Software Engineering Group Project - Test Specification

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1. INTRODUCTION

1.1 Purpose of this document

This document describes all aspects of testing to be performed on the Chess Tutor project and ensures that functional requirements perform as expected.

1.2 Scope

This document is relevant to all team members that are involved in the development of the software ("the code"). This document helps to describe and outline the required modules that must be tested to ensure completion of the project.

It is assumed that the reader is already aware of the details laid out in the following documentation:

- SE.QA.RS-CS22120 - Chess Tutor Requirements Specification [1]
- SE.QA.06 - Test Procedure Standards [2]
- UI-Spec-Docu-GP9 - User Interface Specification [3]
- UI-Spec-Pres-GP9 - User Interface Presentation [4]

1.3 Objectives

The objective of the document is to:

1. Provide a detailed description of how testing will function throughout the project to ensure that all requirements are met, and function as expected.
2. Serve as a guide to assist development of the final solution, and provide criteria against which to test said solution.
3. Describe the purposes of various tests while identifying the required inputs and expected outputs, procedures for executing tests, and configuration of fail or pass criteria in order to determine acceptance of the project.

2. TEST SPECIFICATION

Test Ref	Requirement Being tested	Test Content	Input	Output	Pass Criteria
SE-F-001	FR1	Check whether new game works properly	Click 'New Game'	New game is started	New game is started
SE-F-002	FR1	Check whether 'Load Game' works properly	Click 'Load Game'	Previous game is loaded	Previous game is loaded successfully
SE-F-003	FR1	Check whether 'View Game' works properly	Click 'View Game'	Allows player to view their previous game	Previous game is enabled to view
SE-F-004	FR1	Check whether the players entered their names after being prompted	Insert players' names into the provided tab	Player's names are displayed	Players names are confirmed
SE-F-005	FR1	Check whether name counts exceed 32 characters or having blank names	When players entered their names	Invalid names are not displayed	Players names are invalid
SE-F-006	FR2	Check whether White side player's name is at the bottom, whilst Black side player's name is at the top	Entering names for black and white sides	Board display as white side as bottom whilst black side at top	Players will be shown that white side is at the bottom whilst black side is at the top
SE-F-007	FR2	Both players names, pieces and colour is tracked correctly	Makes a move	Updated board	The players name should match the pieces and colour

SE-F-008	FR2 & FR3	Detects any Pawn Pieces which are on the starting line of the enemy where their promotion is mandatory	Each of the Pawn Pieces on the starting line of the enemy has the ability to promote to a Queen, Knight, Bishop or Rook Piece	indicates the player that a Pawn Piece is ready for promotion	Players must choose between the pieces to promote from a pawn
SE-F-009	FR3	Tutor keeps track of starting player as in white side	Starting the game	White side pieces ready to be moved	Starting player and pieces must be from white side
SE-F-010	FR3	Tutor keeps track of current player and shows visually whos turn it is	New turn	Changed turn	Changes turn and has a visual to show whos turn it is
SE-F-011	FR3	Unambiguous board representation	New game and move a piece	Board clearly displayed	Unambiguous board and pieces represented are clearly able to tell the pieces apart, which accurately represents the board state
SE-F-012	FR4	Only current player can move their own pieces	Player move their own pieces	Players moving pieces	Only current player can move there coloured pieces
SE-F-013	FR4	Current player cannot move opponent's pieces	Player move the pieces of opponent	Opponent's pieces do not move	Player is not allowed to move opponent's pieces

SE-F-014	FR4	Check if piece reselection works	Select a piece and then reselect another piece	The new piece should be selected and the old piece should deselect	The new piece's moves and the old piece should not have its moves shown.
SE-F-015	FR5	Check if piece selection works	Check piece that cannot move as it is pinned	Available piece moves are shown	No available moves are shown that would move piece so it's no longer blocking check
SE-F-016	FR5	Check if piece selection works	Check piece that cannot move as it is check	Available piece moves are shown	No available moves are shown that aren't preventing check (ie: capturing the checking piece)
SE-F-017	FR5	Check if piece reselection works	Click piece that is available to move	Available piece moves are shown	All available positions should be shown to move to
SE-F-018	FR5	Check whether Pawn Pieces are moving legally in one step	Clicking on Pawn Pieces To only move vertically one step as any legal moving space is highlighted	Pawn Pieces should only move one step	Pawn Pieces moved correctly (one step)
SE-F-019	FR5	Check whether Pawn Pieces are moving legally in two steps	Clicking on Pawn Pieces To only move vertically two steps as any legal moving space is highlighted	Pawn Pieces should only move two steps	Pawn Pieces moved correctly (two steps)

