A Mini Project Synopsis on

Connect 4 The Game

Information Technology Engineering

Submitted By

Atharv Joshi   **19104036**

Siddhesh Puranik   **19104014**

Shridhar Joshi   **19104034**

Akshada Warik   **19104042**

Under the Guidance Of

Prof. Rujata Chaudhari

DEPARTMENT OF INFORMATION TECHNOLOGY

A.P. SHAH INSTITUTE OF TECHNOLOGY

G.B. Road, Kasarvadavali, Thane (W), Mumbai-400615

UNIVERSITY OF MUMBAI

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CERTIFICATE

This to certify that the Mini Project report on CONNECT 4- THE GAME has been submitted by Atharv Joshi (19104036) Shridhar Joshi (19104034) Siddhesh Puranik (19104014) and Akshada Warik (19104042) who are a Bonafede students of A. P. Shah Institute of Technology, Thane, Mumbai, as a partial fulfilment of the requirement for the degree in **Information Technology**, during the academic year **2020-2021** in the satisfactory manner as per the curriculum laid down by University of Mumbai.

Prof. Rujata Chaudhari
Guide

Prof. Kiran Deshpande   Dr. Uttam D.Kolekar
Head Department of Information Technology   Principal

External Examiner(s)
1.
2.

Place: A.P. Shah Institute of Technology, Thane
Date:

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1) **INTRODUCTION:**

Connect 4 is a game of strategy. Two players are up against each other to see who can be the first to form a line of 4 of one's own disc colours. The line of 4 discs can be in vertical, horizontal, or diagonal format. This is done by each taking turns to drop coloured discs into the seven columned, six-rowed suspended playing grids. Is it fun? Yes, it is! Is it educational? Absolutely!

Kids take time to develop fine motor skills. This is the ability to coordinate small muscles and movements. This can mean using the hands and fingers correctly to correlate to what they see with the eyes. It is about matching up the movement of hands and fingers (as an example) with what they see in front of them.
When kids play Connect 4, they have to pick up pieces and drop them into a slot. For small children, this can be a bit of a challenge, but the more they do it, the better their fine motor skills will become.

1.1) **PURPOSE:**

Connect 4 is a game which turns the phrase "Learning is fun" practically possible. It is not only a fun to play game, but it also subconsciously trains your mind to think 2 moves ahead of your opponent to achieve the winning condition.

A game of Connect 4 can only be won by someone who is mentally aware of all the pieces that are being played in different directions. This means that a child must take note and be able to perceptually see the pieces and how they are being inserted into the grid. The more a child is exposed to this, the easier it will become for him/her to remember what they have seen without having to constantly refer to the grids. Hence enhancing their visual and perceptual-motor skills. This not only applies to kids, even adults. Also, this can work as a stepping stone to more advanced brain games like chess.

1.2) __OBJECTIVES:__

1. To make the game virtual and make it so that up to 4 players can play at a time.

2. To be able to store the score of the winner so that every player can look at the winning player.

3. To give the players the freedom to choose grid size of their choice so that players can choose essentially the difficulty of the game.

4.To make the game more attractive than the physical version by making a good-looking GUI.

1.3) __SCOPE:__

1. This game can be played by players above age of 6. Which gives us large quantity of player. As this age is probably lowest for a player to understand virtual games. Also, many old aged players can relate to it as it is also old physical game.

2. This game can be useful to everyone as it has a lot of strategy used. Players can sharp themselves and have a healthy competition of mind. This can also help tired people for activating and calming their brain.

3. This game can be played by groups of up to 4 players. This increases scope of game to entertain 2 people to 4 people at a time. So, it's ideal for a group of friends to enjoy it.

4. Database makes it easy to keep a record of the games and winners. Players who want competition and improve their thinking skills will play it again and again to outsmart each other and get maximum wins.

PROBLEM DEFINTION:

The problem presented to us is that the game of connect 4 is a physical game and cannot be played over long distances. The game also uses gravity as a factor in the game so we are now faced with the problem to implement in the virtual version of the game.

This game is played on a vertical board which has seven hollow columns and six rows. Each column has a hole in the upper part of the board, where pieces are introduced. There is a window for every square, so that pieces can be seen from both sides. In short, it´s a vertical board with 42 windows distributed in 6 rows and 7 columns.

Both players have a set of 21 thin pieces (like coins); each of them uses a different colour. The board is empty at the start of the game.

