KNOTS AND CROSSES

A Project Work

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DECLARATION

I, **Parth**, student of **'Bachelor of Engineering in CSE(AIML)'**, **session: 2020-2024**, Department of Computer Science and Engineering, Apex Institute of Technology, Chandigarh University, Punjab, hereby declare that the work presented in this Project Work entitled '**Knots and Crosses'** is the outcome of our own bona fide work and is correct to the best of our knowledge and this work has been undertaken taking care of Engineering Ethics. It contains no material previously published or written by another person nor material which has been accepted for the award of any other degree or diploma of the university or other institute of higher learning, except where due acknowledgment has been made in the text.

Date:22nd July, 2021 **Place: Chandigarh University**

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ACKNOWLEDGEMENT:

The implementation of this project expanded the horizons of my knowledge on so many levels, therefore, I would like to thank our university for organizing this institutional training and giving us an opportunity to create this project. I would also like to thank my respected mentor for helping us whenever we needed it. Last but not the least I would like to thank my teammate for building this project along with me and merging our knowledge together to successfully complete it.

ABSTRACT:

This project, named as knots and crosses, was created using the programming language C++. It consists of grids of various dimensions in which the user has to arrange X's or O's in a row in order to win. This game can either be played against the computer or against a fellow player. It mainly consists of the usage of various types of functions. In the process of making this project we gained a lot of knowledge while applying the things that we already knew. We have made use of various color codes in order to change the color of the terminal and make it more attractive.

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INTRODUCTION

1.1 About the project:

We all are aware of the basic Tic Tac Toe game that we have played as a child. This project is a modification of that and consists of various grids of different dimensions like 3X3,5X5 and 7X7. The rules our just to make a row of consecutive X's or O's horizontally, vertically or diagonally. The user can pick any of the one grid and either play against the computer or a fellow player.

1.2 Features:

1. Three kinds of grids are present: 3X3, 5X5 and 7X7.
2. In 3X3 user has to connect three X's or O's horizontally, vertically or diagonally.
2. In 5X5 user has to connect four X's or O's horizontally, vertically or diagonally.
3. In 7X7 user has to connect five X's or O's horizontally, vertically or diagonally.
4. The user can play against the computer as well as a fellow player.
5. User can choose any of the three grids to play.
6. Block used once cannot be used again.

1.3 Hardware Specification

Operating system: Windows 10

RAM: 8GB

1.4 Software specifications

We made the use of visual studio code for the implementation of the program.

However, any **offline** IDE can be used to implement it.

APPLICATIONS

1) **Thinking ability enhancement:** It is a strategy-based game which involves active thinking as to which move is to be made next. Especially, young children can benefit out of it by developing a sense of a healthy competitive thinking if played against a fellow mate

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2) Entertainment purposes: This is a light game which can be played anywhere, anytime and by anyone who have basic resources and simple knowledge to run it.

3) Escaping boredom: As we all know in these difficult times of an ongoing pandemic, boredom can be really eminent in our day-to-day lives. So, this game can be an efficient form of escaping from it.

4) Non-Addictive: In today's world we have come across many addictive games that have negative effect on mindset as well as makes us less thoughtful about time management in our daily routine. But, this game is completely non-addictive and each round can be completed within a few minutes.

OBJECTIVES

1. **Changing Tic Tac Toe:** We have introduced 2 other grids other than the traditional 3X3 grid, which are the 5X5 and the 7X7 grid.

2. **More advanced:** Introduction of 2 modes: if 2 players are available they can go against each other or if only one player is available, he/she can go against the computer.

3. **Thinking ability enhancement along with entertainment:** It is a strategy-based game which enhances our thinking ability along with entertainment and develops a sense of healthy competition as well.

4.**Attempt to bring about our own innovation:** We tried to experiment a lot while making this game and tried to make use of our knowledge in all aspects of this game.

