**Software Engineering Group Project**

**Testing Specifications**

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# **INTRODUCTION**

This document holds the details on how the system should be formally evaluated as part of the system test process. These specifications will be set with reference to the functional requirements and must be easily reproducible.

## **Purpose of this Document**

This document describes how the functional requirements will be evaluated.

## **Scope**

This document is based on the SE.QA.06 document on Testing Procedure Standards

## **Objectives**

To produce a list of tests for the functional requirements of the system.

# **BODY OF DOCUMENT**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test Ref | Req Being Test | Test Content | Input | Output | Pass Criteria |
| SE-04-001 | FR4 | Check that cards stored is exactly 28 cards, no more no less. | Integer 28 | True or False | 28 cards are stored. |
| SE-04-002 | FR4 | Ensure that all 28 cards are randomly sorted. | Integer 28. Have a separate terminal program that runs in the background of the game. | Should inform tester of the state of the deck when cards are dealt. | Cards are randomised |
| SE-04-003 | FR4 | Ensure that the first card in the deck is drawn from the top and replaced if needed at the bottom. | Take cards from the top of the deck. | [Discussion with group since not sure] | Cards taken are re-entered into the bottom of the deck. |
| SE-04-004 | FR4 | Check that if a card is drawn and a user keeps it, that its noted. | Take a card and add it to your hand. | Player keeps a hold of the card. | System should record a card has been drawn from the deck and that the player holding it is recorded. |
| SE-04-005 | FR5 | Check that in the game there is 20 pieces of treasure. | Start a game, collect all treasures. | All treasure is found. | System should record that all treasure has been collected and that no more can be found. |
| SE-04-006 | FR5 | Check that there are 5 types of each treasure. | Start a game, collect all treasures. | All treasure is found. | System should record that all sets of treasure have been collected. |
| SE-04-007 | FR5 | Ensure that there are 4 pieces of each type of treasure. | Start a game, collect all treasures. | All treasure pieces in a set are found. | System should record that all sets of treasure have been collected. |
| SE-04-008 | FR5 | Check that treasure has randomly been assigned on other islands. | Begin a game and venture to an island to find treasure. | Treasure is found. | Treasure found on all islands. |
| SE-04-009 | FR5 | Ensure that once all treasure has been assigned that any requests to obtain treasure from Treasure Island should be denied. | Collect all treasures. Attempt to find another piece of treasure. | Warning / Error saying its forbidden. | No more treasure can be found. |
| SE-04-010 | FR6 | Maintain a count of cards in each player’s hand with their value. | Begin a game, pick up a few cards. | Check the system for number of cards the user holds. | User’s hand should match the number the system outputs. |
| SE-04-011 | FR6 | Record the total available distance a player can move in one turn. | Start a game and make a move. | The system should allow the user to move the number of places they choose e.g., 2. | The user should move the amount of the places they wanted. |
| SE-04-012 | FR6 | Calculate the fighting power of each player. | Begin a game and collect red and black cards. | Power will be calculated by the difference between red and black cards. | Power is correctly calculated and stored away from the users’ eyes. |
| SE-04-013 | FR6 | Record any chance cards that players may hold. | Begin a game, pick up a chance card. Keep it in user’s hand. | System should store it in the user’s hand, which should not be in the deck or in another player’s hand. | Game should assign it to that one player and nowhere else. |
| SE-04-014 | FR6 | Record the items of treasure on each player’s ship. | Start a game collect treasure. | Store the collected treasure on the ship. | The number of treasures on the ship should correlate with the system data. |
| SE-04-015 | FR6 | Check the location and orientation of the ship. | Begin a game and sail around in different directions. | System should update and store location and orientation of the ship correctly. | Check the data after each turn and match with the ship position on the grid. |
| SE-04-016 | FR6 | Note the players home port. | Begin a game, collect treasure and sail back to home port. | Game saves the treasure at port. Recording the value and the number of items. | System data should be the same as what is in the user’s home port. |

