

PURBANCHAL UNIVERSITY



DEPARTMENT OF COMPUTER ENGINEERING

**KHWOPA ENGINEERING COLLEGE
LIBALI-02, BHAKTAPUR**

FINAL PROJECT REPORT

ON

CHESS GAME

Project work submitted in partial fulfillment of requirements for the award of the degree of
Bachelor of Engineering in Computer Engineering (Third Semester)

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CERTIFICATE

This is to certify that the project entitled “Chess Game” submitted by Mr. Anjan Prajapati, Mr. Dipen Shrestha, Mr. Samesh Bajracharya, Mr. Sushant Twayana in a partial fulfillment of the requirements for the award of the Degree of Bachelor Engineering in a Computer Engineering of Purbanchal University, is a bona fide work to the best of our knowledge and may be placed before the examination board for their consideration.

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ABSTRACT

Chess game is well known and popular game all over the world. This report details the development of the chess game application that is written in the C programming language. This application language can be written as well in other various languages. The aim of this game is to checkmate the opponent's king by placing it under an inescapable threat of capture that is check mate. In addition, the report details the implementation of complexity of algorithm used to solve any kind of chess game. Furthermore, the user-friendly environment is considered in the report as the result of chess are connected to the interface. Moreover, the report specifies how the goal of the project can be achieved. This game is developed using C++ graphics and we have focused on the logic as well return bit on the outlook. Two players care required for this game. Thus, all in all we have tried to make this project like a real one and user friendly too. Finally, the report summarizes the overall achievements of the application development and indicates other possible extensions.

Keywords: Player v/s Player, Strategic game

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CHAPTER 1

INTRODUCTION

1.1 Background

Chess is an abstract strategy board game played on an 8x8 grid checkered board. The game is played by two players with each player beginning with 16 pieces (one king, one queen, two rooks, two knights, two bishops, and eight pawns) of contrasting colors. Player alternate turns to move their pieces with white moving first. The objective is to checkmate the opponent's king by placing it under an inescapable threat of capture.

Played by millions around the world, chess is believed to have originated in India around 7th century. It is one of the most popular board games and has attracted people from all walks of life such as scholars, warriors, strategists, men, women, and children. The rules and appearance of pieces reached today's standard in the early 19th century.

With the development of computers and the internet, the way chess games are played has also changed to a certain degree. Though the World Championship are still played on a physical board, chess is now mostly played on display screens over the internet. Likewise, our Chess game is a desktop application. It emulates the experience of a realworld scenario via GUI interface to which players can interact to move their pieces. The game is engineered to follow the basic rules of chess i.e., all the pieces only move according to valid moves for that piece.

Over 6 decades, computer scientists have been interested in the ability of computers to play chess. In 1949, Claude E. Shannon wrote a paper on programming a computer for playing chess where he defined the problems of constructing a computer program which enables computer to play Chess. It was about the time the notion of thinking machines, aka artificial intelligence, was just born. The paper intrigued curiosity and since then it has been a source of inspiration for generations of programmers. This romantic appeal to build machines to beat mind of man has propelled computer chess from humble beginnings to IBM's Deep Blue win over world champion Gary Kasparov in 1997.[1]

1.2 Motivation

The motivation behind this was to understand the game better. The desire to develop the Chess game came from the realization that a simple game such as this would use so many mechanics and implement the engineering algorithms in such an advanced and efficient manner. This certainly piqued our interest to dive in this content further as this led us to an entire new domain of data structures and algorithms. On top of that, we had an urge to implement the courses that we have undertaken during our study. This project will enable us to challenge the knowledge we have gained at classes and provide us an opportunity to strengthen them, and learn something new on the way.

1.3 Statement of Problems

The previous chess game in itself had no issues (i.e. all the rules of the original board game were followed, provided a smooth gaming experience), however the game ran in a console which means that was no GUI implementation in the game which made it a bit tedious and time consuming to play as players would have to input from their keyboard each and every time a piece is moved. In our version of the game, we are planning to resolve this issue with the help of SFML tool or even a normal graphics file. The game would still follow all the original rules and ideas of the previous game but it will look a lot better and enjoyable to play.

1.4 Objectives

- To develop a Graphical User Interface where the user can interact with the chess piece, the board and browse through some options.

