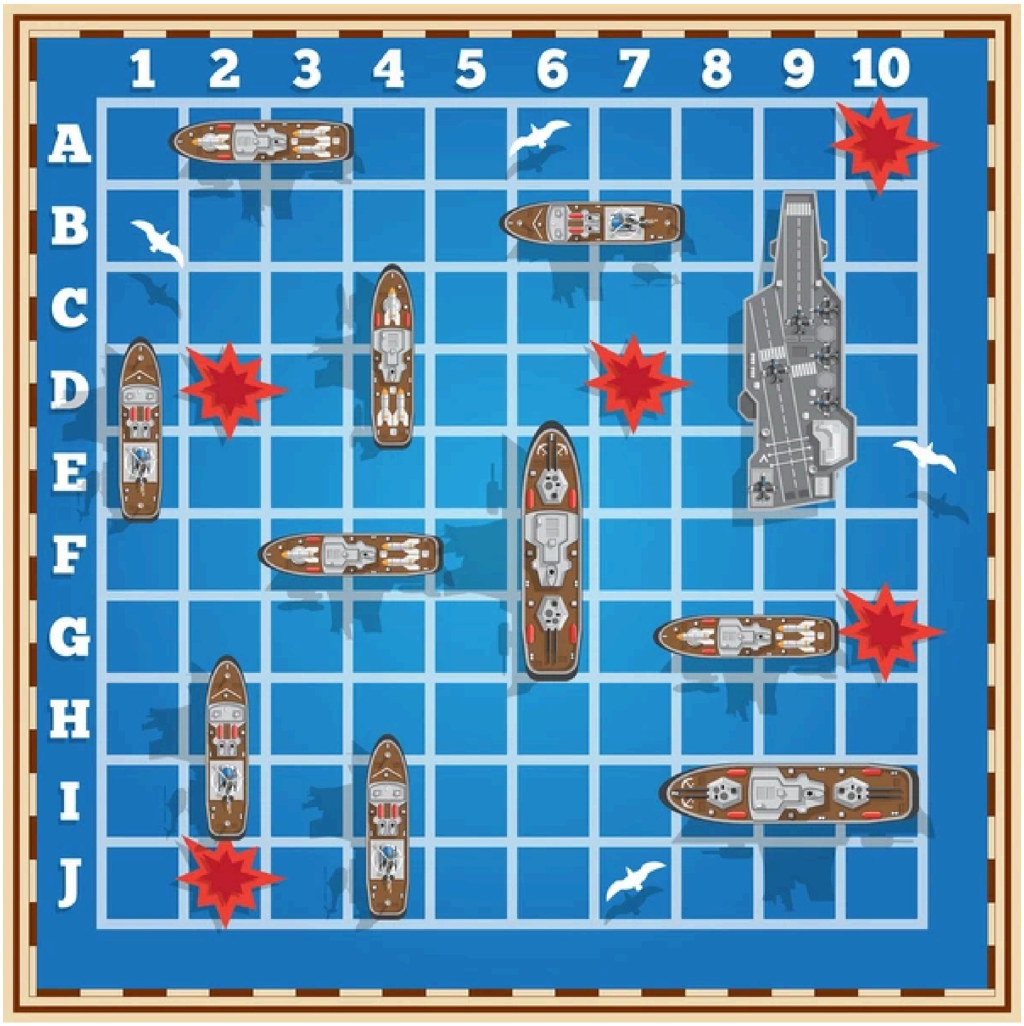
Battleship Application: Testing Manual

Andre Lungu



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I. Testing Plan

The Battleship application should be tested on its functionality. All UI elements in the application, such as buttons, text fields, menu options, and a clickable grid, are essential for the application's function and so it is imperative that they are all tested to ensure the application works properly. All information conveyed to the user either visually on the game's grid or through text displayed on the toolbar needs to be correct and accurately communicate the state of the game. Additionally, the classes which run the Battleship game itself must also be tested in order to ensure the correctness of the game logic.

