

605.201 MINI PROJECT #1

Program Design And Analysis

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General Program Design

The overall program is controlled by a while loop with termination upon either contender reaches or passes the last position of the horizontal course (i.e. position 50). At each iteration, a random number is generated, and then each contender's movement is decided based on this random number. After that, several switch statements match the random number to each contender's movement type and distance which eventually lead to the calculation of the position after the change. At the end of each iteration, the horizontal race course are printed using for loop and the tracked position of contenders are shown whenever its calculated position matches with the loop counter.

Methods are used throughout the program to help make the code clean and easy to follow. For example, `contenderMove()` and `contenderMoveType()` methods contain switch statements with detailed cases and then return corresponding movement steps and types respectively based on random number generated and contender type. In addition, `printDescription()` method is used to display contenders' tracking records including movement types, movement distance, and calculated final positions at each iteration.

One thing I would like to mention is the use of different Math class functions in the program which helps ease the overall structure. Firstly, it helps generate random number with `Math.random()` for deciding movements. Furthermore, `Math.max ()` is used to make sure positions wouldn't drop below 1. Other than that, `Math.max()` function also helps to get the maximum of course length 50 and contender position. This is used to set loop upper bound which makes sure contender position is printed when it is beyond position 50 (i.e. need to loop more than 50 to print the position).

Alternative Approaches

Regarding the overall program design, I've also considered using array to store and display the data. To be more specific, the array contains blank space, letter "T" , and letter "H", each

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position change would result in change in index of the letter, and then at the end of each loop I can print the whole array to display the information instead of looping through 50 positions in the horizontal course. However, this is rejected because I feel it's making the solution too complicated when you have to erase the "letter" in the old position and then add it to the new position in the array. Compared to the loop, this approach doubles the efforts with no significant benefits.

While I'm using switch statement to match the number generated to movement, I've also thought about utilizing if statement. There isn't a huge difference from one to the other but I personally prefer switch statement as it is easier to read and follow in this case. On the other hand, I also try to use switch statement to print the letter in the loop when position matches the loop count. However, position is a variable and switch statement case has to be constant so if statement is the only choice here.

Conclusion

By doing this project, I learnt the importance of planning and designing the overall structure at the early stage of a project. To be specific, I started writing the program from a really small fragment that prints the race course and letters of the contenders and then expanded to the overall program. After that, several issues arose, one was the code block getting too big so I had to re-slice part of them into separate methods to make the code easy to read and follow. Another one was I found some cases I didn't include in the logic rule I wrote earlier such as the position should always be higher than 1 and special case when both contenders land on the same square. Last but not the least, during the test phase, I figured the upper bound of 50 could cause program fail to display contender position at the very end when it passes 50. To fix that, I adjusted the upper bound of the for loop to either 50 or the furthest point reached by contenders. Thus, although the program was finished, there were a lot of extra efforts and adjustments required throughout the project development. In conclusion, if I could start this project from scratch again, I would definitely spend more time to plan the overall structure with detailed arrangement of methods and design a flowchart before the actual production.