1.5 Scope &Application

The main scope\application of this project are listed below:

- This game uses a graphical user interface which allows the user to interact with the game components such as chess pieces, board compartments and some other buttons in real time.
- It also allows the user to mend the game rules to some extent i.e. they can choose whether castling mechanism is required or not, pawn promotion, etc.
- The game also has a user manual where the users can learn about the rules of the game including how each piece moves and formulating some ideas and tips about each piece.
- The user can enjoy an excellent board logic game that develops skills such as tactics, strategy and visual memory.

CHAPTER 2

LITERATURE REVIEW

Chess is a recreational and competitive board game played between two players. It is sometimes called Western or international chess to distinguish it from related games such as xiangqi. The current form of the game emerged in Southern Europe during the second half of the 15th century after evolving from similar, much older games of Indian and Persian origin. Today, chess is one of the world's most popular games, played by millions of people worldwide at home, in clubs, online, by correspondence, and in tournaments. [2]

The chess game was previously developed by many people however very few of them used computer graphics with it. We decided to go along with this project because not only we were piqued by its use of advanced engineering techniques but also we thought this project would prove a challenge to our knowledge, strengthen our understanding of programming and provide us with an opportunity to learn something new which would be fruitful for our career.

CHAPTER 3

PROJECT MANAGEMENT

3.1 Feasibility Study

On the basis of outcome of initial investigation, feasibility takes place. The main goal of feasibility study is not to resolve the problem but to accomplish the scope. In the process of feasibility study, the cost and the benefits are estimated with greater accuracy.

The technical feasibility of our project “CHESS GAME USING COMPUTER GRAPHICS” would be appropriate as our game would be coded using simple graphics in C++ and as such would be available to any user with the access to a personal computer that has a C++ running software or IDE.

CHAPTER 4

METHODOLOGY

4.1 Background

Although chess sets come in many varieties and colors, the traditional colors are white and black, and that is how we will be referring to the two players on this website. The aim of the game is to trap your opponent's king, which is called Checkmate. A game can also be won if your opponent gives up (in chess, we call this 'resigning'), and there are a variety of ways a game can end in a draw, in which case neither player wins.

The original idea would be a text-based approach with a mixture of uppercase and lowercase letters with numbers for their positions on their board and the whole ordeal would run in console. The problem with this approach is that users will have to manually type the positions they are moving their pieces to. Our approach is similar to this but with a graphical user interface designed entirely in C++. What it does is, lets players experience a strategic game without those tedious keyboard inputs with the help of an interactive graphical interface. The GUI will include buttons for the squares of chess board and a message box. The message box will keep the player apprised about the moves they are making and the moves they are making is valid or not.

So according to our model, firstly the users will perceive an interface with 3 buttons; Start, Help and Exit. Then onwards the player who would want to play the game click on Start. If the players are beginners, it is recommended that they check out the help section first as it contains information about rules of the game and how each chess piece move. This is to have an overview of what the game is and what players must do to achieve victory. Clicking on exit button terminates the program. If the players have started the game, they will be asked to select the color they would like to play as. After the completion of this step, the players will be greeted by a board and the chess pieces in their respective positions and then the game starts.

4.2 Generic Model

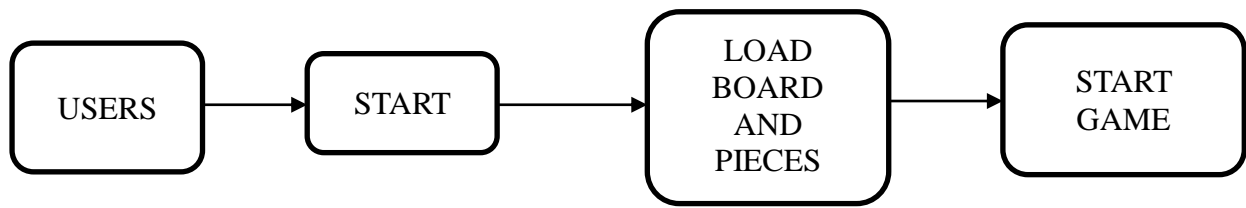


Fig 4.2: Block diagram of Chess game

4.3 Algorithm

Step 1: Start

Step 2: Display board and pieces

Step 3: Set turn = white turn

Step 4: Get input from mouse

Step 5: Check for valid move, if move is valid then go to Step 6

Else go to Step 4

Step 6: Check for checkmate, if true then go to Step 7

Else set turn = black turn and go to step 4

Step 7: Display game over

Step 8: Ask user to restart or exit, if restart then clear screen and go to step 2

Else go to Step 9.

