

Chess Chat Program
Version 0.0014: May 17, 2020

Andres Cervantes, Bradley Chu,
James Guise, Taylor Togami,
& Trenton Nguyen
(Team 16)



University of California, Irvine • Samueli School of Engineering
5200 Engineering Hall Irvine, CA 926297-2700 • +1-949-824-4333 • ugengr@uci.edu • +1-949-824-4334

Table of Contents

Glossary	2
1. Instant Messaging	3
1.1. Usage Scenario	3
1.2. Goals	5
1.3. Features	5
2. Installation	6
2.1. System requirements	6
2.2. Setup and configuration	6
2.3. Uninstalling	6
3. Chat Functions and Features	6
4. Chess Functions and Features	9
4.1 Implementation of the Official Rules of Chess	9
4.2 Chess Board	9
4.3 Human and AI Players	10
4.4 Side Selection	11
4.5 Game Log	11
4.6 AI Player Details	12
Error Messages	13
Index	14

Glossary

Account: An account is what a user will use to identify themselves on the chat program. Each user's account will also have a password the user will provide, so that only that user can use the account.

Chat: The goal of a chat service is to provide instant messaging online between users.

Chess: Chess is a game involving a 8x8 board of squares with 16 pieces for each player. The goal of chess is to capture the opposing player's king.

Client: The client is what the user will be using to interact with the program/server with their personal device.

Contact(s): A contact is another user that the current user has added to their contact list, allowing the two to communicate. A contact can also be removed from the list.

Log-in: The process of accessing an already existing account is called a log-in. In order to log-in, the user must provide the correct account name and password that they made upon registering.

Provider/Server: The provider will accept inputs from any of the users and send outputs back to their clients accordingly. It will also store all of the account information from all of the users.

Register: Registering is the process of creating an account for the server.

1. Instant Messaging

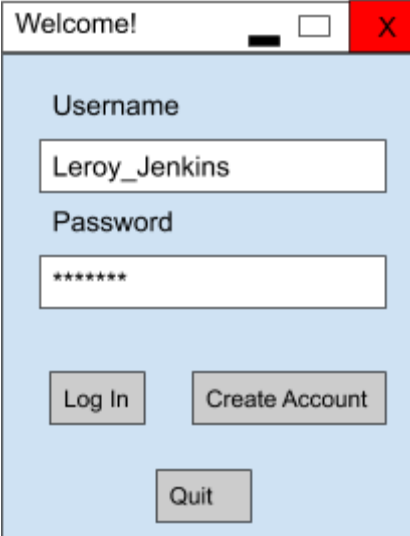
1.1. Usage Scenario

To install, please refer to Section 2.

To open your Chess program, enter the following command in your terminal:

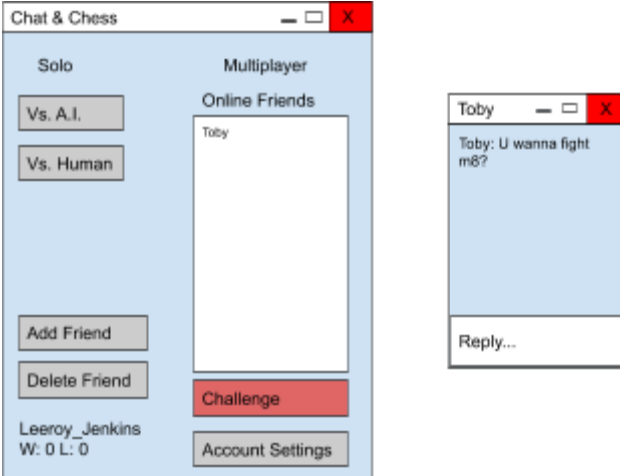
```
.\bin\ChessChat
```

After this, you will be greeted by the login window. You can log in by entering your credentials or create an account and follow the instructions.



