Software Engineering Group Project

Testing Specification

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| --- | --- |
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# Introduction

## Purpose of this Document

This document specifies the repeatable tests for the functional requirements for the Buccaneer group project.

## Scope

This document should be read by all members of the group. This covers content from SE.QA.06[2] and the SE.QA.RS-CS22120 requirements document[1]. The document discusses the system tests to be carried out but does not apply to the module tests.

## Objectives

The objective of this document is to produce a set of reproducible system tests to be formally executed against the program to detect errors in the program.

# Test table

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Test Ref | Req being tested | Test Content | Input | Output | Pass Criteria |
| SE-01.001 | FR1 | Check that software prompts user for names of exactly four players on start up | Starting the program | The user is prompted for the names of exactly four players | After starting the program the user is prompted for the names of exactly four players |
| SE-01.002 | FR1 | Check that blank inputs are rejected | Leaving an input field blank when prompted for the names of players | Error message stating that names must be given | The system does not let the user proceed until all four names have been entered |
| SE-01.003 | FR1 | Check that inputs containing non-letters are rejected | Entering a name containing characters that are not letters | Error message stating that names must contain only letters | The system tells the user that names with special characters are not accepted, and prompts for the name to be given again |
| SE-01.004 | FR1 | Check that names with over 20 letters are rejected | Entering a name with over 20 letters | Error message stating that names must contain 20 letters or less | The system tells the user that names with over 20 letters are not accepted, and prompts for the name to be given again |
| SE-01.004.1 | FR1 | Check that names with characters 1-20 are accepted | Entering a name with 1-20 characters | The program moves into the next state | The names are correctly accepted |
| SE-01.005 | FR1 | Check that names are stored correctly | Entering names of four players | The program moves into the next state | Names are stored correctly |
| SE-01.006 | FR1 | Check that game can handle multiple players with the same name | Entering names of four players, two of which are identical | The program moves into the next state | Names are stored correctly |
| SE-01.007 | FR1 | Check that users cannot choose the same colour ship | After name of one player is entered, choosing a given colour for their ship | The chosen colour should not be available for other players to choose | Users cannot choose the same colour ship |
| SE-02.001 | FR2 | Check that each player is assigned a port | Entering names of four players | Each player is assigned a port | Each player is assigned a port. All four ports are assigned, and no two players have the same port |
| SE-02.002 | FR2 | Check that ports are stored correctly | Users are each assigned a port | Each user’s port is stored by the program | Ports are stored correctly |
| SE-02.003 | FR2 | Check that assignment is random | Repeating SE.02.001 multiple (4) times | Each player is assigned a port at random, each time | Port assignment is random, no obvious pattern is detected |
| SE-03.001 | FR3 | Check that pack contains 36 crew cards | The game has started | Program stores correct number of crew cards | Program maintains a pack of 36 crew cards |
| SE-03.002 | FR3 | Check that pack contains correct number of each card | The game has started | Program stores correct number of crew cards | Pack contains 6 crew cards of 1, 2, and 3 pirates, in red and black |
| SE-03.003 | FR3 | Check that pack is randomly sorted | The game has started (continue running test while playing turns) | Program stores crew cards in random order | Crew cards are stored in random order, no obvious pattern is detected when test is repeated multiple times |
| SE-03.004 | FR3 | Check that cards are dealt from the top of the pack | The game has started (continue running test while playing turns) | User is dealt five crew cards | Crew cards are dealt from the top of the pack |
| SE-04.001 | FR4 | Check that system maintains pack of 28 chance cards | The game has started | Program stores correct number of chance cards | Program maintains a pack of 28 chance cards |
| SE-04.002 | FR4 | Check that pack is randomly sorted | The game has started | Program stores chance cards in random order | Chance cards are stored in random order, no obvious pattern is detected when test is repeated multiple times |
| SE-05.001 | FR5 | Check that game contains correct amount of treasure | The game has started | The game contains the correct amount of each type of treasure | There are 20 pieces of treasure – 4 of each type |
| SE-05.002 | FR5 | All treasure starts on Treasure Island and is assigned elsewhere where appropriate. | The game has started | Observe that the treasures are correctly distributed. | The treasures are stored on treasure Island and then some are moved to other locations. |
