

TCP2201 Project

Trimester 2310

by <>Group03<>

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A. Compile and run instructions (via Visual Studio Code)

1. Open a Terminal/Command Prompt:

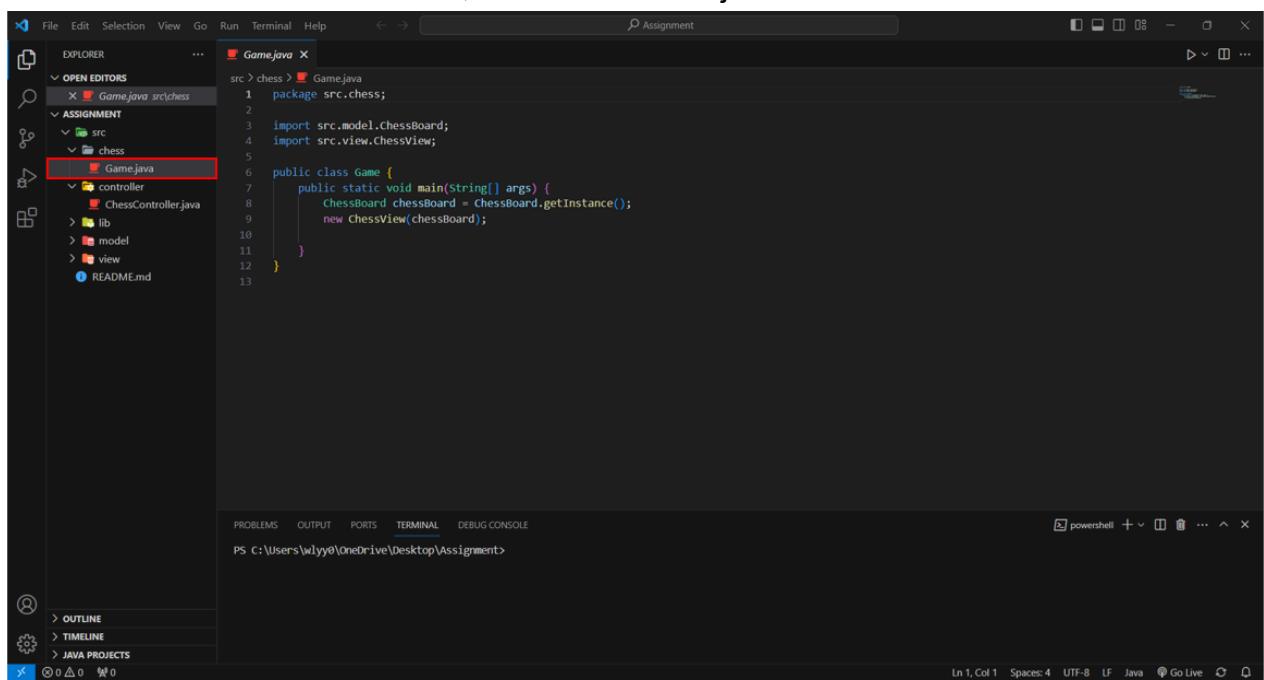
On Windows: Use Command Prompt or PowerShell.

On Linux/Mac: Open Terminal.

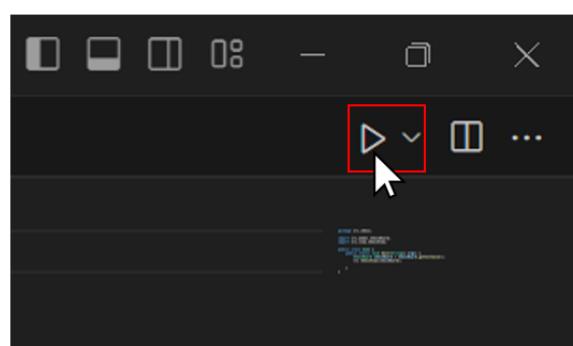
2. Navigate to the Project Directory (eg.), This will open the Visual Studio Code:

```
PS C:\Users\wlyy0\OneDrive\Desktop\Assignment> code .
```

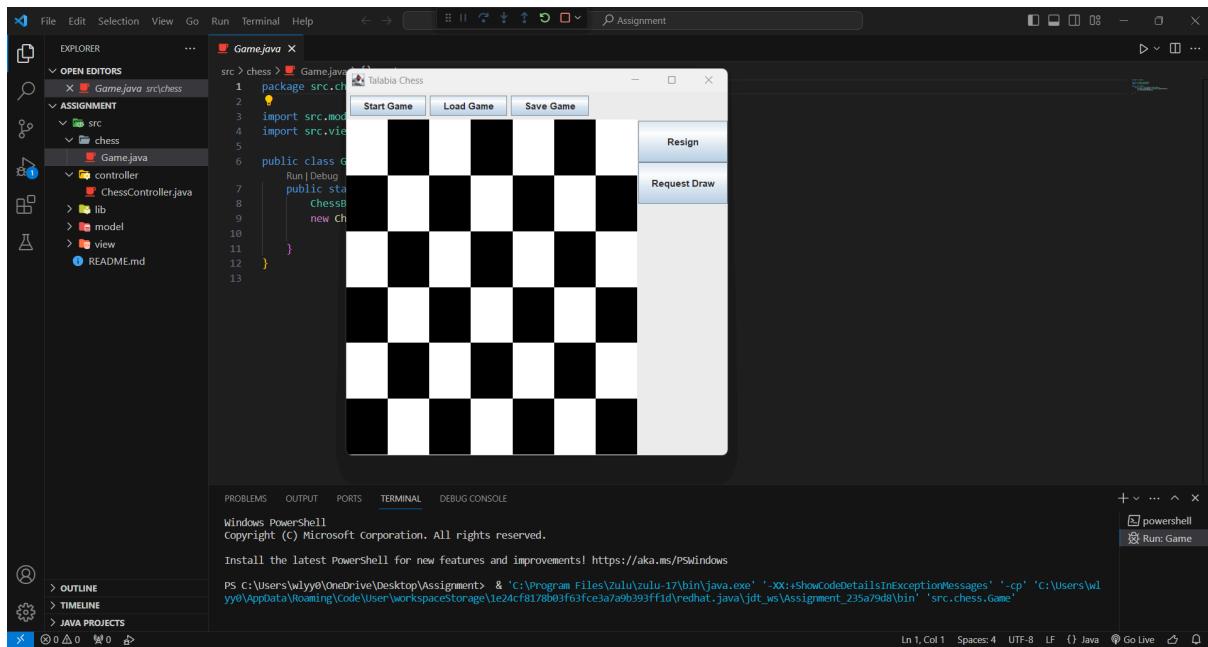
3. Inside Visual Studio Code, select the Game.java file



4. Click the 'Run' button.



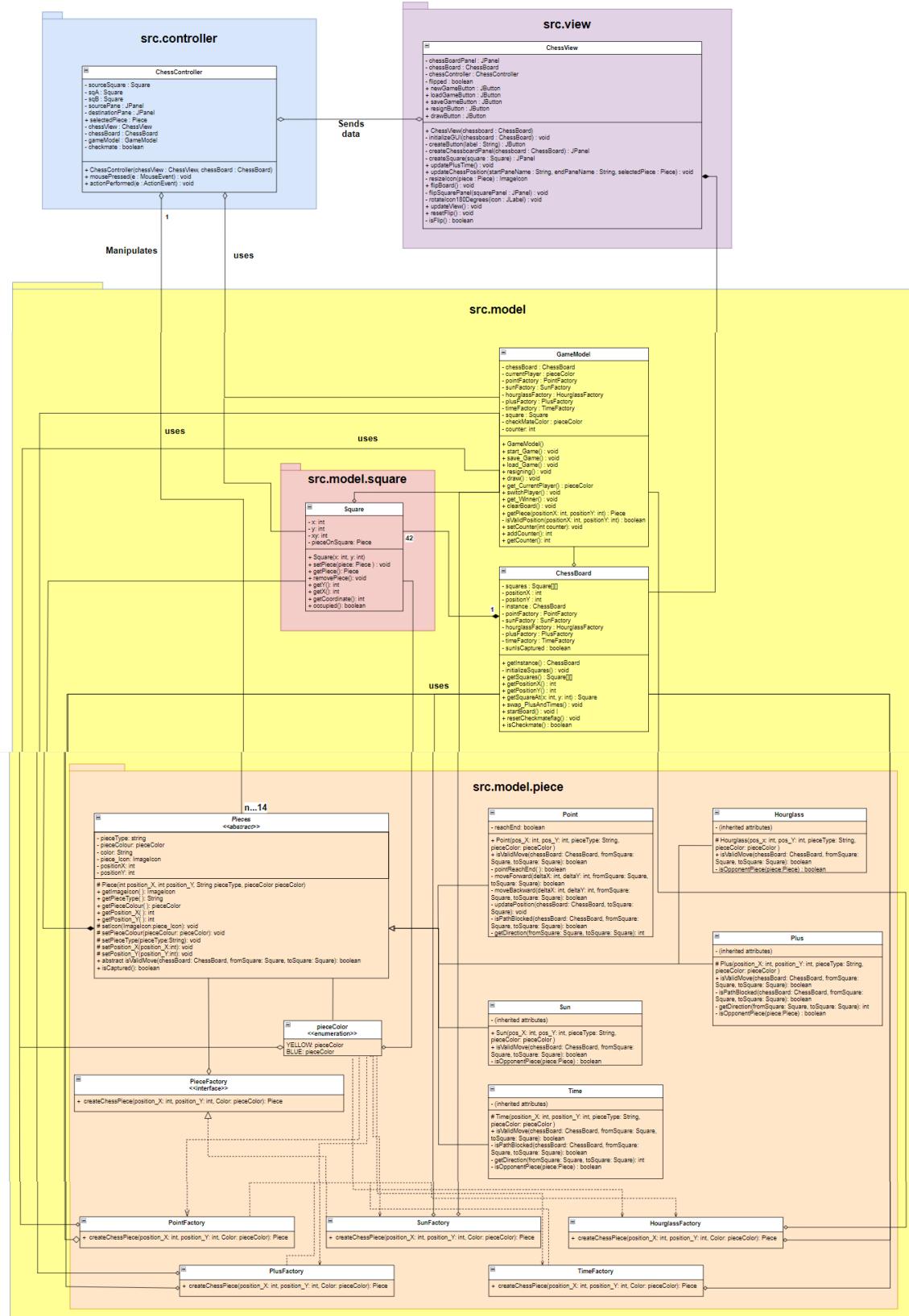
5. Your program runs.



Notes:

- Ensure that you have Java installed on the system and that the javac and java commands are available in the system's PATH.
- Double-check the capitalization of file and class names. Windows is case-insensitive, but Linux and Mac are case-sensitive.

B. UML Class Diagram



Explanation:

The Talabia chess class diagram includes eighteen classes that provide a clear structure to the whole system. The class diagram adheres to the Model-View-Controller (MVC) pattern to organise its components.

In the model packages, there are GameModel class, ChessBoard class and two packages in it, which are src.model.square and src.model.piece. The src.model.square contains a square class representing a square on the chessboard. It has attributes like x, y, xy and pieceOnSquare. It has methods like setPiece(piece: Piece), getPiece(), removePiece() and occupied(). The src.model square linked with ChessBoard, Pieces (Composition) and ChessController, GameModel (Aggregation), pieceColor class.

For the src.model, pieces, it contains an abstract pieces class, pieceColor class and PieceFactory class. The PieceFactory utilises the Factory Design Pattern to create diverse chess pieces. Notably, the specialised factories such as PointFactory, HourglassFactory, TimeFactory, PlusFactory, and SunFactory embody the Factory Design Pattern. All five specialised factories have an implementation relationship with the PieceFactory class.

Each factory is dedicated to producing a specific type of chess piece, promoting modularity and ease of extension. These piece types, namely Point, Hourglass, Time, Plus, and Sun, are all subclasses of the Piece class, inheriting shared attributes and functionalities. By adhering to the Factory Design Pattern and incorporating inheritance, the application enhances its flexibility, making it simpler to introduce new piece types and maintain a cohesive hierarchy.

Additionally, the inclusion of the PieceColor class within the model contributes to a more comprehensive representation of chess piece attributes. The PieceColor class further refines the model, allowing for the representation of different colours associated with chess pieces. The PieceColor class has a dependency relationship with all types of the PieceFactory class. Pieces class also has an aggregation relationship with PieceFactory.

The src.controller package contains the ChessController class. This class manipulates the data from the Piece class. It sends data to the ChessView which is in the src.view class package. It uses the Square class which is in the src.model.square package and the GameModel class which is in the src.model.piece package. All are aggregation relationships. It has attributes such as sourceSquare, sqA, sqB, sourcePanel, destinationPanel, selectedPiece, chessView, chessBoard, gameModel, and checkmate. The selectedPiece attribute is a private attribute while others are public attributes. It has methods such as ChessController(chessView : ChessView, chessBoard : ChessBoard), mousePressed(e : MouseEvent) : actionPerformed(e : ActionEvent) : void.

The src.view Class: ChessView class is used to display the data of the chess game. It has attributes such as (chessBoardPanel, chessBoard, chessController, flipped), private attribute, (newGameButton, saveGameButton, loadGameButton, resignButton and drawButton) public attribute. It has methods such as ChessView(chessboard: ChessBoard), initializeGUI(chessboard: ChessBoard): void, createButton(label: String): JButton, createChessboardPanel(chessboard: ChessBoard): JPanel, createSquare(square: Square): JPanel, updatePlusTime(): void, updateChessPosition(startPanelName: String,

endPaneName: String, selectedPiece: Piece): void, resizeIcon(piece: Piece): ImageIcon, flipBoard(): void, flipSquarePanel(squarePanel: JPanel): void, rotateIcon180Degrees(icon: JLabel): void, updateView(): void, resetFlip(): void and isFlip(): boolean. It receives data from the ChessController class, src.controller package. This shows that it is an aggregation relationship. Also, it connects to ChessBoard in src.model package with composition relationship.

The GameModel class, which represents the game model of the chess game, has attributes like chessBoard, currentPlayer, pointFactory, square, checkMateColor, and counter. It also has methods such as start_Game(), save_Game(), load_Game(), resigning(), draw(), getCurrentPlayer(), switchPlayer(), getWinner(), getPiece(positionX: int, positionY: int), setPiece(positionX: int, positionY: int), addCounter(int counter), and getCounter(). The GameModel class is to control the game's state and rules. It has the relationship between ChessBoard, pieceColor, five factories (PointFactory, HourglassFactory, TimeFactory, PlusFactory, SunFactory) and PieceFactory class (aggregation).

The ChessBoard class, which represents the chessboard of the chess game, has attributes like squares, positionX, positionY, instance, pointFactory, and sunIsCaptured. It also has methods such as getInstance(), initializeSquares(), getSquares(), getPositionX(), getPositionY(), getSquareAt(x:int,y:int), swap_PlusAndTimes(), startBoard(), and resetCheckmateflag(). The ChessBoard class represents the game board and its state. It has the relationship between PieceFactory, five factories (PointFactory, HourglassFactory, TimeFactory, PlusFactory, SunFactory) (aggregation) , ChessView and ChessBoard class (composition).

C. Use Case Diagram

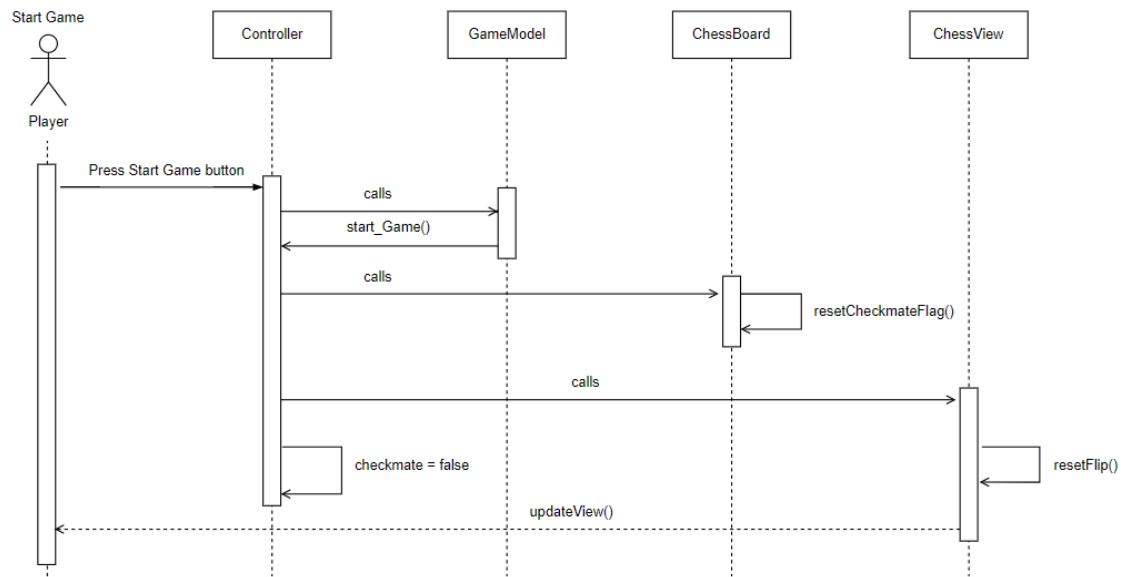


Explanation:

The Talabia use case diagram consists of two actors: Player 1 and Player 2. Each actor is assigned their own respective use case. The use cases for the Player 1 and Player 2 include: Start Game, Move Piece, Checkmate, Resign and Draw Game. There are two use cases for the Player 1 which are Save Game and Load game.

