

**Due:**

**Sunday**

**April 23**

**Assignment**

**6**

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**Tablets Stock Game**

For this program, you'll write a program that uses a recursive function.

Tablets Stock Game is played as follows:

* You start the game with N Tablets, 0 < N <= 10,000.
* You may ask for or give back Tablets according to these rules:

◦ If the number of Tablets you have is an odd number, increment the number of Tablets by 1 and then you can turn in (remove) exactly half the Tablets you have.

◦ If the number of Tablets you have is a multiple of 3, you can ask for (receive) third as many Tablets as you currently have.

◦ You can always ask for (receive) exactly 24 Tablets.

* There is no priority among the rules; you may choose any rule that applies in a given situation.
* The number of Tablets you hold must always be greater than 0 and can never be more than 10,000.
* The object of the game is to end with exactly 18 Tablets in no more than 21 moves.

Your program will ask the user for the starting number of Tablets, and then use a *recursive* function to search for a solution. *Your program must use recursion to receive full credit.*

Output for each case is either a statement that no solution within 21 moves exists (determined after exhaustive search) or a listing of what choices is necessary to end with exactly 18. Because you're using a recursive function, it may be simpler to list it from the last step going backwards towards the beginning; that's fine.

Allow the user to enter multiple values for N. If the user enters values out of range, prompt for re- entry. Ask the user after each case whether to continue.

You will find that this program requires much less code than previous assignments; however, working out what that code should do may be more challenging. *Think carefully about your algorithm.* You need not find the shortest path to victory, only a valid one if any exist.

**Sample output:**

How many Tablets are you starting with? 0

Number of Tablets must be greater than 0 and no more than 10000 How many Tablets are you starting with? 120000

Number of Tablets must be greater than 0 and no more than 10000

How many Tablets are you starting with? 34

Searching for a solution within 21 moves....

No solution found within 21 moves. Sorry.

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

How many Tablets are you starting with? 21

Searching for a solution within 21 moves....

Found solution. I have exactly 18 Tablets, with 16 moves left. With 54, divide by 3 to get 18.

With 30, add 24 to get 54.

With 6, add 24 to get 30.

After incrementing, Reduce 12 by half to get 6.

After incrementing, Reduce 22 by half to get 11. Would you like to try again [Y/N]? y



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How many Tablets are you starting with? 9

Searching for a solution within 21 moves....

Found solution. I have exactly 18 Tablets, with 17 moves left. With 54, divide by 3 to get 18.

With 30, add 24 to get 54.

With 6, add 24 to get 30.

After incrementing, Reduce 10 by half to get 5. Would you like to try again [Y/N]? n

Press any key to continue . . .