| SE-05.005 | FR5 | Check that treasure can be stored on Flat Island. | The game has started | Get another user to go to Flat Island to go and find the treasure. | The user should be able to store treasure on Flat Island. |
| SE-06.001 | FR6 | Check that the game stores the number of cards in a user’s hand. | The game has started (continue running test while playing turns) | Check the system for the number of cards in the user’s hand. | The user’s hand should have the same number of cards as the system says there is. |
| SE-06.002 | FR6 | Check that the game correctly stores the value of each card. | The game has started (continue running test while playing turns) | Check the system for the values of the different cards in their hand. | The value of the cards in the user’s hand should match the values stored in the system. |
| SE-06.004 | FR6 | Check that the game can correctly calculate the fighting strength of the player. | The game has started (continue running test while playing turns) | The game should store the strength as the absolute difference between the number of red and black cards in the player’s hand. | The correct data should be stored but not shown to the user. |
| SE-10.001 | FR10 | Check that the players are given 5 cards from the crew card pack | The game has started | The game should deal 5 crew cards to each player | The game should deal 5 crew cards to each of the four players |
| SE-10.002 | FR10 | Check that each trading port is dealt two crew cards | The game has started | The game should deal 2 crew cards to each port | The game should deal 2 crew cards to each of the six ports |
| SE-10.003 | FR10 | Check that each trading port is dealt the correct piece of treasure | The game has started | The game should deal the correct piece of treasure to each port to bring the total value of items at the port to 8 | The game should know the value of the crew cards at each port and calculate the value of treasure needed to bring the total value of items at the port to 8, then deal the correct piece of treasure to the port |
| SE-10.004 | FR10 | Check that the game assigns player’s ships to their home ports at the start of the game | The game has started | The player’s should see their ships in the correct home port | The test will pass if the ships start the game in the correct home port |
| SE-06.003 | FR6 | Check that the game stores the total distance a player can move. | The game has started (continue running test while playing turns) | The game should allow the user to move the correct number of squares (1 square or the sum of all crew cards). | The user should be able to move the correct number of squares across the board. |
| SE-06.005 | FR6 | Check that the game can keep track of the chance cards in a player’s hand. | The game has started (continue running test while playing turns) | The game should have the chance card stored in the player’s hand and it should not be in the pile or in another player’s hand. | The system should have the card assigned to the correct player and it shouldn’t be present anywhere else in the game. |
| SE-06.006 | FR6 | Check that the game can keep track of the treasure on a players ship | The game has started (continue running test while playing turns) | The game should keep track of the treasure stored on a player’s ship | The system should be able to assign treasure to a player’s ship |
| SE-06.007 | FR7 | Check that a player’s ship can only contain a maximum of two pieces of treasure | The game has started (continue running test while playing turns) | The game should prevent the player from storing more than two pieces of treasure on their ship | A player can only have a maximum of two pieces of treasure on their ship |
| SE-06.008 | FR6 | Check that the game can store and monitor a player’s ship location and orientation. | The game has started (continue running test while playing turns) | The game should update its state after each move, correctly storing the ship’s location on the board and its orientation. | Check the system after each move, the game should store the correct grid position for the ship. |
| SE-06.009 | FR6 | Check that the game can store and monitor the correct information about the player’s home port. | The game has started (continue running test while playing turns) | The game should store the treasures kept in the Home Port and their total value should be monitored. | Check that the system correctly stores the value and treasures in the Home Port. |
| SE-07.001 | FR7 | Check that the program stores the number of cards at each port and their value | The game has started (continue running test while playing turns) | Program stores number of cards at each port and their value | Correct number of cards at each port and their values are stored by the program |
| SE-07.002 | FR7 | Check that the program keeps track of treasure stored at each port | The game has started (continue running test while playing turns) | Program stores type and amount of treasure stored at each port | Correct type and amount of treasure is stored by the program. The program also keeps track of the value of each type of treasure |