D. Sequence Diagram

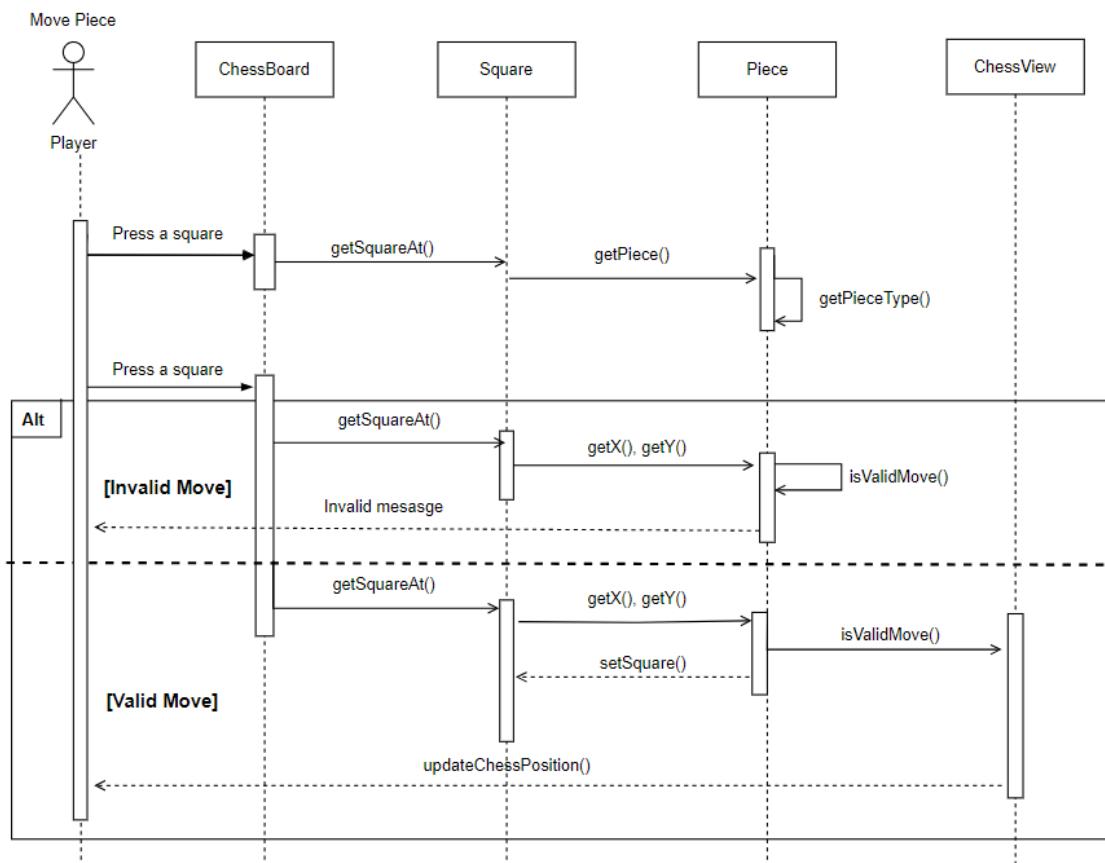
Start Game:



Explanation:

When the player presses the Start Game button, the controller will call GameModel's start_Game(), ChessBoard's resetCheckmateFlag(), and ChessView's resetFlip(). The ChessView will return updateView() to the player.

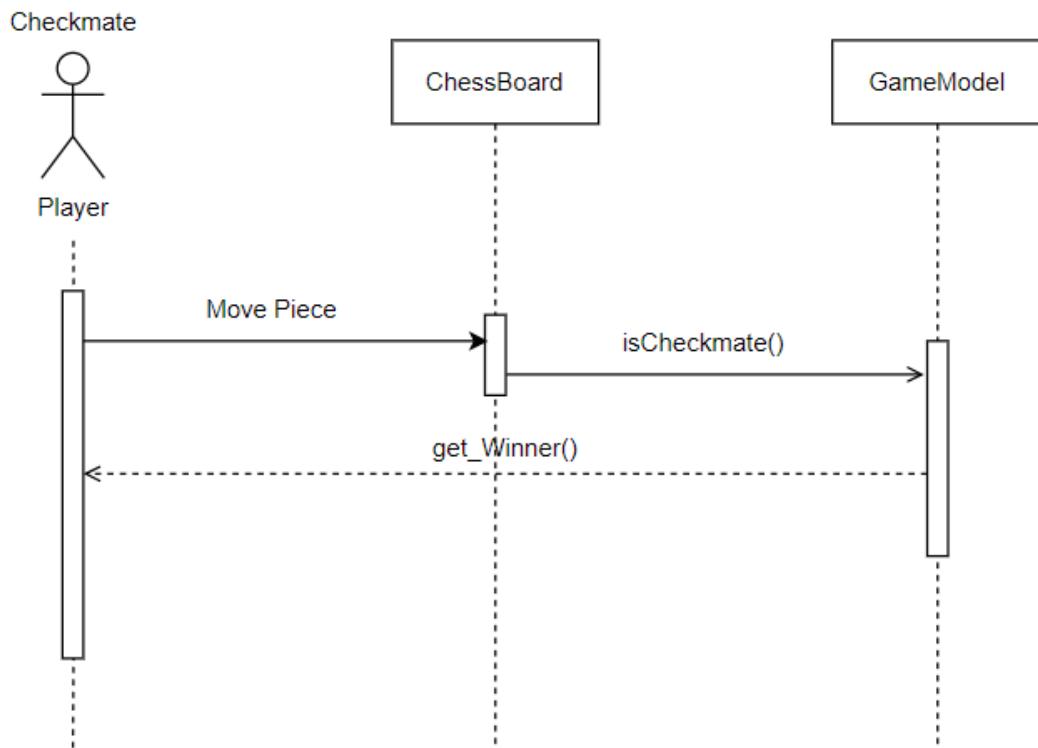
Move Piece:



Explanation:

The move piece starts with when the player pressed the square, the controller will get the square at where the mouse pressed, then it will get the piece type. After that, the player is required to press another square for the piece to move to. The controller call `isValidMove` in `Piece`, if the move is invalid, there will be no response from `ChessView` and the `Piece` will return an invalid message, vice versa, there will be an update from the `ChessView` if it's valid.

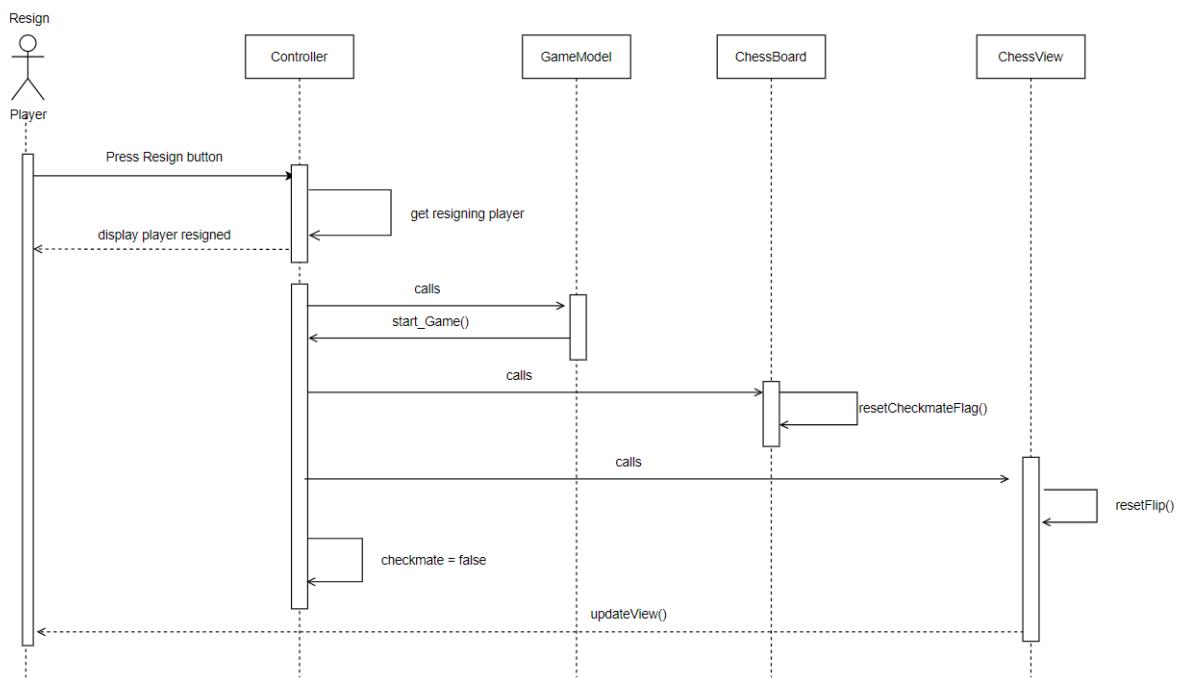
Checkmate:



Explanation:

When the player moves the piece and captures the Sun, ChessBoard will verify whether the Sun has been captured, if it's captured, it will return true and GameModel will return the winner of the game.

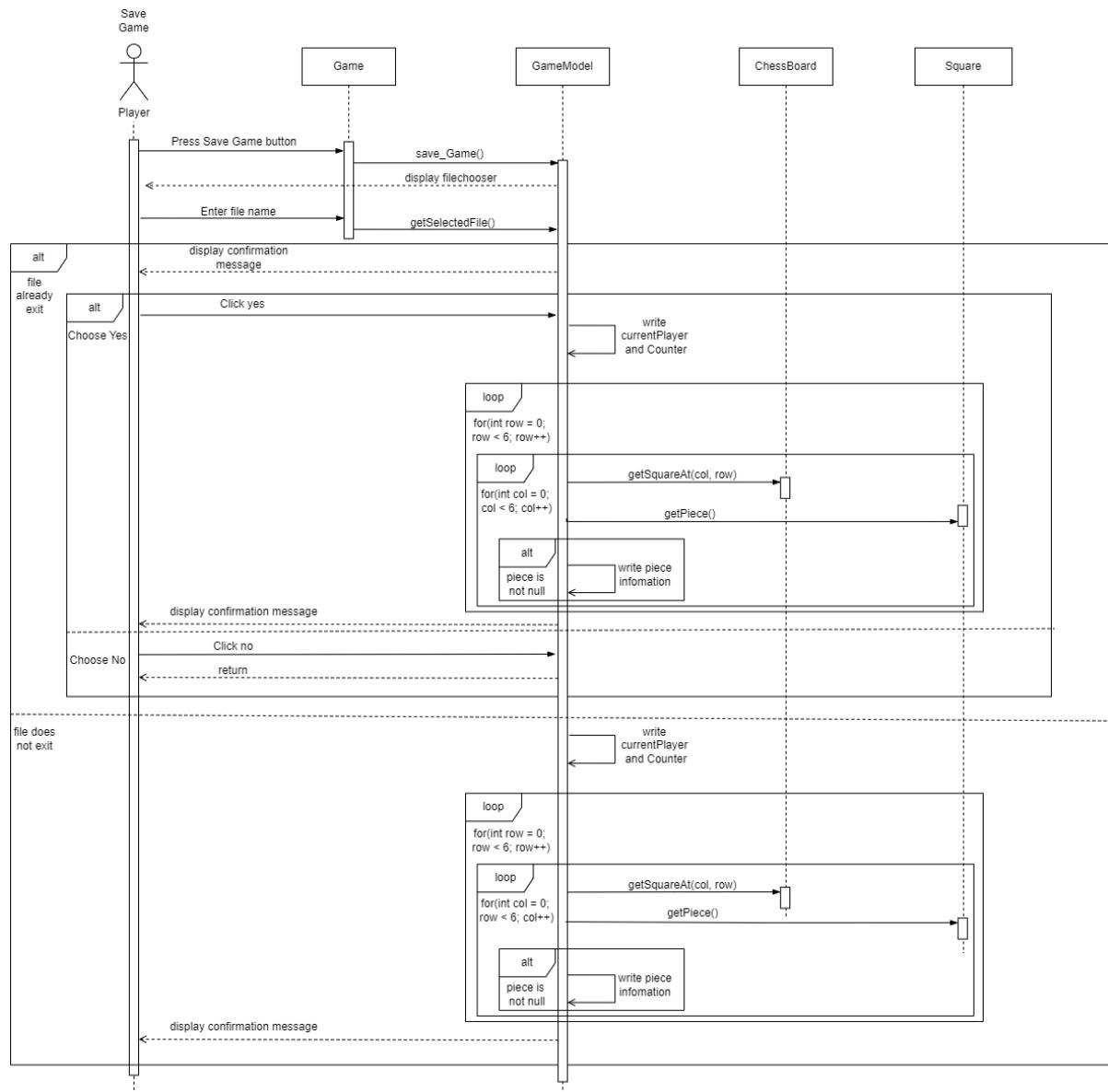
Resign:



Explanation:

When the player presses the resign button, there will be a window pop up showing that the player resigned. Then, the board will reset into the start game state.

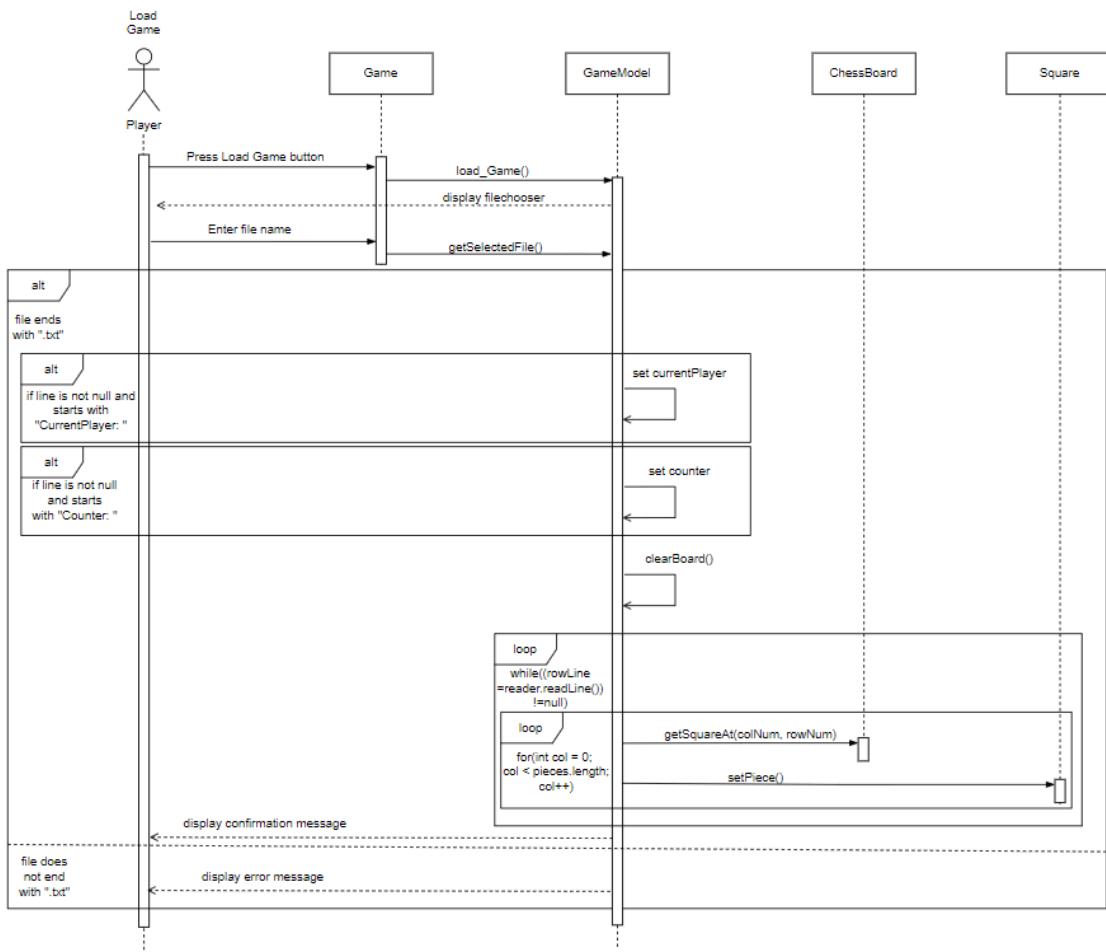
Save Game:



Explanation:

When the player presses the Save Game button, it will pop up a file chooser window that will allow the player to enter the name to save. If the save is successful, it will display the save as a successful message, else it will display the save is invalid message. The save function will save the current player, counter and the board state.

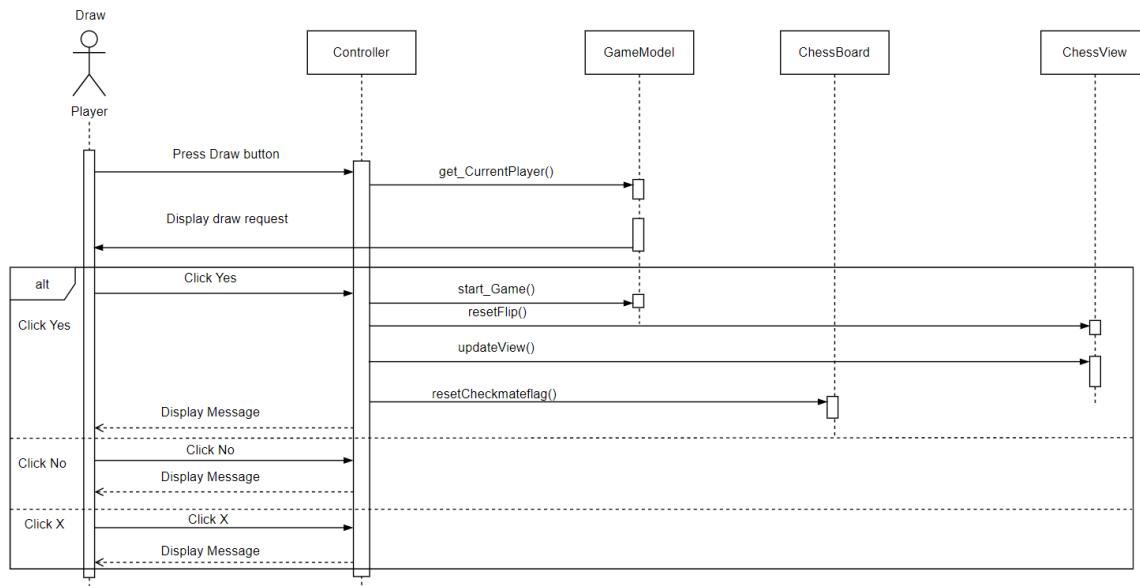
Load Game:



Explanation:

When the player presses the load game button, it will pop up a file chooser window that will allow the player to enter the name to save. If the save is successful, it will display the save as a successful message, else it will display the save is invalid message. The load function will load the current player, counter and board state.