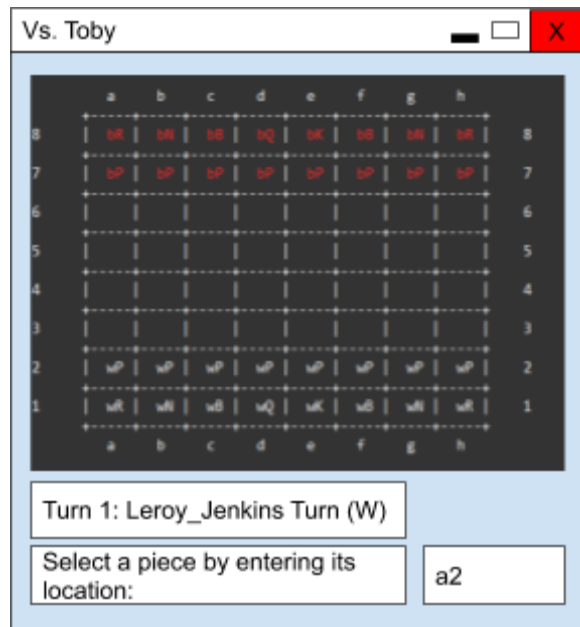
A login window titled "Welcome!" with a light blue background. It contains two input fields: "Username" with the text "Leroy_Jenkins" and "Password" with masked characters "*****". Below the fields are three buttons: "Log In", "Create Account", and "Quit".

To play Chess, you can challenge your friends by pressing the Challenge button, you can play against AI by pressing Vs A.I., and also play locally by pressing Vs Human.



The "Chat & Chess" main window has a light blue background and is divided into two sections: "Solo" and "Multiplayer". The "Solo" section contains buttons for "Vs. A.I." and "Vs. Human", and a status bar at the bottom showing "Leeroy_Jenkins W: 0 L: 0". The "Multiplayer" section contains an "Online Friends" list with the name "Toby", a red "Challenge" button, and an "Account Settings" button. To the right, a chat window titled "Toby" shows a message "Toby: U wanna fight m8?" and a "Reply..." input field.

When playing Chess, against AI, Humans, or a Online Friend, you will see the following window:



When playing use the bottom right box to enter your inputs.
Setup your board to begin playing by answering the prompts.

Which team would you like to play as?(B = Black, W = white):

If you would like to play with another person by taking turns, enter "H"

If you would like to play against the computer, enter "C"

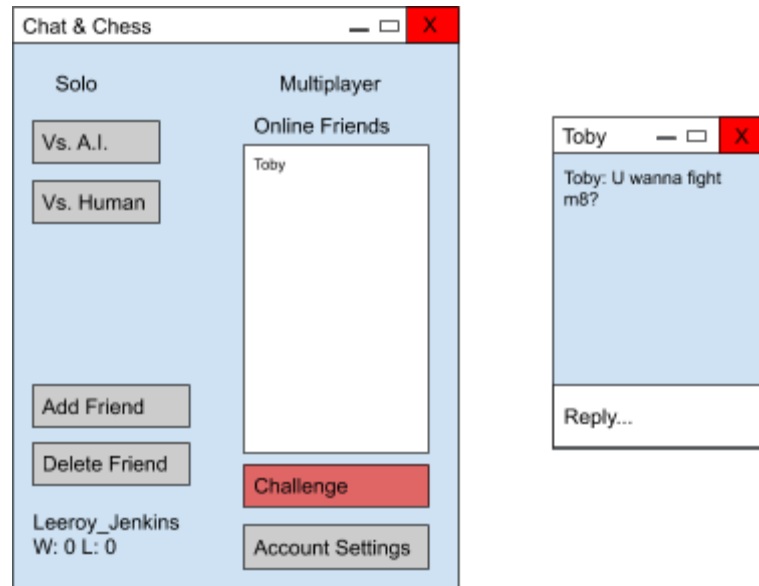
Do you want to go first or second? (1 for first, 2 for second):

If you would like to go first then enter 1.

