

Software Engineering Group Project Testing Specifications

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1. 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.

1.1 Purpose of this Document

This document describes how the functional requirements will be evaluated.

1.2 Scope

This document is based on the SE.QA.06 document on Testing Procedure Standards [4].

1.3 Objectives

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

2. TEST PROCEDURE

The test specification procedure table [1][2][3]:

Test Ref	Req being tested	Test Content	Input	Output	Pass Criteria
SE-06-01	FR1	On start-up check that the user is prompted for the names.	Open the executable and click "New game" on the main menu.	The game should start by prompting the user for four names.	The game starts and asks for names without crashing.
SE-06-02	FR1	Check that the first character is alphanumeric.	Enter the names: John, Jane, Queen Elizabeth II, _Joe	Error message warns of name not starting with alphanumeric character.	System displays "name not starting with alphanumeric character" error message.
SE-06-03	FR1	Check that empty names are not allowed.	Enter the names: John, Jane, Queen Elizabeth II, and one empty name.	Error message warns of empty name. The players' names should not be set yet.	System displays "empty name" error message.
SE-06-04	FR1	Check that repeated names are not allowed.	Enter the names: John, Jane, Queen Elizabeth II, John.	Error message warns of repeated names. The players' names should not be set yet.	System displays "repeated names" error message.
SE-06-05	FR1	Check that expected input is stored correctly	Enter the names: John, Jane, Queen Elizabeth II, 123asdf	The players' names should now be set to those names.	Names are stored correctly and are visible on the UI.
SE-06-06	FR1	Check that name lengths are limited.	Enter name of 25 characters.	Error message warns user that name is too long.	Names are limited to 20 characters.

SE-06-07	FR2	Check that the port assignment works as intended.	Start the game with names a, b, c, d in the same order three times.	The four ports should now be assigned to the players at random.	Each of the four home ports must be assigned to exactly one player and each player must have exactly one assigned port. The port assignment should not be the same all three times.
SE-06-08	FR3	Check that the number of each kind of crew card is correct.	Start the game.	The 36 crew cards should now be stored in their specified quantities.	There are six crew cards of each number (1, 2, 3) for each colour (red, black). They can be seen on the command line.
SE-06-09	FR3	Check that the cards are randomly sorted.	Start the game twice.	The 36 cards should now be stored in a random order.	There is no obvious pattern in the storage of the cards and both games have a different deck order.
SE-06-10	FR3	Check that cards are dealt from the top.	Play the game until a card is given out.	The top card should now be assigned to the player who got it and removed from the original storage.	The top card is assigned to the player and removed from the original storage.
SE-06-11	FR3	Check that cards are returned to the bottom.	Play the game until a card is returned to the original storage.	The card should no longer be assigned to a player and should be added to the bottom of the storage.	The card is no longer assigned to a player and is added to the bottom of the storage.
SE-06-12	FR4	Check that cards stored is exactly 28 cards, no more no less.	Integer 28	True or False. System displays cards on command line.	28 cards are stored.
SE-06-13	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-06-14	FR4	Ensure that the first card in the deck is drawn from the top	Take cards from the top of the deck.	Cards from the top should be in user's possession.	Last card taken from the top of the deck is no

		and replaced if needed at the bottom.			longer at the top.
SE-06-15	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 stored.
SE-06-16	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-06-17	FR5	Check that there are 5 types of treasure.	Start a game, collect all treasures.	All treasure is found.	System should record that all sets of treasure have been collected.
SE-06-18	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-06-19	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-06-20	FR5	Ensure that once all treasure has been assigned that any requests to obtain treasure from Treasure Island should be denied.	Collect all treasures of one type. Attempt to find another piece of the same type of treasure.	Warning / Error saying request to obtain such treasure is rejected.	The type of treasure that is no longer on the island cannot be obtained.
SE-06-21	FR6	Maintain a count of cards in each player's hand with their value.	Begin a game, pick up 3 cards.	Check the system for the number of cards the user holds.	The user's hand should match the number the system outputs.
SE-06-22	FR6	Record the total available distance a player can move in one turn.	Start a game and move 2 boxes.	The system allows the user to move 2 boxes.	The user should be able to move the number of boxes they are allowed according to their crew cards.
SE-06-23	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-06-24	FR6	Record any chance cards that players may hold.	Begin a game, pick up a chance card.	System should store it in the user's hand,	Game should assign it to that