Draw:



Explanation:

When the player presses the draw button, there will be a window pop up showing that the player requests a draw. The opponent can press Yes, No, or exit the page. If the opponent presses Yes. Then, the board will reset into the start game state. If the opponent presses No or exits the page. Then, the game will continue.

E. User Documentation

Talabia Chess Game User Documentation

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1 Introduction

Welcome to our Talabia Chess Game! This user manual is designed to provide you with all the information you need to enjoy and make the most out of your chess-playing experience. Whether you're a beginner or an experienced player, this guide will walk you through the key aspects of our Chess Game.

1.1 Overview

Welcome to Our Talabia Chess Game!

Talabia Chess is an engaging and unique offline chess game designed for two players. Dive into a distinctive chess experience with special pieces and strategic gameplay. Perfect for players seeking a challenging yet entertaining two-player chess match.

- Offline Gameplay: Talabia Chess is a two-player, offline chess game, allowing friends and family to enjoy matches without an internet connection.
- Special Chess Pieces: Experience a twist with specialised pieces, each with its own unique movement rules, adding a layer of strategy to every move.
- Flipping Board Feature: The game automatically flips the board when it's the other player's turn, enhancing the immersive experience.
- User-Friendly Interface: Enjoy a program with a user-friendly interface, featuring suitable menus, resizable windows, and an easy-to-navigate design.
- Save and Load Games: Save and load your games conveniently, with the game data stored in human-readable text files for easy management.

1.2 Features

Discover Talabia Chess Features

Talabia Chess offers a set of features that make it stand out from traditional chess games, providing players with a fresh and captivating chess experience.

Noteworthy Features:

No Skipping Rule: None of the pieces are allowed to skip over other pieces, adding a strategic challenge to the gameplay.

Transformation: After 2 turns, Time pieces transform into Plus pieces, and Plus pieces transform into Time pieces, introducing a dynamic element to the game.

1.3 System Requirements

Ensure Your System is Ready for Talabia Chess

Before you embark on your chess adventure, make sure your computer meets the minimum system requirements to ensure a smooth and enjoyable gaming experience.

Minimum Requirements:

- Operating System: Windows 7 or later
- Processor: Dual-core processor, 2.0 GHz
- Memory: 4 GB RAM
- Graphics: Integrated graphics with at least 512 MB video RAM
- Storage: 500 MB available space

Recommended Specifications:

- Operating System: Windows 10
- Processor: Quad-core processor, 3.0 GHz
- Memory: 8 GB RAM
- Graphics: Dedicated graphics card with 2 GB video RAM
- Storage: 1 GB available space

2 Installation

Follow these steps to install Talabia Chess on your local machine.

2.1 Download and Installation

1. Download the Game:
 - Download the Talabia Chess codebase from the provided source.
 - Ensure that you have a stable internet connection for a smooth download process.
2. Extract the Files:
 - Extract the downloaded zip file to a location of your choice on your local machine.
3. Choose Your Development Environment:
 - Depending on your preference and available tools, choose one of the following development environments:
 - Using BlueJ:
 1. Open BlueJ on your computer.
 2. Choose "Open Project" from the BlueJ menu.
 3. Navigate to the location where you extracted the Talabia Chess files and open the project file.
 - Using Visual Studio Code:
 1. Open Visual Studio Code on your computer.
 2. Choose "File" -> "Open Folder" and select the folder where you extracted the Talabia Chess files.
 - Using Node.js:
 1. Ensure you have Node.js installed on your machine.
 2. Open a terminal window and navigate to the Talabia Chess project directory and then open the project file.

2.2 System Compatibility

Ensure that your system meets the minimum requirements for running Talabia Chess effectively.

Minimum Requirements:

- Operating System: Windows 7 or later
- Java Version (if using BlueJ): Java 8 or later
- Java Version (if using VS Code): Java 8 or later
- Node.js Version (if using Node.js): Node.js 12 or later

Development Environment Compatibility:

- BlueJ: Talabia Chess is compatible with BlueJ version 4.2.2 or later.
- VS Code: Talabia Chess is compatible with Visual Studio Code version 1.60.0 or later.
- Node.js: Talabia Chess is compatible with Node.js version 14.17.5 or later.

3 Getting Started

3.1 Launching the Game

Now that you have successfully installed Talabia Chess, let's get started by launching the game.

For BlueJ:

1. Open BlueJ on your computer.
2. Load the Talabia Chess project by selecting "Open Project" and navigating to the directory where you extracted the game files.
3. Find the main class and right-click on it.
4. Choose "void main(String[] args)" from the menu to execute the game.

For Visual Studio Code:

1. Open Visual Studio Code on your computer.
2. Navigate to the Talabia Chess project folder.
3. Locate the main game file
4. Right-click on the file and choose "Run".

For Node.js:

1. Open your preferred Node.js environment on your computer.
2. Navigate to the Talabia Chess project directory.
3. Find the main game file
4. Execute the file using your Node.js environment.

3.2 Game Interface

Upon launching Talabia Chess Game, you will encounter the interface where you can access various options and settings and an empty chess board.

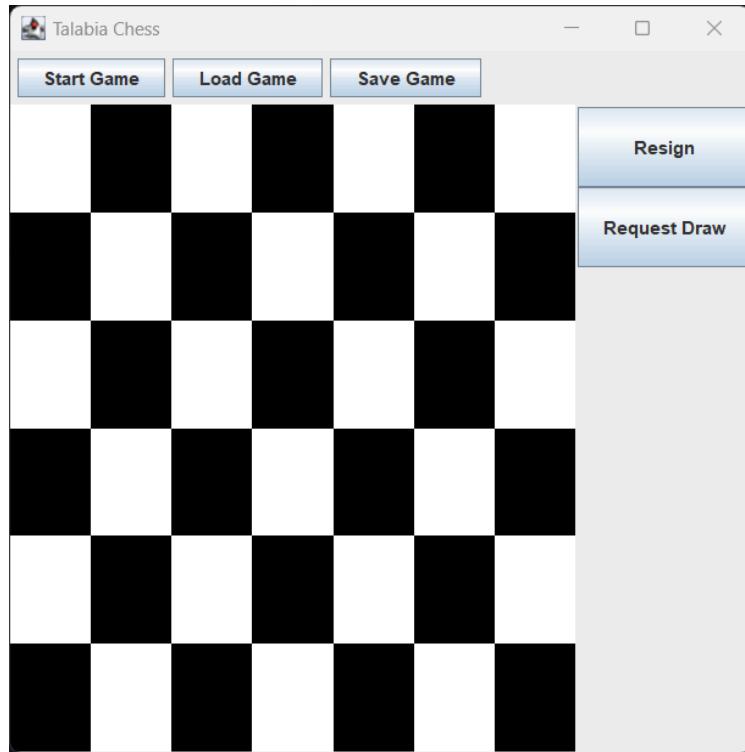


Figure 3.1: Game Interface

Start New Game:

Start a new Talabia Chess adventure by starting a new game.

Load Saved Game:

Resume a previous Talabia Chess match by loading a saved game.

Save the Game:

Capture the current state of your Talabia Chess match by saving the game.

Resign:

If you find yourself in a challenging position and wish to resign the game, you have the option to resign.

Draw:

Under certain circumstances, both players might agree to a draw if the game reaches a stalemate or an inconclusive position.

Exit Game:

Choose this option when you're ready to leave the Talabia Chess game.

4 Chess Board & Pieces

4.1 Initial Position

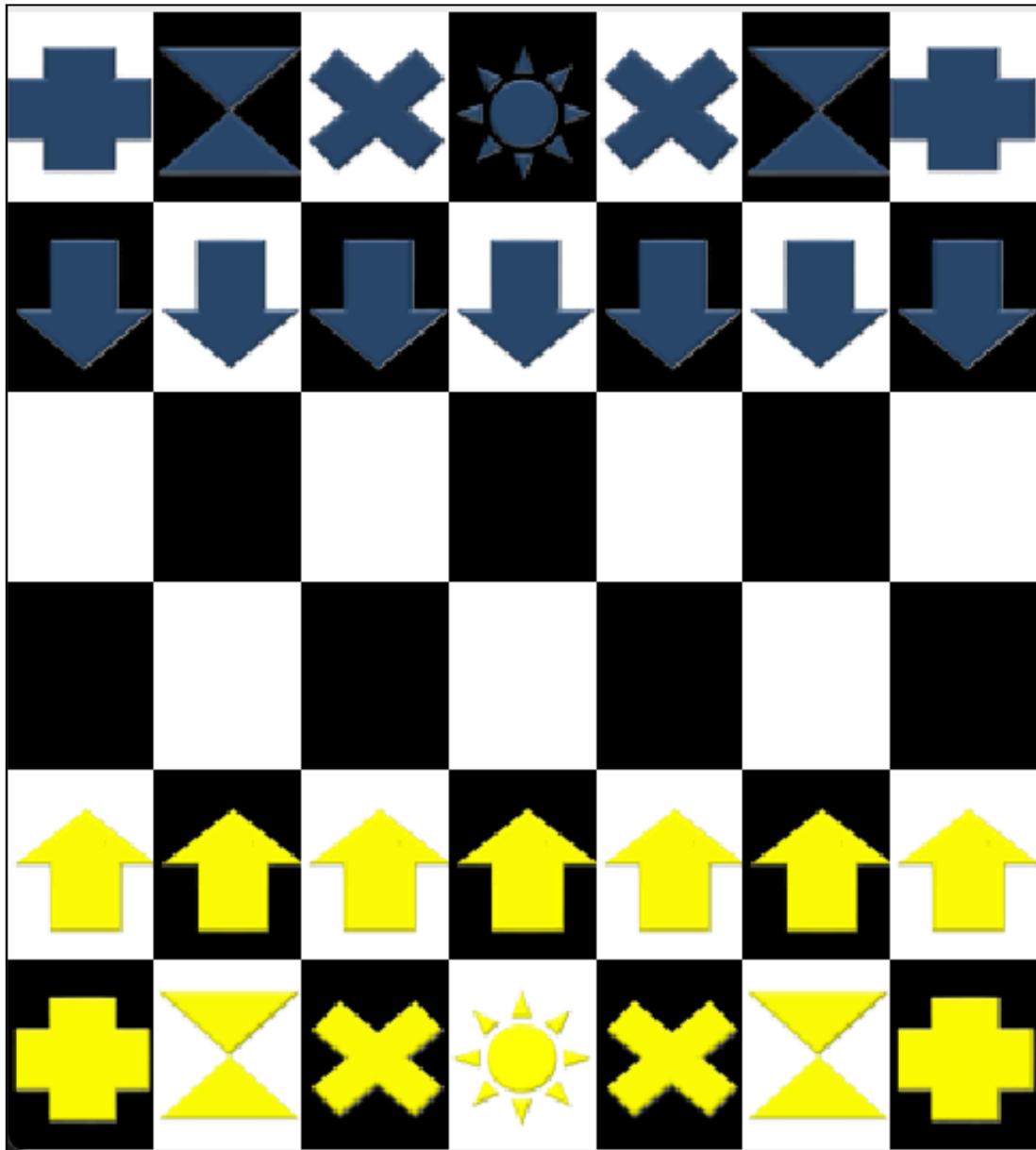


Figure 4.1: Initial Position of Talabia Chess Board
First row: plus, hourglass, time, sun, time, hourglass, plus
Second row: point

4.2 Pieces and Their Movement

4.2.1 Point Piece

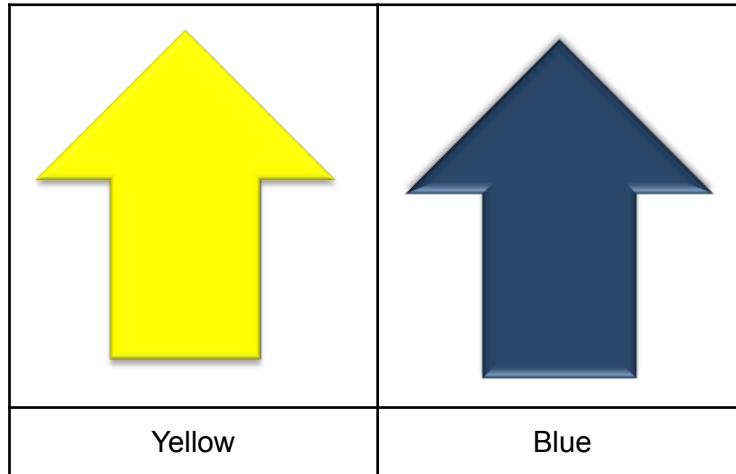


Figure 4.2: Point Piece

The Point piece can only move forward, 1 or 2 steps. If it reaches the end of the board, it turns around and starts heading back the other way. **It cannot skip over other pieces.**

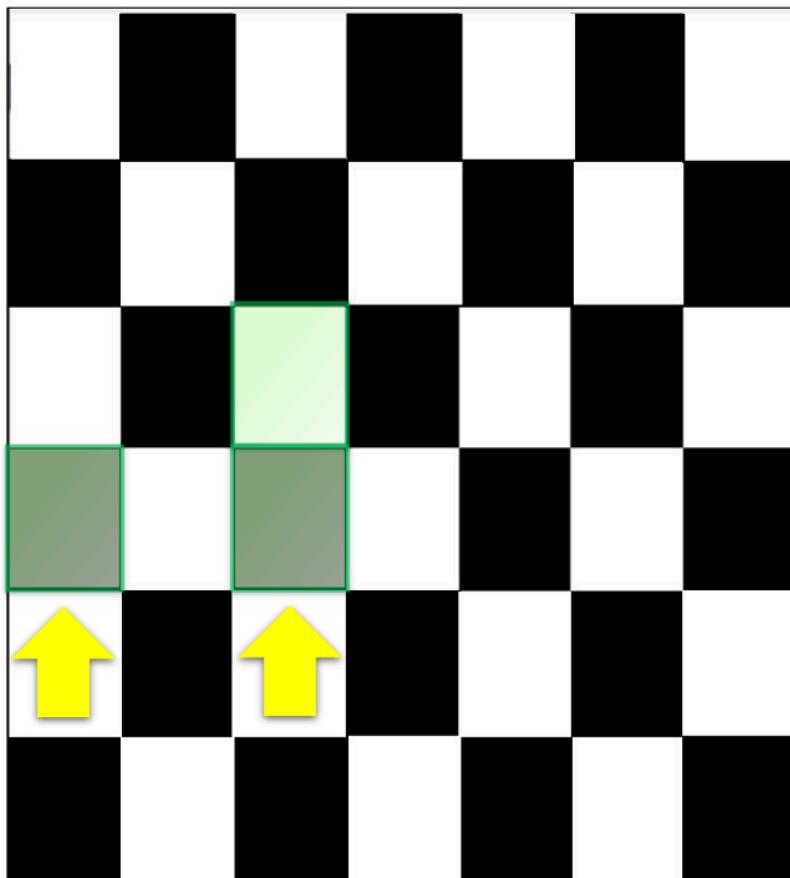


Figure 4.3: Point piece movement

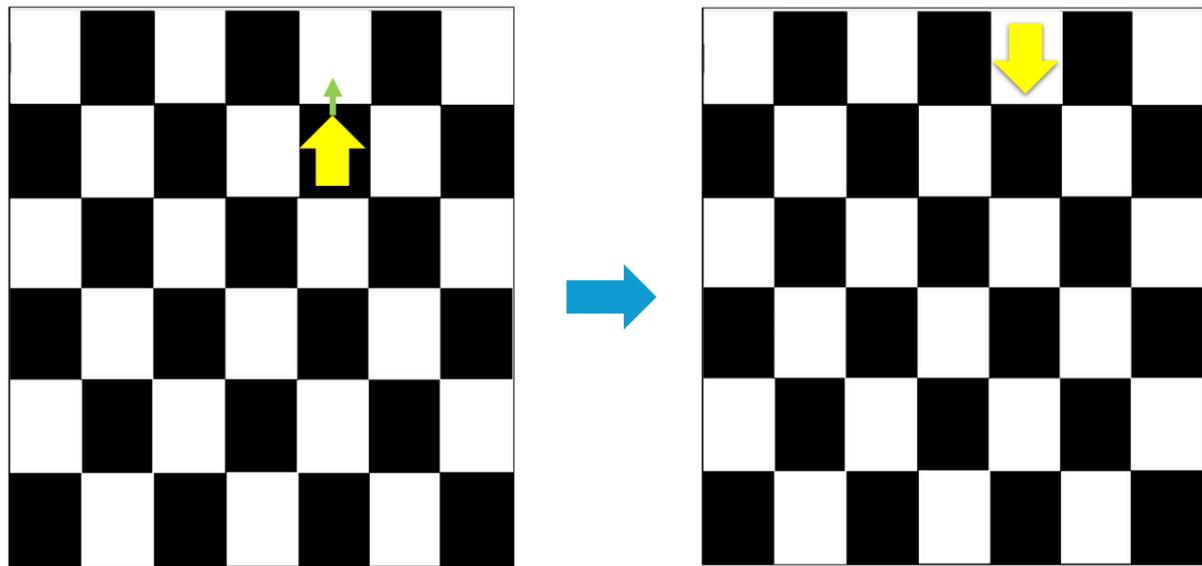


Figure 4.4: Point piece starts turn and heading back when reach the end of the board

4.2.2 Plus Piece

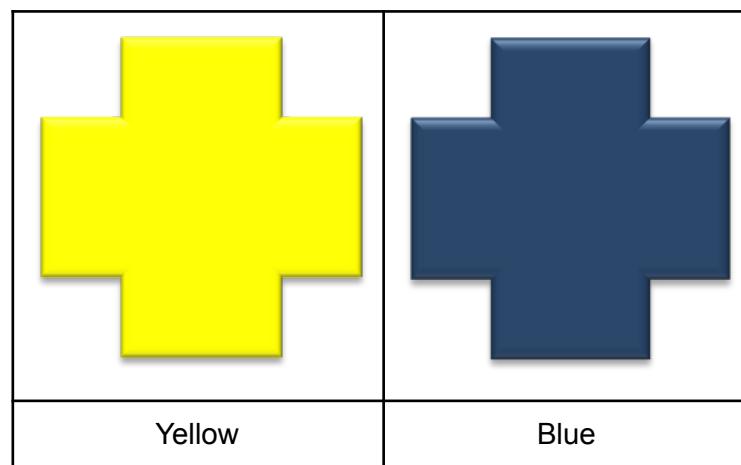


Figure 4.5: Plus Piece

The Plus piece can move horizontally and vertically only but can go any distance. **It cannot skip over other pieces.**