PROPOSED SYSTEM:

We have proposed to turn the game into a virtual format with the use of Python language and using MySQL as the database service to store players name and the win data.

There will be Python functions for running the game, basic algorithm, etc. There will be tables to store data of 2 player to 4 player match data, one to store players data and one to store overall data.

Generally, in classic mode the game is played by two players but we took it upon ourselves to make it so that up to 4 players play thus adding 2 more players. Check project design for more.

FUNCTIONALITY:

1. Number of players

   • This game has to be played by minimum 2 players and maximum 4 players.

2. Colour selection

   • The user can choose a colour to represent the player. It will help players to differentiate their coins. Also, this will contribute for attractive Graphical User Interface of Game.

3. Win situation

   • The player who can connect four balls in a line wins. The connection can be vertical, horizontal and even diagonal. For this algorithm will check if player has 4 coins in horizontal or in vertical or in diagonal. If this Condition gets satisfied that player will be declared as winner.

   •For horizontal win situation row will be same and taking smallest value for column as reference there should be other three coins adjacent.

   •For vertical win situation column will be same and taking smallest value for row as reference there should be other three coins on top of it.

   •For diagonal win situation value associated to rows and columns will either increase or decrease. The coin who is closer to first column will be taken as reference.

4. High score and score count

   • The winning players name will be noted and will be added to the tally.

   • This will help to find which player has played how much matches, has won or lost matches and date when he played. It can use as analyse to players progression and improvement in game skills.

5. Classic mode

    •Connect Four is a two-player game with perfect information for both sides. This term describes games where one player at a time plays, players have all the information about moves that have taken place and all moves that can take place, for a given game state. Connect Four also belongs to the classification of an adversarial, zero-sum game, since a player's advantage is an opponent's disadvantage.

FEATURES:

1. Feature 1: Menu driven

   • The game is menu driven as in it gives you prompts to choose your options and what you want to do in the game.

2. Feature 2: Grid size

   • The grid size of the game is changeable; the player is given a choice at the beginning of the game to choose the size of the grid on which the game is to be played on.

3. Feature 3: Quick gameplay

   • The gameplay takes less time as each game can not exceed 10 to 12 minutes per game.

PROJECT OUTCOMES:

This project will provide a fun time for the players

e.g.

1. User Can choose their colour as to differentiate between the players and represent themselves on the game board.

2. User can look who has the highest win count as to take note of the winning player.

3. Users can sharpen their skills in mind games and strategies and make and develop interest in more strategy-oriented games like chess.