			Keep it in user's hand.	which should not be in the deck or in another player's hand.	one player and nowhere else.
SE-06-25	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-06-26	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-06-27	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.
SE-06-28	FR7	Check that the cards at each port are accurate.	Start the game (after FR10)	Each of the trading ports should have 2 cards.	The game has safely stored 2 cards and their values in each port.
SE-06-29	FR7	Check that the treasures at each port are accurate.	Start the game (after FR10)	Each of the trading ports should have some treasure.	The game has stored pieces of treasure and their values in each port.
SE-06-30	FR7	Check that each of the four home ports has stored one player, and the two trading ports have not.	Start the game (after FR10)	Each of the four home ports should have one player assigned.	The game has stored one player in each of the four home ports while the trading ports have no player.
SE-06-31	FR8	Check that flat island can store cards accurately.	Play the game until cards are stored in flat island.	The cards should now be stored in flat island.	The game has stored the cards and their values in flat island.
SE-06-32	FR8	Check that flat island can store treasure accurately.	Play the game until treasure pieces are stored in flat islands.	The treasure should now be stored in flat island.	The game has stored the pieces of treasure and their values in flat island.
SE-06-33	FR9	Check that the 20x20 board is displayed properly.	Start the game (after FR2)	The game should display a numbered 20x20 square board.	The game displays a 20x20 square board, with the columns being numbered from 1 to 20 from left to right and the files numbered from 1 to 20 upwards.

SE-06-34	FR9	Check that all the features in the board (ports, islands...) are displayed properly.	Start the game (after FR2)	The game should display all the features on the board properly.	The game displays: Port of Venice at (1,7) Port of London at (1,14) Port of Cadiz at (14,20) Port of Amsterdam at (20, 14) Port of Marseilles at (20,7) Port of Genoa at (7,1) Mud Bay at (1,1) Anchor Bay at (20,1) Cliff Creek at (20,20) Flat Island as a rectangle with corners (2,16) and (4,19) Pirate Island as a rectangle with corners (17,2) and (19,5) Treasure Island as a rectangle with corners (9,9) and (12,12) And it is possible to tell which is which at a glance.
SE-06-35	FR9	Check that each ship is displayed properly on the board.	Start the game (after FR2)	The game should display all four ships, with position, rotation, player, and port.	The game displays all four ships, each in a different square. Their position, rotation, player, and port are visible on the board at a glance.
SE-06-36	FR9	Check that the info for each player is displayed properly.	Start the game (after FR2). If needed (depends on UI), follow the steps to display the	The game should display all the info for each player in one place.	The game displays: The total distance the player can move in a single turn. The items of

			info for each of the players.		treasure in the player's ship. The location and orientation of the player's ship. The name of the player's Home Port. Any Chance cards retained in the player's hand. All in one place.
SE-06-37	FR9	Check that the info for each port is displayed properly.	Start the game (after FR2). If needed (depends on UI), follow the steps to display the info for each of the ports.	The game should display all the info for each port in one place.	The game displays: The items of treasure in the port. The number of cards at the port, and the value of each card. The name of the player (if any) for whom it is the Home Port. All in one place.
SE-06-38	FR9	Check that the info for flat island is displayed properly.	Start the game (after FR2). If needed (depends on UI), follow the steps to display the info for flat island.	The game should display all the info for flat island in one place.	The game displays: The items of treasure at Flat Island. The number of cards at Flat Island, and the value of each card. All in one place.
SE-06-39	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 the game.	Five crew cards should be dealt.	Player will gain 5 crew cards after home port has been set up.
SE-06-40	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-06-41	FR10	Calculates the value of items for each port and ensures it adds up to 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 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-06-42	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-06-43	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-06-44	FR11	Make sure the ship cannot turn if in a port.	Have a ship docked at a port. Then try and turn their ship.	Warning says ship is not be able to turn at home port.	The ship does not turn. Player is made to move.
SE-06-45	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-06-46	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-06-47	FR11	If a player moves into a square already occupied and is legal, then the attack sequence starts.	Sail into an occupied legal square.	Game outputs the battle screen.	When attacking, battle screen is initiated.
SE-06-48	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	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.