If you would like to go second then enter 2.

Then you are all set, you are now playing Chess!

To use the chat, press on the name of the person you would like to chat with and after typing your message in the Reply... section of the chat window, press enter.



1.2. Goals

The goal of Chess is to move your pieces in a position that places your opponent's King in checkmate and socialize! Checkmate is when the king is being threatened by enemy pieces and the player can't make any move to save their king. Though, there are rules that state how each piece is allowed to move, please refer to the Glossary for information on how each piece is able to move.

1.3. Features

Custom Board

When you first run your Chess program, you are given the option to setup a custom board. To play with a custom board and set up your board, press B and follow the on screen instructions!

Human vs. Human

You can select to play against another human player locally, enter H in the prompt to play against a computer or human.

Artificial Intelligence

Our chess software has spectacular Artificial Intelligence that will put your chess skills to the absolute test! To play against our Artificial Intelligence please refer to section 1.1.

2. Installation

2.1. System requirements

Red Hat Linux - Linux OS (RHEL-6-x86_64)
 Available disk space: 100 MB
 X11 Server Client(Xming or XLaunch)

2.2. Setup and configuration

Download the latest version of the Chess Game file
 Untar/unzip file (tar -zxvf Chess_Beta.tar.gz)
 Type ./bin/Chess to run the chess game

2.3. Uninstalling

Type cd .. or cd - to exit out of the Chess_V1.0 directory
 Type rm -r Chess_V1.0 to remove the directory and the game

3. Chat Functions and Features

3.1 Client and Server Communication

Client Request:

<request>: LOGIN REQUEST
 USER: <user> PASS: <password>
 PORT: <port>

Server Response:

<server>: CHECK <user> IN DATABASE
 CHECK <password>
 CHECK <port>
 Return SUCCESS if <password> is for correct <user>, DISPLAY HOME
 SCREEN
 Return FAIL if <password> is wrong, PROMPT <user>
 again for <user> and <password>

Client Request:

<request>: CHAT REQUEST WITH <user2>
 MESSAGE: "Hi I'm Ferdinand Von Aegir"

Server Response:

<server>: RECEIVE MESSAGE FROM <user>
 SEND MESSAGE TO <user2>

3.2 Logging In, Algorithm, and Registration

Welcome! [minimize] [maximize] [close]