| SE-07.003 | FR7 | Check that the program associates each port with its owner | The game has started | Program stores names of users and which port they have been assigned | The program keeps track of each ports owner, or, in the case of trading ports, that they have no owner |
| SE-08.001 | FR8 | Check that the program stores the number of cards at flat island and their value | The game has started (continue running test while playing turns) | Cards are removed from players hands and stored at flat island | Correct number of cards at flat island and their values are stored by the program |
| SE-08.002 | FR8 | Check that the program keeps track of treasure stored at flat island | The game has started (continue running test while playing turns) | Treasure is removed from player and stored at flat island | Correct type and amount of treasure is stored by the program. The program also keeps track of the value of each type of treasure |
| SE-09.001 | FR9 | Check that program displays a game board of the correct size | The game has started | A game board of size 20x20 is displayed | Program displays a game board of the correct size |
| SE-09.002 | FR9 | Check that program displays board features in the correct places | The game has started | A game board is displayed with the features in the correct places as given by FR9 | Program displays a game board with features in correct places |
| SE-09.003 | FR9 | Check that the board features are clearly labelled | The game has started | A game board is displayed with correct size and features | Program displays a game board with features that are clearly labelled and distinguishable |
| SE-09.004 | FR9 | Check that the position and orientation of each players ship is displayed | The game has started (continue running test while playing turns) | A game board is displayed with each players ship present | Program displays a game board with each player’s ship present and distinguishable. The orientation of each ship is also clearly shown |
| SE-09.005 | FR9 | Check that player information is correctly displayed | The game has started (continue running test while playing turns) | When it is a player’s turn to move, the information specified in FR9 is displayed | Program displays information for each player correctly |
| SE-09.006 | FR9 | Check that port information is correctly displayed | The game has started (continue running test while playing turns) | Information for each port is displayed clearly on the game board | Information for each port is displayed clearly on the game board |
| SE-09.007 | FR9 | Check that flat island information is correctly displayed | The game has started (continue running test while playing turns) | Items of treasure and amount of crew cards and their value stored at flat island is displayed | Information for flat island is displayed correctly |
| SE-03.005 | FR3 | Check that cards are returned to the bottom of the pack | A card is being returned to the pack | Card is returned to the bottom of the pack | Crew cards are returned to the bottom of the pack |
| SE-03.006 | FR3 | Check that cards cannot be dealt from an empty pack | User attempts to draw card from empty pack | Program states that crew card pack is empty | Program handles an empty pack of crew cards |
| SE-04.003 | FR4 | Check that cards are drawn from the top of the pack | User attempts to draw a chance card | A chance card will be dealt to the player from the top of the pack for them to either hold onto or place back. | The player receives a chance card from the top of the pack. |
| SE-04.004 | FR4 | Allow a user to hold onto a chance card. | Draw a chance card which can be held onto and continue playing. | The user is able to keep the chance card for as long as they want, or use it when it is appropriate. | The game lets the user hold onto the chance card. |
| SE-04.005 | FR4 | Allow the user to use a chance card in their hand | User chooses to use a chance card in their hand | The game executes the effect of the chance card | The effect of the chance card is executed |
| SE-04.006 | FR4 | Check that chance cards that are not able to be held are executed immediately | Draw a chance card that is executed immediately | The effect of the chance card is executed | The effect of the chance card is executed |
| SE-04.007 | FR4 | Check that cards are returned to the bottom of the pack | Use a chance card | The chance card is returned to the bottom of the pack | Chance cards are returned to the bottom of the pack |
| SE-05.003 | FR5 | Check that treasure can be assigned to ships. | A ship collects some treasure. | The user can store a treasure card on their ship. | The ship is assigned a treasure card. |
| SE-05.004 | FR5 | Check that treasure can be assigned to ports. | A ship deposits some treasure at a port. | The port where the treasure was deposited will keep that treasure. | Observe that the treasure has been allocated to the port. |