Thus, an outline of the features needed to be tested are:

- Startup Window
    - Errors
        - Game settings not coinciding
        - Incorrect network settings
    - Correct behavior
        - Custom game settings properly applying
        - Correct network settings + connection established
- Game Window
    - Errors
        - Placing ship with invalid row/column number inputs
        - Placing ship that goes out of bounds of the grid/ has conflict with another ship
        - Locking in without having placed down ships in initial phase
        - Locking in without having picked a place to shoot in main phase
    - Correct behavior
        - Placing ships (via button and clicking grid)
        - Changing colors
        - Text updates to correctly tell players if they missed or hit or sunk, and if enemy shots hit/sunk their ships or not.
- Game Over Window
    - Game win/loss messages due to time.
    - Game win/loss messages due to winning the game
    - Restarting game
    - Not restarting game
- Program correctness (Verified through unit tests)

II. Testing Strategy

II.A. Unit Testing

The correctness of the core battleship game is easy to verify as there are not many operations needed in the game. Since this is a networked application, the core game is managed by the classes in the game.java package, which fulfill the functionality of one player in the game, receiving shots and information about hits from the opponent.

These components of the game functionality are tested via white-box unit tests written with JUnit 5. These tests are located in **src/test/java/BattleshipPlayerTest.java** and can be run using **scripts/run_junit_linux.sh** on linux or **scripts/run_junit_windows.cmd** on windows, and supplying a JUnit standalone jar file. More detailed instructions for running these files are outlined in manuals/readme.txt.

Unit tests are written to ensure >50% statement coverage for the game.java package and test all relevant uses of the classes in the game.java package. Additionally, a log of the test execution (log.txt) and a coverage report generated by Eclipse are located in the src/test/resources directory.

II.B. GUI Manual Testing

Everything other than the BattleshipPlayer functionality is tested via manual testing. Every component listed in the testing plan in section I is tested manually, ensuring that error messages for incorrect input are properly displayed and regular functionality is correct. A spreadsheet of the test scenarios and test cases for manual testing is listed at the end of this document.

Test Scenario ID	Test Scenario Name	Test Scenario Description	Test Cases
HW3TS01	Startup Window: Errors	Check execution of startup window part of the program when incorrect input is given by the user.	1. Players have differing board configurations. 2. Players have differing timer configurations. 3. Players have differing ship configurations 4. Players have different port numbers. 5. Player attempts to connect with bad IP address.
HW3TS02	Game Window: Errors	Check execution of game window part of the program when incorrect input is given by the user.	1. Player attempts to place a ship with invalid row and column numbers. 2. Player attempts to place a ship where there is a conflict with another ship or out of bounds of grid. 3. Player attempts to lock in without having placed all ships down. 4. Player attempts to lock in without having selected a grid square to shoot at.
HW3TS03	Startup Window: Correct Behavior	Check execution of startup window part of the program when correct input is given by the user.	1. Toggling settings bar. 2. Players successfully establish network connection based on settings.
HW3TS04	Game Window: Correct Behavior	Check execution of game window part of the program when used correctly by the user.	1. Placing ships down via clicking on grid and via clicking button 2. Changing ship color 3. Changing hit color 4. Changing miss color 5. Shooting enemy (missing, hitting, sinking)
HW3TS05	Game End	Check execution of program when the game ends.	1. Game ends due to time-out for both players in ship placement phase 2. Game ends due to time-out for one player in ship placement phase 3. Game ends due to time-out for one player in shooting phase 4. Game ends due to one player's fleet being destroyed. 5. Restarting game 6. Game ends with one or more players voting not to restart

