CS2600 Homework 1

Be sure to read this document carefully. You are responsible to read and understand all of these instructions. If you have questions, be sure to ask, either in class, by email, or at office hours.

Description

You will write a program that plays the game *Nim*. Note that there are many variations of this game, the version we use here is one of the simplest forms.

The game is played with one pile of marbles, starting with between 10 and 100 marbles. Two players take turns removing marbles from the pile, and whichever player takes the last marble loses. Each player must take at least one marble and at most half of the marbles. *Note: on the last turn, there will be one marble in the pile: the loser has to take this marble, even though this is more than half of the marbles!*

Your program should do the following:

1. Pick a number between 10 and 100. This value should be placed in the variable *count*.
2. Inform the player of the number of marbles, *count*.
3. Determine the largest value the user can take, which is half of *count* (or 1 at the end of the game.
4. Prompt the user to enter a value between 1 and the limit determined in step 3.
5. Check the user's input to make sure the value is in range. If not, complain to the user and get a new value.
6. Subtract the value from count.
7. Determine the number of marbles to be taken by the program. Print this value for the user, then subtract this number from count.
8. Go back to step 2, unless either the program or the user wins.

Make sure that you have a comment line at the top of the file giving your name.

Extra credit opportunity

You can earn some extra credit in one of two ways:

1. Rather than having just 1 pile, make your game with 3 piles of marbles (each pile has its own starting count from 10 to 100). When the player (and computer) take a turn, first ask which pile, then ask the number of marbles to take.
2. Research on the web for winning strategies for *Nim*. Code one of these strategies into your program. (Note that this can be pretty tricky…) If you are attempting this option, be sure to describe in comments the algorithm you are using.

Collaboration vs Cheating

Recall that Cal Poly's Academic Integrity policy states that all homework should be your own work. You should not turn in someone else's work with your name on it. Since this is ***not*** a group project, you ***cannot*** work on the assignment together, turning in joint work.

However, for this homework, I will allow the following: If you get stuck following the instructions in the book, you may ask fellow students to 'look over your shoulder' to see what you are doing wrong. You can do a screen share with them, asking them to help look for a typo or some other mistake you may have made. You are free to discuss what you are working on. *But, all the typing must be your own. You cannot have other students contribute sections of your code, and you cannot type verbatim what they have written.* I reserve the right to ask you to explain any section of your code, or to recreate a portion of your code.

Grading

This homework is worth 6 points (6% of your grade for the course). Your score will be computed as follows:

- **2 points:** Your code correctly compiles, so that you have a runnable executable.
- **1 point:** Your code includes comments that explain the operation of your code.
- **3 points:** You have followed *all of the instructions* in the *Description* section.
- **2 points:** Completing either of the two extra credit options. *Note: If you do both options, great! But you will only get the +2 once!*
- **-∞ points:** Cheating
- **Transfer of points:** If you do not have your name in a comment near the start of the *.c* file, I won't know who to give the points to, so your points might be given to someone else.

Turning In Homework

You will submit your homework to Blackboard. Your code should just be one single *.c* file. Attach this file to your response in Blackboard. *Note: Be sure to write your name in a comment at the start of the .c file. Otherwise, the points might go to someone else!*

Due Date

The homework is due on **Feb 11**, by the end of the day.