4. This game serves as a very basic but entertaining gateway for players to get interested in more strategy-based games.

```
RESTART: C:\Users\USER\Desktop\Recycle Bin\Python Project\connect4.py
pygame 2.0.1 (SDL 2.0.14, Python 3.9.2)
Hello from the pygame community. https://www.pygame.org/contribute.html
Enter Number of Players in range of 2 to 4 4
Enter number of rows in range of 4 to 6 6
Enter number of column in range of 4 to 8 7
```
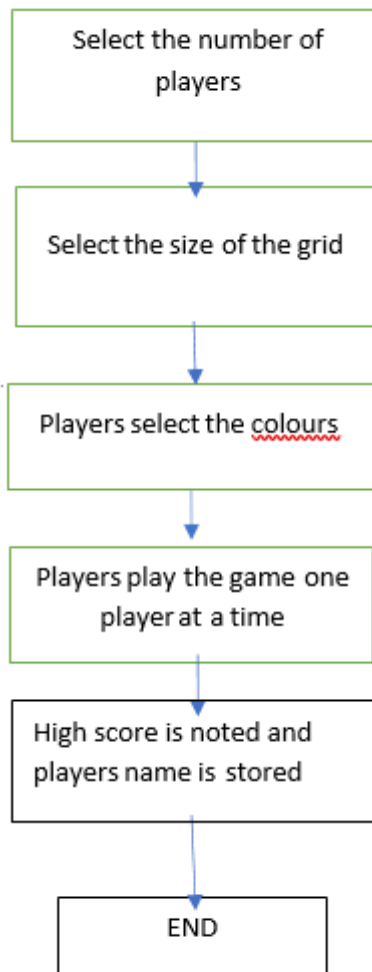
Command Line Execution
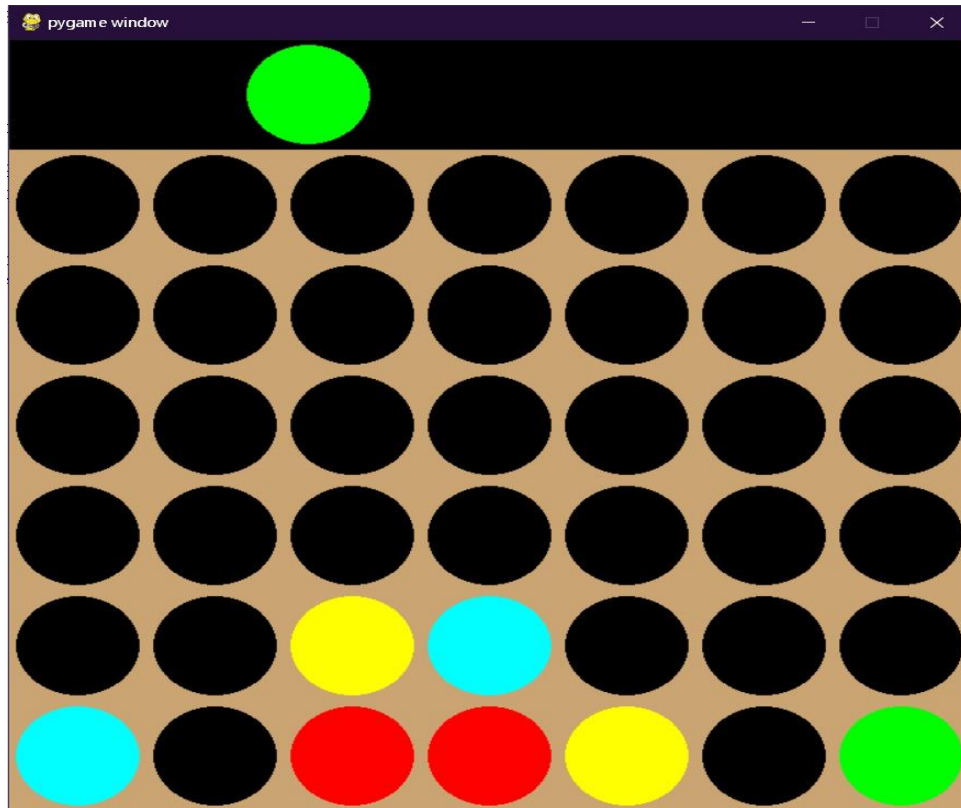
User Interface

Round Win Condition Satisfied

Project design

SOFTWARE REQUIREMENTS:

1. Front End: Considering the power of Python language and its predefined modules. We are currently using Python 3 to take advantage of thelot of freedom and easy coding to create the front end.

2. Back End: MySQL is used as a database service to store and use player's data.

PROJECT SCHEDULING:

Sr. No	Group Member	Time duration	Work to be done
1	Atharv Joshi	1st week	Implementing and creating the algorithm and the pseudocode Also writing code for the program
2	Shridhar Joshi	1st & 2nd week	Implementing and creating the algorithm and the pseudocode Also writing code for the program
3	Siddhesh Puranik	1st &3rd week	Implementing and creating the algorithm and the pseudocode Also writing code for the program
4	Akshada Warik	Last Week	Testing the game and giving feedback on ease of playing and GUI.

CONCLUSION:

Connect 4 is a very enjoyable game and is a nice starting point for a grand adventure into strategy-based games. Connect Four (also known as Four Up, Plot Four, Find Four, four in a Row, four in a Line, Drop Four, and Gravitrips in the Soviet Union) is a two-player connection board game, in which the players choose a colour and then take turns dropping coloured discs into a seven-column, six-row vertically suspended grid. The pieces fall straight down, occupying the lowest available space within the column. The objective of the game is to be the first to form a horizontal, vertical, or diagonal line of four of one's own discs. Connect Four is a solved game. The first player can always win by playing the right moves.

We have learned a lot from making this project. We use a menu driven style in presenting the game and have the basic concept ready. The algorithm for playing game is almost done and working correctly. It provides win situation and gives winner's name.

This will be helpful while making Graphic User Interface of program. The Entity Relationship Model of Database is in the making. Which will be implemented into program after making a good GUI and connecting the database to the frontend of the program.

This assures us that program construction is taking place in right way and planned to the end.

REFERENCES:

- Wikipedia- https://en.wikipedia.org/wiki/Connect_Four

- YouTube- https://www.youtube.com/watch?v=utXzIFEVPjA

ACKNOWLEDGEMENT