SE-F-020	FR5	Test functionality of Pawn Pieces for capturing pieces	Pawn Pieces could only move towards enemy pieces as in diagonally to the left or right	Pawn Pieces could only capture enemy pieces diagonally and then landing on its designated location	Pawn Pieces attacked correctly
SE-F-021	FR5	Test Pawn Pieces applying En Passant rule which only occurs when a pawn captures a horizontally adjacent enemy pawn piece that made an initial two square advance	Pawn Pieces could only capture enemy pawn pieces if it advances two square which its position is adjacent to the player's pawn piece and the space is highlighted	Pawn Pieces could only capture enemy pawn pieces if it met the requirements of En Passant	Pawn Pieces applying the En Passant rule to capture enemy pawn pieces whenever its position is adjacent to the player's pawn piece
SE-F-022	FR5	Check if players intend to move Pawn Pieces into restricted spaces	Players attempting to move Pawn Pieces into illegal spaces	Pawn Pieces return back to its initial moving space and flashes red	Pawn Pieces flashes red and is not moved
SE-F-023	FR5	Check whether Bishop Pieces are moving legally	Clicking on Bishop Pieces to only move diagonally as many steps as desired as any legal moving spaces are highlighted	Bishop Pieces should only move diagonally	Bishop Pieces moved correctly

SE-F-024	FR5	Test functionality of Bishop Pieces for capturing enemy pieces	Bishop Pieces could only move diagonally in any steps while any enemy pieces that are allowed to be captured are highlighted	Bishop Pieces could only capture enemy pieces diagonally and then landing on its designated location	Bishop Pieces attacked correctly
SE-F-025	FR5	Test functionality of Bishop making illegal move	Move bishop piece horizontally	Bishop piece flashes red	Bishop piece flashes red and is not moved
SE-F-026	FR5	Check whether Knight Pieces are moving legally on the top side	Clicking on Knight Pieces to only move one space left or right horizontally and then two spaces up or down vertically as any legal moving spaces are highlighted	Knight Pieces should only move up or down one space vertically and over two spaces horizontally as in a 'L' shape	Knight Pieces moved correctly (top side)
SE-F-027	FR5	Check whether Knight Pieces are moving legally on the bottom side	Clicking on Knight Pieces to only move two spaces left or right horizontally and then one space up or down vertically as any legal moving spaces are highlighted	Knight Pieces should only move up or down two spaces vertically and over one space horizontally as in a '¬' shape	Knight Pieces moved correctly (bottom side)

SE-F-028	FR5	Test functionality of Knight Pieces for capturing enemy pieces on the top side	Knight Pieces could only move one space left or right horizontally and then two spaces up or down vertically while the enemy pieces that are allowed to be captured are highlighted	Knight Pieces could only capture enemy pieces after attacking and then landing on its designated location	Knight Pieces attacked Correctly (top side)
SE-F-029	FR5	Test functionality of Knight Pieces for capturing enemy pieces on the bottom side	Knight Pieces could only move two spaces left or right horizontally and then one space up or down vertically while the enemy pieces that are allowed to be captured are highlighted	Knight Pieces could only capture enemy pieces after attacking and then landing on its designated location	Knight Pieces attacked correctly (bottom side)
SE-F-030	FR5	Test functionality of knight piece making illegal move	Move knight to across the board to a square it shouldn't be able to go	Knight piece should not be moved	Knight piece should flash red and not move
SE-F-031	FR5	Check whether Rook Pieces are moving legally as in vertically	Clicking on Rook Pieces to only move vertically for as far as desired as any legal moving spaces are highlighted	Rook Pieces should only move vertically as in a straight line	Rook Pieces moved correctly (vertically)

SE-F-032	FR5	Check whether Rook Pieces are moving legally as in horizontally	Clicking on Rook Pieces to only move horizontally for as far as desired as any legal moving spaces are highlighted	Rook Pieces should only move horizontally as in a straight line	Rook Pieces moved correctly (horizontally)
SE-F-033	FR5	Test functionality of Rook Pieces for capturing enemy pieces vertically	Rook Pieces could only move vertically for as many spaces as desired while the enemy pieces that are allowed to be captured are highlighted	Rook Pieces could only capture enemy pieces in a vertical direction and then landing on its designated location	Rook Pieces attacked correctly (vertically)
SE-F-034	FR5	Test functionality of Rook Pieces for capturing enemy pieces horizontally	Rook Pieces could only move horizontally for as many spaces as desired while the enemy pieces that are allowed to be captured are highlighted	Rook Pieces could only capture enemy pieces in a horizontal direction and then landing on its designated location	Rook Pieces attacked correctly (horizontally)
SE-F-035	FR5	Test functionality of rook moving illegally	Attempt to move rook piece diagonally	Rook piece flashes red and isn't moved	Rook piece flashes red and isn't moved

