# In Class - Test Cases

Here are some test cases to ensure that the requirements for the game are met. Each test case includes a precondition, action, and postcondition.

These test cases cover various aspects of the game's functionality and should help ensure that the requirements are met as specified. Additional test cases may be needed to address specific details of the game and ensure robust testing.

**Test Case 1: Launching Missiles with Right Mouse Button**

- Precondition: The game is running, and there are no active missiles on the screen.
- Action: Click the right mouse button.
- Postcondition: One missile is launched from the center of the bottom of the screen and becomes active. Repeat this action five times; each time, one missile is launched until there are five active missiles.

**Test Case 2: Launching Missiles with Space Bar**

- Precondition: The game is running, and there are no active missiles on the screen.
- Action: Press the space bar key.
- Postcondition: One missile is launched from the center of the bottom of the screen and becomes active. Repeat this action five times; each time, one missile is launched until there are five active missiles.

**Test Case 3: Limit on Active Missiles**

- Precondition: The game is running, and there are already five active missiles on the screen.
- Action: Click the right mouse button or space bar.
- Postcondition: No new missiles are launched, and the total count of active missiles remains at five.

**Test Case 4: Missile Off-Screen Removal**

- Precondition: The game is running, and there is an active missile on the screen.
- Action: Wait for the active missile to move off the screen.
- Postcondition: The active missile is removed from the screen.

**Test Case 5: Consistent Missile Speed and Direction**

- Precondition: The game is running, and there is an active missile on the screen.
- Action: Observe the movement of the active missile.
- Postcondition: The active missile moves at a constant speed, and in a vertical direction from the center of the bottom of the screen.

**Test Case 6: Missile Hits a Ship**

- Precondition: The game is running, and there is an active missile on the screen, as well as at least one active ship.

- Action: Direct the active missile to hit an active ship.

- Postcondition: (1) The active missile "hits" the ship, (2) an explosion is displayed at the point of impact, (3) both the missile and the ship are removed from being active, (4) and the hit count is incremented by one.

**Test Case 7: Launching Ships by the System**

- Precondition: The game is running, and there are no active ships on the screen.

- Action: Wait for the system to initiate a ship launch.

- Postcondition: A ship is launched from a random location, following the specified rules for ship initiation, and becomes active.

**Test Case 8: Ship Types and Image Display**

- Precondition: The game is running, and there is multiple active ships on the screen.

- Action: Observe the active ships.

- Postcondition: The active ships display the appropriate images based on their type.

**Test Case 9: Random Ship Launch Rate**

- Precondition: The game is running, and there are no active ships on the screen.

- Action: Wait for the system to initiate ship launches multiple times.

- Postcondition: Ships are randomly launched at a configurable rate, and the number of active ships does not exceed the specified limit.

**Test Case 10: Ship Direction and Speed**

- Precondition: The game is running, and there is an active ship on the screen.

- Action: Observe the active ship's movement.

- Postcondition: The ship's direction is correctly determined based on its launch location, and its speed is determined based on its type.

**Test Case 11: Ship Off-Screen Removal**

- Precondition: The game is running, and there is an active ship on the screen.

- Action: Wait for the active ship to move off the screen.

- Postcondition: The active ship is removed from the screen.

**Test Case 12: Game Over Conditions**

- Precondition: The game is running.

- Action: Trigger one of the game over conditions (e.g., reach 10 hits, click the left mouse button, press the escape button, or wait for 5 minutes without launching a missile).

- Postcondition: The game ends, and the appropriate end-game actions are taken, such as displaying a game over screen or returning to the main menu.

**Test Case 13: Constant Speed for All Missles**

- Precondition: The game is running.

- Action: Trigger 5 consecutive missile launches and observe their movement.

- Postcondition: All missles should move at the same constant rate of speed.

These test cases cover various aspects of the game's functionality and should help ensure that the requirements are met as specified. Additional test cases may be needed to address specific details of the game and ensure robust testing.