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| --- | --- | --- | --- | --- | --- |
| Test Ref | Req Being Test | Test Content | Input | Output | Pass Criteria |
| SE-04-001 | FR10 | At the beginning of a game, after the first setup (i.e., player details recorded and home port set) player is dealt 5 cards. | Begin game, enter details, and set home port. Pick up 5 crew cards. | Five crew cards should be dealt. | Player will gain 5 crew cards after home port has been set up. |
| SE-04-002 | FR10 | Make sure that trading ports are dealt 2 cards. | Begin a game. | Setup should distribute two cards to home port. | System should deal 2 cards to the home ports and record it. |
| SE-04-003 | FR10 | Calculate the value of items for each port is no more than 8. | Set game up, home port should be dealt two cards. | Depending on the value of the two cards, treasure will be added, and the sum would be no more than 8. | System should record the value of the two dealt cards on a port. Then decide what piece of treasure should be given for that port to make up the remaining numbers to add to 8. |
| SE-04-004 | FR10 | Ships should be assigned to each player’s home ports. | Begin game. | Player ship should be in the home port ready. | The game setup should be complete. All requirements ready to go, with the ships ready to sail from their home ports. |
| SE-04-005 | FR11 | Checking the order of player turns depending on home port location. | Begin a game, have each player assigned to a Home Port. | Player one will be whoever is assigned to London, player two Genoa etc. | The player order is correct an follows London, Genoa, Marseilles, Cadiz then repeat. |
| SE-04-006 | FR11 | Make sure the ship cannot turn if in a port. | Have a ship docked at a port. Then try and turn their ship. | Ship should not be able to turn. | The does not turn. Player is made to move. |
| SE-04-007 | FR11 | That a player cannot move any further than the permitted legal squares. | Attempt to move further than allowed squares. | It should not be allowed. Warning message could be output. | Ship only moves within its permitted legal squares. No further. |
| SE-04-008 | FR11 | Players who are on the coast of Treasure Island or in a port are invulnerable. Making it illegal to attack. | Play a game. Have ship docked in a port and another on the coast of treasure island. Have the remaining ships attack the docked ships? | The attack requests are denied since it is against the rules. | Docked ships should not be attacked or effected by the players decision to attack. |
| SE-04-009 | FR11 | If a player moves into a square already occupied and is legal, then the game asks the player if they would like to attack. | Sail into an occupied legal square. | Game outputs a decision for player to make, attack or do not attack. | If they decide to attack, then attack sequence starts. If not, then they sail to another square. |
| SE-04-010 | FR11 | As long as there has been no attack in the players turn nor are they in a port, after they move in their turn the game should ask if the player would like to turn their ship. | Have the player move or turn their ship but not attack in the turn or be in a port. | Game will ask what direction they would wish to turn the ship. | Player meets the criteria, game asks the question, ship is turned. |
| SE-04-011 | FR12 | Game should compare fighting strengths if player decided  to attack another player. Whoever has the higher strength wins the fight. | Player decides to attack another player. | System compares the fighting power of both players. | Whoever has the higher power, is announced the winner. |
| SE-04-012 | FR12 | Loser of the fight gives up their treasure on the ship. | Player loses a battle. | System removes the treasure from the ship (2 pieces). | The treasure is given to the winner or placed back on Treasure Island. |
| SE-04-013 | FR12 | Make sure that no player can accommodate more than 2 pieces of treasure on their ship. | Attempt to collect 3 pieces of treasure. | System should not allow it. Error message or deny request to pick up a third. | Player only holds two pieces of treasure. |
| SE-04-014 | FR12 | If a player defeats another and already has 2 pieces of treasure, system should place defeated players treasure back on treasure island. | Defeat a player while holding two pieces of treasure on a ship. | Notification that player cannot accommodate the third piece of treasure. | System moves the treasure back to treasure island. |
| SE-04-015 | FR12 | If a player loses a fight but has no treasure. They hand over two of their lowest cards to the winner. | Lose a fight to another player while not holding treasure. | Player hands over two of their lowest cards to the victor. | Loser is down two cards in their hand. |
| SE-04-016 | FR12 | If a player loses a fight but has no treasure and only one card. They hand over that one card to the winner. | Lose a fight to another player while not holding treasure but holding one card. | Player hands over their only card to the victor. | Loser has no cards in their hand. |
| SE-04-017 | FR12 | Loser has to move at least one move. They can move up to the maximum legal squares available. | Lose a fight with another player. After handing over treasure/cards, make a move. | Player moves away from the attacking player once they have lost. | Loser has sailed away from the Winner. |
| SE-04-018 | FR12 | Losing player is allowed a change of direction after moving. | Lose fight, move away from winner, change direction. | Loser will be facing a new direction. | Loser would have sailed away and is now facing a new direction. |
| SE-04-019 | FR12 | Winner stays in the direction they were moving/facing. | Win a battle against another player. | Winner cannot move in that turn. | Winner stays there. |
| SE-04-020 | FR13 | Player is next to Treasure Island, deal player top card of deck. | Move ship next to treasure island. | Have player draw a card. | Player is dealt a card. |
| SE-04-021 | FR13 | Game conducts what the top card says. | Draw the top card from chance deck. | Whatever is mentioned on the chance card happens in the game. | System successfully conducts the correct action. |
| SE-04-022 | FR14 | Player is next to Flat Island, award player with treasure. | Move ship next to flat island. | Award player with treasure. | Player has a new piece of treasure on their ship. |
| SE-04-023 | FR14 | While holding treasure, player is awarded the most valuable piece of treasure. | Move ship next to flat island while holding some treasure. | Player is awarded valuable available treasure. | Player has a new piece of treasure on their ship. |
| SE-04-024 | FR14 | While having a full ship and being next to Flat Island, no treasure is given. | Move ship next to flat island while being full. | Player is not awarded any treasure. | Player does not receive any items because they cannot hold anymore. |
| SE-04-025 | FR14 | While next to Flat Island, award player cards from the island. | Move ship next to flat island. | Player picks up cards. | The player now has more cards in their hand. |
| SE-04-026 | FR14 | Check to see that there’s cards to be awarded to the player on Flat Island. | Move ship next to flat island. | Cards are picked up by player. | Player’s deck grows. |
| SE-04-027 | FR15 | When a player arrives at their Home Port, any treasure in their ship is unloaded. | Sail ship to player home port. | Treasure is unloaded. | The number of treasures is decreased by -1 or -2. |
| SE-04-028 | FR15 | When arriving at another port, player should be shown the values of their treasure and cards as well as the available treasure and cards at the port. | Sail to a port that is not owned by the player. | Player is shown their card and treasure values. They are also shown the ports treasure and card values. | Player can see what each treasure is worth and what each card is worth. |
| SE-04-029 | FR15 | Test to see if player can trade with a port that has no available treasure and or cards. | Sail to a port. Try and trade. | If it has treasure, then the player can successfully trade with that port. | Player can trade treasure and or cards. |
| SE-04-030 | FR15 | Test to see if player can trade with a port that has available treasure and or cards. | Sail to a port. Try and trade. | If there is no available treasure, then the player cannot opt to trade with the port. | Player cannot trade treasure and or cards. |
| SE-04-031 | FR15 | Player trades loot or cards with the port for items of the equivalent value. | Sail to a port. Commence a trade. | Background calculation to compare card and treasure values of both the port and player. Result shows the available treasure or cards to trade. | Player can successfully trade items or cards with the port of the same or equivalent value. |
| SE-04-032 | FR15 | If the port is Home to another player, then cards traded at the port must go into that players hand. | Commence a trade with another player. Trade cards with that player. | The player receiving cards must have those cards added into their hand. | Recipient of cards, has an increase in their hand. |