SE-F-036	FR5	Check whether Queen Piece is moving legally	Clicking on Queen Piece to move in any directions and any distance as in vertically, horizontally and diagonally as any legal moving spaces are highlighted	Queen Pieces could move into any highlighted space desired	Queen Piece moved correctly
SE-F-037	FR5	Test functionality of Queen Piece for capturing enemy pieces	Queen Piece could move in any direction and any distance regardless of vertical, horizontal or diagonal while any enemy pieces that are allowed to be captured are highlighted	Queen Piece could move in any direction and any distance regardless of vertical, horizontal or diagonal to capture any enemy pieces and then landing on the designated location	Queen Piece attacked correctly
SE-F-038	FR5	Test functionality of queen piece making illegal move	Move queen piece to a position shouldn't be able to move	Queen piece should flash red and not move	Queen piece should flash red and not move
SE-F-039	FR5	Check whether King Piece is moving legally	Clicking on King Piece to only move one space in any direction as any legal moving spaces are highlighted	King Piece should only move one space in any direction	King Piece moved correctly

SE-F-040	FR5	Test functionality of King Piece for capturing enemy pieces	King Piece only moves one space in any direction as vertical, horizontal or diagonal to capture enemy pieces while any enemy pieces that are allowed to be captured are highlighted	King Piece could only move in one space in any direction as vertical, horizontal or diagonal to capture enemy pieces and then landing on the designated location	King Piece attacked correctly
SE-F-041	FR5	Test functionality of king piece moving illegally	Move king piece across the board to a square it shouldn't be able to move	King piece should flash red and not move	King piece should not move and flash red
SE-F-042	FR5	Test functionality of king piece moving itself into check	Attempt to move king piece to a square that is attacked by opponents piece	King should flash red and not move	King piece should flash red and not move as it's an illegal move
SE-F-043	FR5	Test functionality of kingside castling when allowed	Castling when neither the king or rook has moved yet and there is space between on the kings side	The king should move 2 spaces right from players perspective and the rook should be one square to the left of king	Should be king and rook next to each other king on the left side of rook from the player's perspective.

SE-F-044	FR5	Test functionality of queenside castle when allowed	Castling when neither the king or rook has moved yet and there is space between on the queens side	The king should move 2 squares to the left from players perspective and the rook should be one square to the right of king	Should be king and rook next to each other with the rook on the right side of the king
SE-F-045	FR5	Test functionality of kingside castle when not allowed because king or rook previously moved	Attempt castling when there is space to castle but the king or rook have already moved	It wont't work and the king should flash red	The king flashes red and no move is made
SE-F-046	FR5	Test functionality of queenside castle when not allowed because king or rook previously moved	Attempt castling when there is space to castle but the king or rook have already moved	It won't work and the king should flash red	The king flashes red and no move is made
SE-F-047	FR5	Test functionality of kingside castle when not allowed because there are pieces in the way	Attempt castling when there is no space to castle however the king and rook haven't moved	Nothing happens and the king should flash red	The king flashes red and no move is made
SE-F-048	FR5	Test functionality of attempting to castle when in check	Click king and then attempt either king or queenside castle	It shouldn't work and king should flash red	It shouldn't work and king should flash red

SE-F-049	FR5	Test functionality of Pawn Pieces which are eligible for promotion	Clicking on Pawn Pieces which have advanced until the starting point of the enemy	display a window for players to allow them choose which piece to promote to from a Pawn Piece into a Queen, Knight, Bishop or Rook Piece	Pawn Pieces are valid to undergo the promotion process
SE-F-050	FR5	Test error condition if piece is moved off the board	Check pieces can only stay on the allocated board by clicking on a piece and then off the board	Nothing happens and no move is made.	Nothing happens and no move is made as the move is invalid.
SE-F-051	FR6	Tutor detects whether if a player's king is currently in stalemate state	It is a player's turn but the player's King Piece does not have any legal moves left	Display on the board as the player's King Piece isn't allowed to move	The player is indicated that the player's King Piece is in stalemate
SE-F-052	FR6	Tutor detects whether if a player's king is currently in the checked state	Only appears when the player's King Piece is being attacked	Display the player's king and the attacking piece with a different colour to indicate it as in a checked state	The player is indicated that the player's king is in check
SE-F-053	FR7	Tutor detects whether if the opponent's king is in the state of checkmate	Only appears when the opponent's King Piece is in checked state and do not have any legal moves left	Display opponent's king with a colour which indicates that it is in checkmate and the player has won the game	The player indicates that the opponent's king is in checkmate. Game ends and a window pop up to show this

