CHESS GAME USING PYTHON

A PROJECT REPORT

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BONAFIDE CERTIFICATE

Certified that this project report titled **Chess Game Using Python** is the bonafide work of **Manan Sharma (21BCE10210), Arnav Sinha (21BCE10168), P Harshit Kumar(21BCE10709), Arvind Garg (21BCE10184), Shivang Choudhary(21BCE10188)** who carried out the project work under my supervision. Certified further that to the best of my knowledge the work reported here does not form part of any other project research work on the basis of which a degree or award was conferred on an earlier occasion on this or any other candidate.

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Last, but not the least, I am deeply indebted to my parents who have been the greatest support while I worked day and night for the project to make it a success.

ABSTRACT

The aim of the project is to build a responsive Chess game website. Our website helps user to play chess according to his choice. Our website takes the user data preference that if the user want to play with AI or as a 2 player game and he can play easily just clicking in any of the options. We used pygame library for making chess game AI and for 2 player we used HTML CSS JAVASCRIPT AND JQUERY.

HTML and CSS were used to develop the responsive frontend alongwith Django Framework which made the website user-friendly.

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CHAPTER 1: INTRODUCTION

Chess is a strategic board game that has been played for centuries and remains popular to this day. It is a game of skill and patience, requiring players to think several moves ahead and anticipate their opponent's strategy.

we will explore how to create an AI chess game using Python. Python is a popular programming language that is widely used for various applications, including game development. We will be able to create a simple chess game that we can play with another person or against the computer.

To create this game, we will be using Python's built-in turtle graphics module to display the game board and the pieces. We will also utilize various Python data structures, such as lists and dictionaries, to keep track of the board's state and the pieces' positions.

So, let's dive in and learn create a chess game using Python.

CHAPTER 2: Software Requirements

We implemented the game using Python's built-in turtle graphics module to display the game board and the pieces. We utilized various Python data structures, such as lists and dictionaries, to keep track of the board's state and the pieces' positions. We also implemented various functions to handle the various aspects of the game, such as moving the pieces, checking for valid moves, and detecting checkmate.

- **Python3-** It is a general-purpose programming language which provides the high-level readability and it is interpreted. In our project we use python to calculate the players move.

- **Pygame-** Pygame is a python framework for game programming. We use pygame in our project for creating, updating and handling GUI.

- **Django-** Django is a high-level Python web framework that enables rapid development of secure and maintainable websites. We will use it to deploy are code on a website.

CHAPTER 3: PROJECT PROCEDURE

We should introduce two things to computer for making the game Intelligent which will make the game to do optimal moves -

A technique to choose the move to make amongst all legal possibilities, so that it can choose a move instead of being forced to pick one at random.

A way to compare moves and positions, so that it makes intelligent choices.

Algorithm for Chess Engine

- MiniMax Algorithm

The Mini-max algorithm is a way to find an optimal move in a two-player game. Mini-max algorithm is a recursive or backtracking algorithm which is used in decision making and game theory. It provides an optimal move for the player assuming that opponent is also playing optimally. The minimax algorithm performs a depth-first search algorithm for the exploration of the complete game tree. The minimax algorithm proceeds all the way down to the terminal node of the tree, then backtrack the tree as the recursion

- Alpha-beta Pruning

  Alpha-beta pruning is a way of finding minimum solution Alpha-beta pruning is a modified version of the minimax algorithm. It is an optimization technique for the minimax algorithm The Alpha-beta pruning to a standard minimax algorithm returns the same move as the standard algorithm does, but it removes all the nodes which are not really affecting the final decision but making algorithm slow. Hence by pruning these nodes, it makes the algorithm fast.