[Functional Requirements are referenced from Buccaneer Requirements CS221.docx]

FR4 Chance card management

The game will maintain a pack of 28 Chance cards. The standard 28 cards are listed in appendix A. Some of these cards may prove impossible to implement during the investigation phase of the project. In that case, the project team may replace them with other chance cards, but all such substitutions should be documented by the project team. The Chance cards should be randomly sorted originally. When a card is given out, it should be dealt from the top of the pack. As cards are returned to the pack, they should be added to the bottom of the pack. Some cards may need to be held by players for a length of time, and the game should deal with that correctly if the project team chooses to implement those cards.

FR5 Treasure management

The game contains 20 pieces of treasure of 5 types. There are four each of the following types of treasure:

• Diamonds, worth 5 points

• Rubies, worth 5 points

• Gold bars, worth 4 points

• Pearls, worth 3 points

• Barrels of rum, worth 2 points

All treasure is originally on Treasure Island and should be assigned elsewhere as appropriate. It is possible for treasure to be assigned to ships, to ports, and to Flat Island. Where all treasure of a specific type has been assigned elsewhere, a request to obtain treasure of that type from Treasure Island should be refused.

FR6 Player management

The game will keep track of the following information for each player:

• The number of cards in the player's hand, and the value of each card.

• The total distance the player can move in a single turn (one square if no crew cards, or the sum of all crew cards in the player's hand).

• The fighting strength of the player (the absolute value of the difference between the red cards in the player's hand and the black cards in the player's hand). This should be calculated, and used in attacks, but not indicated to the players.

• Any Chance cards retained in the player's hand.

• The items of treasure in the player's ship.

• The location and orientation of the player's ship.