Step 9: Stop

4.4 Flowchart

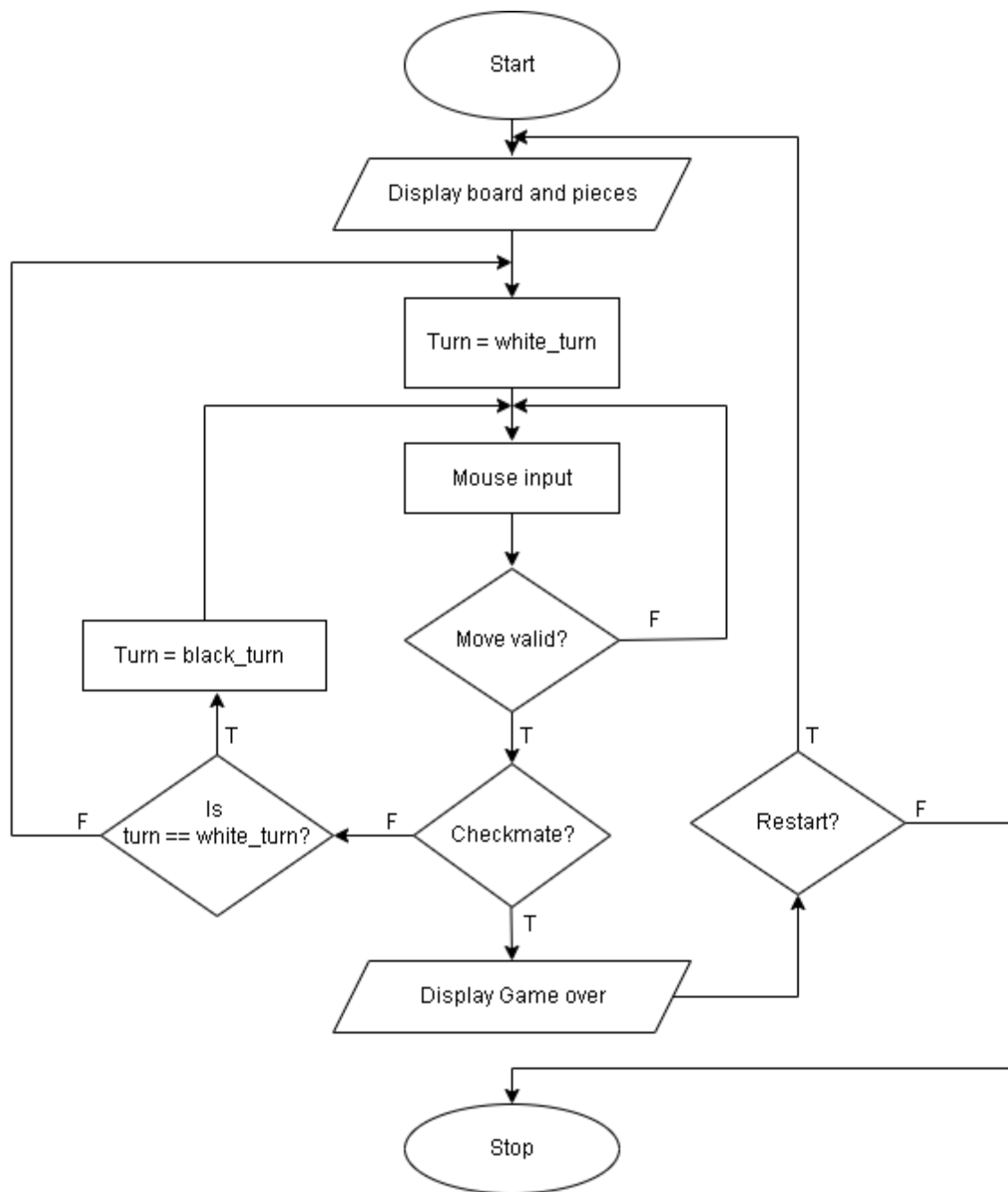


Fig 4.4: Flowchart of Chess game

4.5 Data - Flow Diagram

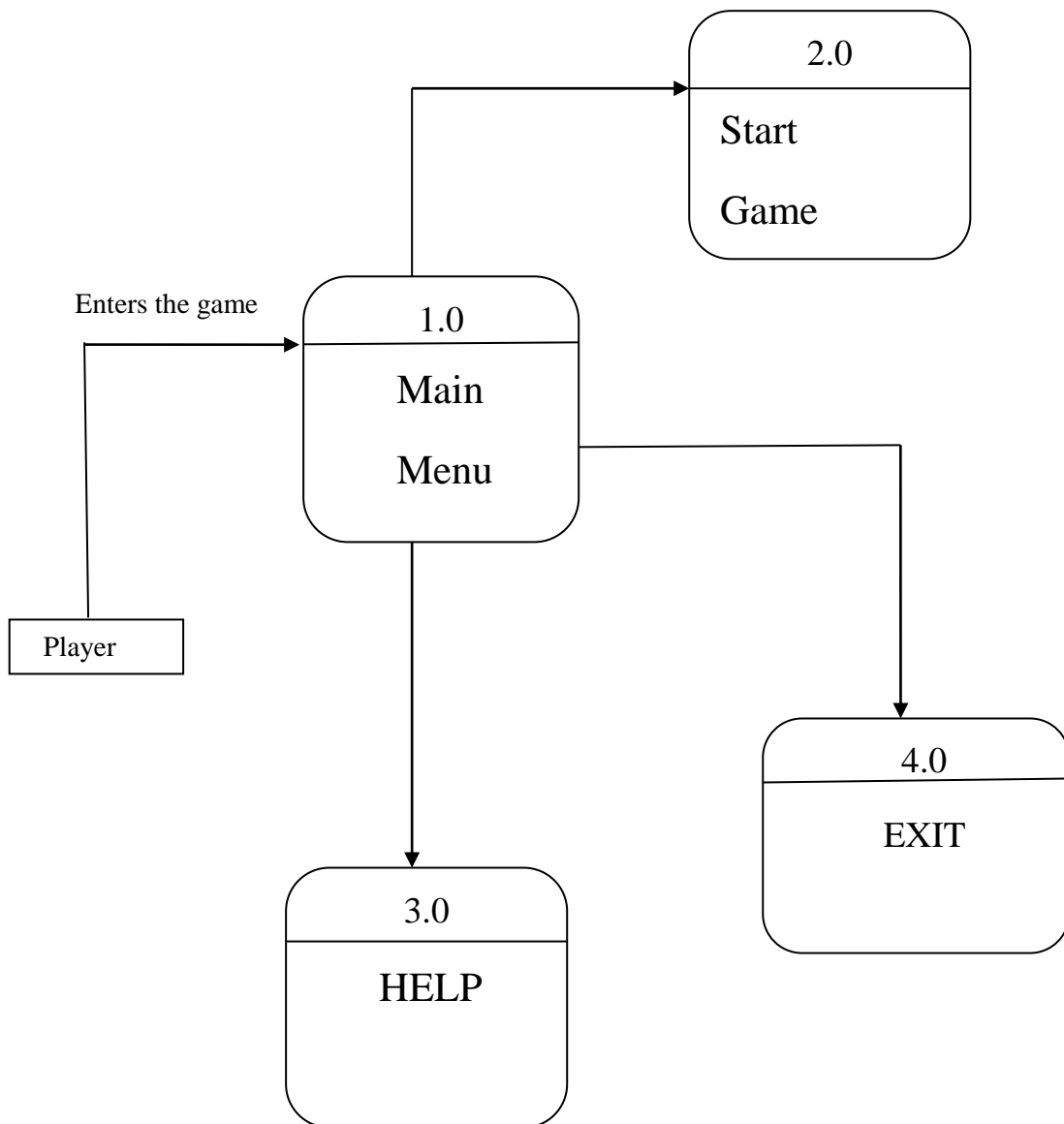


Fig 4.5: Data Flow Diagram

The above is the data flow diagram of our chess game. Initially, the player enters the game and the main menu is displayed. The menu has three options: Start game, Help and Exit from which the user can choose either to start the game, display the instructions or exit the program.