METHODOLOGY

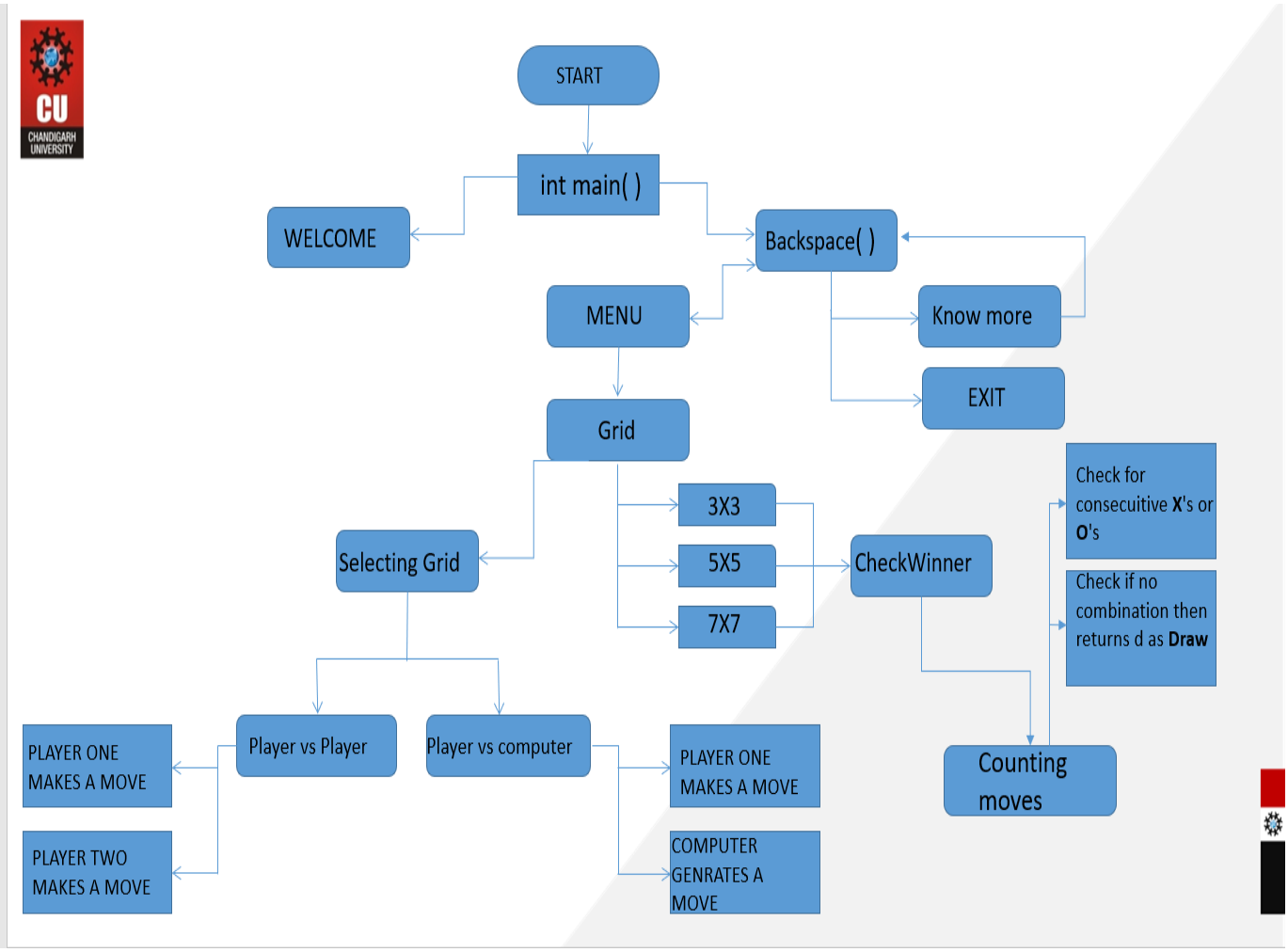

Figure 1

The figure (1) given above shows the working of the program. When we start with the game the main function leads us to a welcome message and then another function called backspace. Backspace has three other options first is to know more about the game, to exit and the third one is the main menu. The menu either leads back to backspace or to another function of the grid, where we first chose the type of grid we want to play in and then select the mode (player vs player or computer vs player). Separate functions are made to take the input of both the players and separate function is made to generate the move of the computer, side by side another function is being executed which is the check winner function. This function will keep counting the moves, is the moves are equal to the number boxes in the grid it will return 'd' for a draw else it will keep checking for the consecutive X's and O's.

RESULTS AND DISCUSSION

1. Introduction of the array:

We have created 3 one-dimensional arrays globally for various kinds of grids.

2. Show board function (figure (2)):

These are the functions which will be used to display the board.

Figure 2

3. Welcome message (figure (3)):

Initially when the user starts playing the compiler gives a welcome message.

```
ENTER THE NAME:
shreya
Welcome!!!
shreya HOPE YOU HAVE A REALLY GOOD TIME PLAYING THIS GAME
```

Figure 3

4. Void backspace (figure (4)):

Then the user is given an option to either know more about the game or to go to the main menu or simply exit the game.

```
ENTER 1 TO GO TO MAIN MENU
ENTER 2 TO KNOW MORE ABOUT GAME
ENTER 3 TO EXIT
```

Figure 4

Know more about the game (figure (5)):

```
PLACE A X's OR O's  IN A PARTICAL BLOCK OF THE GRID
YOU HAVE TO MAKE A HORIZONTAL, VERTICLE OR A DAIGNOL LINE EDGE TO EDGE TO WIN THE GAME.....
ENTER 1 TO GO TO MAIN MENU