SE-F-054	FR7 & FR8	Tutor detects whether checkmate is avoidable by moving piece to block check	Put a player in check and then have the only option to block the checkmate	Piece is moved and checkmate blocked	Checkmate is blocked and game continues
SE-F-055	FR7 & FR8	Tutor detects whether checkmate is avoidable by moving piece to capture attacking piece	Put a player in check and have the only option to capture the attacking piece to avoid checkmate	Piece is moved and opponents piece is captured, checkmate avoided	Checkmate is blocked and game continues
SE-F-056	FR7 & FR8	Tutor detects whether checkmate is avoidable by moving king out of checkmate	Put a player in check and have the only option to move the king to avoid checkmate	King is moved and checkmate is avoided	Checkmate is blocked and game continues
SE-F-057	FR7 & FR8	Tutor detects whether if the player's king is in the state of checkmate	Only appears when the player's King Piece is in checked state and do not have any legal moves left	Display player's king with a colour which indicates that it is in checkmate and the opponent has won the game	The player is indicated that the player's king is in checkmate
SE-F-058	FR8	Stalemate	One player is in stalemate	Game finishes in a draw	Game ends and players asked if they want to save the game
SE-F-059	FR8	Checkmate	One player is checkmated	Game finishes	Game ends and players asked if they want to save the game

SE-F-060	FR8	Resign	Click 'Resign' and player is notified that the game will be saved for replay at a future point	Game finishes as one player has resigned	Game ends and players are notified that the game is saved for future purposes
SE-F-061	FR8	Agree to finish (Offer Draw)	Click 'Offer Draw' and prompt to the opponent for agreement	Game finished and ends in a draw	Game ends in a draw as both players agree to a draw
SE-F-062	FR8	Disagree to finish (Offer Draw)	Click 'Offer Draw' and prompted to the opponent for disagreement	Game continues as the player takes the turn while the 'Offer Draw' button disappeared	Game continues as one of the players disagree to a draw
SE-F-063	FR8	Resign the game after game is won (checkmate)	Resign the game after you have already won	Nothing as game is not running	Game does not allow you to resign as you have already won the game
SE-F-064	FR9	Game quit	Click ' Save and Quit'	Game finishes with save prompt	Game closes and players asked if they want to save the game then returned to main menu
SE-F-065	FR9	Exit game without quitting	One player force closes the game	Game is saved for later	Game is saved although it was force closed

SE-F-066	FR10	Game replay	Player clicks replay game and selects a game from the list	Game runs through in replay mode. First showing a list of games to be selected	Replay mode opens
SE-F-067	FR10	Replay step forward	Click 'Step Forward'	Replay goes forward	Replay rolls forward
SE-F-068	FR10	Replay step backwards	Click 'Step Backwards'	Replay goes backwards	Replay rolls backwards
SE-F-069	FR10	Replaying invalid step forward	Player reached the end as the most recent move	'Step Forward' button does not appear	Unable to replay steps forward
SE-F-070	FR10	Replaying invalid step backwards	Player reached the beginning as the first move	'Step Backwards' button does not appear	Unable to replay steps backwards
SE-F-071	FR10	Attempt to replay game when there is nothing to replay	Click replay game	Program will popup and say there are no games to replay	Program will popup and say there are no games to replay
SE-F-072	FR11	Game saved while playing	Move made	Game is saved to a file to later be either restored or replayed	If the program crashes the game can be restored. If game is saved it can be replayed

SE-F-073	FR11	Game reloaded	Previous unfinished game selected and reloaded	Game is loaded from a file and is restored	Game is restored as it was when previously exited with the same players turn and board position
SE-F-074	FR11	Non-Existent Game	First time the program is run there will not be previously saved games or files	'Continue' button is not shown	Unable to replay an non-existent game or file

3. REFERENCES

[1]　QA Document SE.QA.RS-CS22120 - Chess Tutor Requirements Specification

[2]　QA Document SE.QA.06 - Test Procedure Standards

[3]　UI-Spec-Docu-GP9 - User Interface Specification

[4]　UI-Spec-Pres-GP9 - User Interface Presentation

4. DOCUMENT HISTORY

Version	Issue No.	Date	Changes made to document	Changed by
0.1	N/A	10/02/23	Added tests for each FR.	JIB16
0.2	N/A	15/02/23	Added/modified additional tests.	CKC2
0.3	N/A	20/02/23	Reformatted document structure.	CKC2
0.4	N/A	02/03/23	Added error conditions.	JIB16
0.5	N/A	07/03/23	Reformatted document. Prep for review.	TYW1