4.6 Context Diagram

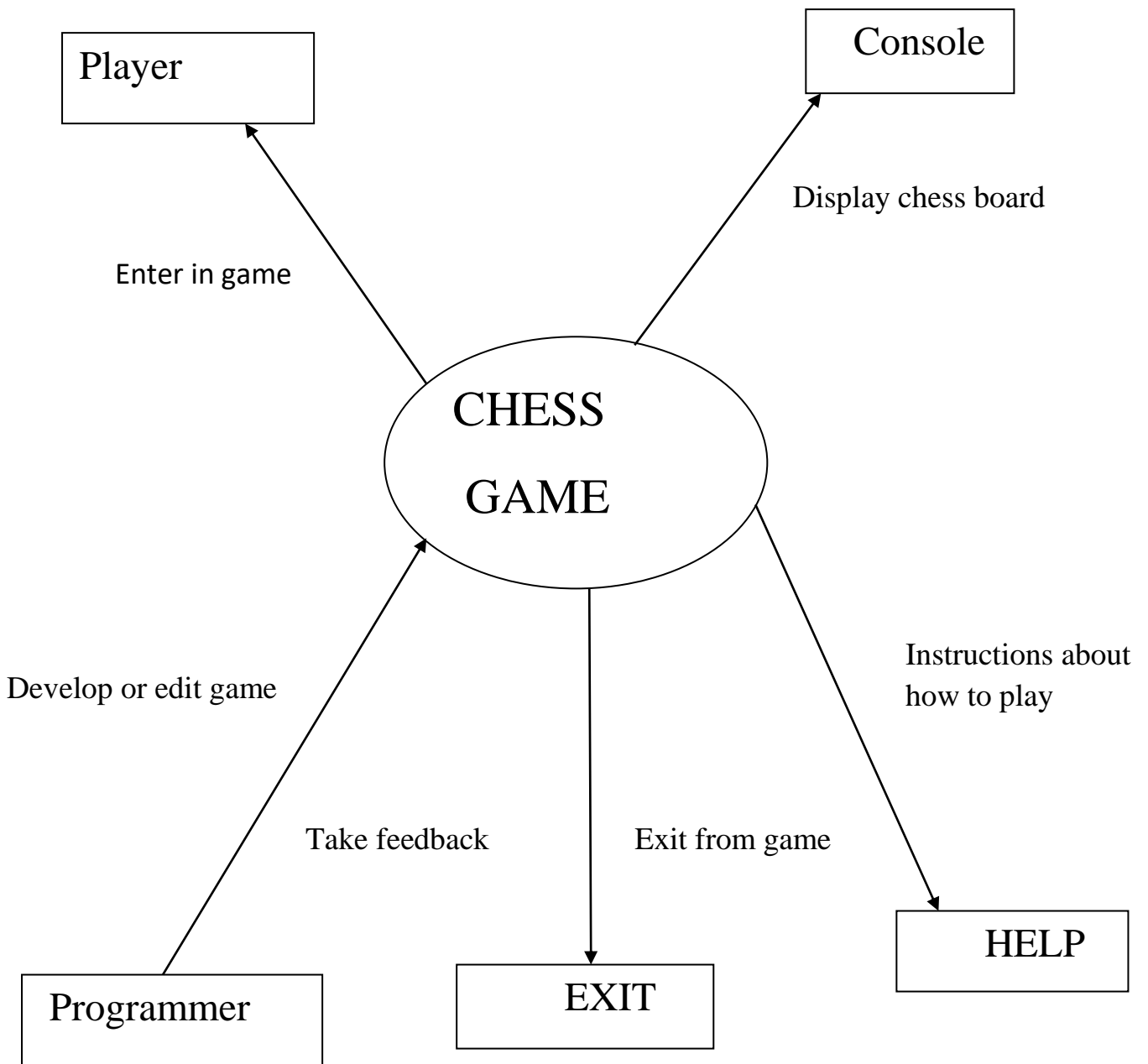


Fig4.6: Context Diagram

4.7 Tools & Platforms

Software

Turbo C7

Platforms

Windows

CHAPTER 5

RESULT AND DISSCUSSION

5.1 Result and Discussion

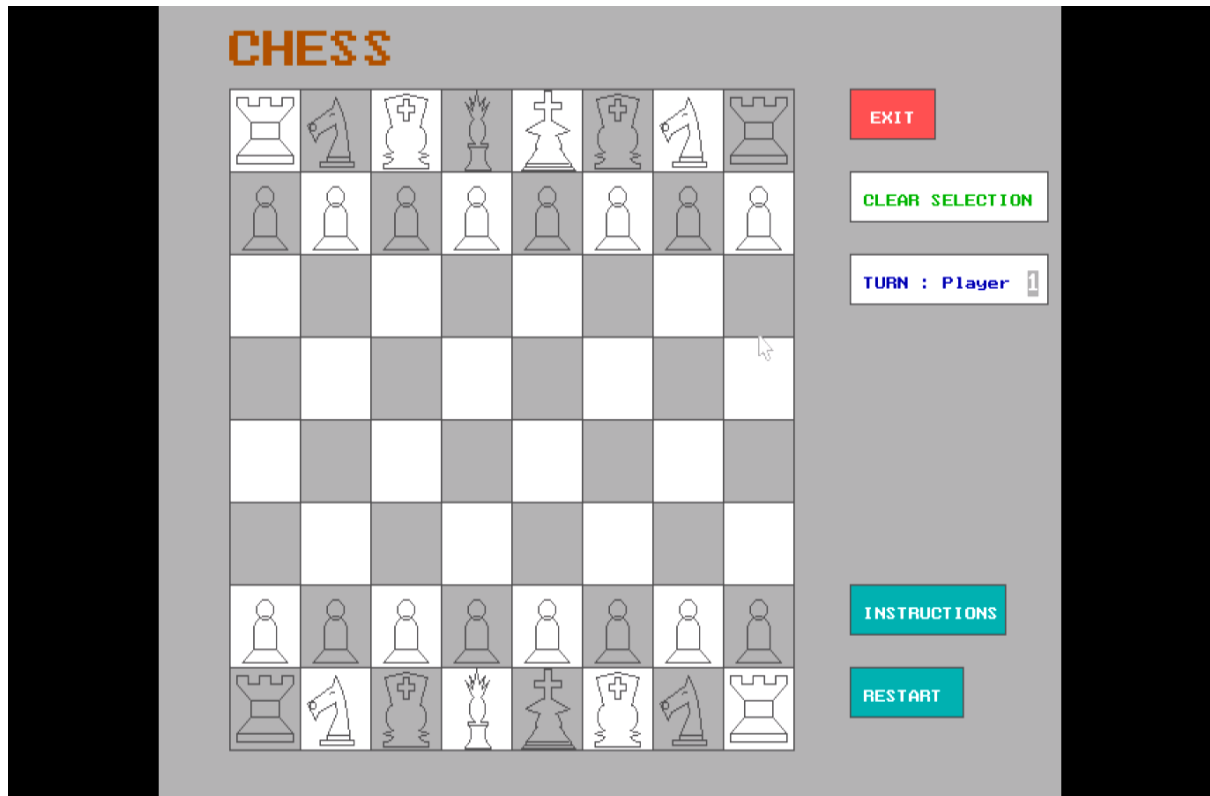


Fig 5.1: Initial position of chess pieces

The final output of our chess game, initially when the game starts is displayed in figure 5.1. The chess pieces are arranged according to their respective positions & the player 1(i.e. the player below) will play first.