Username
Leroy_Jenkins

Password

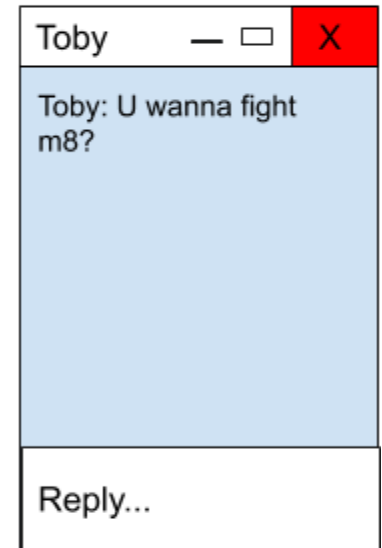
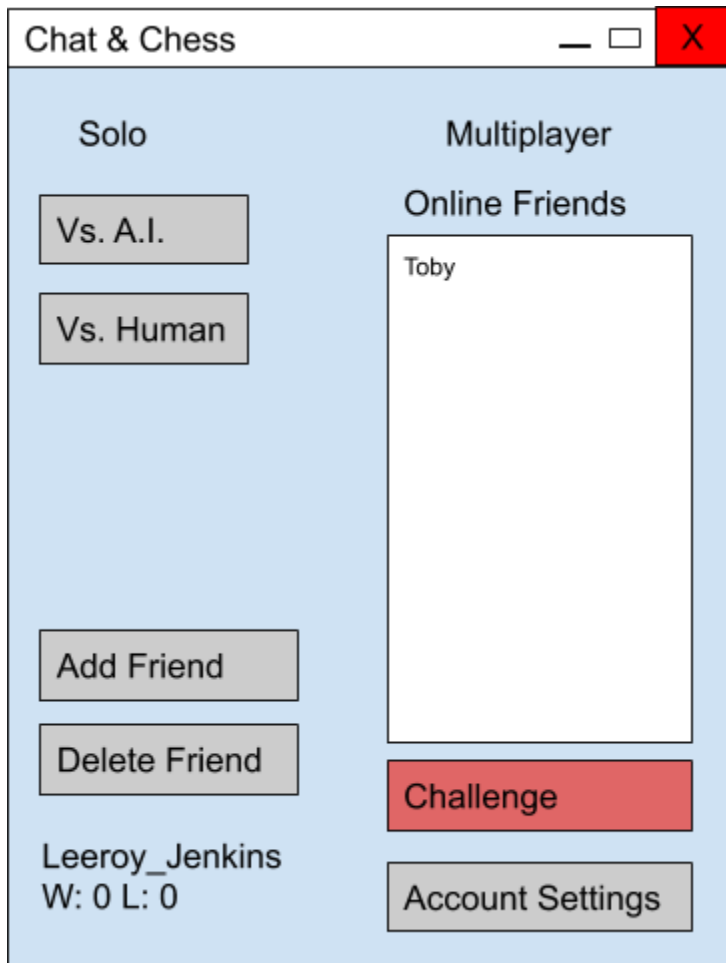
Log In Create Account

Quit

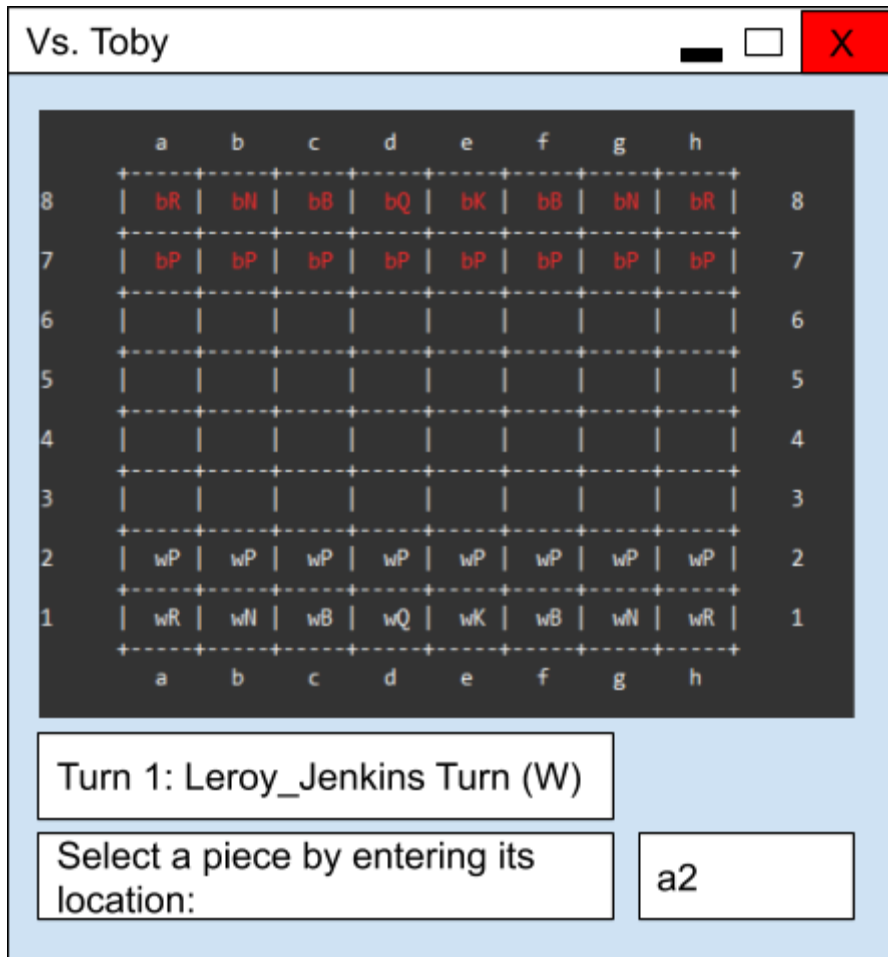
- Upon launching the chat program, the user will be prompted to log in or make an account
- The account creation process involves the user entering a new username and a password. If the username is unique then the server creates an account with that username and the password specified.
- Once an account is created, the user can easily login to their own account in a window that is similar to the one shown above
- For username creation spaces are not permitted