Test Case Id	Test Scenario Name	Test Priority Level		Pre-requisites	Test Data	Test Steps	Expected Result	Actual Result	Status	Test Executed By	Test Execution date
HW3TS01TC01	Startup Window: Errors	Extremely High	1. Players have differing board configurations.	Application is open to startup window for 2 players, with correct IP addresses and ports on both.		Set one player's rows to 9 while keeping the other's at 10. Attempt connection. Verify an error window pops up for both players and close it. Restart application using scripts in scripts/ directory Set one player's columns to 9 while keeping the other's at 10. Attempt connection. Verify an error window pops up and close it.	Error dialog appears in both cases	Error dialog appears in both cases	Passed	Andre Lungu	7/22/24
HW3TS01TC02	Startup Window: Errors	Extremely High	2. Players have differing timer configurations.	Application is open to startup window for 2 players, with correct IP addresses and ports on both.		Set one player's timer to 20 seconds while keeping the other's at 30. Attempt connection. Verify an error window pops up for both players and close it.	Error dialog appears.	Error dialog appears.	Passed	Andre Lungu	7/22/24
HW3TS01TC03	Startup Window: Errors	Extremely High	3. Players have differing ship configurations	Application is open to startup window for 2 players, with correct IP addresses and ports on both.		Add a ship of length 2 to one player's ships and one of length 1 to the other. Attempt connection. Verify an error window pops up for both players and close it.	Error dialog appears.	Error dialog appears.	Passed	Andre Lungu	7/22/24
HW3TS01TC04	Startup Window: Errors	Extremely High	4. Players have different port numbers.	Application is open to startup window for 2 players, with correct IP addresses on both.		Set one player to use port 9000 while leaving the other unchanged. Add a ship of length 2 to both players' ships. Attempt Connection.	Error dialog appears for client, server blocks while waiting for connection	Error dialog appears for client, server blocks while waiting for connection	Passed	Andre Lungu	7/22/24
HW3TS01TC05	Startup Window: Errors	Extremely High	5. Player attempts to connect with bad IP address.	Application is open to startup window for 2 players, with correct ports on both.		Set one player to use IP 0.0.0.0 while the other uses any string not equal to the server's IP. Add a ship of length 2 to both players' ships. Attempt Connection.	Error dialog appears for client, server blocks while waiting for connection	Error dialog appears for client, server blocks while waiting for connection	Passed	Andre Lungu	7/22/24
HW3TS02TC01	Game Window: Errors	Extremely High	1. Player attempts to place a ship with invalid row and column numbers.	Application is open and connection is established, game is in ship placement phase with at least 1 ship in the game configurations		Type a into the row text field. Click place ship button. Type -4 into the row text field. Click place ship button. Repeat the steps above but with the column text field.	Error dialog appears in each case of incorrect input.	Error dialog appears in each case of incorrect input.	Passed	Andre Lungu	7/22/24
HW3TS02TC02	Game Window: Errors	Extremely High	2. Player attempts to place a ship where there is a conflict with another ship or out of bounds of grid.	Application is open and connection is established, game is in ship placement phase with at least 3 ships in the game configurations		Place one ship anywhere. Attempt to place another ship in a way that causes a conflict with the other ship. Attempt to place another ship in a way that causes part of the ship to go out of bounds.	In both cases no ship is placed down and the selected ship still appears in the ship length choice box.	In both cases no ship is placed down and the selected ship still appears in the ship length choice box.	Passed	Andre Lungu	7/22/24
HW3TS02TC03	Game Window: Errors	Extremely High	3. Player attempts to lock in without having placed all ships down.	Application is open and connection is established, game is in ship placement phase with at least 1 ship in the game configurations		Click the lock in button	Error Dialog Appears	Error Dialog Appears	Passed	Andre Lungu	7/23/24
HW3TS02TC04	Game Window: Errors	Extremely High	4. Player attempts to lock in without having selected a grid square to shoot at.	Application is open and connection is established, game is in main phase and it is the tester's turn to shoot.		Click the lock in button	Error Dialog Appears	Error Dialog Appears	Passed	Andre Lungu	7/23/24
HW3TS03TC01	Startup Window: Correct Behavior	Extremely High	1. Toggling settings bar.	Application is open to startup window for 2 players		Click the settings button in the toolbar. Click the settings button again. Click the menu bar item labeled "settings" and click the option labeled "settings" Click the menu bar item labeled "settings" and click the option labeled "settings" again	Network settings are properly toggled on and off by both the button and the menu option.	Network settings are properly toggled on and off by both the button and the menu option.	Passed	Andre Lungu	7/22/24
HW3TS03TC02	Startup Window: Correct Behavior	Extremely High	2. Players successfully establish network connection based on settings.	Application is open to startup window for 2 players, with correct IP addresses and ports on both. Any number of rows, columns, ships, time per round can be set but should coincide for both players.		Attempt connection by clicking wait for opponent on one window and connect to opponent on the other.	Connection is established and game window appears. Game has desired settings.	Connection is established and game window appears. Game has desired settings.	Passed	Andre Lungu	7/22/24
HW3TS04TC01	Game Window: Correct Behavior	Extremely High	1. Placing ships down via clicking on grid and via clicking button	Application is open and connection is established, game is in ship placement phase with at least 2 ships in the game configurations		Place a ship by setting row and column values in the settings panel and clicking the place ship button. Place another ship by clicking on the grid in a way that does not cause a conflict or ship going out of bounds.	Both ships appear on the grid.	Both ships appear on the grid.	Passed	Andre Lungu	7/22/24