| SE-11.001 | FR11 | Check that the player’s take their turn in order according to their home port | The game has started (continue running test while playing turns) | Each player should have their turn in the order of their home port. | The player’s turns should go in order of their ports: London, Genoa, Marseilles and then Cadiz. |
| SE-11.002 | FR11 | Check that a player can take the correct movement actions during their turn | A player’s turn has begun | During each player’s turn, they should be able to: Move their ship or turn their ship. | The player must be given the choice of moving forward or turning their ship |
| SE-11.002.1 | FR11 | Check that a player cannot move to an incorrect square during their turn | A player’s turn has begun. Selects an incorrectly possible square to move to | The player must be informed that the square selected cannot be moved to | The player must not be able to move their ship to the incorrect square |
| SE-11.003 | FR11 | Check that the player cannot turn their ship within a port | A player’s turn begins in a port | The player shouldn’t be able to turn the ship while in a port | The game must not give the option for the user to turn their ship while in a port |
| SE-11.004 | FR11 | Check that the game shows all legal movement squares during their turn | The game has started (continue running test while playing turns) | The player should be shown which squares they can move to. | The game should allow a player to move the correct number of squares forward or in any direction within the port |
| SE-11.005 | FR11 | Check that the game does not allow the user to move beyond the edge of the board | A player’s turn begins facing the edge of the board (within reach) | The player should be shows that they could move up to the edge of the map but no further. | The game should allow a player to only move to the edge of a map but not past it |
| SE-11.006 | FR11 | Check that the game does not allow the user to move through islands | A player begins their turn facing an Island and attempts to move through the island | The player should only be able to move up to the square that the Island is on and no further | The game should allow the player to move up to the Island and into it, but no further |
| SE-11.007 | FR11 | Check that a player fight’s another player if they move to a space occupied by that player. | A player has moved to the same space as another player | The game should begin the attack code which will follow the requirements in FR12 | The game should begin the attack and calculate the winner of the fight |
| SE-11.008 | FR11 | Check that the game doesn’t allow a player to attack another player at a port | A player attempts to move to a port while another player is in the port | The game shouldn’t display the port as a legal move position and the user shouldn’t be able to share that space with another player | The game shouldn’t allow the user to move to that illegal position |
| SE-11.009 | FR11 | Check that the game doesn’t allow the user to attack another player at the coast of Treasure Island | A player attempts to attack a ship while that ship is on the coast of Treasure Island | The game shouldn’t display that position as a legal move position and the user shouldn’t be able to share that space with another player | The game shouldn’t allow the user to move to that illegal position |
| SE-11.010 | FR11 | Check that the game gives the opportunity for a player to attack a ship moving through the square they are occupying | A player move over another player. | The game should interrupt the movement of the ship and ask the stationary player if they would like to attack the ship | The game should give the option for the stationary player to attack the moving player, or to let them continue |
| SE-11.011 | FR11 | Check that once a stationary player has attacked a moving player, the moving player stops their movement and the attack begins | A stationary player attacks a moving player | The game should allow the ship to be stopped on the square occupied by the stationary ship, and then the attack sequence in FR12 should begin | The game should allow the stationary ship to attack the moving ship, following the same method as for FR12 |
| SE-11.012 | FR11 | Check that after a move not involving an attack and whilst not in a port, they should be asked which direction they would like to turn to. | A player has moved and not attacked during their turn | The game should ask the user which direction they want to turn to at the end of each turn | The game should allow the user to turn their ship at the end of the turn |
| SE-11.013 | FR11 | Check that the user isn’t allowed to turn their ship at the end of a turn where they are in a port | A player has moved into a port | The game shouldn’t prompt the user to choose a direction to turn to at the end of their turn | The user shouldn’t be allowed to change their direction at the end of their turn while in a port |
| SE-11.014 | FR11 | Check that the user isn’t allowed to turn their ship at the end of a turn where they have attacked someone or been attacked | A player has moved and attacked another player | The game shouldn’t give the player who’s turn it is the option to turn their ship at the end of their turn | The user shouldn’t be able to change their direction at the end of their turn after an attack has occurred |