		would like to turn their ship.			
SE-06-49	FR12	Game should compare fighting strengths if player attacks another player. Whoever has the higher strength wins the fight.	Player attacks another player.	System compares the fighting power of both players.	Whoever has the higher power, is announced the winner.
SE-06-50	FR12	Loser of the fight gives up their treasure on the ship.	Player loses a battle.	System removes the treasures from the ship.	The treasure is given to the winner or placed back on Treasure Island.
SE-06-51	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 a maximum of two pieces of treasure.
SE-06-52	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.	Notify that player cannot accommodate the third piece of treasure.	System moves the treasure back to treasure island.
SE-06-53	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-06-54	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 loses their only card and winner receives said card.
SE-06-55	FR12	Loser must 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.	Loser moves away from the attacking player once they have lost.	Loser has sailed away from the Winner.
SE-06-56	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-06-57	FR12	Winner stays in the direction they were moving/facing.	Win a battle against another player. Try to rotate to a different direction.	Winner cannot rotate in that turn.	Winner stays in the direction they were facing.
SE-06-58	FR13	Player is next to Treasure Island, deal	Move ship next to	Player is dealt a the top card from	Player is dealt the top chance

		player top card of deck.	treasure island.	the chance card deck.	card.
SE-06-59	FR13	Game conducts what the chance card says.	Player is dealt the top card from chance card deck.	Whatever is mentioned on the chance card happens in the game.	System successfully conducts the correct action.
SE-06-60	FR13	Check that the chance cards from UC13 transfer crew cards properly	Go to treasure island and get one of the chance cards mentioned in UC13 [3]	The correct board element and player receive or lose chance cards	Crew cards are transferred between the player and the board element depending on the chance card.
SE-06-61	FR13	Check that the chance cards from UC14 transfer crew cards properly	Go to treasure island and get one of the chance cards mentioned in UC14 [3]	The correct players receive or lose chance cards	Crew cards are transferred between the players depending on the chance card.
SE-06-62	FR13	Check that the chance cards from UC15 transfer treasure properly	Go to treasure island and get one of the chance cards mentioned in UC15 [3]	The correct board element and player receive or lose treasure	Treasures are transferred between the player and the board element depending on the chance card.
SE-06-63	FR13	Check that the chance cards from UC16 transfer treasure properly	Go to treasure island and get one of the chance cards mentioned in UC16 [3]	The correct players receive or lose treasure	Treasures are transferred between the players depending on the chance card.
SE-06-64	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-06-65	FR14	While holding a treasure, player is awarded the most valuable piece of treasure.	Move ship next to flat island while holding some treasure.	The player is awarded valuable available treasure.	Player has a new piece of treasure on their ship.
SE-06-66	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.	The player is not awarded any treasure.	The player does not receive any items because they cannot hold anymore.
SE-06-67	FR14	While next to Flat Island, award player cards from the island.	Move ship next to flat island.	The player is given the cards.	The player is dealt the cards on the flat island.
SE-06-68	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-06-69	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 at home port is by 1 or 2.
SE-06-70	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-06-71	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 it has treasure, then the player can successfully trade with that port.	Player can trade treasure and or cards.
SE-06-72	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 there is no available treasure, then the player cannot opt to trade with the port.	Player cannot trade treasure and or cards.
SE-06-73	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-06-74	FR15	If the port is Home to another player, then cards traded at the port must go into that other player's hand.	Commence a trade at other player's home port. Trade cards at the port.	The player whose home port is where the cards are deposited have those cards added into their hand.	Recipient of cards, has an increase in their hand.
SE-06-75	FR16	Check that nothing happens if you do not have Kidd's chart.	One of the players travels to anchor bay without any treasure or kid's chart.	Nothing special should happen.	The player does not receive any treasure from treasure island and the turn ends normally.
SE-06-76	FR16	Check that the game gives two pieces of treasure in anchor bay when possible if you have Kidd's chart.	One of the players travels to anchor bay with Kidd's chart and no treasure. Treasure island must be full (right after starting the game).	The player should now have up to 7 points of treasure.	The player is given two pieces of treasure from treasure island adding up to 7 points and Kidd's chart is returned.

