

<ExceedsExpectations4.0>

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## Missile Launch:

1. Test Case: Initiate Missile Launch with Right Mouse Button
  - Pre-Condition: No active missiles on the screen.
  - Action: Click the right mouse button.
  - Post-Condition: One missile is launched from the center of the bottom of the screen, moving vertically straight up. The total active missile count increases by one.
2. Test Case: Initiate Missile Launch with Space Bar
  - Pre-Condition: No active missiles on the screen.
  - Action: Press the space bar key.
  - Post-Condition: One missile is launched from the center of the bottom of the screen, moving vertically straight up. The total active missile count increases by one.
3. Test Case: Limit Active Missiles
  - Pre-Condition: Four active missiles on the screen.
  - Action: Click the right mouse button twice.
  - Post-Condition: Five missiles are active on the screen, and the sixth click does not result in a new missile launch.
4. Test Case: Remove Missile if Off-Screen
  - Pre-Condition: Active missile on the screen.
  - Action: Wait for the missile to go off the screen.
  - Post-Condition: The missile is removed from being active.
5. Test Case: Constant Missile Speed
  - Pre-Condition: Active missiles on the screen.
  - Action: Launch multiple missiles.
  - Post-Condition: All missiles maintain the same constant speed and disappear at the same rate they were launched.

## Missile Hit:

6. Test Case: Missile Hit/miss a combined test
  - Pre-Condition: active ships on screen
  - Action: fire 2 missiles, one on an intercept with the ship and one on miss trajectory

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- Post-Condition: for the hit: An explosion is displayed at the point of impact, and both the missile and ship are removed. The hit count increases by one. For miss: the missile is remove at screen bounds

## Ship Launch:

### 7. Combined Ship Spawn case

- Pre-condition: No active ships on screen.
- Action: The program spawns a ship and displays the model to the screen.
- Post-condition: the ship object is created, and the image is displayed over the object.

### 8. Test Case: Random Ship Launch Rate

- Pre-Condition: Continuous monitoring of ship launches.
- Action: Observe ship launches over time.
- Post-Condition: Ship launches occur randomly, with approximately 30% of the launches.

### 9. Test Case: Limit Active Ships

- Pre-Condition: generate nine active ships on the screen.
- Action: force another ship to launch twice.
- Post-Condition: Ten ships are active on the screen, and the eleventh launch does not result in a new ship.

### 10. Test Case: Configurable ship types

- Pre-Condition: game running.
- Action: observe ships spawned by program, and note speed based on type.
- Post-Condition: an even distribution of ship types spawning, ships of the same type exhibiting the same speed.

### 11. Test Case: Remove Ship if Off-Screen

- Pre-Condition: Active ship on the screen.
- Action: Wait for the ship to go off the screen.
- Post-Condition: The ship is removed from the active ship count.

### 12. Test Case: Ship Speed and Direction

- Pre-Condition: Active ship to be launched.
- Action: Launch ships from both sides of the screen.
- Post-Condition: Ships launched from the left move left to right, and ships launched from the right move right to left.

## Game End:

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13. Test Case: End Game on Hit Count -

- Pre-Condition: Game in progress with a hit count of 9.
- Action: Continue the game until the hit count reaches ten (10).
- Post-Condition: The game ends with a game-over message displayed.

14. Test Case: End Game on Left Mouse Button Click

- Pre-Condition: Game in progress.
- Action: Click the left mouse button.
- Post-Condition: The game ends with a game-over message displayed.

15. Test Case: End Game on Esc Button

- Pre-Condition: Game in progress.
- Action: Press the Esc button.
- Post-Condition: The game ends with a game-over message displayed.

16. Test Case: End Game on Inactivity

- Pre-Condition: Game in progress.
- Action: Wait for 5 minutes without initiating a missile launch.
- Post-Condition: The game ends due to user inactivity, displaying a game-over message.

**Combined Test Case:**

17. Test Case: Rapid Missile Launch

- Pre-Condition: No missiles are active on the screen.
- Action: Click the right mouse button six times rapidly.
- Post-Condition: Five missiles are active on the screen, and the sixth click does not result in a new missile launch.

These test cases cover a range of scenarios, including pre-conditions, actions, and post-conditions, to ensure the solution meets its requirements and behaves as expected.

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### Sources used:

ChatGPT: requirement framework generation

D2I News: requirement document

4250 Reading: testing ppt