=31 ::
IS(33)=20 :: GOTO 190
1180 IF IS(23)<>0 AND G$=JT$
(22)AND R=20 THEN PRINT "AN
ANGRY DOG IS GUARDING THE ST
RANGE BOX" :: GOTO 340
1190 IF OP<>-1 AND G$="COFFI
N" AND R=45 AND IS(21)=-1 TH
EN OP=-1 :: A$(45)="NEAR AN
OPEN COFFIN" :: GOTO 190 ELS
E GOTO 640
1200 G$=SEG$(Q$,5,20)
1210 IF DS=-1 AND G$=JT$(2)A
ND R=23 THEN PRINT "ADD ONE
LETTER TO EACH LETTER IN THE
 PHRASE" :: GOTO 340
1220 IF R=23 AND G$=JT$(2)TH
EN PRINT "FOR A BOTTLE OF WH
ISKEY I COULD BECOME TALKATI
VE" :: GOTO 340 ELSE GOTO 64
0

1230 G$=SEG$(Q$,7,25)
1240 IF IS(31)=50 AND R=50 A
ND IS(6)=-1 AND G$=JT$(6)AND
 IS(31)=50 THEN GOTO 1250 EL
SE 1270
1250 PRINT "LARGO BURNS FIER
CELY, A VOICE SAYS","GID TA
TIP"
1260 IS(6)=50 :: IS(31)=-2 :
: J=J-1 :: GOTO 340
1270 IF IS(23)=-1 AND G$=JT$
(23)AND R=20 THEN PRINT "THE
 DOG RUNS FOOLISHLY AFTER TH
E STICK." :: IS(23)=0 :: J=J
-1 :: GOTO 290
1280 GOTO 760
1290 G$=SEG$(Q$,6,20)
1300 IF DS<>-1 AND R=23 AND
G$=JT$(24)AND IS(24)=-1 THEN
 PRINT "THE DRUNK QUICKLY TA
KES THE BOTTLE" :: DS=-1 ::
GOTO 1310 ELSE 1320
1310 IT$(2)="THE HAPPY TOWN
DRUNK" :: J=J-1 :: GOTO 340
1320 GOTO 760
1330 G$=SEG$(Q$,6,20)
1340 IF IS(35)=0 AND G$=JT$(
25)AND R=49 THEN IS(35)=49 :
: GOTO 190 ELSE GOTO 640
1350 G$=SEG$(Q$,8,25)
1360 IF IS(15)=0 AND G$=JT$(
35)AND IS(35)=49 AND R=49 TH
EN GOTO 1370 ELSE GOTO 640
1370 PRINT "REFER TO BIRTH D
IGITS SAYS A VOICE."
1380 FOR I=1 TO 3 :: PRINT B
$(I);" VALUE"
1390 INPUT C(I)
1400 IF C(I)<=0 THEN 1390
1410 NEXT I
1420 IF C(1)=7 AND C(2)=8 AN
D C(3)=6 THEN PRINT "THE SAF
E CREAKS OPEN" :: IS(14)=49
:: IS(15)=49 :: GOTO 340
1430 PRINT "THE SAFE DID NOT
OPEN" :: GOTO 340
1440 G$=SEG$(Q$,5,20)
1450 IF IS(20)<>0 AND R=14 A
ND G$=JT$(24)AND IS(27)=-1 T
HEN GOTO 1120
1460 IF G$=JT$(27)AND R=14 A
ND IS(27)=-1 THEN IS(20)=14
:: GOTO 190 ELSE GOTO 640
1470 G$=SEG$(Q$,6,20)
```