3.3 Chess Game Integration

- You can challenge anyone on your friend's list to a game of chess
- This is done by clicking the challenge button then clicking a user in your Online Friends List
- Once you challenge a player they will get a notification to accept or decline the challenge
- Simply clicking on a user in your Online Friends List will open up a chat log in a separate window with them where you can send messages to each other
- You can also play solo versus an AI player or a local human player on the same machine



- If the other user accepts the challenge then the chess game will launch in another window



- In this window you can play chess with your opponent, the chat window will also be open during this time so you can talk to your opponent while playing

4. Chess Functions and Features

4.1 Implementation of the Official Rules of Chess

- The 6 unique pieces (pawn, bishop, rook, king, queen, and knight) are represented as abbreviations on the text-based board each with different movement abilities.
- There are special movement options for certain pieces.
 - Pawn - En Passant
 - King + Rook - Castling
- After every move the game board is checked whether or not the king is in check and forces the player/computer to move in order to prevent their king from being captured

4.2 Chess Board

- The chess board is represented with a grid of squares. The pieces lie on top of those squares.

- The user selects the piece they want to move by typing in the location of the piece.
- After selecting the piece, the user can enter where they want the piece to go by entering the final location of the piece. If the final location has an enemy piece then it will automatically capture that piece once the player enters the command.
- Example:

```

      a  b  c  d  e  f  g  h
8 | bR | bN | bB | bQ | bK | bB | bN | bR | 8
+-----+
7 | bP | bP | bP | bP | bP | bP | bP | bP | 7
+-----+
6 |   |   |   |   |   |   |   |   | 6
+-----+
5 |   |   |   |   |   |   |   |   | 5
+-----+
4 |   |   |   |   |   |   |   |   | 4
+-----+
3 |   |   |   |   |   |   |   |   | 3
+-----+
2 | wP | wP | wP | wP | wP | wP | wP | wP | 2
+-----+
1 | wR | wN | wB | wQ | wK | wB | wN | wR | 1
+-----+
      a  b  c  d  e  f  g  h

Turn 1: Player 1's Turn Team: (W) (Human)
Select a piece by entering its location: a2

Enter the end location (enter 00 to de-select the current piece):a4

For Turn 1, Team (W) (H) moved Pawn from a2 to a4

      a  b  c  d  e  f  g  h
8 | bR | bN | bB | bQ | bK | bB | bN | bR | 8
+-----+
7 | bP | bP | bP | bP | bP | bP | bP | bP | 7
+-----+
6 |   |   |   |   |   |   |   |   | 6
+-----+
5 |   |   |   |   |   |   |   |   | 5
+-----+
4 | wP |   |   |   |   |   |   |   | 4
+-----+
3 |   |   |   |   |   |   |   |   | 3
+-----+
2 |   |   | wP | wP | wP | wP | wP | wP | 2
+-----+
1 | wR | wN | wB | wQ | wK | wB | wN | wR | 1
+-----+
      a  b  c  d  e  f  g  h

Turn 2: Player 2's Turn Team: (B) (Human)
Select a piece by entering its location: b7