Algorithm Pseudocode

function minimax(node, depth, maximizingPlayer) is

if depth = 0 or node is a terminal node then

return the heuristic value of node

if maximizingPlayer then

value := —«

for each child of node do

value := max(value, minimax(child, depth — 1, FALSE))

return value

else (* minimizing player *)

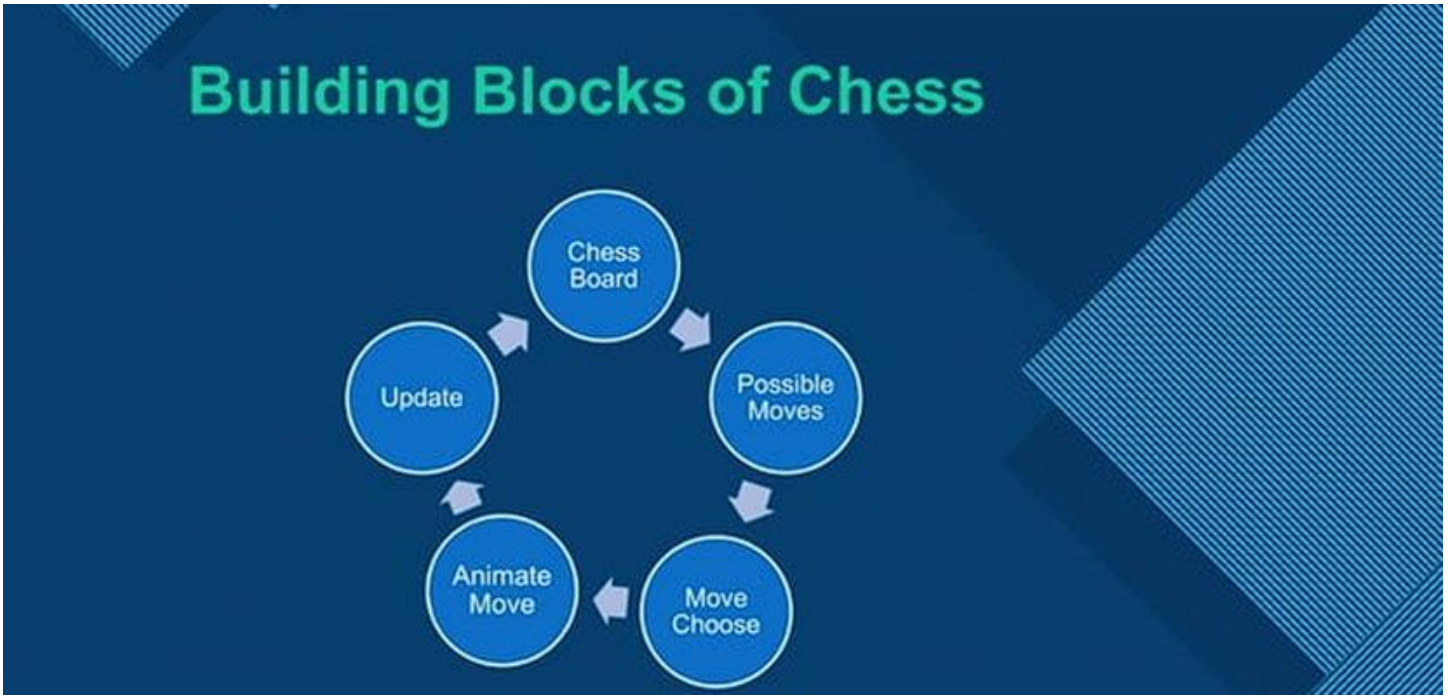
value := +

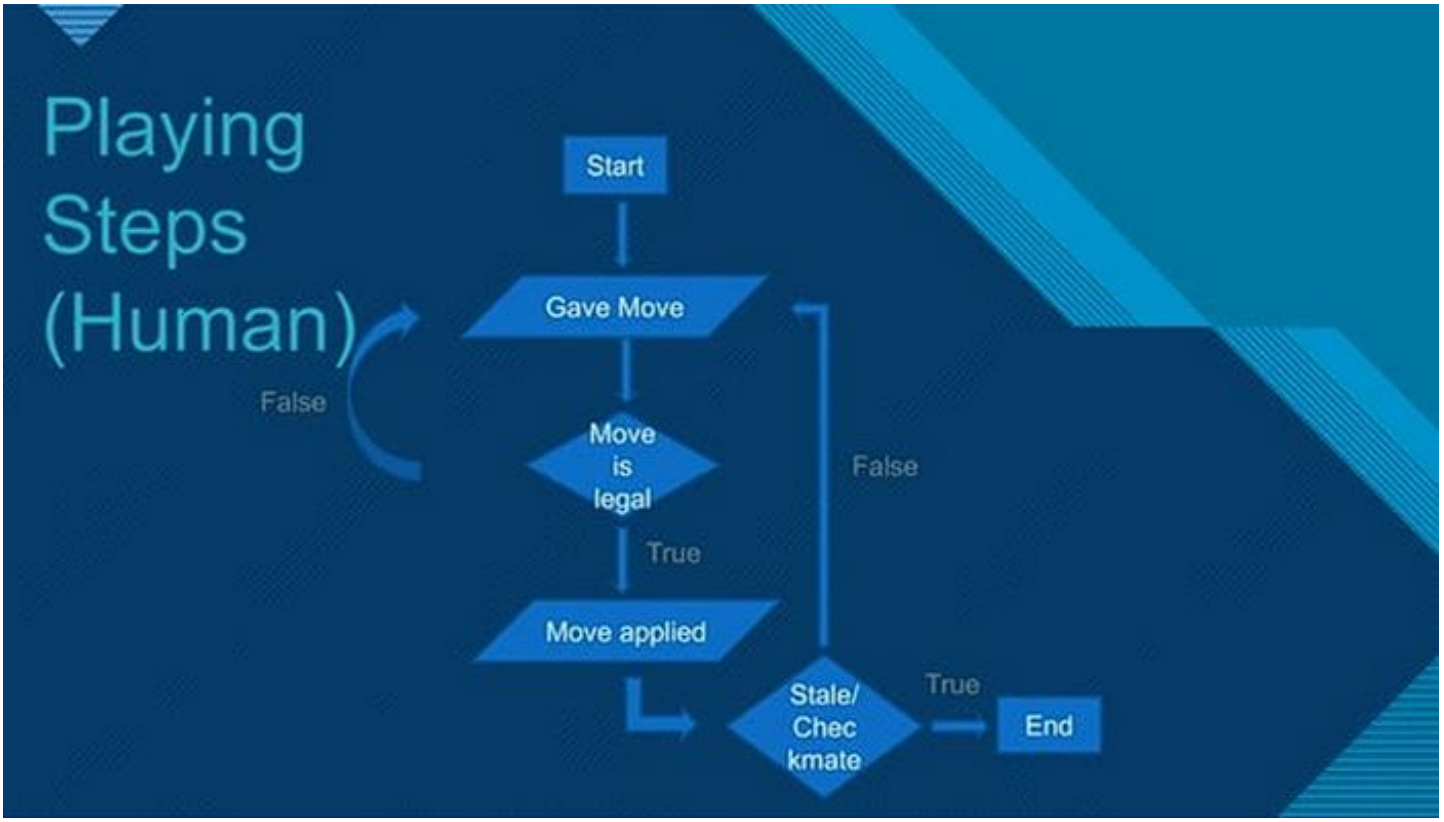
for each child of node do

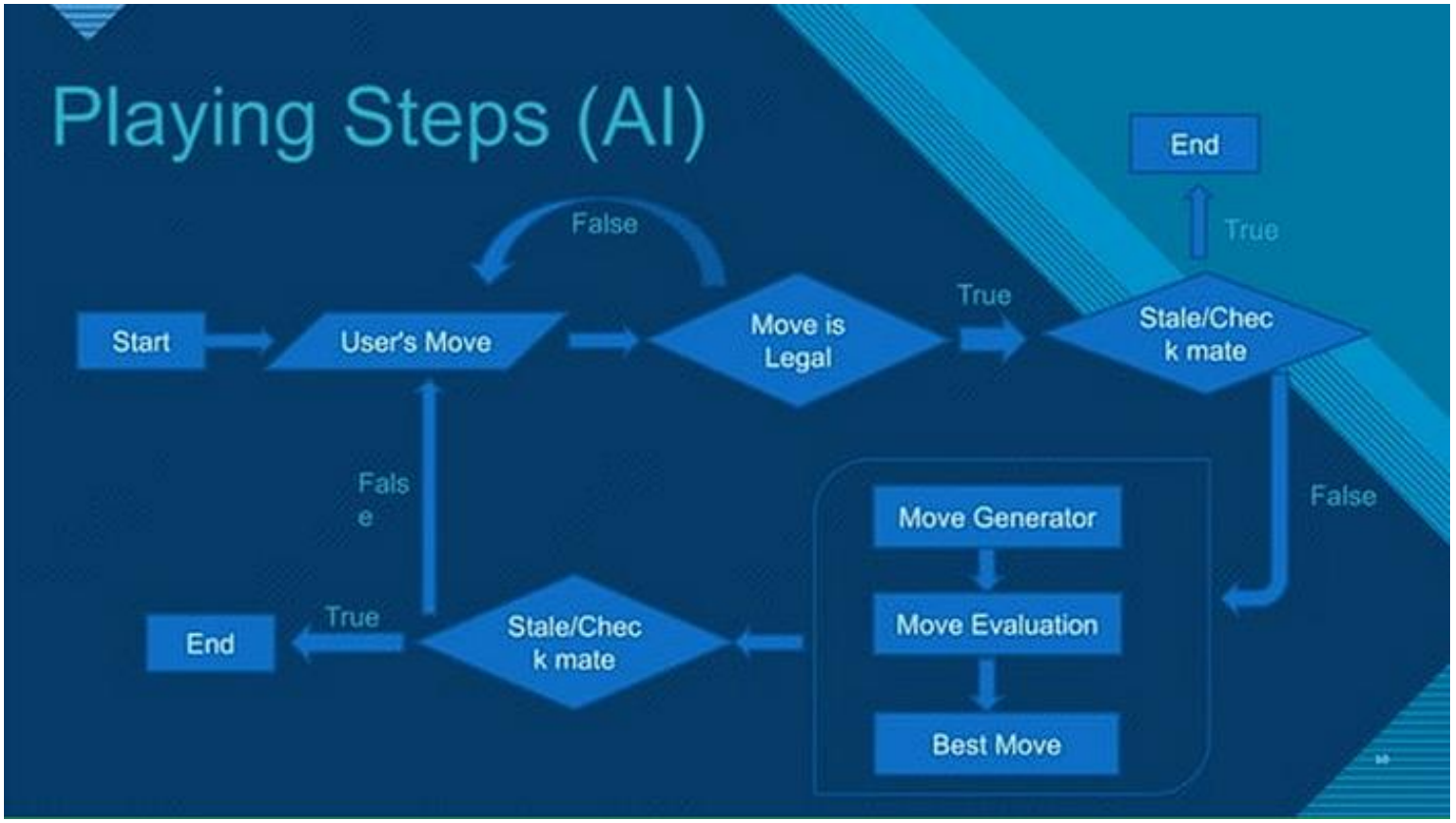
value := min(value, minimax(child, depth — 1, TRUE))

return value

CHAPTER 4: OBSERVATION AND FEATURES







Advantages of our Chess Engine

- **Points** - Their will be a point system in the game when a person wins, he can check his points.
- **Two-player game** - The chess game implemented is a two-player game, where each player takes turns to move their pieces.
- **Graphical User Interface (GUI)** - The game has a simple GUI that allows players to interact with the game board and the pieces.
- **Piece movement** - The game allows players to move their pieces according to the rules of chess, including pawn promotion, castling, etc.
- **Check and Checkmate** - The game detects when a player is in check and when a player is in checkmate, ending the game.
- **Multiplayer** - We will try to host a sever where a player can play online with players all over the world.
- **Save and Load** - The game allows players to save and load the game so that they can continue the game later.

CHAPTER 5: CONCLUSION

Creating a chess game using Python is a great project that can teach us a lot about programming and game development. By implementing various functions and utilizing different data structures, we created a fully functional chess game that you can play with your friends or against the computer. This project, helped us in improving or Python skills, and also have fun while making a game that has been enjoyed for centuries.

REFERENCES-

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