```
1480 IF IS(16)=0 AND G$=JT$(
9)AND IS(9)=-1 AND IS(28)=-1
 THEN GOTO 1490 ELSE GOTO 64
0
1490 PRINT "THE OYSTER EATS
THE ALGAE   AND SOMETHING IN
 IT DISAPPEARS" :: IS(16)=2
:: IS(28)=0 :: J=J-1 :: GOTO
 340
1500 G$=SEG$(Q$,8,30)
1510 IF IS(17)=0 AND G$=JT$(
16)AND R=42 AND IS(16)=-1 TH
EN A$(42)="IN FRONT OF AN UN
LOCKED DOOR" :: IS(17)=42 ::
 GOTO 190 ELSE GOTO 640
1520 G$=SEG$(Q$,6,20)
1530 IF FG<>-1 AND R<>10 AND
 G$="WATER" AND IS(29)=-1 TH
EN PRINT "YOU ARE IN TROUBLE
" :: FG=-1 :: GOTO 340
1540 IF FG<>-1 AND UP<>-1 AN
D IS(29)=-1 AND G$="WATER" A
ND R=10 THEN GOTO 1550 ELSE
GOTO 640
1550 UP=-1 :: FG=-1 :: PRINT
 "THE FORCE FIELD IS DESTROY
ED" :: GOTO 340
1560 G$=SEG$(Q$,6,20)
1570 IF NF<>-1 AND G$=JT$(30
)AND IS(30)=-1 THEN PRINT "N
ICE FIT" :: NF=-1 :: GOTO 34
0 ELSE GOTO 640
1580 G$=SEG$(Q$,7,30)
1590 IF G$="HERMIT" AND R=2
AND NF=-1 THEN PRINT "YOU FE
EL DIZZY FOR A MOMENT" :: PH
=-1 :: GOTO 340
1600 IF G$="HERMIT" AND R=2
AND NF<>-1 THEN PRINT "YOU H
AVE JUST DIED" :: GOTO 1640
ELSE GOTO 640
1610 G$=SEG$(Q$,6,20)
1620 IF IS(31)<>-2 AND G$=JT
$(31)AND R=50 AND PH=-1 THEN
 IS(31)=50 :: GOTO 210
1630 IF G$=JT$(31)AND R=50 A
ND PH<>-1 THEN YD=-1 :: IS(3
1)=50 :: GOTO 210 ELSE GOTO
640
1640 END
1650 G$=SEG$(Q$,7,20)
1660 IF IS(18)=0 AND G$=JT$(
32)AND IS(32)=-1 THEN IS(18)
=5 :: PRINT "SOMETHING FALLS
 OUT, THEN  DISAPPEARS" :: G
OTO 340 ELSE GOTO 640
1670 G$=SEG$(Q$,7,25)
1680 IF IS(33)=-1 AND LO=-1
AND ZZ<>-1 AND G$="GUNFIGHTE
R" AND R=21 THEN GOTO 1690 E
LSE GOTO 640
1690 PRINT "YOU KILLED THE G
UNFIGHTER: :: IS(30)=21 :: Z
Z=-1 :: IT$(33)="EMPTY REVOL
VER" :: GOTO 340
1700 END
1710 IF (INT(7*RND)=1)=1 THE
N PRINT "THE GUNFIGHTER SHOT
 YOU IN THE LEG"
1720 GOTO 340
1730 IF R=50 THEN PRINT "WIT
HOUT THE TOUCH, THE SIGHT OF
LARGO WILL KILL YOU"  :: GOT
O 340
1740 IF R=2 THEN PRINT "TOUC
H THE HERMIT ONLY WHILE THE
GLOVE IS ON" :: GOTO 340
1750 IF R=20 THEN PRINT "LAR
GO LOVES TO HEAR HIS NAME" :
: GOTO 340
1760 PRINT "NOT NOW" :: GOTO
 340
```

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```
1770 IF AG<>-1 AND R=35 THEN
 PRINT "THE GORILLA FALLS AS
LEEP" :: AG=-1 :: GOTO 340
  80 PRINT "YOU ARE A LITTLE
OFF LINE" :: GOTO 340
1790 G$=SEG$(Q$,6,20)
1800 IF LO<>-1 AND G$=JT$(33
)AND IS(33)=-1 AND IS(34)=-1
 THEN PRINT "OK" :: LO=-1 ::
 IT$(33)="LOADED REVOLVER" :
: IS(34)=0 :: J=J-1 :: GOTO
340
1810 GOTO 640
```

Since this is a long game to enter there seems to creep in a gremlin or two when loading in the data from the file you have created. Remember this program is pushing the limits of TI memory space.

Once the program is all in the question of how to play arises. Well I rather not tell you too much as knowing all the answers will take away the frustration and anger you will (maybe) feel when you get no where fast.

When loaded and run, you will be "North of a forest, there is a cave to the east." Obvious directions are south, east, and west. You see nothing of note. The rest is up to you. Movement is governed by the four compass directions and you have the list of nouns and verbs to do all you need to do to get the ten treasures that are scattered about the area and do with them as you please to win. Having all the treasures does not mean you win, what you do with them you will find in the game.