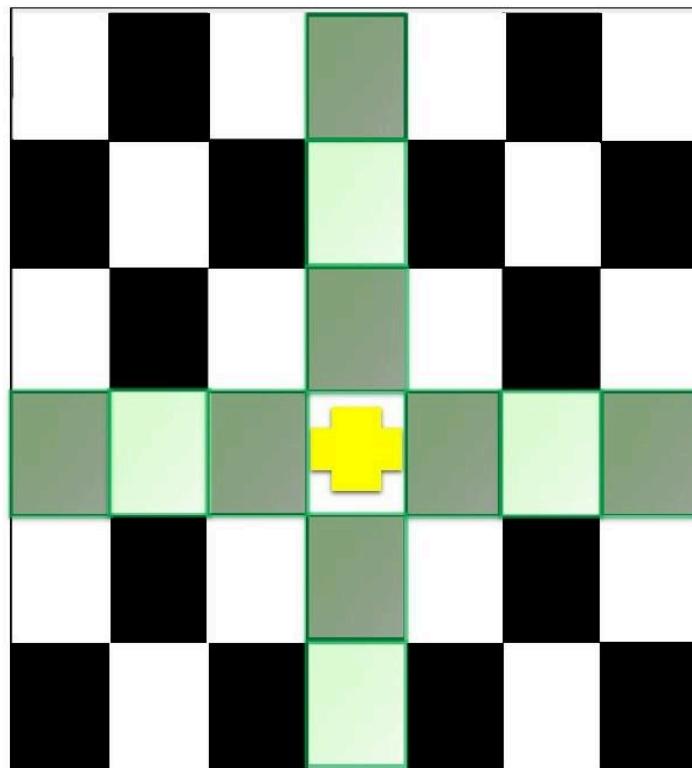


Figure 4.6: Movement of Plus Piece

4.2.3 Hourglass Piece

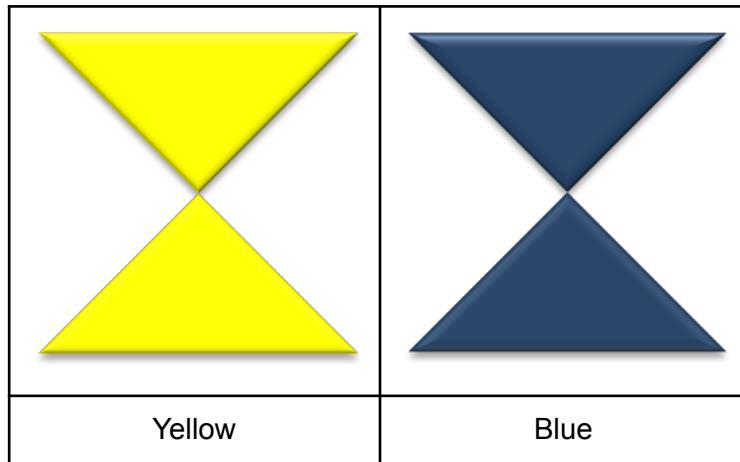


Figure 4.7: Hourglass Piece

The Hourglass piece moves in a 3x2 (L shape) in any orientation. It can skip over other pieces. **It is the only piece that can skip over other chess.**

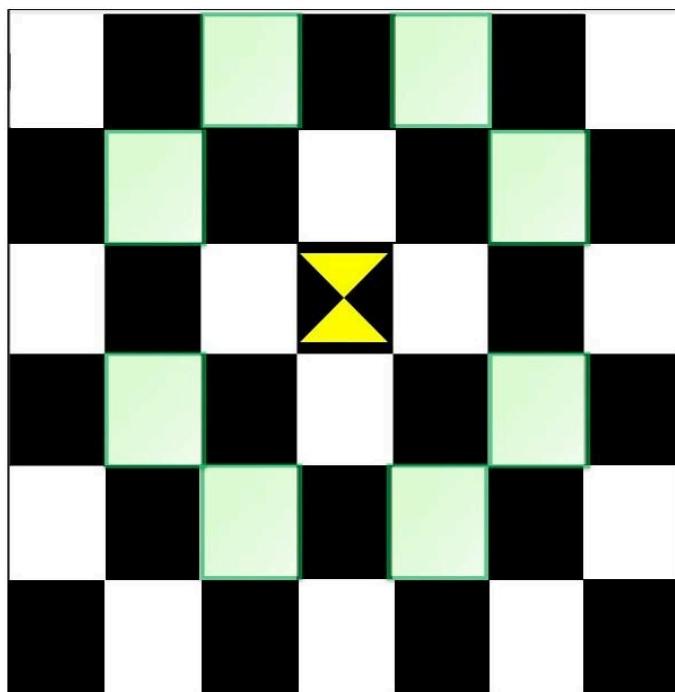


Figure 4.8: Movement of Hourglass Piece

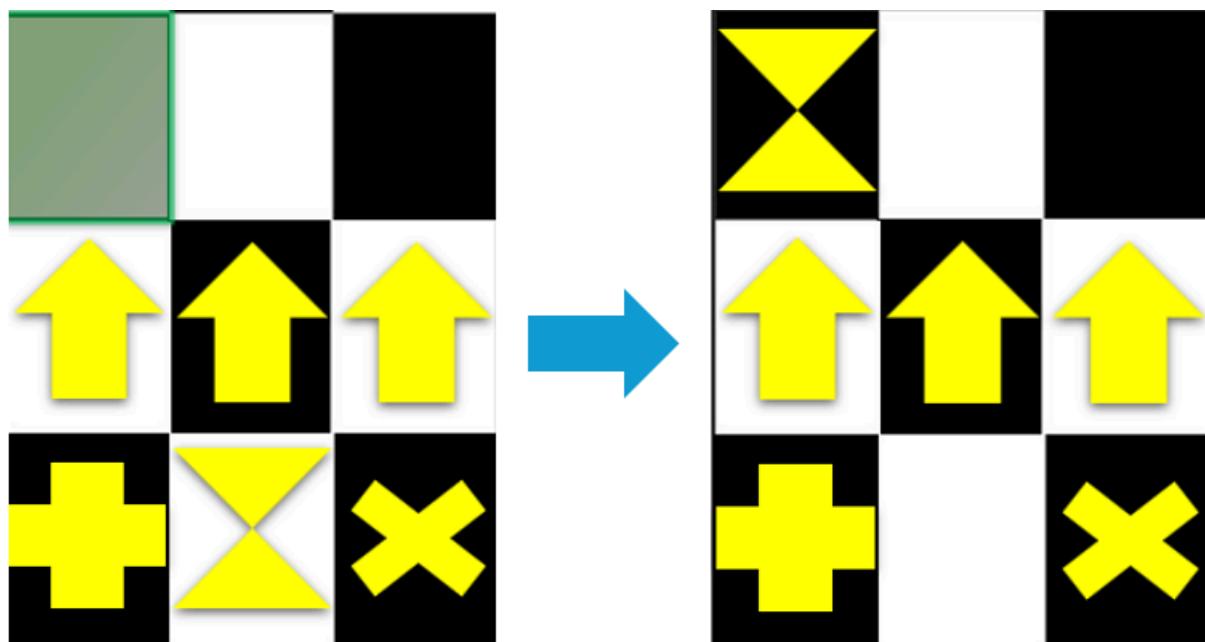


Figure 4.9: The Hourglass Piece **can skip over other chess**

4.2.4 Times Piece

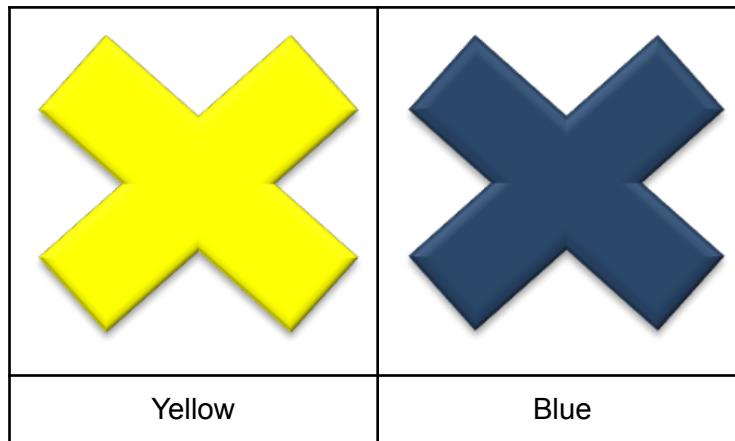


Figure 4.10: Time Piece

The Time piece can only move diagonally but can go any distance. **It cannot skip over other pieces.**

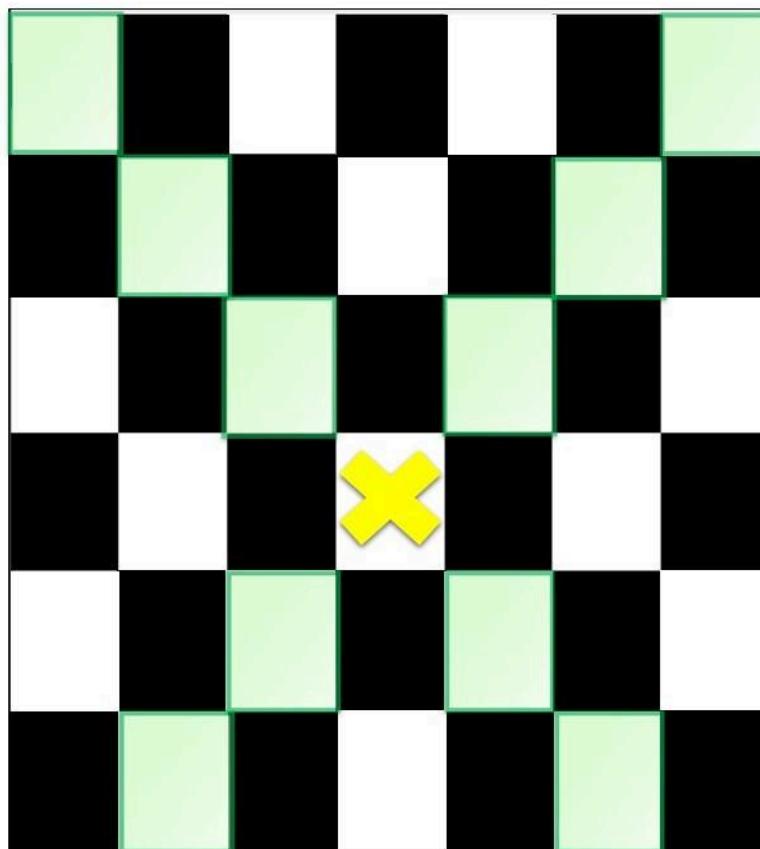


Figure 4.11: Movement of Times Piece

4.2.5 Sun Piece

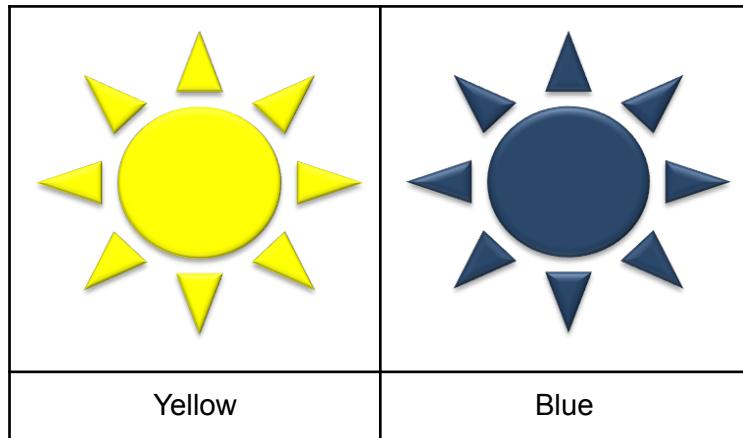


Figure 4.12: Sun Piece

The Sun piece can move only one step in any direction. **It cannot skip over other pieces.** when the Sun piece is captured by the other side's piece, Game over.

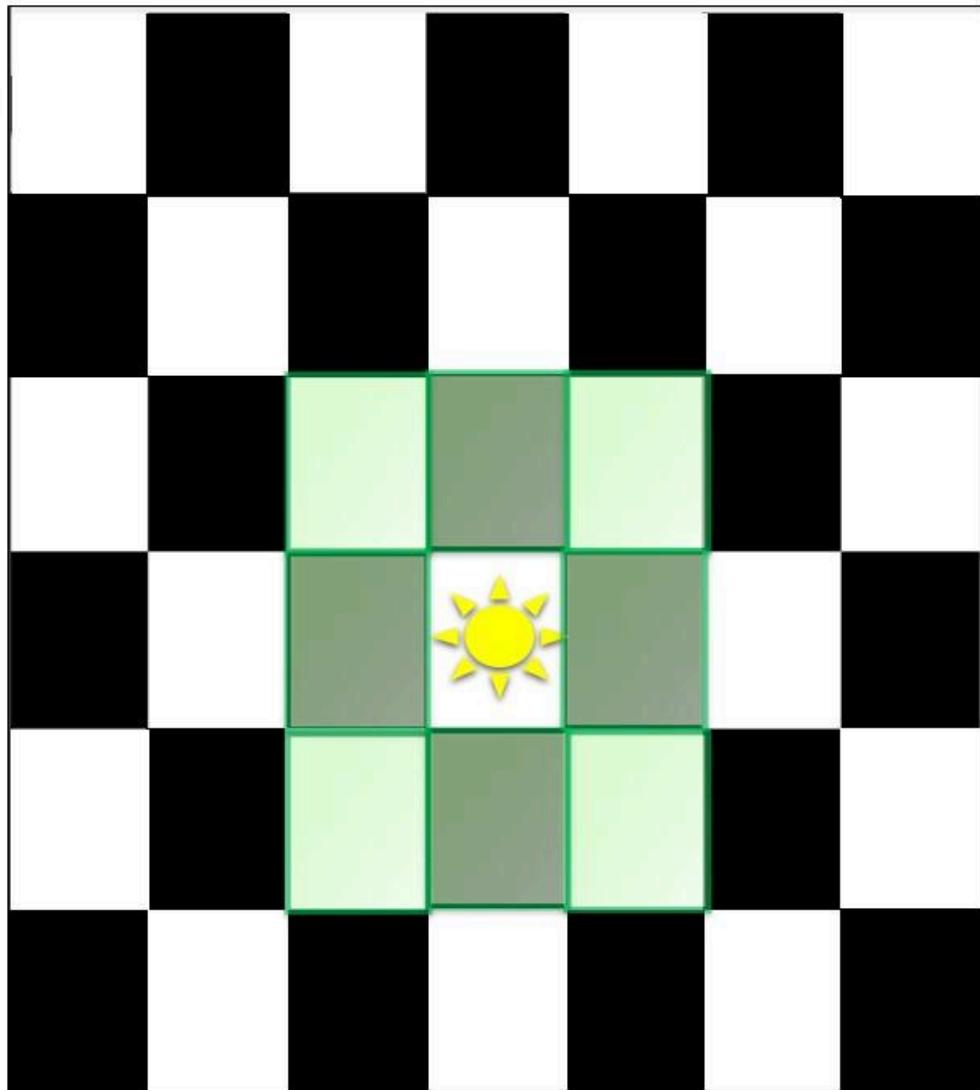
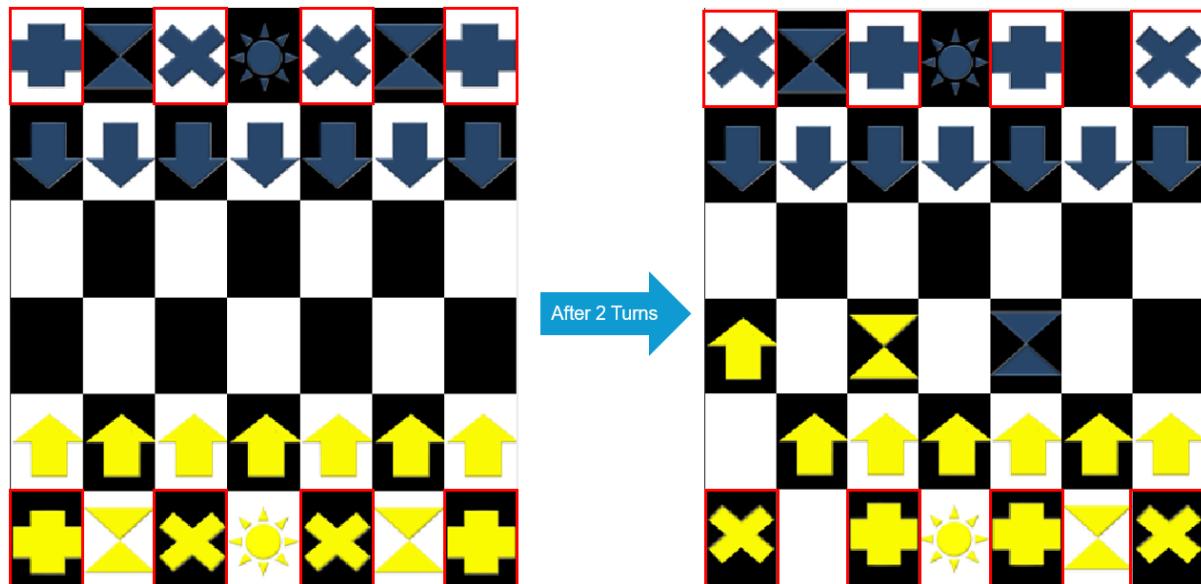


Figure 4.13: Movement of Sun Piece

4.3 Special Pieces with transformation

Times and Plus Pieces

After 2 turns with counting one yellow move and one blue move as one turn, all player's Time pieces will turn into Plus pieces, and all Plus pieces will turn into Time pieces.