SE-06-77	FR16	Check that the game gives one piece of treasure in anchor bay when possible if you have Kidd's chart.	One of the players travels to anchor bay with Kidd's chart and one piece of treasure. Treasure island must be full (right after starting the game).	The player should now have up to 7 points of treasure.	The player is given one piece of treasure from treasure island adding up to 7 points and Kidd's chart is returned.
SE-06-78	FR16	Check that the game does not give treasure to a full ship.	One of the players travels to anchor bay with Kidd's chart and two pieces of treasure. Treasure island must be full (right after starting the game).	Nothing special should happen.	The player is given no treasure and Kidd's chart is not returned.
SE-06-79	FR16	Check that the game does not give treasure if there is not any in treasure island.	One of the players travels to anchor bay with Kidd's chart and no treasure. Treasure island must be empty.	Nothing special should happen.	The player is given no treasure and Kidd's chart is not returned.
SE-06-80	FR17	Check that the game does not end with less than 20 treasure.	One of the players returns to their port with enough treasure to add up to 19 points with the treasure in the port.	The treasure should now be in the port, but the game continues.	The game stores the treasure in the port and passes the turn to the next player.
SE-06-81	FR17	Check that the game ends with 20 treasures.	One of the players returns to their port with enough treasure to add up to exactly 20 points with the treasure in the port.	The game ends and that player wins.	The game ends, displays that the winner is this player and gives the players the choice of starting again or closing the game.
SE-06-82	FR17	Check that the game ends with over 20 treasures.	One of the players returns to their port with enough treasure to	The game ends and that player wins.	The game ends, displays that the winner is this player and gives the players the

			add up to 25 points with the treasure in the port.		choice of starting again or closing the game.
SE-06-83	FR17	Check that the game returns to the beginning if the players choose to play again.	End the game, then click "play again".	The game should be restarted.	All the state of the game (treasure storages, chance cards, ship positions and rotations...) is reset and the game starts again with the same names. (Randomize ports again?)

In some of these testing specifications, we are intending to carry out some equivalence partitions tests as well as some boundary case tests. The results of these tests will be recorded as will the rest of the system tests in the testing report near the conclusion of this project. These tests will mainly be testing parts of the project where the user would be entering some sort of input, for example, test reference SE-06-06, where we can double check that the input required is set between a certain range. These tests will further aid the project's development, as it will ensure that parts of the system are validated.

REFERENCES

[1] Software Engineering Group Projects: Buccaneer Online Board Game Requirements Specification. C.W. Loftus. SE.QA.RS-CS22120. 1.2. Release

[2] Buccaneer Slides. Khalid Ameen Aslam. 1.0. Release

[3] Software Engineering Group Project: The main use cases of the system. David Hernandez Rodriguez, Alexander Gardemann, Khalid Ameen Aslam and Mukhriz Bin Mustafa. SE.GO2.UseCaseDoc. 1.5. Release

[4] Software Engineering Group Projects: test Procedure standards. C.W. Loftus. SE.QA.06. 2.1. Release

DOCUMENT HISTORY

Version	Issue No.	Date	Changes made to document	Changed by
0.0	N/A	02/02/2022	N/A - original version	all49
0.1	N/A	02/02/2022	Wrote test for FR1-3	alf56
0.2	N/A	02/02/2022	Wrote tests for FR4-6	all49
0.3	N/A	08/02/2022	Added tests for FR7-9	alf56
0.4	N/A	09/02/2022	Made tests for FR10-12	all49
0.5	N/A	15/02/2022	Added more tests, FR13-15	all49
0.6	N/A	16/02/2022	Wrote tests for FR16-17	alf56
0.7	N/A	21/02/2022	Corrected Grammar, Added tests	all49
0.8	N/A	28/02/2022	Added minor contributions. Ready for Review.	all49
0.9	N/A	1/03/2022	Small fixes and wording changes.	alf56
1.0	N/A	08/03/2022	Fixing all the issues (1-25) found during the Test Spec Formal Review.	mub11
1.1	N/A	27/03/2022	Modified some tests according to the feedback.	alf56
1.2	N/A	26/04/2022	Corrections made according to feedback.	all49
1.3	N/A	04/05/2022	Formatting corrections and QA check	dah73, mub11
1.4	N/A	04/05/2022	Added four more tests for chance cards	alf56, mub11
1.5	N/A	05/05/2022	Corrected a minor change	all49
1.6	N/A	11/05/2022	Final check for release	mub11