| SE-11.015 | FR11 | Check that the user cannot make an illegal rotation | A player is at the edge of the map and attempts to turn to face the outside of the board | The game shouldn’t give the player the choice to turn to face the edge of the map | The player should always be able to take one step forward in their turn. |
| SE-11.016 | FR11 | Check that the correct procedures are followed if the player ends their movement in a special position | A player ends their movement adjacent to flat island, treasure island or in a port | The game should follow the sequence in FR13, FR14, FR15 respectively | The user should be presented with the correct sequence of options and choices depending on where they end their movement |
| SE-12.001 | FR12 | Check that the game correctly decides who wins in a fight | A player attacks another player | The player with the highest fighting strength should win the fight | The game should compare the fighting strength of the two players and the one with the highest score should win the fight |
| SE-12.002 | FR12 | Check that the winner gets the loser’s treasure from their ship given they have any treasure | A successful attack has taken place. | The player who wins should be allowed to take the treasure from the loser’s ship assuming they have enough room | The game should give the winner the treasure from the loser’s ship |
| SE-12.003 | FR12 | Check that any excess treasure from the loser’s ship is returned to Treasure Island | Two players attack each other and both have 2 treasures on their ship | The player who wins will not be able to take the treasure from the loser as they won’t have any space, so the treasure should be returned to Treasure Island | The game should return any excess loot to Treasure Island from the loser’s ship |
| SE-12.004 | FR12 | Check that if the loser does not have treasure but does have more than 1 card, then the two lowest value cards should be given to the winner | Two players attack each other and the loser has no treasures and at least two cards | The winner should be given the two lowest value cards from the loser’s hand | The game should give the winner the two lowest value cards from the loser’s hand |
| SE-12.005 | FR12 | Check that if the loser does not have treasure and has only 1 card in their hand that the winner is given that one card | Two players attack each other and the loser has no treasures and 1 card | The winner should be given the 1 remaining card from the loser’s hand | The game should give the winner the card from the loser’s hand |
| SE-12.006 | FR12 | Check that after the cards/treasures have been allocated, the loser is able to make a movement in any direction followed by a change of direction | Two players have attacked each other | The loser should be allowed to move their maximum distance in any direction followed by a change of direction. They must move at least one square | The game should allow the user to move one or more squares in any direction and then change direction |
| SE-12.007 | FR12 | Check that the loser cannot move into a port | Two players have attacked each other | The loser should not be able to move into a port after losing a battle | The game should not allow the user to move into a port after losing a battle |
| SE-12.008 | FR12 | Check that the winner remains facing the direction they were moving/facing | A player wins an attack | The winner should remain facing their original direction from before the attack | The game shouldn’t change the winning ship’s orientation |
| SE-13.001 | FR13 | Check that card is drawn from top of deck when player arrives at treasure island | Player moves to square adjacent to treasure island | Chance card is drawn from top of deck and given to player | Chance card is drawn from top of deck and given to player |
| SE-13.002 | FR13 | Check that chance cards are correctly implemented | Player is given chance card | Chance card behaviour is implemented | The game correctly implements the behaviour of all chance cards |
| SE-14.001 | FR14 | Check that player is given crew cards upon reaching flat island | Player moves to square adjacent to flat island | If there are crew cards on flat island, these are given to the player | Player is dealt crew cards upon reaching flat island |
| SE-14.002 | FR14 | Check that player is awarded treasure upon reaching flat island | Player with enough room on their ship to hold all the treasure stored on flat island moves to square adjacent to flat island | Treasure on flat island is awarded to player | Player is awarded all treasure on flat island |
| SE-14.003 | FR14 | Check that player with room for only one piece of treasure is awarded highest-value treasure on flat island | Player with room for only one piece of treasure moves to square adjacent to flat island | Treasure with highest-value is awarded to player | Player is awarded treasure on flat island with the highest value |
| SE-14.004 | FR14 | Check that player with full ship is not awarded treasure | Player with full ship moves to square adjacent to flat island | No treasure is awarded to player | Player is awarded no treasure |