Remarks:

| Piece | Figure | |
|-------|--------|--|
| Plus | | |
| Time | | |

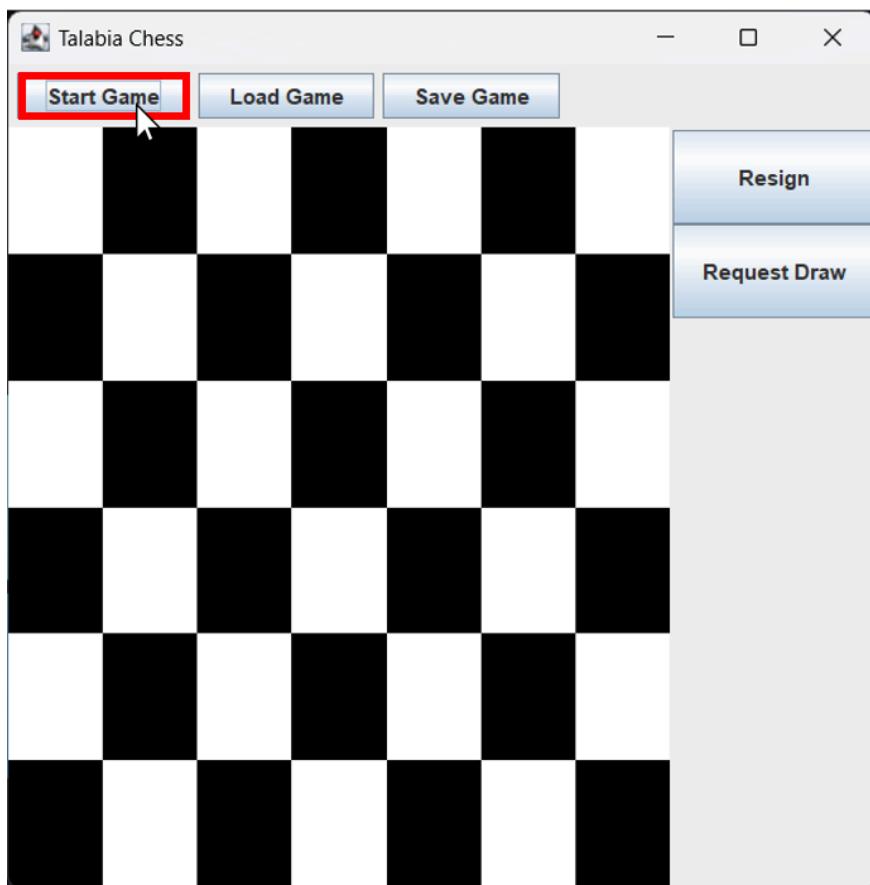
Figure 4.14: Transformation of Times and Plus Pieces after two turns

5 Playing the Game

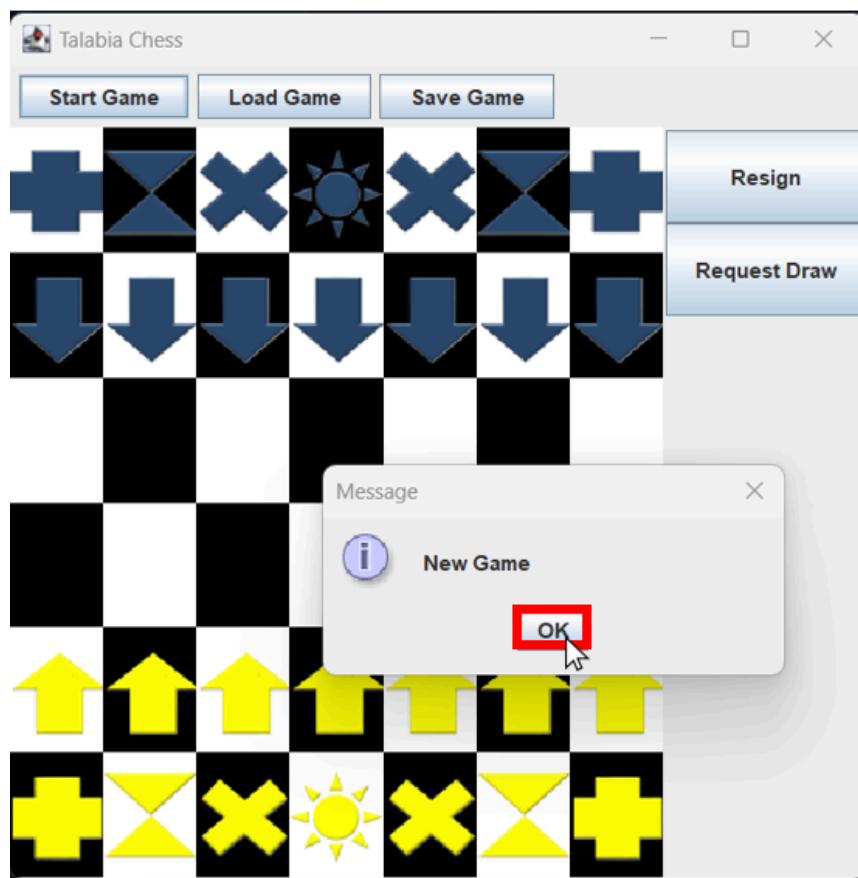
5.1 Starting a New Game

Start New Game:

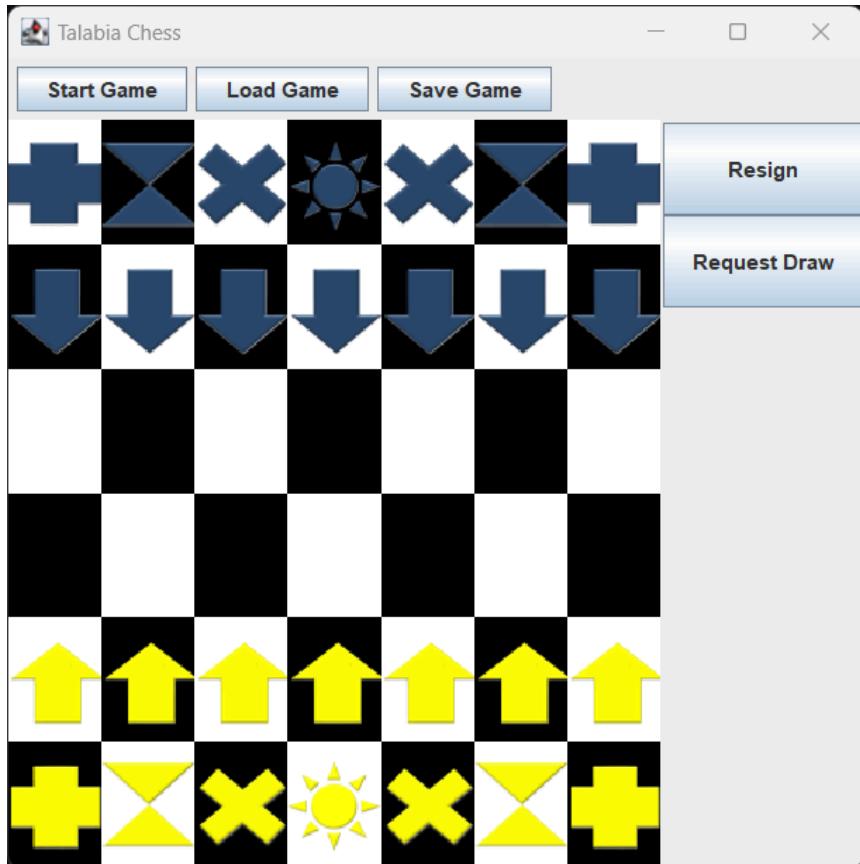
1. Click the "Start Game" button.



2. The New Game pop up message will appear and the empty chess board is filled with blue and yellow chess pieces. Click on the 'OK' button.



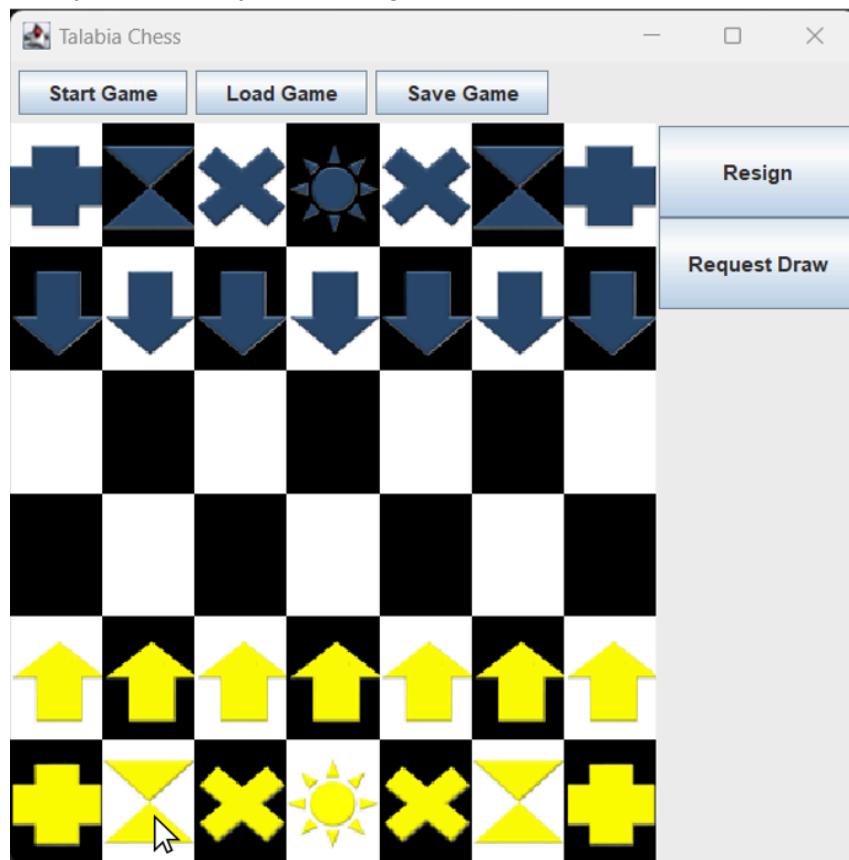
3. You're ready to make the first move in your new Talabia Chess game!



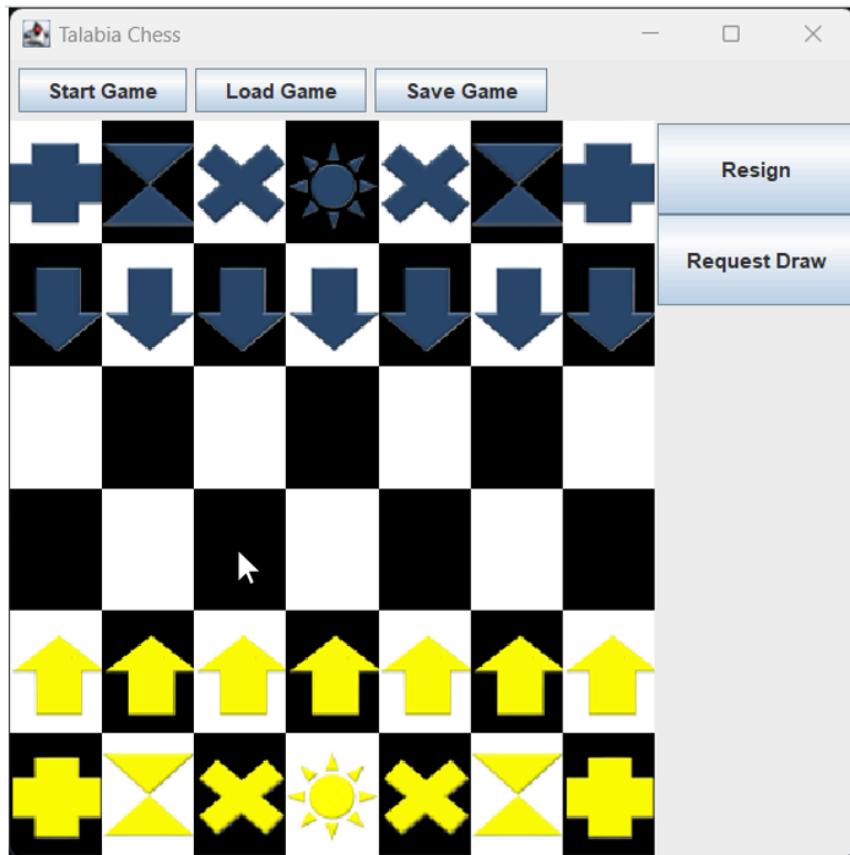
5.2 Making Moves

Move Pieces:

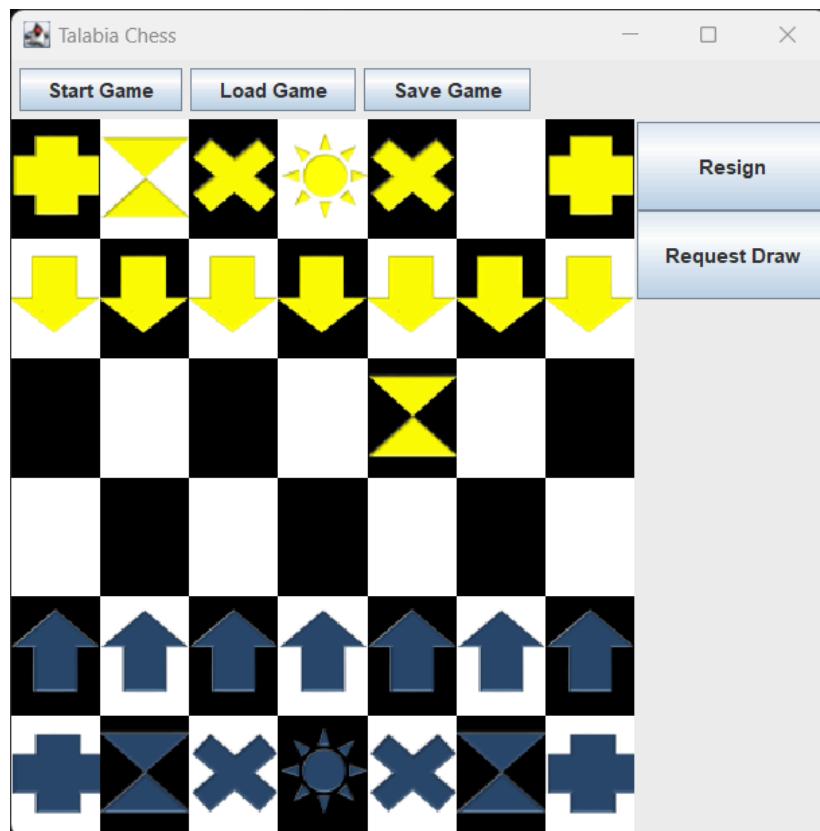
1. Click on any pieces (ie: yellow hourglass piece).



2. Select the square that is correct on the piece movement.



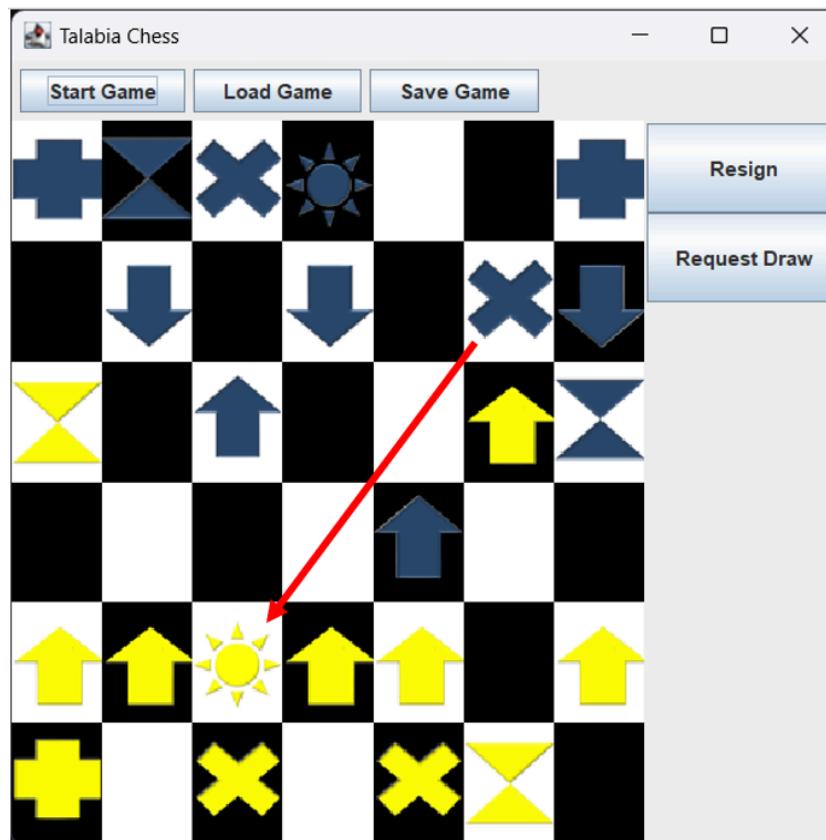
3. The piece moves and the chess board flips to the other side.



5.3 Checkmate

Checkmate:

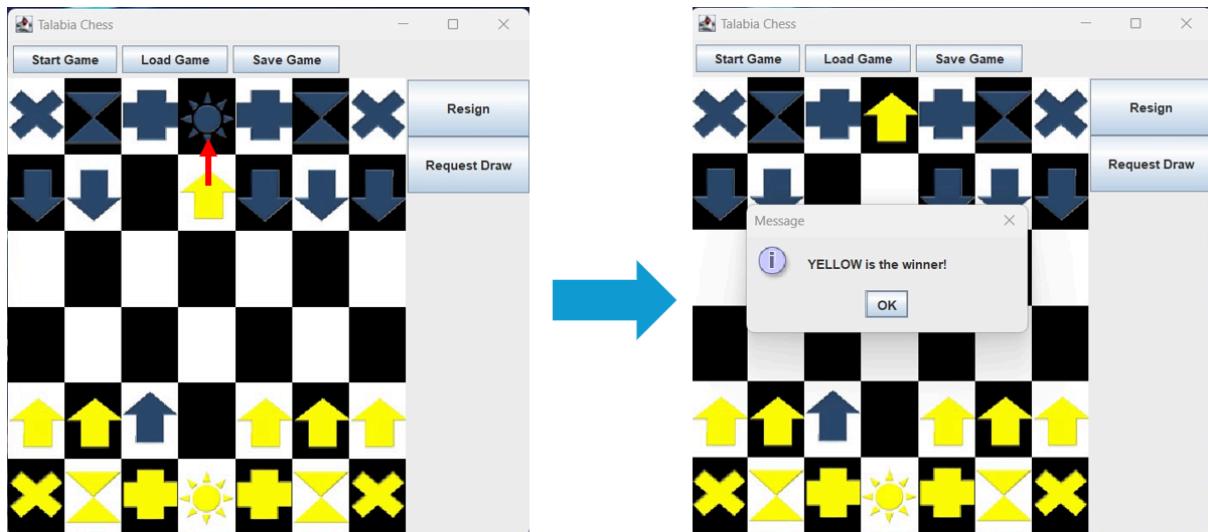
When one player's sun piece is in the checkmate. The player can move the sun piece only.
(eg: The blue time piece is going to capture the yellow sun piece)



5.4 Game Over

Game Over:

When one of the player's sun piece is captured, the pop up message "(yellow/blue) is the winner!" is shown.

