CSE 321 Software Quality Assurance and Testing

Final Project – 100 Points

Spring 2022

Assigned: 4/11/2022

Due: 5/11/2022

Project Description:

This is a group project focused around developing a small mobile program, either Apple or Android, and implementing the major Software Testing criterions we discussed during the lectures. Specifically, you will be forming groups of size 3-4 to create and test a mobile Yahtzee game. If you are not familiar with the game of Yahtzee, the link to the official rule set is listed below.

https://www.hasbro.com/common/instruct/yahtzee.pdf

Project Instructions:

You may choose any language for programming the mobile Yahtzee game as the testing techniques are language independent. For the sake of brevity, you will only be applying the software testing techniques to the finished code rather than any specification documents. Specifically, you will be utilizing Input Space Partitioning (ISP), Graph Coverage, and Logic Coverage. Note that we will not be utilizing Syntactic coverage as it is done through automated means and is not practically time efficient for this project. These tests will be formulated into a comprehensive testing plan that describes how your team approached testing the software as well as the actual tests and their results. Furthermore, during your testing, your team is required to keep track of a defect log which records all faults that occurred during development and how you fixed them. For explicit project requirements to follow, see the information below.

Before your team begins developing the program and testing it, you must create a short document that details each member's expected contributions to the project. This can be altered as long as the team notes the alteration and reason for alteration in the document. During the development phase, you have artistic liberty for how the finished product will look as long as it remains a playable game of Yahtzee on a mobile phone while following the listed requirements. After your team has completed the software and tested it using the chosen techniques, each member of the team must individually write a one-page document about what you learned. This can range from learning specific mobile development, ways you figured out to apply the software testing techniques, or anything else you deem worthy as takeaways from this project.

Finally, when your team has completed the project, your last task is to create a 10-minute presentation. This presentation should showcase your final mobile application, what testing techniques your team chose and how you implemented them, what notable faults you found, and what the team learned as a whole from this project.

Project Requirements:

1. The mobile application shall follow the rules of Yahtzee.
    a. The game lasts 13 rounds of rolling and scoring.

b. At the end of the 13th roll, all the boxes which can be scored in must be filled. That is, if the user chose to have only 10 of the 13 boxes scored, then the last three will be defaulted with a 0.
c. For the upper section, if the user has any 1's in the roll, they can add the total of the 1's to the Aces column.
d. For the upper section, if the user has any 2's in the roll, they can add the total of the 2's to the Twos column.
e. For the upper section, if the user has any 3's in the roll, they can add the total of the 3's to the Threes column.
f. For the upper section, if the user has any 4's in the roll, they can add the total of the 4's to the Fours column.
g. For the upper section, if the user has any 5's in the roll, they can add the total of the 5's to the Fives column.
h. For the upper section, if the user has any 6's in the roll, they can add the total of the 6's to the Sixes column.
i. If the user has over 63 points in the upper section, then they receive a bonus of 35 points.
j. For the lower section, if the user has a 3 of a kind, they will add the total of all 5 dice to the box.
k. For the lower section, if the user has a 4 of a kind, they will add the total of all 5 dice to the box.
l. For the lower section, if the user has a full house (a three of a kind and a pair), they will add 25 to the box.
m. For the lower section, if the user has a small straight (four consecutive faces (1, 2, 3, 4, X) where X can be any value), they will add 30 to the box.
n. For the lower section, if the user has a large straight (five consecutive faces (1, 2, 3, 4, 5)), they will add 40 to the box.
o. For the lower section, if the user has a Yahtzee (a five of a kind), they will add 50 to the box.
p. For the lower section, if the user chooses to use the chance box, they will sum the 5 dice add the score to the box.
q. For the lower section, if the user scored a Yahtzee previously, they will receive a 100 point bonus per Yahtzee scored.
r. At the end of the game, add the score from the upper section into the total box for upper section.
s. At the end of the game, add the score from the lower section into the total box for lower section.
t. At the end of the game, add the two total boxes together for the grand total of the game, and the game finishes.

2. The program shall only accommodate one player (single player game).
3. The program shall display the possibilities of scoring for each roll. That is, if the roll has 3 possible options for scoring, the program shall notify the user before the user does the scoring phase.
4. Your team must apply ISP to assist in choosing testing values for the Graph and Logic Coverage.
5. Your team must create a 10-minute presentation that showcases your Yahtzee mobile application along with your testing plan, results, and defects found.
6. Each team member individually must write one page on "What I Learned" about creating the program and applying the various software testing techniques to increase the software quality by assisting in finding and fixing faults.
7. Finally, the team must agree upon what each member will do and record it in a document. It can be altered, but note what the changes were and why they were made if alteration to the document is done.

Coverage Criteria Specifics:

Input Space Partitioning: You must implement Pair-Wise Coverage.

Graph Coverage: You must draw Control Flow Graphs and annotate them with Data Flow information. Perform Edge-Pair Coverage and All-Du-Path-Coverage of every method.

Logic Coverage: You must find and extract every predicate of the program and perform Predicate Coverage if only one clause or Correlated Active Clause Coverage if two or more clauses.

Important Participation Note:

There will be a survey available which allows you to detail any concerns of a team member not contributing to the project. I do hope there will not be any submissions of this survey. But it will be there if needed and grading will be affected by fair and proved concerns.

Submission Instructions:

After your group has completed the project, submit your project **(your code, presentation file, testing plan with results as a pdf, defect log as a pdf, all team member's "What I Learned" pdf files, and the team member contribution document as a pdf**) to the corresponding Canvas Final Project folder as a zip file.

Rubric:

Task	Grade
Finished implementation of Yahtzee on a mobile app with code	20
Team expected contribution document	5
Testing plan showing the implementation of ISP	10
Testing plan showing the implementation of first testing technique (Graph, Logic, or Syntactic)	20
Testing plan showing the implementation of second testing technique (Graph, Logic, or Syntactic)	20
Completed defect log	5
Presentation	10
Individual "What I Learned" document	10
Total	**100**