As I said this game is a translation. A close friend worked at solving it on his Color computer while attacked it on my TI-99/4A. Expect to take between 5 and 10 hours of playing to solve the puzzle.

If you do not fancy typing all that in a tape is available from UNOFFICIAL that will have these two programs on. One program per side because the file creating program should be run only when creating the file. Once the file is created flip the tape over and run the main program. There will be no copy protection so you better make a couple copies for later when one tape wears out. Since there will be no file given, you will have to make one by running the file create program. It is best to put the file onto a new tape so you know where the beginning is all the time. Knowing where the beginning of all three programs is important that is why you ought to keep the two programs and one file separate and starting at the beginning of a tape

The cost of this tape is (including postage and packaging) $4.75 (U.S. dollars only).

If you have a disk system with some extra memory you may want to look into the disk version of Largo. Since you have the disk system then you will face the Gunfighter in a more fatal way. The rooms will have more clues -or false leads- and you will have the Save and score feature that is left out of the 16K tape version.

With the Save feature you will be able to save all you need to get back to the same spot if you get killed, fried, or had to go to work just when it was getting exciting, When saving you must give the disk drive number and a name. I.E. DSK1.TRY1 The score function will keep you informed on your score and how much light you have left. I know you are thinking about 'light' but you will find out all about in in the game.

The disk version is sold ready to go. All you have to do is to turn on your system and the program automatically starts to run the program.

The disk version costs (including postage and packaging) $7.00 if UNOFFICIAL supplies the disk. If you send your own disk the cost is $5.00. U.S. currency only. If you live outside North America add $3.00 to every tape or disk ordered. If any tape or disk fails to operate, return it for replacement.

If you get stuck, write and I shall print your letter and, hopefully, someone will write with the answer. The best thing you can do is to keep track of all your moves and create a map as you progress.

Yes there is a map at UNOFFICIAL that has everything on it. And no it is not for sale at any price... If you offer that much I could be tempted.

Have fun !! ###

REVIEW & VIEWS

With the festive season only weeks away you might be thinking what you could buy to enhance your TI home computer. UNOFFICIAL has two items that you really should look at.

If you bought your TI-99/4A computer as a means to run the modules only, you may be ready for expansion. I am sure that you have been a little wary at the prices you have to pay when it comes to expanding anything. Well "Toys 'R' Us" has been offering a package that will make your eyes light up and allow you to leave with quite a bit of money in your pocket.

At the moment "Toys 'R' Us" is selling the TI Expansion Box (PHB 1200), Disk Control Card with Disk Manager 2 (PHB 1240), and the Expansion Box Disk Drive (PHB 1250) for the exceptional price of $299.00 plus tax. You would normally expect to pay in the region of $675.00 plus tax.

The deal is a very sweet one and made even better when you realize that all the equipment is stamped TI. That allows you to exchange any defective parts at the Exchange Center nearest you.

If you were to buy this package, take it home and set it up, you may be a little disappointed. The disk system has not given you anything that you could not do with your tape system. That may sound kind of strange but let us look at it closely.

The primary function of a storage device is to store information. A tape and disk system does that very well. Another function is to allow for the sending of a storage medium to another individual without any damage to the storage medium. A tape and disk system can handle that. However, when we look at secondary functions of the tape and disk systems we see that there is a world of differences between the two.

Basically there is no secondary function to a tape system. A tape system is designed to be reliable and inexpensive and no more.

A disk system has many faces. The first time you SAVE or LOAD a program from a disk you will be surprised at the speed with which everything takes place at. No more coffee breaks while the old tape rolls. If you are not impressed by this saving in time, remember that time saved does add up and can allow you to get more done in less time.

Aside from the speed you now can write programs longer than the tight 12K

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that you were limited to when using a tape system. With extra memory you can go as high as you want. I know that 12K rograms are not too thick on the ground, but if you enter the program in this issue of UNOFFICIAL you will see that a tape system can have its limitations and be painfully slow.

This disk system does allow you to develop a library of subroutines that you can call upon by invoking the MERGE command.

The development of a personal library is a must to any programmer. Having a library can cut down the time it takes to develop and write a program by hours -if it is a short program- or days -if it is a long program.

Of course you are going to need EX-BASIC to do all of this fancy programming. With the disk system you can get into some very fancy data base managing. With a tape system you were allowed to enter the world of data managing through the limited SEQUENTIAL file organization. Now with the disk you can use the powerful RANDOM file organization and the EOF (End Of File) command.