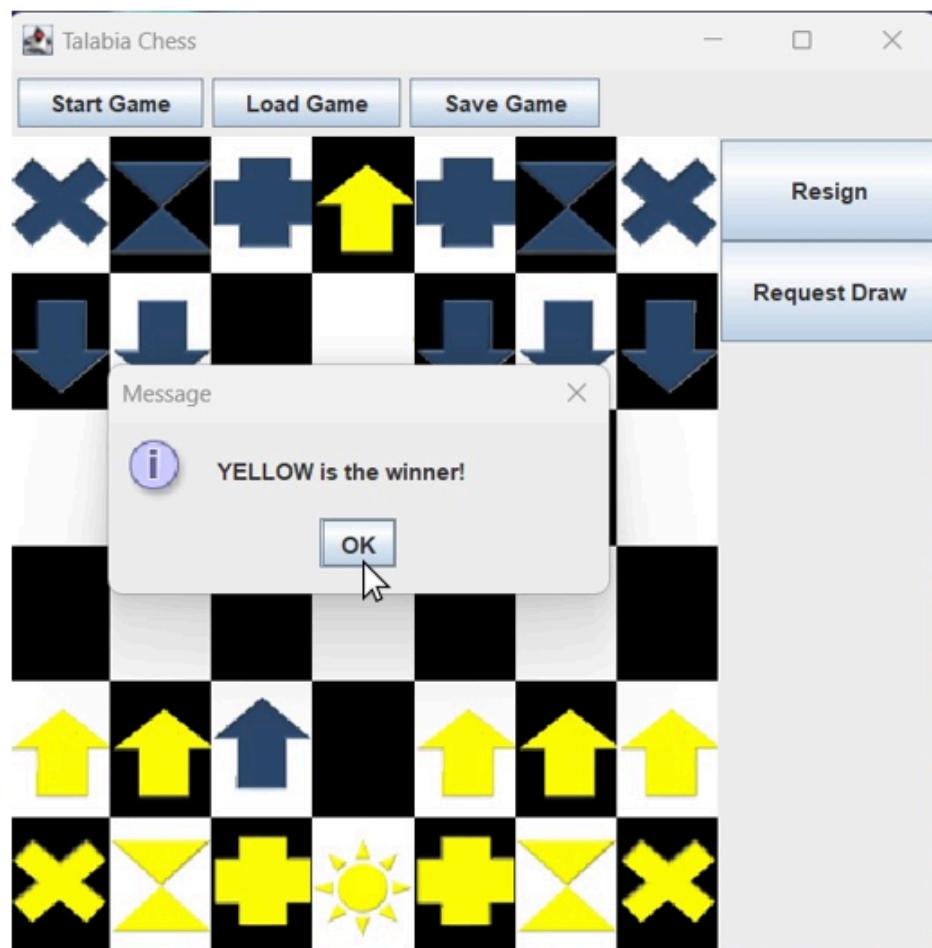


5.5 Play Again

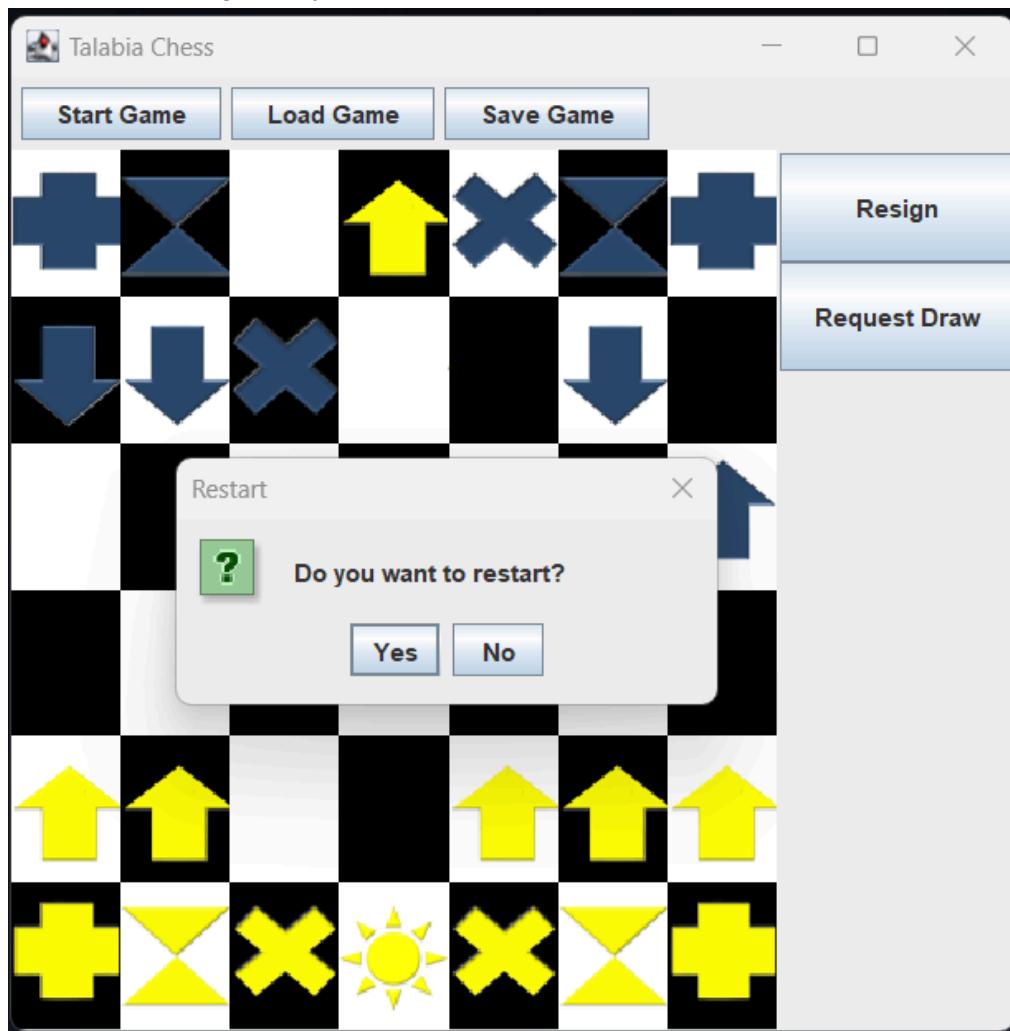
Play Again:

If you wish to play again from the end of the game. You can:

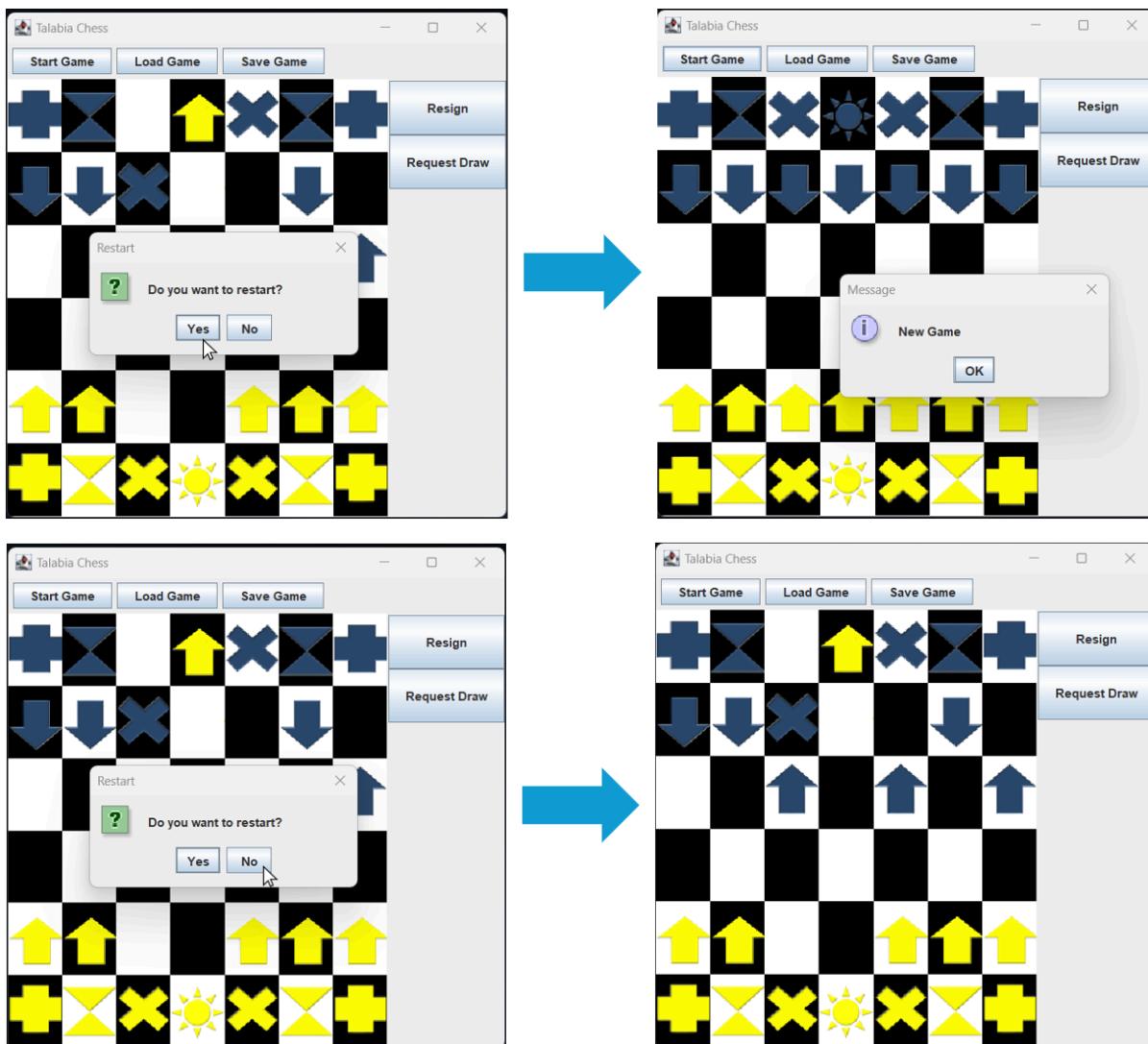
1. Click 'OK' button



2. A pop up message 'Do you want to restart' will appear.



3. If you wish to restart the game. Click Yes and the chess board will reset and the New Game pop up message will appear else will close the message.

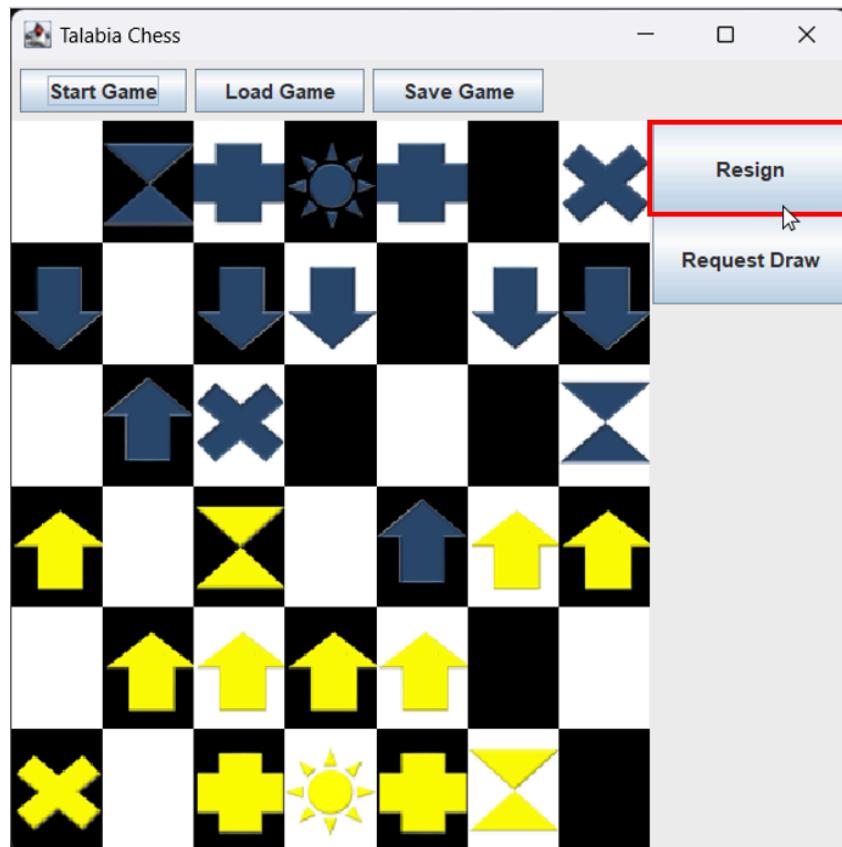


5.6 Resign Game

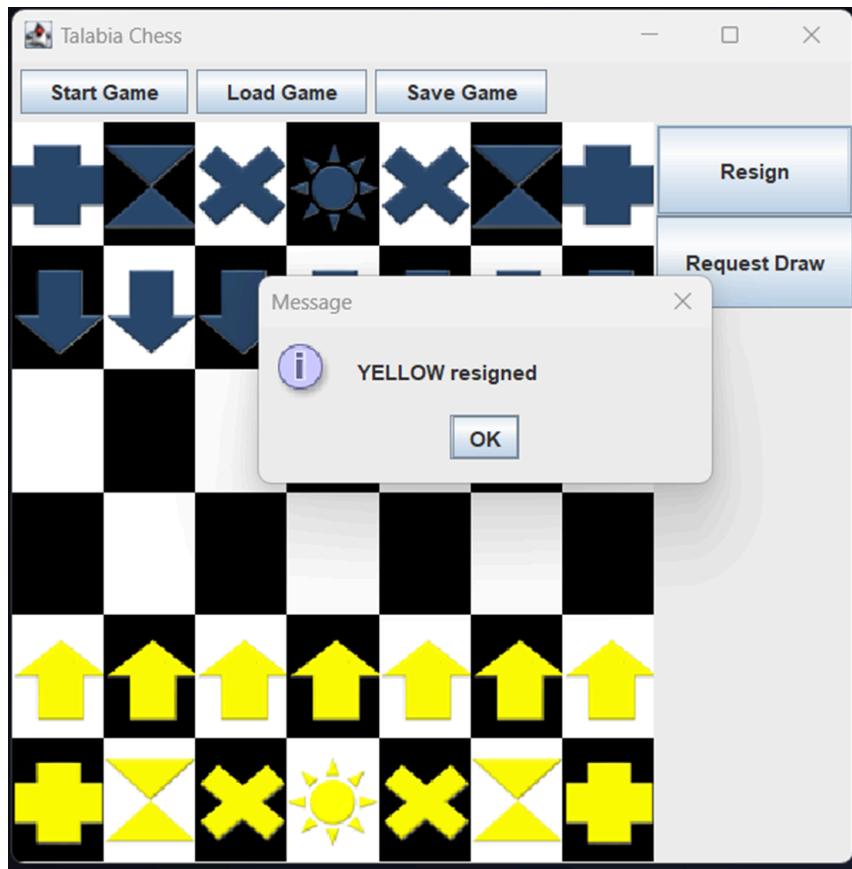
Resign:

If you find yourself in a challenging position and wish to concede the game, you have the option to resign. Follow these steps:

1. Click the "Resign" button.



2. The game will acknowledge your resignation, and your opponent will be declared the winner with a pop up message “(Yellow/Blue) resigned”. Also, the chess board will reset.