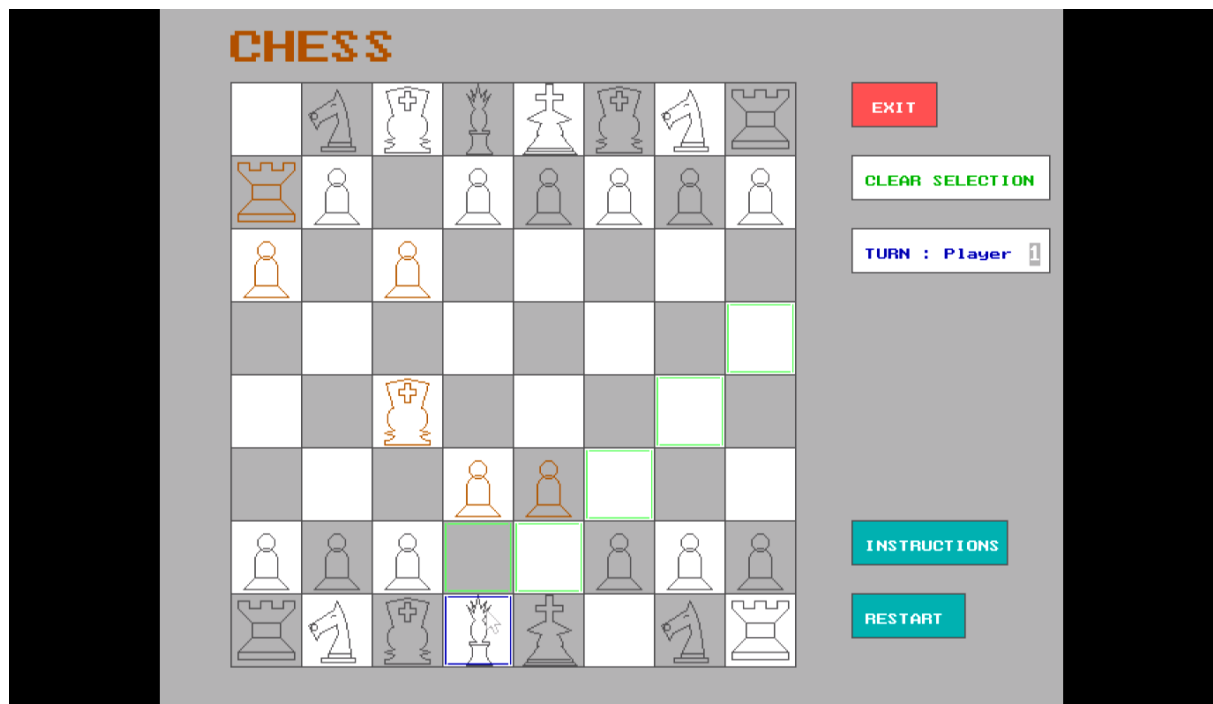


Fig 5.2: Chess game being played

Once the user first clicks on any piece then, the game officially starts and only valid position is displayed.

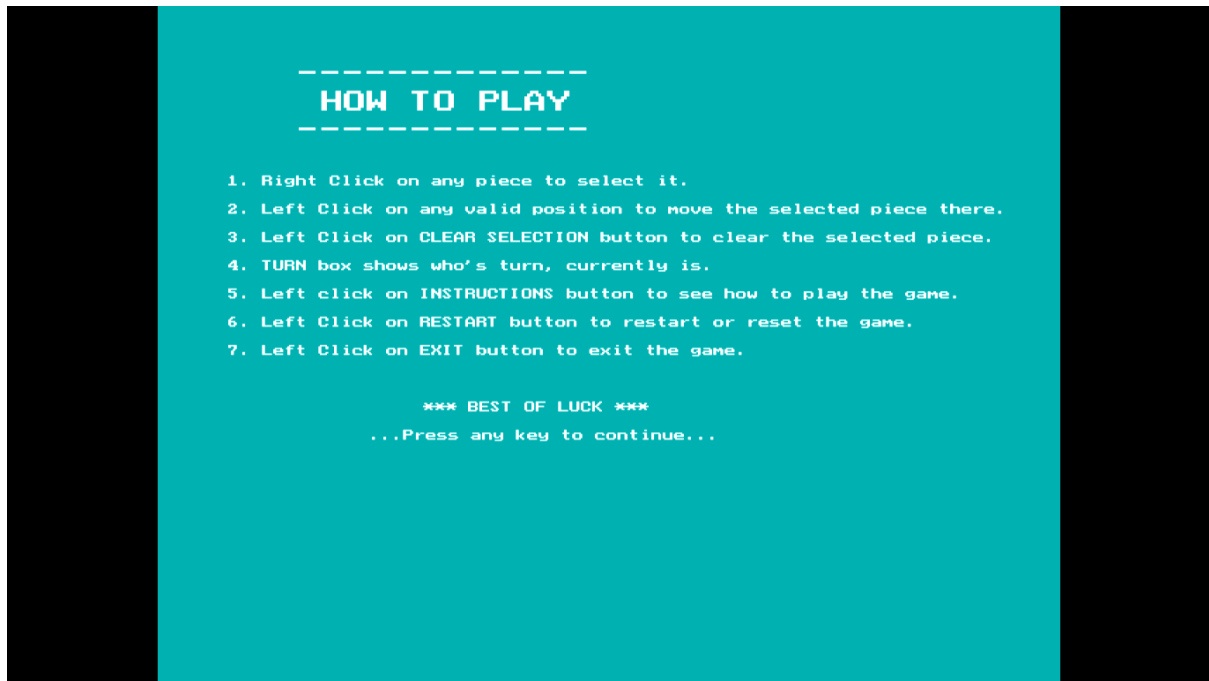


Fig 5.3: Instructions

If the user chooses instruction option, then screen as in picture below will appear displaying different instruction needed related to the game. And if the user wants to restart the game then he can chooses restart option.



Fig 5.4: Player 1 wins



Fig 5.5 Player 2 wins

This screen is displayed when either player 1 or player 2 wins. A new game will start if Restart button is pressed and the program is terminated if exit button is pressed.