As you can see, having the disk system will make a big difference in your life.

As with any disk system you need are going to do some house keeping sooner or later. TI has their Disk Manager 2 module. This module is packaged with the Disk Control Card.

The Disk Manager comes with several languages -English, French, and German. I assume they all mean the same. While you have the 'home TI screen' on, plug in the module and get the English version going. Up on the screen will come a list of options.

The Disk Manager has four options. 1) File Commands 2) Disk Commands 3) Disk Tests 4) Set all Commands for Single Disk Processing. The break down into four options makes life easy and simple to follow.

File Commands allows you to work with the files on a disk. Under File Commands you have 1) Copy File 2) Rename File 3) Delete File 4) Modify ile Protection.

Disk Commands allows you to work with the disk as a whole. You are allowed to 1) Catalogue Disk 2) Backup Disk 3) Modify Disk Name 4) Initialize New Disk.

If you ever think you have problems with your disk drive, control card, or disk, you will need the Disk Test option. Here you will have the option of two test methods 1) Quick Test 2) Comprehensive Test.

Since few will go out and buy several disk drives, most will use the Single Disk Processing option sooner or later.

The Disk Processing option is used when transferring information from one disk to another while using one disk drive. As you can imagine, when transferring a program from one disk to another and using one disk drive, there is a great deal of putting and pulling of disks. Life is very easy if you have two disk drives.

The file and disk commands are easy to follow and similar to other computer house keeping systems. If you have any difficulty, TI does supply a manual that covers all commands in excellent detail that you should have no trouble in doing what you want to do.

There it only two problem areas that you must be aware of when using the Disk Manager module.

The first, and maybe the most important, is to remember to leave the Disk Manager in the proper way. You can not pull the module out if you have anything but the TI home screen showing. Failure to follow this order can result in loss of data on the disk. To exit properly I keep hitting the BACK key to travel back through the levels of disk management that I have gotten into until I arrive at the TI home screen.

The keys PROC'D, REDO, BEGIN, and BACK are all disk operating keys which the manual covers well. I'm sure that you can guess what they mean since TI is very logical in all its key and command labeling.

The other problem with using the Disk Manager is that the manager is in a module. To use the module you have to stop what you are doing, get to the TI home screen, pull out your module -most probably EX-BASIC- and plug in the Disk Manager. Not conducive to fast and efficient programming.

Why would you need to stop in the middle of a program to use the Disk Manager? If you are a serious programmer and have embarked on a fairly long program and do not copy your program onto a tape or a disk, you run a real risk of losing all your work through any one of many things that can effect you or your computer. Simply put you are a fool not to copy your work from memory to recording medium from time to time.

All this pulling and pushing of modules is wearing away the male contacts in the module port of your computer (see IN CLOSING for a solution). If you ever get your hands on a IBM P.C., Radio Shack model 2 or 16, or any other larger computer you will find the manager is either in ROM or is loaded in from disk when you start up the computer. Having the manager so easily accessible is a big advantage, but then you are paying thousands of dollars for the computer and better get quality and ease of use.

The package deal from Toys 'R' Us rates a full five stars and is definitely value for money

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I am sure that extra memory has been one topic you have been thinking of since you could then buy TI LOGO II, the Mini-Memory module, Multiplan, TI-Writer, and many other interesting programs. If you are interested in extra memory why limit your sight to just 32K worth of memory. Did that make you think? Is there anything after 32K that the TI-99/4(A) can handle? Yes there is. Foundation (74 Claire Way, Tiburon, CA 94920 (415) 388-3840) is the only company that is making 128K cards that plug into the TI Expansion Box and

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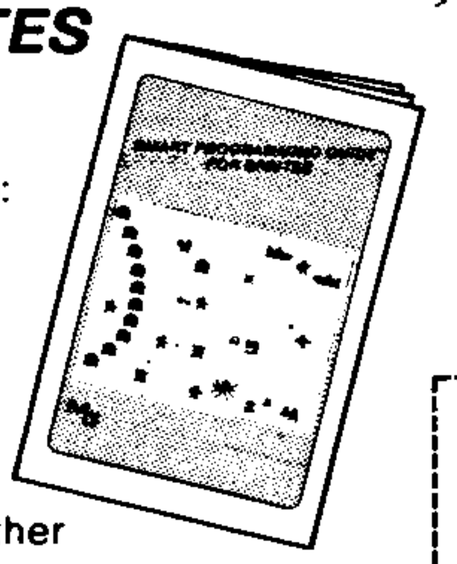

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U-2

at a very reasonable price. Foundation's 16K card comes in at $150.00, and the 128K card is $230.00 If you are looking at TI's 16K card you will be paying about $230.00 See anything interesting in these prices? Why pay the same money for 16K when you can get 128K of memory?

