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DECUS NO.	FOCAL8-111
TITLE	BATTLE OF NUMBERS GAME (Newberry College Version)
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SOURCE LANGUAGE	FOCAL

ATTENTION

BATTLE OF NUMBERS GAME
(Newberry College Version)

ABSTRACT

This program allows the user to play a Battle of Numbers with the computer. The computer usually wins!

EXECUTION

Load the FOCAL compiler. Respond to initial dialogue by typing YES to the first question. Place the source tape in the reader and allow FOCAL to load the program. If FOCAL is already in the machine, be sure that the FSIN function is retained. After loading is completed, type GO and carriage return. The computer will print:

LET'S PLAY BATTLE OF NUMBERS

GOAL = (number) PLAY LIMIT = (number) YOUR PLAY IS:

The user then chooses a number between 1 and the number indicated for PLAY LIMIT, types his choice and a carriage return. The computer subtracts the user's choice from GOAL to form NEW GOAL, chooses a number between 1 and the PLAY LIMIT, subtracts its choice from NEW GOAL to form another NEW GOAL, and prints:

MY PLAY = (its choice) NEW GOAL = (value of NEW GOAL) YOUR PLAY IS:

This process continues until the value of NEW GOAL is 1. Whoever has to play at this point loses. The computer will then type out who won, choose a NEW GOAL and PLAY LIMIT and starts a new game. The program will run indefinitely; it must be terminated by typing CTRL/C, or by stopping the computer.

As is well known, the first player of this game has a winning strategy provided that GOAL is not congruent to 1 mod (PLAY LIMIT+1). If the player does not use this strategy, the computer chooses its moves in such a way that it will win. If the player does adopt the winning strategy, the computer chooses its moves at random using FOCAL's FRAN function. It also chooses initial GOALS and PLAY LIMITS at random. There is no guarantee that the program will not begin repeating GOALS and PLAY LIMITS, but it has played 5 games in a row without such repeating.

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GO
LET'S PLAY BATTLE OF NUMBERS
GOAL = 11Ø.ØØØØ PLAY LIMIT =   12.ØØØØ YOUR PLAY IS :7
MY PLAY = 11.ØØØØ NEW GOAL =   92.ØØØØ
YOUR PLAY IS :77
PLEASE MAKE A LEGAL PLAY.
YOUR PLAY IS :1Ø
MY PLAY = 3.ØØØØ NEW GOAL =   79.ØØØØ
YOUR PLAY IS :-5
PLEASE MAKE A LEGAL PLAY.
YOUR PLAY IS :6
MY PLAY = 7.ØØØØ NEW GOAL =   66.ØØØØ
YOUR PLAY IS :8
MY PLAY = 5.ØØØØ NEW GOAL =   53.ØØØØ
YOUR PLAY IS :5
MY PLAY = 8.ØØØØ NEW GOAL =   4Ø.ØØØØ
YOUR PLAY IS :3
MY PLAY = 1Ø.ØØØØ NEW GOAL =   27.ØØØØ
YOUR PLAY IS :9
MY PLAY = 4.ØØØØ NEW GOAL =   14.ØØØØ
YOUR PLAY IS :7
MY PLAY = 6.ØØØØ NEW GOAL =   1.ØØØØ
SORRY, YOU HAVE JUST LOST.

