**Project Tests**

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| **ID** | **Description** | **Expected Outcome** | **Succeeded?** |
| 1 | **Settings (graphical)**  1) Enter the setting menu. Change resolution, windowed mode and apply the settings. | Correct change of resolution and window mode. |  |
| 2 | **Setting (in-game visuals)**  1) Enter the setting menu. Change square bright and dark square colors, change the 'flip after a move' setting and apply the settings.  2) Start a new game of player vs. player. | Correct change of colors for both sides and the change in the flip setting, after making a move (when the setting is 'On', game board should flip after each move). |  |
| 3 | **Settings aren't saved if they aren't applied**  1) Enter the setting menu. Change any settings.  2) Go back to the menu without applying the settings. | Settings weren't changed without being applied. |  |
| 4 | **Settings are saved if they're applied**  1) Enter the setting menu. Change any settings and apply them. | Settings that were applied, were changed. |  |
| 5 | **Game options saving after a game**  1) Enter the game options menu, make a change to a few options (any options).  2) Start a new game, then forfeit the game. | Game options were saved from the last change. |  |
| 6 | **Game options saving after re-launch**  1) Enter the game options menu, make a change to a few options (any options).  2) Close the game. | Game options were saved from the last change. |  |
| 7 | **Time clock input check**    1) Enter the game options menu. Try to change custom clock time to a negative value or to zero. | The entered value for the clock time wasn't applied. |  |
| 8 | **Time increment input check**    1) Enter the game options menu. Try to change custom time increment to a negative value. | The entered value for the time increment wasn't applied. |  |
| 9 | **Changes when playing with no time limit**  1) Enter the game options menu. Change the clock time setting to 'No limit'. | Time increment option, in game options, is hidden.  Upon starting a game, both clocks aren't shown. |  |
| 10 | **Losing when time runs out**  1) Enter the game options. Select a time limit for the game.  2) Start a new game. Don't make any moves. | Game is lost because of running out of time. |  |
| 11 | **Illegal moves**  1) Start a new game.  2) Try to make illegal moves, meaning any moves that are not legal. For the full list of legal moves check the references at the end of the file.  Also try to move out of board's bounds. | Illegal moves didn't register, and the selection highlight is gone after each illegal move attempt. |  |
| 12 | **Check**  1) Start a new game.  2.1) Put the king under a check[1].  2.2) Try to make a move that would put the king under a check.  *(Steps 2.X can be tested in any order or in different games).* | After step 2.1, the only moves possible, are the ones which will put your king out of check.  After step 2.2, the attempted move is doesn't work. |  |
| 13 | **Checkmate**  1) Start a new game.  2) Put the enemy king under a checkmate[2] (king under check, with no moves to get him out of a check). | The game immediately ends with you winning. |  |
| 14 | **Castling**  1) Start a new game.  2.1) Try to castle[3] with king being under check.  2.2) Try to castle with any piece being between the king and the rook.  2.3) Try to castle after moving either the king or the castling rook.  2.4) Try to castle with only the rook being threatened.    *(Steps 2.X can be tested in any order or in different games).* | Moves at steps 2.1, 2.2, 2.3 don't work.  Move at step 2.4 does work. |  |
| 15 | **Pawn moves**  1) Start a new game.  2.1) At the start, try to move any pawn by two squares forward.  2.2) Try to move a pawn that has already moved, by two squares forward.  2.3) Move another piece to a square forward to an un-moved pawn. Next turn, try to move the pawn by two squares forward.  *(Steps 2.X can be tested in any order or in different games).* | Move at step 2.1 works.  Moves at steps 2.2, 2.3 don't work. |  |
| 16 | **Playing after game ends**  1) Start a new game.  2) After the game ends, try to make any move. | No new highlights or moves happened after the game has ended. |  |