Foundation's memory card is ruggedly built but does not have tabs on the ends that would run in the holding slots that are at the front and back of the Expansion Box. The lack of these tabs is no real problem since TI has two strips of padding that runs the full length of the lid and holds down on any item in the expansion slots. With the card in place and with power on you get a quiet green light that indicates all is well.

Now why get 128K when all any BASIC -language will address is 64K and the TI-99/4A can only cope with and extra 32K of memory? Foundation uses the ancient art of 'banking.' By designing the 128K into four 32K blocks, and all blocks are identical, the TI computer is shown only one 32K block at a time. To get to the other three 32K banks, you are going to need a Mini-Memory or the Editor-Assembler.

Foundation has realized that not everyone is into assembly language programming and has developed an optional Device Service Regester (DSR) firmware package that will allow you to use the upper 86K that the TI home computer can not access.

The DSR allows the memory to be split, 32K for programming and 86K to be used as a predefined RAM-disk with certain limitations.

UNOFFICIAL will be doing a detailed review of this 128K memory expansion card in the January-February 1984 issue.

If you are interested in some serious programming, this memory card is for you because of what it can do now and the fact that Foundation keeps hinting at more to come in the future.

UNOFFICIAL rates this device at a five star article.

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Programs that I hate are ones that I can not win at. Mirage Software has come out with a tough four screen production called "Treasure Hunt." The program is written in EX-BASIC to take full use of the sprite capabilities that exist. Sound, graphics, color and plenty of thought went into this program.

You start out with four men to find the treasures on the unplundered tomb. That sounds very easy but it is not.

You start on screen one -naturally- and at level one. The object is to go from the bottom of the screen to the top and up a ladder that leads to screen two. To get to the top of the screen you have to aviod several nasty animals by jumping over them and trying to collect some treasures at the same time. Since all the animals are different you have to use different timing on your jumping. You will see what I mean when you play the game. This first screen is super tough for my fingers and I may make it through without losing a man one time in five.

Screen two is my favorite because the you are chased by a sad looking ghost that only puts on a smiling face when he gets you! The ghost is kind of slow and none to smart (remember that this is level 1) and careful planning will get you through every time. You have to find the right treasure among many that will open a trap door that will lead you to screen three. All the treasures are on blocks that you have to jump to to get the treasure. You can out-smart yourself since you can only land on a block once. If you cut off all routes to a block that has a treasure you can never see if that is the treasure that will open the trap door.

This screen is one of careful tactics and planning and you should win all the time or else see the smiling face of the ghost.

Screen three is a nasty maze with a big spider after you. As with the ghost the spider is none too smart, but this is the beginning skill level. You have to wander about in the maze collecting as many treasures as you can without getting eaten by the spider. You can jump over the spider but it is very difficult to do so because of its size and shape. I'd rather run the opposite

way because the screen wraps round on itself. That is you can go off the screen to your right and reappear on the left of your screen. Now that keeps the spider on its toes. Whether that screen wrape was designed or not, remember it is there and us it.

Getting out of screen three and to number four is simple, get to the bottom of the maze and collect as many treasures as you can. Again careful planning and cunning tactics will win through over brute force any time.

Screen four is the strangest one of the four screens and needs a steady jumping finger. You are in the center chamber of the tomb and can see the the magic sword way below you on a lower ledge. 'To get to the sword you must jump from the ledge, on which you are standing, onto a moving stone. The stone will take you to the other side of the screen and then you must jump from the moving stone onto a lower ledge. It is a lot easier to write about than play! If you wait, the stone that you jumped on will come back round again with you still standing on it for another try.

You work your way down by jumping onto stones and ledges till you reach the magic sword. At this time you will go back to the first screen but now be on level two. There are ten levels to work through; if you have enough men to do so.

Each level of difficulty brings with it more problems, smarter and more ghosts, moving holes, and a spider that moves so fast that you do not have time to get any treasures, just to get out is fine enough.

Of course there are some finer points to this game but only by playing the game will you learn them.