NEW GAME.
GOAL = 56.ØØØØ PLAY LIMIT =   5.ØØØØ YOUR PLAY IS :1
MY PLAY = 3.ØØØØ NEW GOAL =   52.ØØØØ
YOUR PLAY IS :3
MY PLAY = 3.ØØØØ NEW GOAL =   46.ØØØØ
YOUR PLAY IS :3
MY PLAY = 4.ØØØØ NEW GOAL =   39.ØØØØ
YOUR PLAY IS :2
MY PLAY = 2.ØØØØ NEW GOAL =   35.ØØØØ
YOUR PLAY IS :4
MY PLAY = 2.ØØØØ NEW GOAL =   29.ØØØØ
YOUR PLAY IS :4
MY PLAY = 2.0000 NEW GOAL =   23.ØØØØ
YOUR PLAY IS :4
MY PLAY = 3.ØØØØ NEW GOAL =   16.ØØØØ
YOUR PLAY IS :3
MY PLAY = 1.ØØØØ NEW GOAL =   12.ØØØØ
YOUR PLAY IS :5
MY PLAY = 1.ØØØØ NEW GOAL =   6.ØØØØ
YOUR PLAY IS :5
CONGRATULATIONS. YOU WIN.

NEW GAME
GOAL = 99.0000 PLAY LIMIT =   11.0000 YOUR PLAY IS :2
MY PLAY = 1.0000 NEW GOAL =   96.0000
YOUR PLAY IS :11
MY PLAY = 8.0000 NEW GOAL =   77.0000
YOUR PLAY IS :4
MY PLAY = 7.0000 NEW GOAL =   66.0000
YOUR PLAY IS :5
MY PLAY = 6.0000 NEW GOAL =   55.0000
YOUR PLAY IS :8
MY PLAY = 10.0000 NEW GOAL =   37.0000
YOUR PLAY IS :2
MY PLAY = 10.0000 NEW GOAL =   25.0000
YOUR PLAY IS :6
MY PLAY = 6.0000 NEW GOAL =   13.0000
YOUR PLAY IS :8
MY PLAY = 4.0000 NEW GOAL =   1.0000
SORRY, YOU HAVE JUST LOST.
NEW GAME.
GOAL = 42.0000 PLAY LIMIT =   11.0000 YOUR PLAY IS :?01.00 @   01.25
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Ø1.Ø5  T    "LET'S PLAY BATTLE OF NUMBERS",!
Ø1.1Ø  S    I = 5
Ø1.11  S    M=1ØØ;D 2;S G=I+14
Ø1.15  S    M = 1Ø;  D 2; S PL = I+3
Ø1.2Ø  T    "GOAL ",G," PLAY-LIMIT ",PL
Ø1.25  A    "YOUR PLAY IS "  P; I (P) 1.26,1.26,1.27
Ø1.26  T    "PLEASE MAKE A LEGAL PLAY.",!;G 1.25
Ø1.27  I    (P-PL)1.29,1.29,1.28
Ø1.28  G    1.26
Ø1.29  S    G=G-P; I (G-1) 1.31,1.35,1.41
Ø1.31  T    "SORRY, YOU HAVE JUST LOST.",!,"NEW GAME.",!;G 1.11
Ø1.35  T    "CONGRATULATIONS.  YOU WIN.",!,"NEW GAME.",!;G 1.11
Ø1.41  S    M=(G-1)/(PL+1); I (M-FITR(M) )1.42,1.47,1.42
Ø1.42  S    M=(G-FITR(G/(PL+1) )*(PL+1) )-1;G 1.48
Ø1.43  T    "MY PLAY ",M," NEW GOAL ",G,!
Ø1.44  I    (G-1)1.25,1.31,1.25
Ø1.47  S    M=PL;S I=FRAN( );S I=FABS(I);D 2;S G=G-I;S M=I;G 1.43
Ø1.48  I    (M+1) 1.5Ø,1.49,1.5Ø
Ø1.49  S    M=PL;
Ø1.5Ø  S    G=G-M;G 1.43


Ø2.Ø1  S    J=I;S I=FABS(FSIN(I) )+1;S I=I*1ØØ;
Ø2.Ø2  S    I=FITR(I); S I=I-FITR(I/M)*M+1
Ø2.Ø3  I    (J-1)Ø2.Ø5,Ø2.Ø4,Ø2.Ø5
Ø2.Ø4  S    I=I+FABS(J);G 2.2
Ø2.Ø5  RETURN
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