```

```

Enter the end location (enter 00 to de-select the current piece):b5

For Turn 2, Team (B) (H) moved Pawn from b7 to b5
a4 b5

      a  b  c  d  e  f  g  h
8 | bR | bN | bB | bQ | bK | bB | bN | bR | 8
+-----+
7 | bP |   | bP | bP | bP | bP | bP | bP | 7
+-----+
6 |   |   |   |   |   |   |   |   | 6
+-----+
5 |   | bP |   |   |   |   |   |   | 5
+-----+
4 | wP |   |   |   |   |   |   |   | 4
+-----+
3 |   |   |   |   |   |   |   |   | 3
+-----+
2 | wP | wP | wP | wP | wP | wP | wP | wP | 2
+-----+
1 | wR | wN | wB | wQ | wK | wB | wN | wR | 1
+-----+
      a  b  c  d  e  f  g  h

Turn 3: Player 1's Turn Team: (W) (Human)
Select a piece by entering its location: a4

Enter the end location (enter 00 to de-select the current piece):b5

For Turn 3, Team (W) (H) moved Pawn from a4 to b5

      a  b  c  d  e  f  g  h
8 | bR | bN | bB | bQ | bK | bB | bN | bR | 8
+-----+
7 | bP |   | bP | bP | bP | bP | bP | bP | 7
+-----+
6 |   |   |   |   |   |   |   |   | 6
+-----+
5 |   | wP |   |   |   |   |   |   | 5
+-----+
4 |   |   |   |   |   |   |   |   | 4
+-----+
3 |   |   |   |   |   |   |   |   | 3
+-----+
2 |   | wP | wP | wP | wP | wP | wP | wP | 2
+-----+
1 | wR | wN | wB | wQ | wK | wB | wN | wR | 1
+-----+
      a  b  c  d  e  f  g  h

Turn 4: Player 2's Turn Team: (B) (Human)
Select a piece by entering its location:

```

4.3 Human and AI Players

- After the side selection, the game will prompt the user if they want to play against a human or AI player. The user will always be player one while the opponent will always be player two.
- If the user selects AI then the user will play against a computer that will automatically do moves once the user's turn ends every time until checkmate or a king is captured.
- If the user selects a human then the user will play against another human opponent. This chess game only supports one device so in order to play with another player, the user will have to trade off the computer to the other player so they can make their move.

- The user can also spectate a match by watching two computer players play against each other

4.4 Side Selection

- Before the chess game starts, the user will have the option to choose a side, black or white.
- Once the decision is made, the opponent will automatically be the other color.

4.5 Game Log

- The program will keep track of all moves made by the player and the opponent on the board.
- Once the game ends, a log file will be generated with all of the moves made in order.
- Example:

```

amelog

      a      b      c      d      e      f      g      h
+---+---+---+---+---+---+---+---+
8 |      |      |      |      |      |      | wR |      | 8
+---+---+---+---+---+---+---+---+
7 |      |      |      | bK |      |      |      |      | 7
+---+---+---+---+---+---+---+---+
6 |      |      |      |      |      |      | wR |      | 6
+---+---+---+---+---+---+---+---+
5 |      |      |      |      |      |      |      |      | 5
+---+---+---+---+---+---+---+---+
4 |      |      |      |      |      |      |      |      | 4
+---+---+---+---+---+---+---+---+
3 |      |      |      |      |      |      |      |      | 3
+---+---+---+---+---+---+---+---+
2 |      |      |      |      |      |      |      |      | 2
+---+---+---+---+---+---+---+---+
1 |      |      |      |      | wK |      | wQ |      | 1
+---+---+---+---+---+---+---+---+
      a      b      c      d      e      f      g      h

Turn 1: Player 1's Turn Team: (B) (Human)

For Turn 1, Team (B) (H) moved King from c7 to d7

      a      b      c      d      e      f      g      h
+---+---+---+---+---+---+---+---+
8 |      |      |      |      |      |      | wR |      | 8
+---+---+---+---+---+---+---+---+
7 |      |      |      | bK |      |      |      |      | 7
+---+---+---+---+---+---+---+---+
6 |      |      |      |      |      |      | wR |      | 6
+---+---+---+---+---+---+---+---+
5 |      |      |      |      |      |      |      |      | 5
+---+---+---+---+---+---+---+---+
4 |      |      |      |      |      |      |      |      | 4
+---+---+---+---+---+---+---+---+
3 |      |      |      |      |      |      |      |      | 3
+---+---+---+---+---+---+---+---+
2 |      |      |      |      |      |      |      |      | 2
+---+---+---+---+---+---+---+---+
1 |      |      |      |      | wK |      | wQ |      | 1
+---+---+---+---+---+---+---+---+
      a      b      c      d      e      f      g      h

Turn 2: Player 2's Turn Team: (W) (Human)

For Turn 2, Team (W) (H) moved Queen from g1 to g7

Kd7 Qg7#

