Assignment 1 – LRC Report Template

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CSE 13S – Winter 24

Purpose

Audience for this section: Pretend that you are working in industry, and write this paragraph for your boss. You are answering the basic question, “What does this thing do?”. This section can be short. A single paragraph is okay.

Do not just copy the assignment PDF to complete this section, use your own words.

In this game, players decide the number of players, then in a circle and roll a dice. Each player starts with three chips and rolls a die for each chip, up to three dice per turn. The dice results determine what the player does:
- Rolling 1, 2, or 3 (a "dot") lets the player keep one chip.
- Rolling 4 ("left") means passing one chip to the left.
- Rolling 5 ("center") involves placing one chip in the pot.
- Rolling 6 ("right") leads to passing one chip to the right.

The game keeps going until only one person has chips. If a player runs out of chips, they stay in the game but can start rolling again if a neighbor passes them a chip.

Questions

Please answer the following questions before you start coding. They will help guide you through the assign ment. To make the grader’s life easier, please do not remove the questions, and simply put your answers below the text of each question.

Randomness

Describe what makes randomness. Is it possible for anything to be truly random? Why are we using pseudorandom numbers in this assignment?

Randomness is something that is unpredictable or does not have a clear pattern. It is almost impossible to be truly random. Computer’s can not be completely random. Pseudorandom numbers are the closest computers can get to random, hence why we are using them for our random numbers.

What is an abstraction

When writing code, programmers often use ”abstractions”. Define an abstraction in non computer science terms (Don’t google it!)

An abstraction is focused on main and important aspects of something, ignoring minor details

that may come up later.

Why?

The last assignment was focussed on debugging. How can abstractions make debugging easier? What other uses are there for abstractions? Hint: Do you have to be the one to write the abstraction?

Abstractions make debugging easier, because they tell you what the program is supposed to do. It gives you the main functions of the program so you know what needs to be done for the program to properly function.

Functions

When you write this assignment, you can chose to write functions. While functions might make the program longer, they can also make the program simpler to understand and debug. How can we write the code to use 2 functions along with the main? How can we use 8 functions? Contrast these two implementations along with using no functions. Which will be easier for you? When you write the Program design section, think about your response to this section.

To program this with two functions, one function controls the rolls and the other keeps track of the players and the chips. To program this with eight function you make one function for each type of roll, one to keep track of random seed, one to keep track of players chips, one that tracks how many turns each player has left, and one to loop through all of the functions and actually run the game. To make this with no functions you would create a while loop with lots of if statements that track players, chips, rolls, and turns. I believe it will be easier to make this program with eight functions rather than two or zero because it will be easier to code if all of the functions are separate through copying and pasting all of the rolls. It will also be easier to identify bugs in the individual functions if they are all separated.

Testing

The last assignment was focused on testing. For this assignment, what sorts of things do you want to test? How can you make your tests comprehensive? Give a few examples of inputs that you will test.

I would want to test to make sure that the players enter a valid number of players and a valid random seed. I can test that the inputed number of players is between 3 and 10. I can test that the seed entered is made up of only numbers by adding it to another number and checking the result.

Putting it all together

The questions above included things about randomness, abstractions and testing. How does using a pseu dorandom number generator and abstractions make your code easier to test?

The random number generator makes the code easier to test because you can set a seed code and keep it the same for all tests to make sure all parts of the code are properly running by generating the same number every time. Abstractions help with testing because it keeps all of the components separated so you can isolate and test different components of the code individually.

How to Use the Program

Audience: Write this section for the user of your program. You are answering the basic question, “How do I use this thing?”. Don’t copy the assignment exactly; explain this in your own words. This section will be longer for a more complicated program and shorter for a less complicated program. You should show how to compile and run your program. You should also describe any optional flags that your program uses, and what they do.

To show “code font” text within a paragraph, you can use \lstinline{}, which will look like this: text. For a code block, use \begin{lstlisting} and \end{lstlisting}, which will look like this:

```
Here is some code in lstlisting.
```

And if you want a box around the code text, then use \begin{lstlisting}[frame=single] and \end{ lstlisting}

which will look like this:

```
Here is some framed code (lstlisting) text.
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Want to make a footnote? Here’s how.[1]

Do you need to cite a reference? You do that by putting the reference in the file bibtex.bib, and then you cite your reference like this[1][2][3].

In order to compile and run our code we need to use clang on our file.

clang -o lrc.c lrc

Then we run the lrc program

./lrc

Then the program will ask you to enter the number of player and then a random seed. After this the code should run and output a winner.

Program Design

Audience: Write this section for someone who will maintain your program. In industry you maintain your own programs, and so your audience could be future you! List the main data structures and the main algorithms. You are answering the basic question, “How is this thing organized so that I can have a chance of fixing it?”. This section will be longer for a more complicated program and shorter for a less complicated program.

Pseudocode

Give the reader a top down description of your code! How will you break it down? What features will your code have?

My code will have an indviuall function for each type of dice roll that will change the players chip counts. I will write a function that keeps track of the number of chips each player has and another that tracks how many turns each player has. Along with two more functions one that keeps track of the random seed and another that loops through all of the functions and actually makes the game run. This will first check if the current player has chips then roll the dice then do the proper exchange of chips. This will keep cycling through until there is only player remaining with chips.

Function Descriptions

For each function in your program, you will need to explain your thought process. This means doing the following

- The inputs of every function (even if it's not a parameter)
- The outputs of every function (even if it's not the return value)
- The purpose of each function, a brief description about a sentence long.
- For more complicated functions, include pseudocode that describes how the function works
- For more complicated functions, also include a description of your decision making process; why you chose to use any data structures or control flows that you did.

Do not simply use your code to describe this. This section should be readable to a person with little to no code knowledge.

The functions for the dice roll will take the random seed and output a random number that corresponds to that seed. Then the main function will take this random number and run the corresponding function for the number rolled. The function for the various types of rolls will output updated player chip counts. The function for keeping track of the player's chip count will then take this input and update the player chip count. The last function will make sure no players have more than three turns and that players no longer have turns when the run out of chips.

[1]This is my footnote.

References

[1] Wikipedia contributors. C (programming language) — Wikipedia, the free encyclopedia. https://en.wikipedia.org/wiki/C (programming language), 2023. [Online; accessed 20-April-2023].

[2] Robert Mecklenburg. *Managing Projects with GNU Make, 3rd ed.* O'Reilly, Cambridge, Mass., 2005.

[3] Walter R. Tschinkel. Just scoring points. *The Chronicle of Higher Education*, 53(32):B13, 200