**Space Race Test Plan**

* Play a multi-player game of Space Race
  + *Step 1*: Start a new game
    - Display GUI
    - Ask how many players there are
    - Get player names
    - Set up scorecards
  + *Step 2*: Roll a hand
    - Roll all dice
    - Determine if re-rolls are available
    - Ask user what dice to keep
    - Reroll the dice not kept
    - Determine how to proceed
      * Determine if all dice have been kept
      * Determine if all the rolls have been used
  + *Step 3*: Score a hand in build phase
    - Determine what the user can build
    - Prompt the user to build what they can
    - Record what they choose to the scorecard
  + *Step 4*: Display a build phase scorecard
    - Show the user what they’ve built
    - Display the distance they can fly
  + *Step 5*: Playing during space phase
    - Prompt user to choose how fast to proceed
    - Determine what the user chose and respond accordingly
  + *Step 6:* Finish a game
    - Determine if all players have played all turns through space
    - Determine who flew the furthest
    - Display the overall winner
    - Record the high score to a file
    - Ask the user if they’d like to play again
    - Play again if applicable

*Starting a new game:*

When starting a new game, the first thing that needs to be done is displaying all the options for gameplay to the user via GUI components. Next, the player(s) will be prompted to answer how many players there are and to enter a name for each player. Finally, a scorecard will be set up by designating a section for each player and his/her name along with a designated score.

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| Requirement ID: | Requirement: | Verified By: |
| 1.0 | Starting a new game and display GUI | Test Case 1, step A |
| 1.1 | Ask how many players there are and get player names | Test Case 1, step B |
| 1.2 | Set up players | Test Case 1, step C |

*Rolling a hand:*

When rolling a hand, each player takes turns rolling all dice (6 in total). Each dice corresponds to a resource: fuel, hull parts, electronics, glass, crew members, and chance. After each roll, a player may choose which die or resource to keep and which die or resource to reroll. After the player either chooses to keep a desired roll for each resource or reaches the maximum of three rerolls, the player enters the build phase.

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| Requirement ID: | Requirement: | Verified By: |
| 2.0 | Roll all dice | Test Case 1, step D |
| 2.1 | Determine if re-rolls are available | Test Case 1, step E |
| 2.2 | Ask user what dice to keep | Test Case 1, step E |
| 2.3 | Reroll the dice not kept | Test Case 1, step E |
| 2.4 | Determine how to proceed:  Determine if all dice have been kept | Test Case 1, step E, F |
| 2.5 | Determine how to proceed:  Determine if all the rolls have been used | Test Case 1, step E, F |

*Scoring a hand in build phase:*

When scoring a hand in the build phase, ship parts are built dependent on the resources in the previous stage. The build phase will prompt the user of what they can potentially build. Each ship part constructed will be recorded on the scorecard. Additionally, based upon the ship parts each player has, a calculation will be made for how far they can potentially travel into space.

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| Requirement ID: | Requirement: | Verified By: |
| 3.0 | Determine what the user can build | Test Case 2, step B |
| 3.1 | Prompt the user to build what they can | Test Case 2, step B |
| 3.2 | Record what they choose to the scoreboard | Test Case 2, step B  Test Case 1, step F,G |

*Displaying a build phase scorecard:*

When displaying the scorecard, each player will be presented with the ship parts they constructed and the ambiguous distance (LOW, MED, HIGH) they can travel.

Cockpit: Hull Parts + Electronics + Glass + Crew Members -Fuel Reserves:

Hull Parts + Electronics + Fuel + Fuel

Thrusters: Hull Parts + Electronics + Fuel

Add Fuel: Fuel + Fuel + Fuel

Add Crew: Crew Members + Crew Members + Crew Members

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| Requirement ID: | Requirement: | Verified By: |
| 4.0 | Show the user what they've built | Test Case 2, B |
| 4.1 | Display the distance they can fly | Test Case 2, B |

*Playing during space phase:*

During the space phase, each player will take turns and be prompted a message of how fast they wish to travel. Dependent upon what each player chooses, certain events will occur.

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| Requirement ID: | Requirement: | Verified By: |
| 5.0 | Prompt user to choose how fast to proceed | Test Case 3, C |
| 5.1 | Determine what the user chose and respond accordingly | Test Case 3, D |

*Finishing a game:*

When finishing a game, each player's fuel must be completely depleted. Then, whoever traveled the furthest into space will be the winner. The game will calculate each player's distance and every player's name and corresponding score will be displayed to the player(s). The player and their overall distance will be recorded into a High Scores file. The game will then prompt the player(s) to decide whether or not to play again.

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| Requirement ID: | Requirement: | Verified By: |
| 6.0 | Determine if all players have played all turns through space | Test Case 3, G |
| 6.1 | Determine who flew the furthest | Test Case 4, B |
| 6.2 | Display the overall winner | Test Case 4, C |
| 6.3 | Record the high score to a file | Test Case 4, D |
| 6.4 | Ask the user if they'd like to play again  And play again if applicable | Test Case 1, N,O |

Test Case 1: Play a game

Test Case 2: Build phase

Test Case 3: Space phase

Test Case 4: Finish game

Test case 1:

1. Start the game
2. Enter any number of players, at least 2
3. Verify that you see player one’s build phase board
4. Verify the player has a full hand
5. Play until prompted to build a rocket part
6. Pick a rocket part, and play as normal
7. Keep playing and building parts for each player until the build phase ends
8. Verify each person has used all their turns
9. Enter the space phase
10. Play space phase for each player
11. Verify each player has run out of fuel before their turn is over
12. Verify that the scoreboard is showing the player with the most advanced rocket is furthest on the scoreboard
13. Verify the scoreboard file has been updated to include the current leader
14. When prompted play again however you like
15. Once you finish the second game, end when asked to play again

Test case 2:

1. Enter build phase
2. When playing build phase, make sure each new part is added to the scoreboard.
3. Attempt to build a part that has already be constructed
4. Attempt to complete build phase with an uncomplete rocket, only keep fuel and crew members
5. Verify you have a distance of 0 when entering space phase

Test case 3:

1. Enter space phase
2. Verify every player at this stage has a complete rocket
3. Play through one player’s turn
4. Verify the player’s icon moves on the scoreboard
5. Verify the player’s icon stays put while others play
6. When done with space phase, verify the scoreboard file has been updated
7. Verify all users have finished turns

Test case 4:

1. Complete the game.
2. Verify the final scoreboard displays the rocket that flew the furthest as the winner
3. Verify all rockets are sorted according to distance, furthest on top of the scoreboard.
4. When exiting, make sure the scoreboard file has been updated with the new score and only the highest score from the current game.