| 17 | **Player turns working**  1) Start a new game (player vs. player).  2) Try to make moves for both of the players. | Each player can only move his pieces during his turn, and after each move the turn is passed to the second player. |  |
| 18 | **Stalemate**  1) Start a new game (player vs. player).  2) After playing, get in a position where one of the players is in position with no legal moves left, and the king not being in check. | Game ends in a draw. |  |
| 19 | **Draw by repetition**  1) Start a new game (player vs. player).  2) For both players, repeat the same moves three times for each player. | Game ends in a draw. |  |
| 20 | **Draw by 50 moves**  1) Start a new game (player vs. player).  2) For both players, make moves with a piece that isn't a pawn, without the board repeating itself. Repeat for 50 times. | Game ends in a draw. |  |
| 21 | **Draw by no material**  1) Start a new game (player vs. player).  2) Makes moves, so that both players end up having only their kings. | Game ends in a draw |  |
| 22 | **En passant**  1) Start a new game.  2.1) After the enemy has moved his pawn by one square, to a square which is right/left from your pawn, try to do the en-passant[4] move.  2.2) Try to do step 2.1, but with enemy moving his pawn only by one square.  *(Steps 2.X can be tested in any order or in different games).* | Move at step 2.1 works.  Move at step 2.2 doesn't work. |  |
| 23 | **AI plays legal moves**  1) Start a new game (player vs. bot).  2) Put bot's king under a check. | The bot opponent makes moves only at his turns, and his moves are all legal.  Under a check, the bot defends the king from a check (or loses from checkmate if there no moves can save him from check). |  |  |
| 24 | **AI doesn't miss obvious moves**  1) Start a new game (player vs. bot). Difficulty level should be at least 5.  2) Move one of your pieces (preferably a knight or a bishop) in a place where the bot can capture it without losing anything. | The bot opponent should capture the moved piece. |  |  |
| 25 | **AI plays fast if needed**  1) Set clock time to 15 seconds, increment time to 0.  2) Start a new game (player vs. bot).  3) Play any moves, taking around 1 second before each move. Continue doing so for 10 moves, or until the game ends. | The bot should not lose on time. |  |
| 26 | **AI calculates next moves**  1) Set starting color to white.  2) Start a new game (player vs. bot). Difficulty level should be at least 5.  3) Play the opening of a Scholars mate (reference at the end). Make the best moves using a chess engine. | After 5 moves of playing from both sides, the bot should not lose by checkmate, or lose any pieces. |  |
| 27 | **Low level AI makes mistakes**  1) Repeat the previous step, but with setting the difficulty level to 1 before playing against the bot. | After 5 moves of playing from both sides, the bot should lose pieces or lose by checkmate. |  |
| 28 | **AI doesn't accept bad draws**  1) Start a new game (player vs. bot).  2) Let one of your pieces (not a pawn) be captured by the bot, while not capturing anything yourself.  3) Offer a draw. | The bot rejects the draw |  |
| 29 | **AI accepts good draws**  1) Start a new game (player vs. bot).  2) Play moves until you have an advantage of at least a bishop/knight. A chess engine can be used to play these moves.  3) Offer a draw. | The bot accepts the draw. |  |

**Terms**

[1] - A condition that occurs when there is a possibility of another piece, moving to enemy's king square, next turn. The player with a king under a check, must get out of a check in his turn.

[2] - King being under check, with no moves to get him out of a check.

[3] - A special move made by the king and the rook, the king moves two square to the rook, the rook moves to the adjacent square on the other side of the king.

Can only be done if the rook in question and the king haven't moved. Another requirement, is to have no other pieces between them, and king or any other square between, not being threatened by the enemy.

[4] - A special move made by the pawn. The move can be done only if enemy's pawn has moved 2 squares and to the side of the pawn. The pawn moves diagonally behind the moved enemy's pawn, and captures it.

**References**

[Rules of chess piece moves](http://www.fide.com/fide/handbook.html?id=207&view=article) (Article 3).

[Scholars mate](https://en.wikipedia.org/wiki/Scholar%27s_mate)