Assignment 1 – LRC Report Template

Your Name

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.

This program simulates the dice game "Left, Right, and Center". The game is fairly simple. The user first specifies the amount of players it wants. Each player starts with 3 chips and then rolls one die for each chip they have up to 3.

If a 1,2, or 3 is rolled nothing happens.

If a 4 is rolled, the player must pass a chip to the person clockwise from himself.

If a 5 is rolled, the player must pass a chip to the center where it forever leaves circulation.

If a 6 is rolled, the player must pass a chip to the person counterclockwise from himself.

The game continues until only one player has any number of chips, and that player is then considered the winner.

Questions

Please answer the following questions before you start coding. They will help guide you through the assignment. 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?

Unpredictability is what makes randomness. It is possible for something to be truly random. As long as it isn't exhibiting any patterns, it can be considered random even if it is being produced by an algorithm. We are using pseudo random numbers to simulate the randomness nature of dice that the game we are trying to create uses.

What is an abstraction

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

Abstraction is when you get an idea and you break it down into its characteristics.

Why?

The last assignment was focused 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 allow you to consider a program in terms of a checklist of requirements that need to be fulfilled. You can then go through each checklist and think up of what might go wrong, and write test

code to ensure that those errors do not occur. Abstractions also helps make a program more digestible to understand, which in turn makes it easier to work out how to best program it.

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.

If we were to implement 2 functions, we could have one function govern how an entire turn for a player will play out. This will include getting the die rolls and updating everyone's chip count accordingly. Another function would check if there is a winner after the aforementioned function is finished running. It would check if only 1 player has chips remaining and if so, stop the program and determine a winner.

If we were to have 8 functions, we could expand upon the first function mentioned by adding in more functions for each specific action 1. Generate a die roll 2. Transfer a chip from one player to another 3. remove a chip from a player 4. Determine the number of times the player must roll 5. Assign each die roll to an action 6. Assigns each player to a name in the names file 7.Checks if a player has any chips, if not they don't get a turn 8. Check after every turn to see if there is a winner

Having no functions would mean that our code would all be in one place, which would make it harder to read and digest.

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.

1. Make sure that pseudorandomness output is constrained to outputs 1-6 2. Make sure an error is output is a value that isnt in range of 3-10 is inputted when prompted to input the number of players 3. Make sure that a valid seed is inputted, and to default to seet 4823 if an invalid seed is inputted

Putting it all together

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

Abstractions breaks down key components of our code into individual parts. To test, we can simply use tests to compare each part's functionality by its expected output given a certain input. Using a pseudorandom number generator allows us to examine the seed being used and compare it to our output to ensure that our program is being random in the way that we want it to be.

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.
```

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].

You will first be prompted to input the number of players that you want in this game. The number of players should be 3-10, otherwise an error will be thrown out. Afterwards you will be prompted to enter a seed for the game. Please enter a valid seed, otherwise it will be defaulted to seed 4823. Afterwards, the program will run itself and you will have your 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? How will you

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.

My code will consist of 2 functions:

doTurn(): Simulate a turn on the turn player

checkWinner(): Runs everytime a turn is completed.

doTurn() will simulate an entire turn, and checkWinner() will determine if there is a winner. The first function will check if there are any chips in the turn player's possession, roll the appropriate amount of die, and distribute chips accordingly from the results. The 2nd function will check if only one player has chips. If so, designate that person as the winner and stop the game.

[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, 2007.