CS 201R
Fall 2016
Program 6 - Recursion
Due date: Sunday November 27 by 11:59PM

For this program you'll write a program that uses a recursive function to carry out a depth-first search.

This program plays a simple token-taking game. The rules are simple:

1. You start the game with exactly 13 tokens.
2. On each turn, you may do one of two things:
    a. You may ask for exactly 25 more tokens; or,
    b. IF the number of tokens you have is an even number, you may give back exactly half of the tokens you have.
3. The object of the game is to reach exactly *K* tokens within *N* turns, where *K* and *N* are specified at the start of each game.

Think about this problem recursively; if the goal is to reach, say, 34 tokens within 10 turns, and I begin with 13 tokens and choose to take 25 more, then I have 38 tokens and 9 turns left. *Your program must be recursive to get full credit.*

Your program should ask the user for the goal number of tokens, and the number of turns allowed. It should then carry out a depth-first search and either report to the user that the total cannot be reached within the desired number of turns, or the exact sequence of moves for doing so, in order from the start state .There may be more than 1 path from the starting state to the winning state; you do not need to find them all, count them all, or find the shortest one, only find a valid path within the specified number of turns if one exists.

<u>Output Sample:</u>

```
Enter the number of tokens you want to reach:
34
What is the number of turns:
10
Searching for a solution within 10 moves....
Found solution, with 1 moves left.
By adding 25, you get 34 tokens.
Reducing by half, you get 9 tokens.
Reducing by half, you get 18 tokens.
By adding 25, you get 36 tokens.
Reducing by half, you get 11 tokens.
Reducing by half, you get 22 tokens.
By adding 25, you get 44 tokens.
Reducing by half, you get 19 tokens.
By adding 25, you get 38 tokens.

Would you like to try again [Y/N]?y
```

```
Enter the number of tokens you want to reach:
69
What is the number of turns:
10
Searching for a solution within 10 moves....
No solution found within 10 moves. Sorry.


Would you like to try again [Y/N]?n
Press any key to continue . . .
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