```

Final Board State:

	a	b	c	d	e	f	g	h	
8							wR		8
7				bK			wQ		7
6						wR			6
5									5
4									4
3									3
2									2
1					wK				1
	a	b	c	d	e	f	g	h	

!-----CHECKMATE: GAME OVER TEAM B LOSES-----!

4.6 AI Player Details

- The AI player is designed to make moves quickly and does moves that benefit it the most
- The algorithm works by evaluating each piece's ability to move and selects the one with the best scoring.
- In terms of priority for movements the AI player focuses on:
 - Keeping the king out of check
 - Moving pieces out of danger/Capturing pieces beneficially
 - Capturing pieces beneficially/Moving pieces out of danger
 - Random movement
- The AI player will shift between being defensive(moving pieces out of danger) and offensive(capturing pieces beneficially) to serve as a more engaging opponent
- For what the algorithm considers a beneficial capture, it evaluates based on the worth of the pieces. A pawn capturing a bishop is much more beneficial than a rook capturing a pawn.

Error Messages

“Invalid Move! Please re-enter a legal move”

- You have chosen an illegal move or a move that places you in check. You will get prompted to enter in a move again.

“Invalid Input!”

- Given when the choice of board input is not A or B. Enter ‘A’ for Classic and ‘B’ for a custom board, not something else.

“Invalid Input!”

- You have entered something that is not ‘B’ or ‘W’, please enter the proper characters.

“Invalid Input!”

- You have entered a character that is not ‘H’ or ‘C’, please enter the proper characters.

“Out of bounds!”

- You have entered a row+column that is not part of the chess board, please enter a column and row that is shown on the board.

“There's no piece at that location!”

- You have tried to select a piece that does not exist on the board at the requested row and column. Please enter the proper row and column.

“Whoa there partner, you tried selecting the other team's piece!”

- You have tried to select the opponent’s piece to move when it is your turn. Please select your own team pieces.

“Invalid login! Please enter a valid login”

- You have typed in an incorrect username or password. Please type in the correct login credentials.

“This port is currently unavailable! Please select a valid port.”

- You have tried to connect to a port that is being used already. Select another port for connection.

Index

AI, 7, 10, 12
Bishop, 4, 9, 12
Black, 3, 4, 11
Board, 2, 3, 4, 5, 13
Button, 7
Capture, 2, 10, 12
Castling, 9
Check, 4, 6, 9, 12, 13
Checkmate, 4, 10
Defensive, 12
En Passant, 9
Game Log, 11
Install, 3, 5
King, 2, 4, 5, 9, 10, 12
Knight, 9
Offensive, 12
Pawn, 4, 12
Priority, 12
Provider, 2
Queen, 9
Username, 7, 13
Rook, 9, 12
Server, 5, 6, 7
Side Selection, 10
Terminal, 3
White, 3, 4, 11

This document and its content are copyright of Team16 - 2020.
All rights reserved.