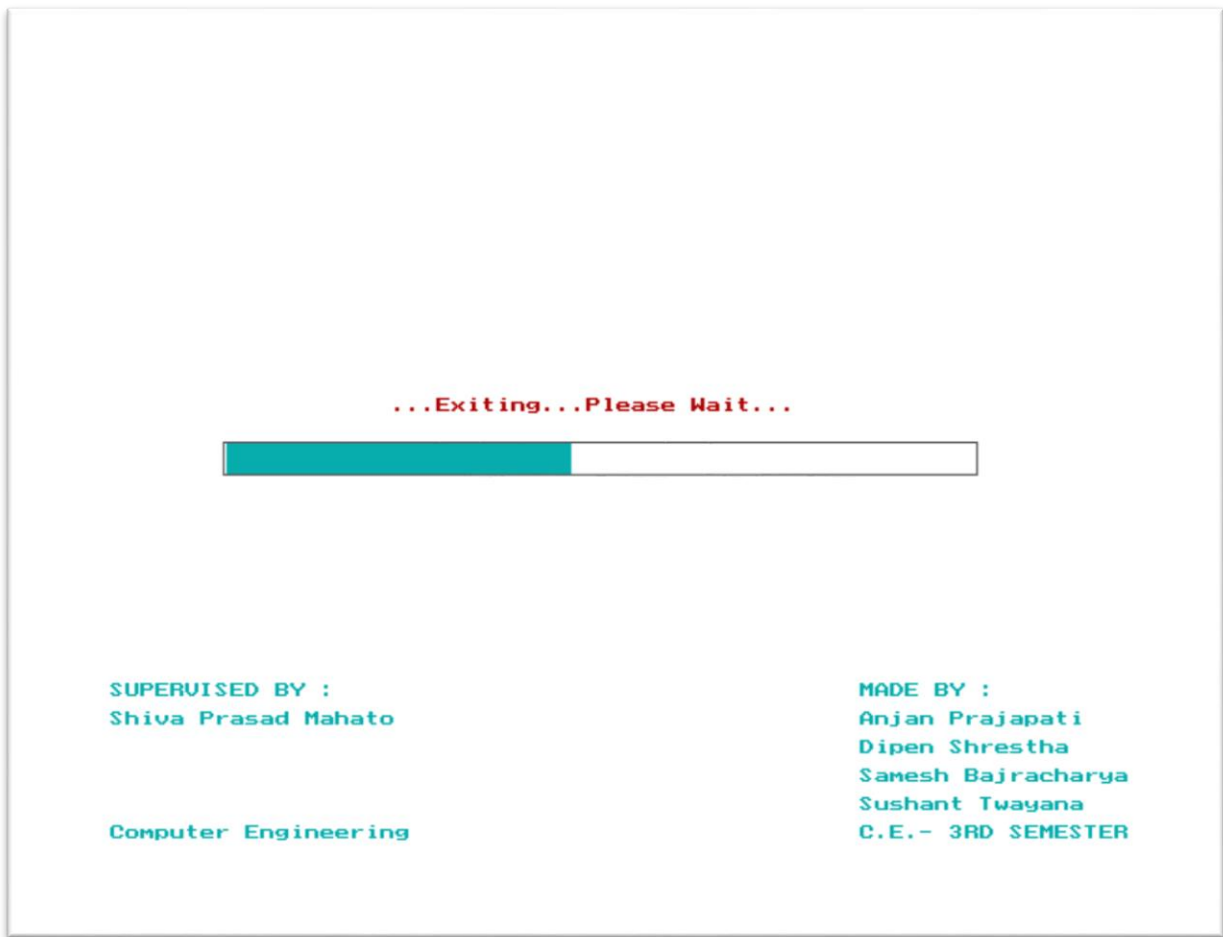


Fig 5.6: Exit Screen

Once the exit button is clicked then the game is officially closed and a exit screen is displayed and if the player wants to restart then game can be restart from the beginning.

5.2 Future Enhancement

Although we had tried to include most of the features of chess in our project, enhancement can be done in future. Some of the works that can be done are:

- Implement of Artificial Intelligence

The codes implemented in the application have been well organized and also includes comments everywhere. Therefore, we believe that the application can be developed more.

5.3 Conclusion

We have created a Chess game. In order to create a program, we used the concept of arrays, odd – even entities and matrix arrangement. Simply this program takes the coordinates from the mouse, processes them in arrays, checks if the moves are legal or not and then displays the output according to the input provided by the user.

REFERENCES

[1] <https://thebestschools.org/magazine/brief-history-of-computer-chess/> [1]

[2] <https://en.wikipedia.org/wiki/Chess> [2]