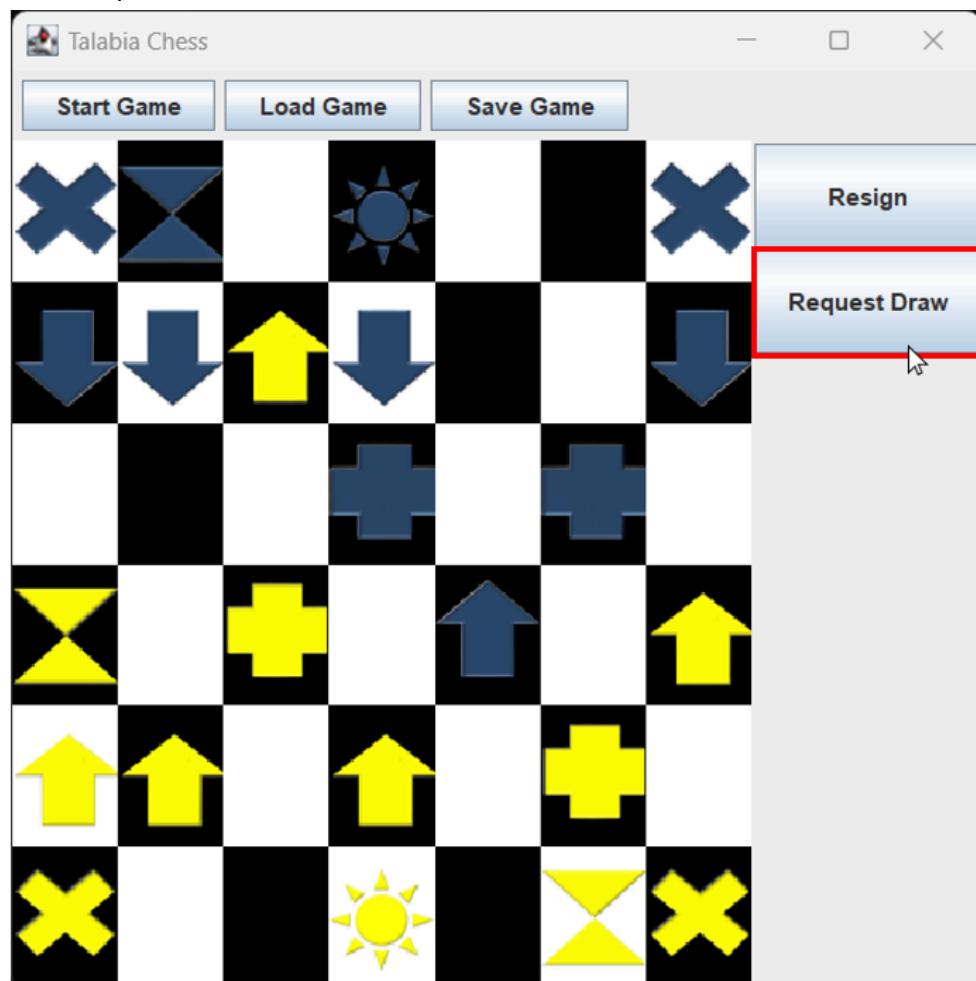


5.7 Draw Game

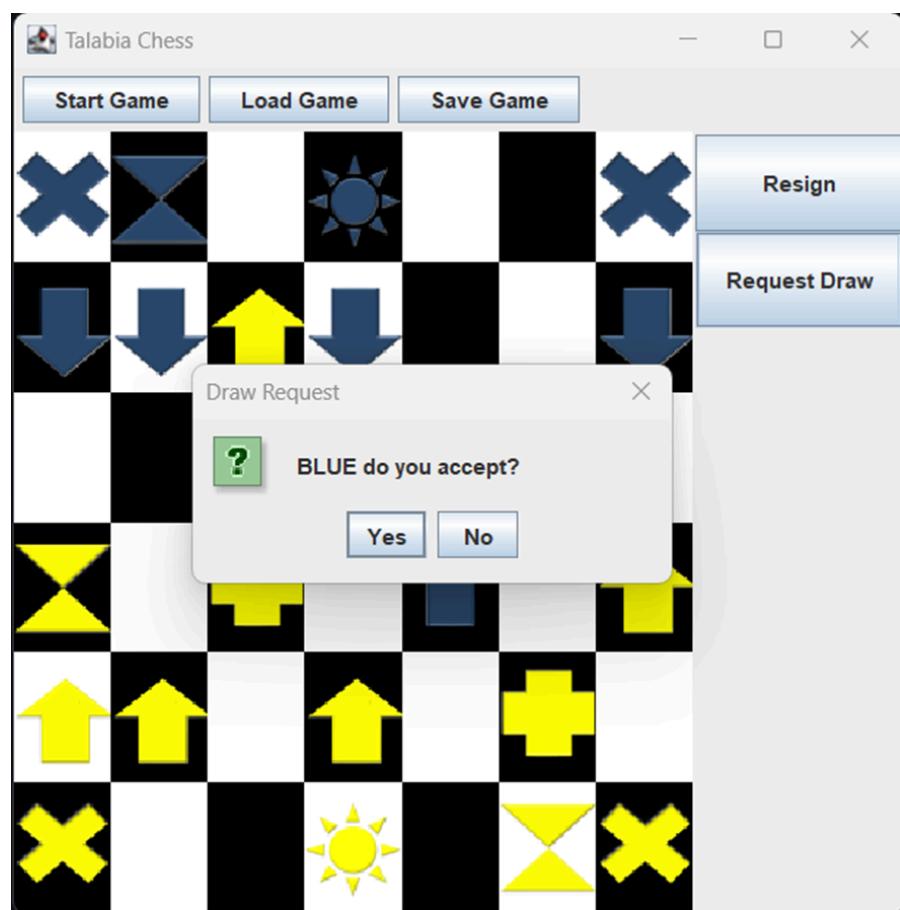
Draw Game:

Under certain circumstances, both players might agree to a draw if the game reaches an inconclusive position. Here's how to propose a draw:

1. Click the 'Request Draw' button.



2. A pop up message "(Yellow/Blue) do you accept?" shown to your opponent to accept the draw.



3. If your opponent agrees, the game ends in a draw with a pop up message ‘It is a draw’ appears. Else a pop up message ‘Draw request reject’ appears.

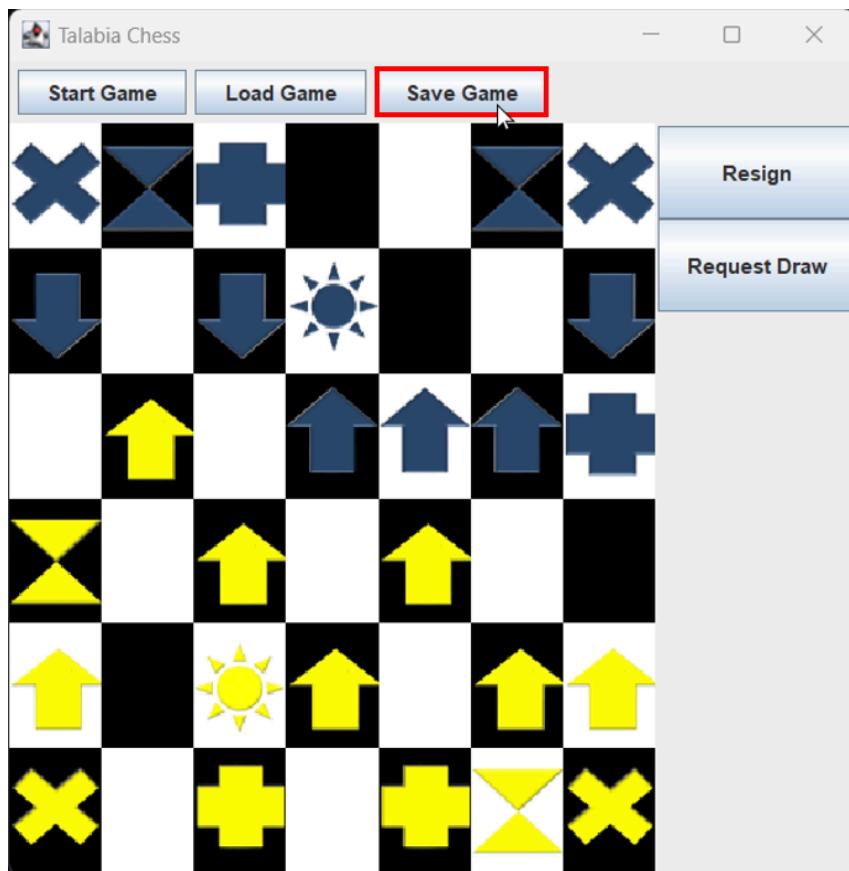


5.8 Saving Game

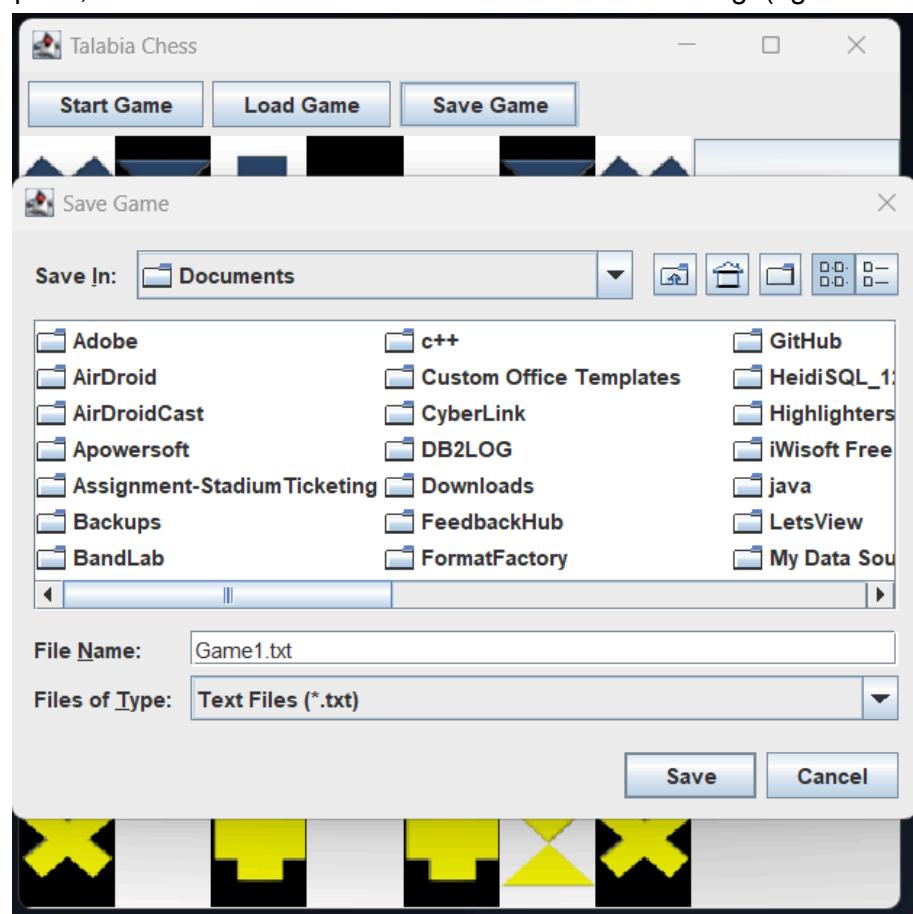
Save the Game:

Capture the current state of your Talabia Chess match by saving the game. Follow these steps:

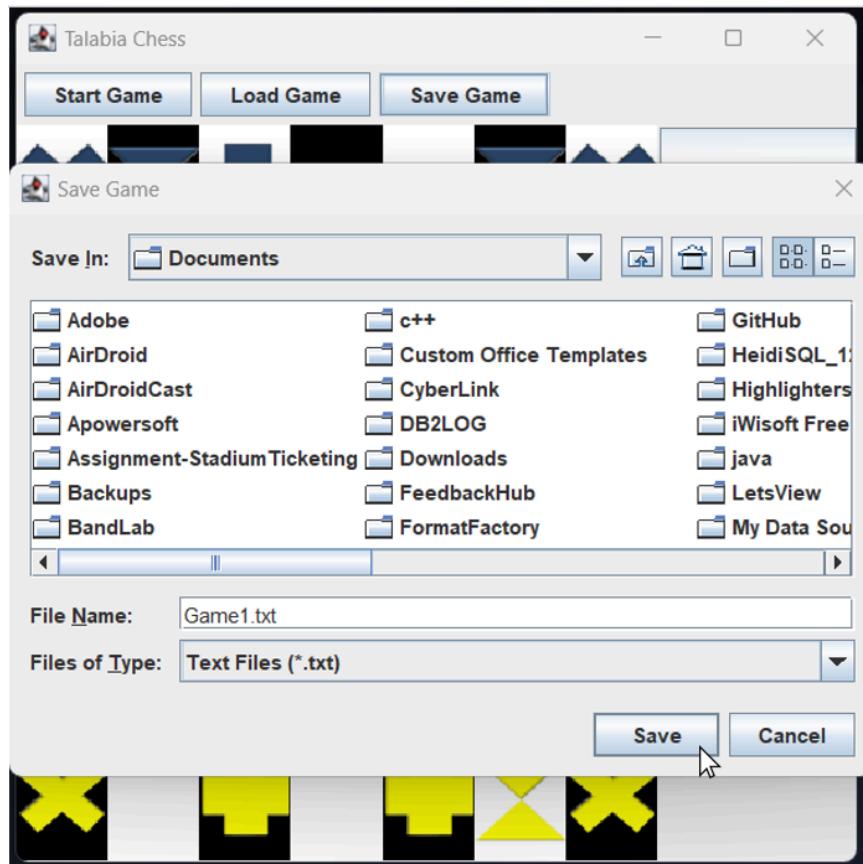
1. Click the "Save Game" button.



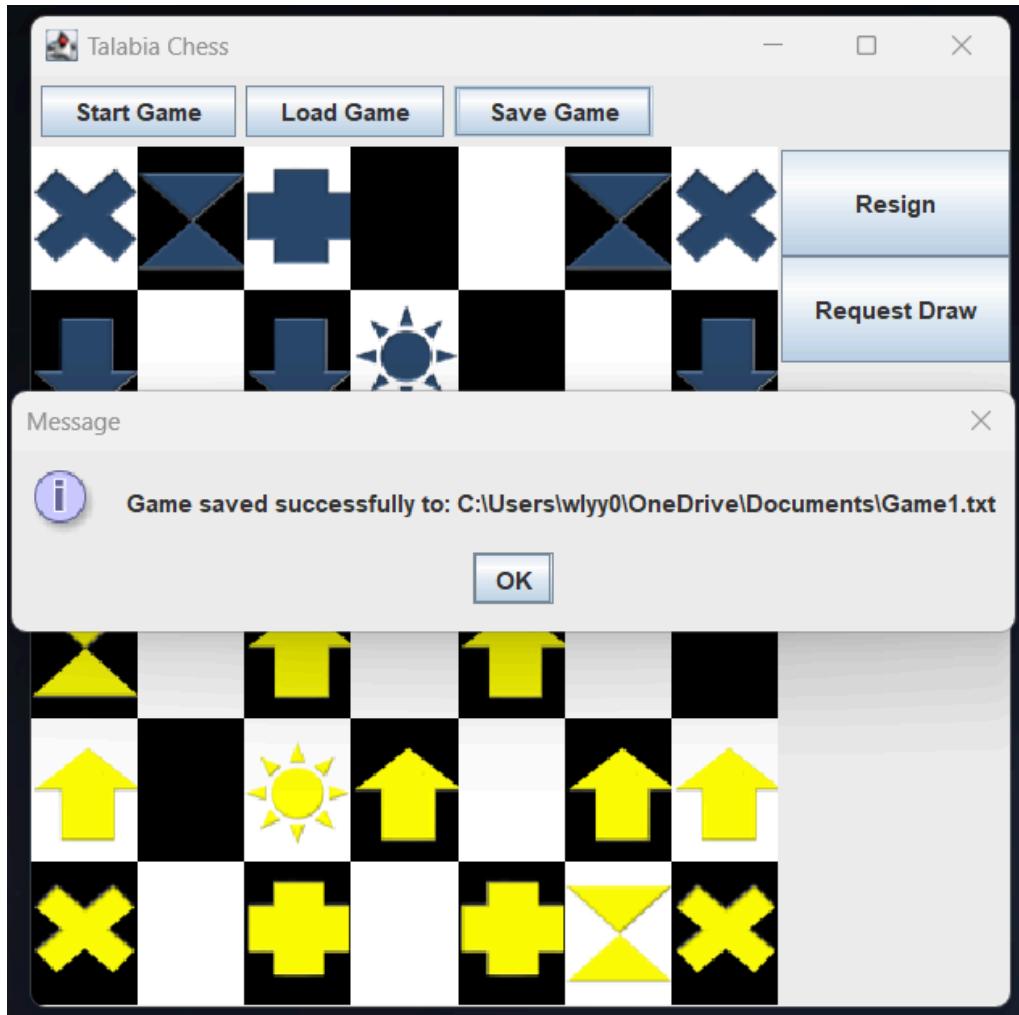
2. A Save Game “Save Game” dialog box will appear. You can save in any location on the computer, Remember to add .txt behind the file while naming. (eg: Game1.txt)



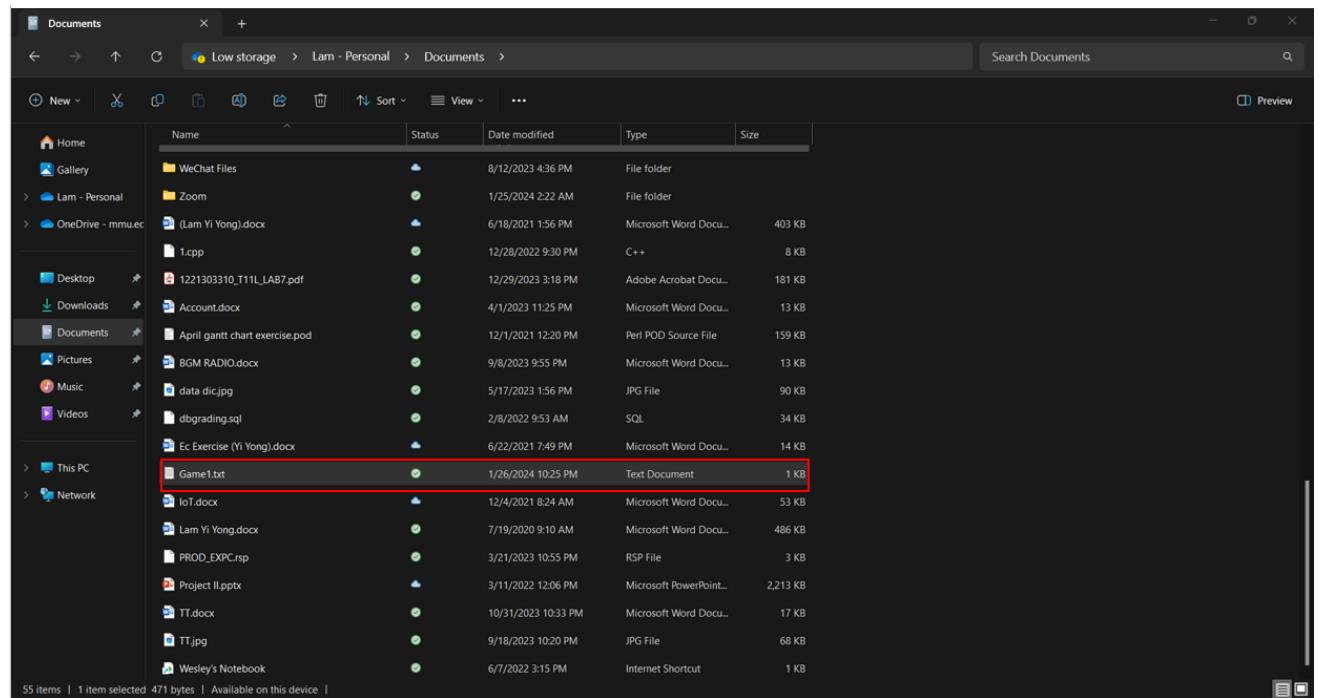
3. Once the naming is complete, click 'Save'.