• The player's Home Port.

FR10 Game setup

Once the players' details have been taken (FR1), and they have been assigned Home Ports (FR2), then each player is dealt five cards from the crew card pack. Each of the Trading ports are dealt two cards, and the value of items at the port is made up to 8 by adding treasure. For example, if the two cards dealt were a 3 and a 2, making 5, then treasure worth 3 points (a pearl) should be placed at the port. The ships of all four players should be assigned to their Home Ports.

FR11 Taking turns

Each player will take a turn in the order dictated by their Home Port. The first turn will be given to the player with London as Home Port, then Genoa, then Marseilles, then Cadiz, then London etc.

In each turn, the player should be given a suitable choice of doing the following:

• Move their ship.

• Turn their ship.

Turning the ship is not a choice if they are in a port - they must move.

If they choose to move the ship, then the game should indicate all legal squares that can be moved to during that turn (all squares in the direction that they are facing, or all squares in all directions if they are in port, up to the maximum numbers of squares that the player can move, or until an Island or the edge of the board is reached), and allow the player to select the square to which they wish to move.

If the player chooses to move to a square occupied by another player, then they must attack the other player (see FR12). As it is illegal to attack another player on the coast of Treasure Island or in a port, those squares are not legal choices for a move. If the chosen move takes the player through a square occupied by another player, and that square is not a port or on the coast of Treasure Island, then the other player is asked by the game whether they wish to attack the moving ship. If they do, then the moving player only moves to the square occupied by the other ship, and the attack sequence in FR12 is followed.

After any move not involving an attack or if the player chooses just to turn the ship, the player is asked which direction they wish to turn their ship to, and the ship is turned to their choice, unless they are in a port, where the choice is irrelevant. Illegal choices are any direction in which they cannot move at least one square on the next turn.

If after the move the player is on a square adjacent to Treasure Island, the sequence in FR13 is followed.

If after the move the player is on a square adjacent to Flat Island, the sequence in FR14 is followed.

If after the move the player is on a square representing a port, the sequence in FR15 is followed.

FR12 Attacking Rules

When a player chooses to attack another player, then the game should compare the fighting strength of the two players and announce which player is the winner.

If the loser has treasure in their ship, then the winner is awarded the treasure. If the winner cannot accommodate the treasure in their ship (a ship can take a maximum of two pieces of treasure, and they may already have some), then the extra treasure is returned to Treasure Island).

If the loser does not have treasure, but does have cards, then the two lowest value cards in the loser's hand are given to the winner, or one card if the loser only has one card.

The loser is then allowed to make a legal move up to the maximum squares that they can move, in any direction, followed by a change of direction. They must move at least one square.

The winner remains in the direction they were already moving/facing.

FR13 Treasure Island

When the end of a player's turn leaves them adjacent to the coast of Treasure Island, they are dealt the top card from the Chance card pack, and the game will do what it says. Details of what the game should do for each Chance card are given in Appendix A.

FR14 Flat Island

When the end of a player's turn leaves them adjacent to the coast of Flat Island, they are awarded any treasure there (as long as they have room in their ship: if they only have room for one extra piece of treasure, it should be the most valuable one on Flat Island). Any cards on Flat Island are added to the player's hand.

FR15 Arriving at a port

When a player arrives at their Home Port, any treasure in their ship is unloaded.

When a player arrives at another port, they can trade if the port contains any treasure or cards to trade. They should be shown the values of each of their own cards and treasure, and of the available cards and treasure in the port and be able to select cards and treasure to trade of equivalent value on each side. When they have done this (they might choose NOT to trade at this point), the game should check that the two sets of choices have equivalent value and make the trade. If the port is the home port of a different player, any cards deposited at that port should be immediately added to the other player's hand (this is a change from the original rules designed to simplify how the game is played). The stock at the port, in the player's ship and in each player’s, hand is updated appropriately.

If certain Chance cards are implemented, it may also be possible for the player to use a Chance card from their hand at this point.

# **References**

[1] Buccaneer Requirements CS221 C.W. Loftus. SE.QA.RA CS22120 1.1 Release

# **Document History**

| Version | Issue No. | Date | Changes made to document | Changed by |
| --- | --- | --- | --- | --- |
| 1.0 | N/A | 02/02/2022 | N/A - original version | All49 |
| 1.1 | N/A | 15/02/2022 | Added more tests | All49 |
| 1.2 | N/A | 21/02/2022 | Corrected Grammar, Added tests | All49 |
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