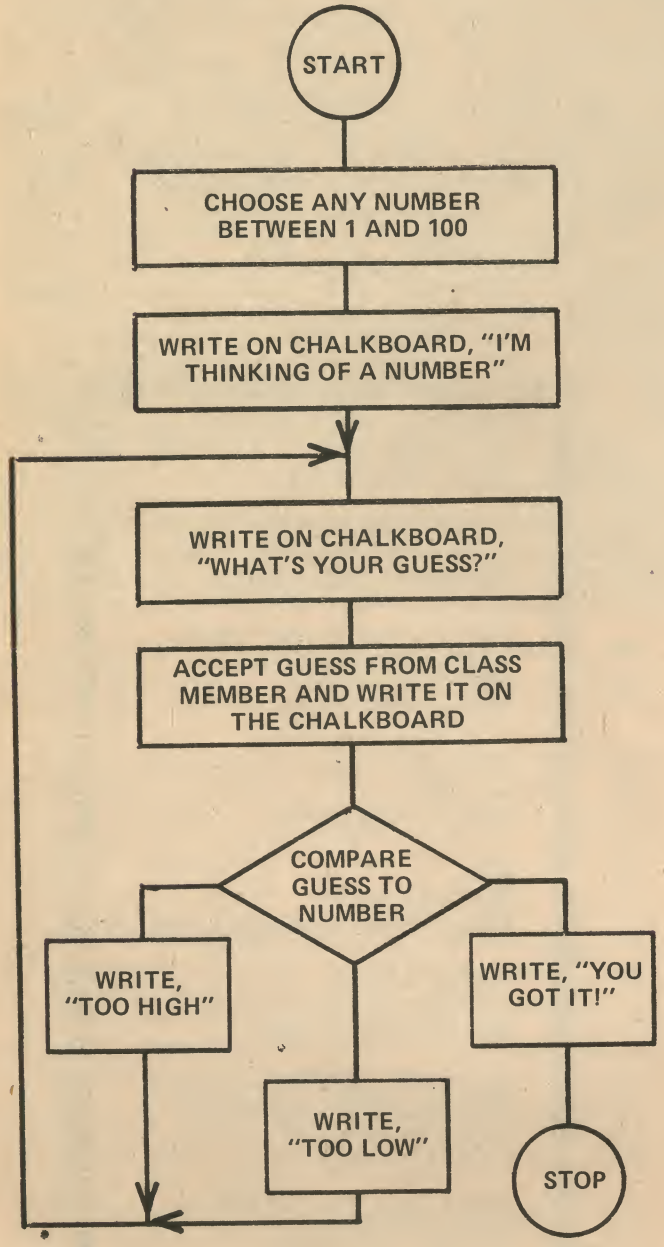
?¿?¿?GUESS?¿?¿?

GUESS is a simple introduction to the idea of a computer program and computer games. It also introduces the notions of comparison and searching a list.

Before playing GUESS on the computer, you may wish to play it in class at the chalkboard. One student is selected to be the computer. He is given the flowchart below and is asked to follow it and write on the chalkboard the statements in parentheses as well as each guess. Students take turns being the computer.

FLOWCHART



After playing the game manually, play GUESS on the computer. Divide the class into small teams of 2 or 3 members each. Have each team play 10 games on the computer and keep track of the number of guesses required to get each number. Compute the average guesses for each team and for the entire class. After playing the class should consider the following questions:

1. Why should it never take more than 7 guesses to find the number?
2. What was the average guesses for the class? How does this compare to the theoretical average (using the correct guessing strategy) of 5.3?
3. What are the maximum number of guesses required to find a mystery number between:

1 and 10	1 and 64
1 and 63	1 and 1000

PROGRAM LISTING

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 1 PRI "THIS IS A NUMBER GUESSING GAME.  I'LL THINK"
 2 PRI "OF A NUMBER BETWEEN 1 AND ANY LIMIT YOU WANT."
 3 PRI "THEN YOU HAVE TO GUESS WHAT IT IS."
 4 PRI
 5 PRI "WHAT LIMIT DO YOU WANT";
 6 INPL
 7 PRI
 8 L1=INT(LOG(L)/LOG(2))+1
10 PRI"I'M THINKING OF A NUMBER BETWEEN 1 AND"L
11 G=1
14 PRI "NOW YOU TRY TO GUESS WHAT IT IS"
15 M=INT(L*RND(0))+1
20 INP N
21 IF N>0 THEN 25
22 GOSUB70
23 GOTO1
25 IF N=M THEN 50
30 G=G+1
31 IF N>M THEN 40
32 PRI "TOO LOW.  GUESS AGAIN."
33 GOTO 20
40 PRI "TOO HIGH.  GUESS AGAIN."
42 GOTO 20
50 PRI "THAT'S IT!  YOU GOT IT IN"G"TRIES.
52 IF G<L1 THEN 58
54 IF G=L1 THEN 60
56 PRI"YOU SHOULD HAVE BEEN ABLE TO GET IT IN ONLY"L1".
57 GOT 65
58 PRI"VERY ";
60 PRI"GOOD!
65 GOSUB70
66 GOTO10
70 FOR H=1 TO 5
71 PRI
72 NEXT H
73 RETURN
99 END
```

Note: BASIC statements in this program are abbreviated to their first 3 letters.

SAMPLE RUN

```
THIS IS A NUMBER GUESSING GAME.  I'LL THINK
OF A NUMBER BETWEEN 1 AND ANY LIMIT YOU WANT.
THEN YOU HAVE TO GUESS WHAT IT IS.

WHAT LIMIT DO YOU WANT? 100

I'M THINKING OF A NUMBER BETWEEN 1 AND 100
NOW YOU TRY TO GUESS WHAT IT IS
? 50
TOO HIGH.  GUESS AGAIN.
? 25
THAT'S IT!  YOU GOT IT IN 2 TRIES.
VERY GOOD!



I'M THINKING OF A NUMBER BETWEEN 1 AND 100
NOW YOU TRY TO GUESS WHAT IT IS
? 50
TOO HIGH.  GUESS AGAIN.
? 25
TOO LOW.  GUESS AGAIN
? 37
TOO HIGH.  GUESS AGAIN.
? 31
TOO HIGH.  GUESS AGAIN.
? 28
TOO LOW.  GUESS AGAIN
? 29
TOO LOW.  GUESS AGAIN.
? 30
THAT'S IT!  YOU GOT IT IN 7 TRIES.
GOOD!
```