HW3TS04TC02	Game Window: Correct Behavior	Extremely High	2. Changing ship color	Application is open and connection is established, game is in ship placement phase with at least 1 ship in the game configurations		Place a ship down. Change the ship color using the ship color picker.	Ship changes color to the selected color	Ship changes color to the selected color	Passed	Andre Lungu	7/22/24
HW3TS04TC03	Game Window: Correct Behavior	Extremely High	3. Changing hit color	Application is open and connection is established, game is in main phase and it is the tester's turn to shoot. Tester should have at least 1 hit displayed on their hit grid.		Change the hit color using the hit color picker.	Hit squares on the grid change color to the selected color.	Hit squares on the grid change color to the selected color.	Passed	Andre Lungu	7/22/24
HW3TS04TC04	Game Window: Correct Behavior	Extremely High	4. Changing miss color	Application is open and connection is established, game is in main phase and it is the tester's turn to shoot. Tester should have at least 1 miss displayed on their hit grid.		Change the miss color using the miss color picker.	Miss squares on the grid change color to the selected color.	Miss squares on the grid change color to the selected color.	Passed	Andre Lungu	7/22/24
HW3TS04TC05	Game Window: Correct Behavior	Extremely High	5. Shooting enemy (missing, hitting, sinking)	Application is open and connection is established, game is in main phase and it is the tester's turn to shoot.		Shoot somewhere which will hit an enemy ship. Click the lock in button. Wait until next turn. Shoot somewhere which will miss an enemy ship. Click the lock in button. Wait until next turn. Sink an enemy ship via a series of hits.	Text displays messages notifying the tester that they hit, missed, sunk ships. Text displays messages notifying the tester's opponent that they were hit, were not hit, had their ships sunk. Text displays messages notifying the tester's opponent that they hit, missed, sunk ships. Text displays messages notifying the tester that they were hit, were not hit, had their ships sunk.	Text displays messages notifying the tester that they hit, missed, sunk ships. Text displays messages notifying the tester's opponent that they were hit, were not hit, had their ships sunk. Text displays messages notifying the tester's opponent that they hit, missed, sunk ships. Text displays messages notifying the tester that they were hit, were not hit, had their ships sunk.	Passed	Andre Lungu	7/22/24
HW3TS05TC01	Game End	Extremely High	1. Game ends due to time-out for both players in ship placement phase	Application is open and connection is established, game is in ship placement phase with at least 1 ship in the game configurations		Wait for the timer to run out for both players, without doing anything to the game.	Game over window appears notifying both players that they lost due to time running out.	Game over window appears notifying both players that they lost due to time running out.	Passed	Andre Lungu	7/22/24
HW3TS05TC02	Game End	Extremely High	2. Game ends due to time-out for one player in ship placement phase	Application is open and connection is established, game is in ship placement phase with at least 1 ship in the game configurations		For one player, place down all ships and lock in the ship selection. For the other player, wait until time runs out.	Game over windows appear notifying the player that placed ships down that they won due to time, and notifying the other player that they lost due to time.	Game over windows appear notifying the player that placed ships down that they won due to time, and notifying the other player that they lost due to time.	Passed	Andre Lungu	7/22/24
HW3TS05TC03	Game End	Extremely High	3. Game ends due to time-out for one player in shooting phase	Application is open and connection is established, game is in main phase and it is the tester's turn to shoot.		Wait for the timer to run out.	Game over windows appear notifying the tester that they lost due to time, and notifying the tester's opponent that they won due to time.	Game over windows appear notifying the tester that they lost due to time, and notifying the tester's opponent that they won due to time.	Passed	Andre Lungu	7/22/24
HW3TS05TC04	Game End	Extremely High	4. Game ends due to one player's fleet being destroyed.	Application is open and connection is established, game is in main phase and it is the tester's turn to shoot. 1 ship of length 1 should be placed at row 0, column 0 for both players as the only ship in the game.		Click on the square at row 0, column 0 in the grid. Click the lock in button. Wait until time runs out.	Game over window appears notifying the tester that they won due to sinking all enemy ships. Game over window appears notifying the tester's opponent that they lost due to all ships being sunk.	Game over window appears notifying the tester that they won due to sinking all enemy ships. Game over window appears notifying the tester's opponent that they lost due to all ships being sunk.	Passed	Andre Lungu	7/22/24
HW3TS05TC05	Game End	Extremely High	5. Restarting game	Application is open and connection is established, game should be over with both players having game over windows displayed.		Have both players click yes.	Game over window closes and game restarts.	Game over window closes and game restarts.	Passed	Andre Lungu	7/22/24
HW3TS05TC06	Game End	Extremely High	6. Game ends with one or more players voting not to restart	Application is open and connection is established, game should be over with both players having game over windows displayed.		Have one player hit no while the other can hit either yes or no.	Game over window and game window both close.	Game over window and game window both close.	Passed	Andre Lungu	7/22/24