I like this game because it is not very common to find four screens with ten levels to work through. To win takes thought as well as luck and skill. But will you ever make it to the end, that is the key question. Rather than a 'bang bang, shoot shoot' type game 'Treasure Hunt' offers a little bit more than you usually get in a game.

When you start the game you can read through excellent instructions so you know what you are doing. All instructions are on the disk or tape that you buy. After you read through the instructions you are offered the option of running the program one of four ways. They are:-

1) Memory Expansion Joystick.
2) Memory Expansion Keyboard.
3) Nonexpansion joystick.
4) Nonexpansion Keyboard.

All options run the same game but if you have the extra memory you can restart the program right away rather that reloading the whole program.

If you can avoid the TI joysticks you will do better on the keyboard.

If this game has a weakness it will lie at the feet of the COINC subprogram that is used to determine the coincidence of two sprites. Sometimes you will get a treasure but not really. I have found that I may have to go back over a treasure to 'get' it. There is really nothing you can do about it. The problem lies with the hardware designers.

"treasure Hunt" costs $17.95 and does offer value for money because this program will keep you busy for many hours and leave you wondering how are you ever going to get past the ghosts.

UNOFFICIAL gives "Treasure Hunt" a big four star rating, but now expects bigger and better things to come out from Mirage Software.

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Every now and again there comes a tape in the mail with some very interesting programs. Ermware (P O Box 1322, Sandy, UT 84091) recently sent a tape that is well worth writing about.

The first program on the tape is "Fractions are Fuh" written in EX-BASIC. You have a chance of going against the a robot for the title of Mathematician. The robot has a computer for a brain that you can see working so you know if you beat the robot to the answer. In Fractions are Fun you never enter your answer but write it down. This is a race remember. When the robot has the answer he (I think it is a he robot)

will let you know. Press <ENTER> for the right answer and see if you agree with the robot.

You have four skill levels and five options to play -Addition, Subtraction, Mulitplication, Division, and Random.

The random adds a touch that many programs do not think of or bother with. By using the Random option will not allow the person using the game to get into a rut or allow the luxury of forgetting to read the question properly.

The screen is well designed with a box in which is the question being asked, while through the window in the robots head you can see him working hard at the problem and pleasant colors all combine for an interesting drill on fractions.

The next program on the tape is "Bombing Mission" again written in EX-BASIC and is an interesting program that uses sprites to their fullest.

The first bombing mission you are on is when you have to destroy four radar installations with bombs from your helicopter. Hard enough with out the antiaircraft guns firing at you. If you make it through that then you come up with the mission to bomb four airfields. There are nine levels to this game and five targets to hit, but I never got there past the airfield.

A very nice program but the with poor TI joysticks you may well run into problems playing the game. Talking about joysticks, the author did not allow you the option to use the keyboard over joysticks which I think is needed when facing poor response from joysticks.

If you do not have EX-BASIC there is Bombing MIssion #1 & 2 in TI-BASIC. No it is not the same as having sprites but the action is there. In the TI-BASIC version #1 there are limitations and the most troublesome was not having the ability to move the helicopter upward and the slow control responses. The upward motion is necessary so you can get the proper range on a target. Get too close and you will over shoot, so you need to back off but can not. About the only way round this, as far as I can see, is to get shot down and start again with one less chance to do the job. Version #2 differs from #1 in that the horizontal motion it done for you by the computer.

Another program on the tape is a family tree program. A fairly simple program that allows you to store family information on tape. The program is called "New Family Tree" and is written in EX-BASIC. The program is only for recording information and has no search routine that is so necessary if you are going to construct a family tree of some size.

One last program from Ermware is Crazey Clown. This EX-BASIC program has two Shooting games, one spell game and a guessing the number game. All quite interesting but none too fantastic.

If any of these programs are of interest to you, write to Ermware up in Utah.

If you have any programs that you would like reviewed put them on a disk or tape and send in.

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R E M E M B E R

T O

F I L L O U T

T H E

Q U E T T I O N A R E

A T T H E

E N D O F T H I S

I S S U E.

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1983 INDEX

Since this is the end of volume one here is an index to the publications that have passed. The index covers those main topics that can be catagorized. Hopefully the topic headings are easy to follow. In some cases the same item is listed under more than one heading. Multiple listings are done so as to make it possible that you will find what you are looking for rather than trying to follow my reasoning for listing it that way. I hope that this index helps you find what you are looking for.

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