| SE-15.001 | FR15 | Check that whenever a player arrives at their home port, all treasure is unloaded | Start the game and put some treasures onto a ship, then have that ship go to the home port | The ships should transfer it’s treasures onto the home port | The game should move the treasures assigned to the ship to the home port |
| SE-15.002 | FR15 | Check that when a player arrives at another port, they can trade with the port if there are any treasures in the port to be traded | A player enters a non-home port | They should be shown a choice to trade their cards for treasures | The game should show the player the values of their cards and the treasures in the port. |
| SE-15.003 | FR15 | Check that players can choose items to trade | A player moves into a non-home port with card to trade | The player should be shown a trade window and be able to select cards and treasures to trade | The game should allow a player to choose treasures and cards to trade within a port |
| SE-15.004 | FR15 | Check that players can cancel their trade after choosing cards | A player has begun a trade and attempts to cancel the trade | The player should be shown the trade window, allowed to select items and then press a cancel button (maybe escape) and then exit the trade | The game should allow the player to cancel their trade at any point while selecting treasures and cards |
| SE-15.005 | FR15 | Check that once a trade is requested, the cards have equivalent value | Cards of equivalent value have been chosen during a trade | The player should be taken out of the window and the stock at the port, player’s ship and player’s hand should be updated | The game should allocate the traded cards correctly |
| SE-15.006 | FR15 | Check that a trade cannot be completed if cards are of inequivalent value | Cards of in-equivalent value have been chosen during a trade | The player shouldn’t be able to press the trade button (not useable or disabled) | While the selected cards are not equal in value, the user should not be able to press the trade button |
| SE-15.007 | FR15 | Check that a player cannot trade for more treasure than their ship can carry | A player chooses to trade for more treasure than their ship can carry | The player shouldn’t be able to press the trade button (not useable or disabled) | A player should not be able to trade for more treasure than their ship can carry |
| SE-15.008 | FR15 | Check that once a trade is completed, cards traded to another player’s home port are put in that player’s hand | A player completes a successful trade | The player who’s home port is being traded at should receive the cards deposited in the trade | The game should allocate the player who’s home port is being traded with the cards that were given to the port in the trade |
| SE-15.009 | FR15 | Check that if certain chance cards are implemented, a player should be able to use a Chance card when the trade completed | After a successful trade, the player should be able to use a chance card | A player should be able to use an appropriate chance card after a trade has been completed | The game should allow players to use a chance card when a trade has been completed, as long as the chance card allows it to be played at this point |
| SE-16.001 | FR16 | If chance cards 25 and 26 are implemented, then the game needs to recognise when Anchor Bay is reached, if the player holds one of the relevant cards, they should exchange it for treasure | A player enters Anchor Bay with chance card 25 or 26 and exchanges the card for up to two treasure | The player should be able to exchange one of the chance cards for as many treasures as can be fit onto the ship | The game should take the chance card from a player and give the player their chosen treasure cards |
| SE-17.001 | FR17 | Check that when a player enters their home port and the total value of treasure in the port (including the ones just added) totals at least 20 points, the game is finished and that player wins the game | A player deposits treasures into their home port making the total value of treasures over 20 points | The players should be shown a screen which says who won and then be given the choice of terminating or starting another game | The game should display who won to the players and then give the players a choice of ending the game or starting another one |

[This is taken from Buccaneer Requirements CS221.docx[1]]

REFERENCEs

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

[2] SE.QA.06 - Test Procedure Standards. C.W. Loftus

[3] SE.QA.04 – User Interface Specification Standards. C.W. Loftus

DOCUMENT HISTORY

| *Version* | *Issue No.* | *Date* | *Changes made to document* | *Changed by* |
| --- | --- | --- | --- | --- |
| 0.1 | N/A | 18/02/2022 | Added tests for FR4, FR5, FR6, FR10, FR11, FR12. | cjh26 |
| 0.2  0.3 | N/A  N/A | 18/02/2022  22/02/2022 | Added tests for FR1, FR2, FR3, FR7, FR8, & FR9. Edited test ref numbers.  Added tests for FR15, 16 & 17. | nar29  cjh26 |
| 0.4  0.5  1.0 | N/A  N/A  N/A | 02/02/2022  10/03/2022  11/03/2022 | Updating after informal review  Made changes as discussed in formal review  Released documents | cjh26  nar29  nar29 |