4. ‘Game Saving’ pop up message will appear.



Your file will appear depending on your file saving location.

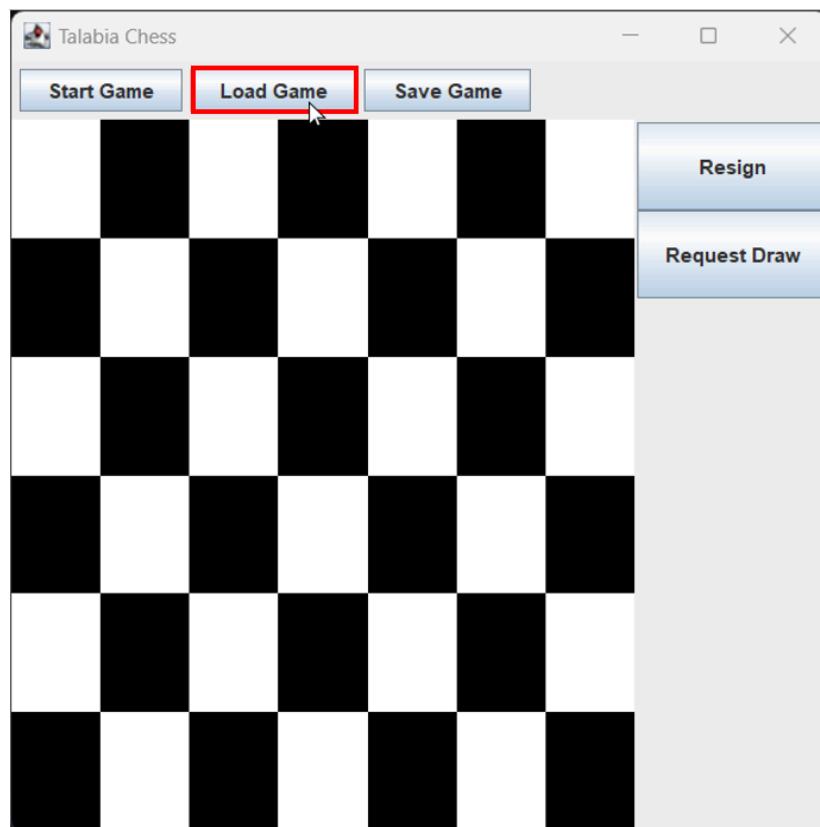


5.9 Loading Game

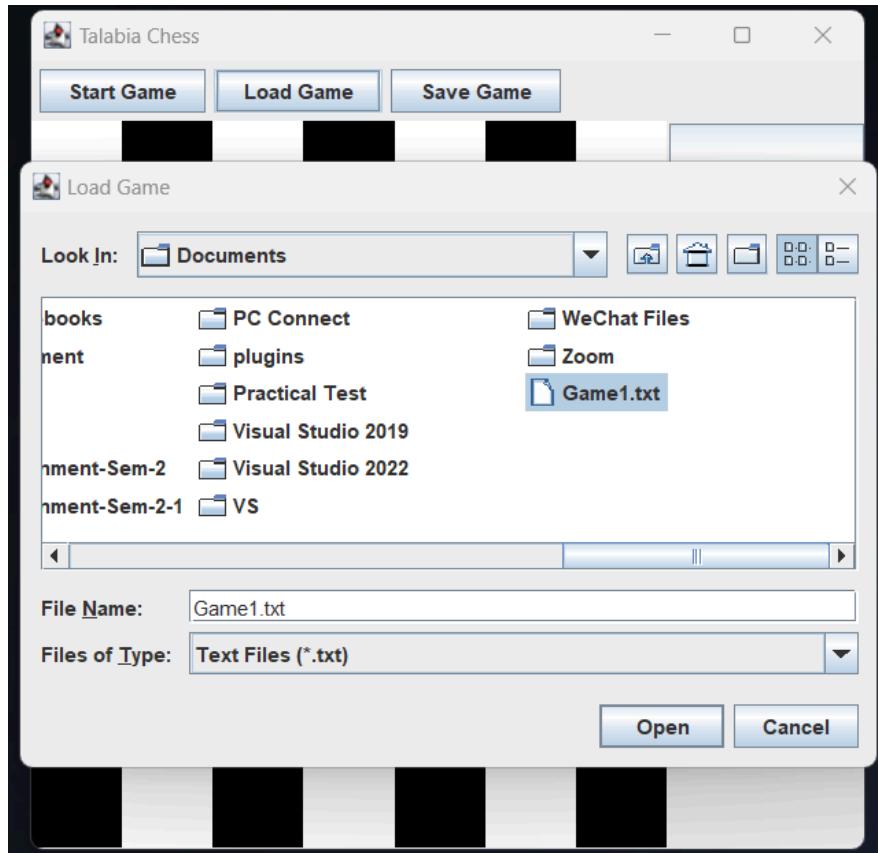
Load Game:

Resume the previous match by loading a saved game.

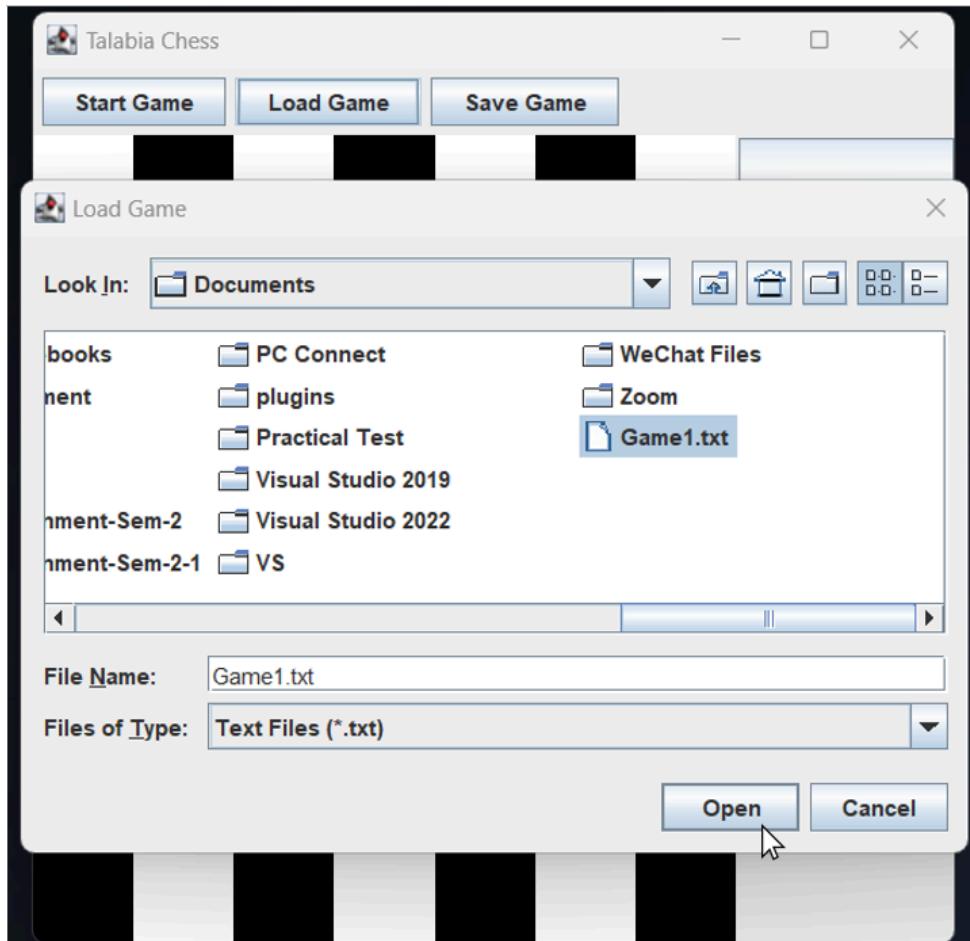
1. Click the "Load Game" button.



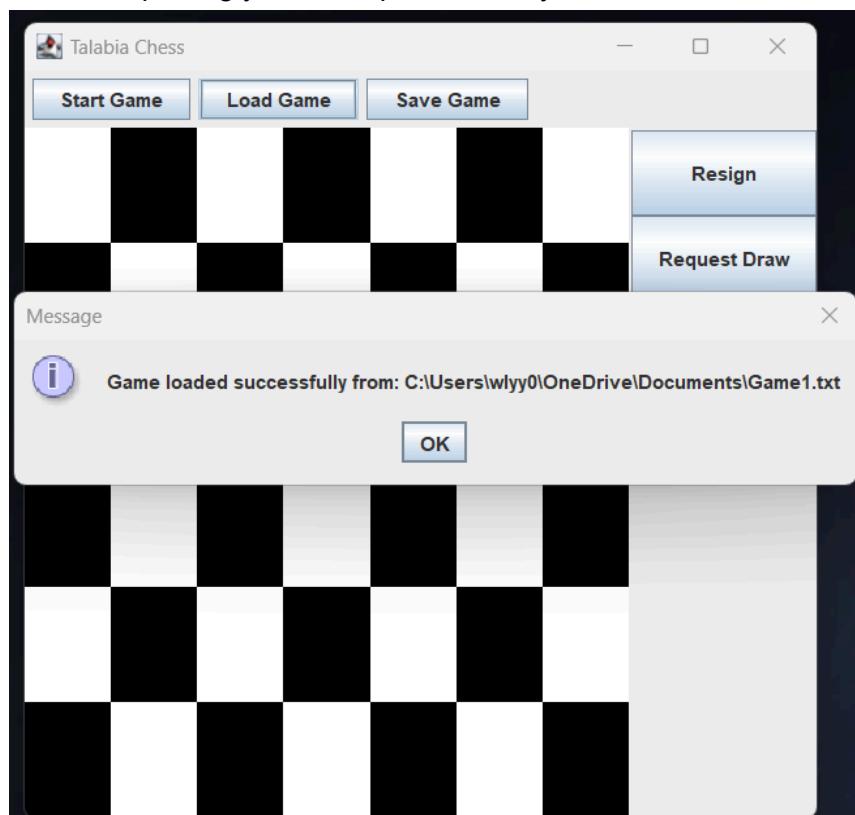
2. Choose the saved game file you wish to load.



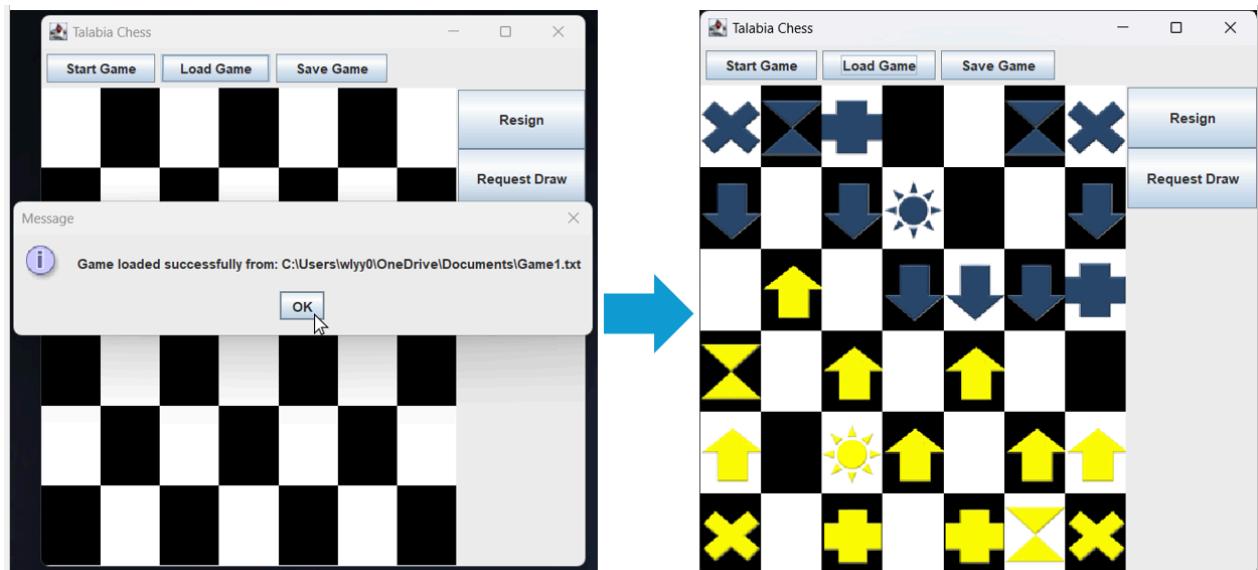
3. Once selected, Click 'Open'.



4. The game will load, placing you at the point where you left off.



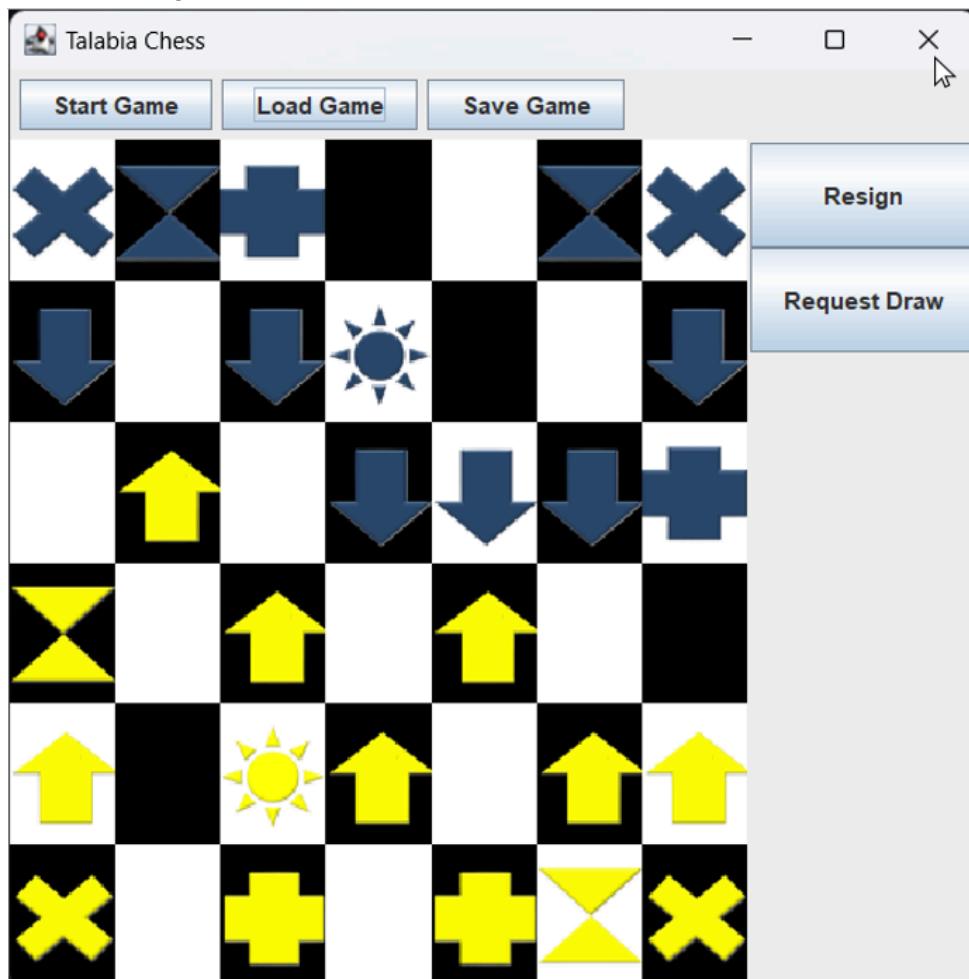
5. Click 'OK' to continue the game.



5.10 Exiting Game

Exit Game:

If you wish to exit the game, click on the 'X' button (on Windows).



6 Troubleshooting

6.1 FAQs(Frequently Asked Questions)

If you encounter issues or have questions about Talabia Chess, refer to the following FAQs for assistance:

Q1: The game is not launching. What should I do?

Solution: Ensure that your system meets the minimum requirements. Check for any error messages.

Q2: The pieces are not moving as expected. What could be the issue?

Solution: Review the rules of each piece in the game. If the problem persists, check for any conflicting input methods or controls.

Q3: How can I reset the game if it becomes unresponsive?

Solution: Close and relaunch the game. If the issue persists, refer to the "Resign" option to conclude the current game.

Q4: Can I customise the pieces or the chessboard in Talabia Chess?

Answer: Talabia Chess does not support customization of pieces or the chessboard. The game features a unique set of predefined pieces and rules.

Q5: I encountered an issue not listed here. Where can I find more help?

Solution: Contact our support team (refer to section 7 - Support).

7 Support

7.1 Contacting Support

If you encounter issues or have questions related to Talabia Chess, please don't hesitate to contact our support team. As a student team, we're here to help you with any problems you may encounter.

Email Support:

Reach out to our support team via email.

Email Address: 1221303302@student.mmu.edu.my

1221303310@student.mmu.edu.my

1211103024@student.mmu.edu.my

1221303664@student.mmu.edu.my

1221301122@student.mmu.edu.my

Response Time:

Our support team will make every effort to respond to your inquiries promptly.

Please allow up to 24-48 hours for a response.

We appreciate your understanding and cooperation. Your feedback is essential for us to improve Talabia Chess and ensure an enjoyable gaming experience.

8 Conclusion

8.1 Thank You

Thank you for choosing Talabia Chess! We appreciate your enthusiasm and hope you thoroughly enjoy playing our unique chess game. Your support means a lot to us, and we're grateful for the opportunity to share this gaming experience with you.

8.2 Feedback

We value your feedback and insights into your Talabia Chess experience. If you have suggestions, encountered issues or would like to share your thoughts, please reach out to us. Your feedback is crucial in helping us enhance the game and provide a better experience for all players.

How to Provide Feedback:

Email:

Send your feedback via email to

1221303302@student.mmu.edu.my,
1221303310@student.mmu.edu.my,
1211103024@student.mmu.edu.my,
1221303664@student.mmu.edu.my,
1221301122@student.mmu.edu.my,

Include any details about your experience, suggestions for improvement, or any issues you may have encountered.

We're dedicated to continuously improving Talabia Chess and your input plays a significant role in shaping its future. Once again, thank you for playing Talabia Chess and we look forward to hearing from you!