ENTER 2 TO KNOW MORE ABOUT GAME
ENTER 3 TO EXIT
```

Figure 5

5. Main menu (figure (6)):

The main menu will give us an option to either start a new game or go back to the function backspace.

```
ENTER 1 FOR A NEW GAME
ENTER 2 TO RETURN TO HOME
```

Figure 6

6. New game (figure (7)):

It will ask us to choose the kind of grid we want.

```
ENTER 1 FOR  3X3 GRID
ENTER 2 FOR  5X5 GRID
ENTER 3 FOR  7X7 GRID
ENTER 4 TO RETURN TO HOME
```

Figure 7

When we chose a particular grid it will display us the rules for that particular grid and ask whether we want to go against the computer or want to go against a fellow player (figure (8)).

```
THE RULES FOR ROUND 2 IS AS FOLLOWS:
1. IN 5X5 GRID CONNECT FOURS X'sOR FOURS O'sIN A ROW TO WIN THE GAME.
2. BLOCK USED ONCE CANNOT BE RE-USED.
3. PLAYER CAN ONLY SELECT ONE SYMBOL.
4. 2 PLAYERS CAN ONLY PLAY.


1. Computer VS Player.
2. Player VS Player.
Select Game Mode.
```

Figure 8

7. Computer vs player:

If we go for computer vs player it will first ask for our name and then display the grid. (figure(9 & 10))

```
Select Game Mode.
1
Enter Your Name: shreya
```

Figure 9

```
   |   |   |   |
------------------
   |   |   |   |
------------------
   |   |   |   |
------------------
   |   |   |   |
------------------
   |   |   |   |
shreya's Turn.
Select Your Position (1 - 25): 1
```

Figure 10

There is a different function in the code which is meant to take the input for he user and a different function which is used to generate the computers move randomly.

After someone wins the game the result is declared. (figure(11))

```
X  |  X | X | X | O
------------------
   |   |   |   |
------------------
   |   |   |   | O
------------------
   |   | O |   |
------------------
   |   |   | X | O
shreya Won The Game.
```

Figure 11

8. Player vs player:

After selecting the player vs player mode both the players would be asked to input there Names (figure (12))

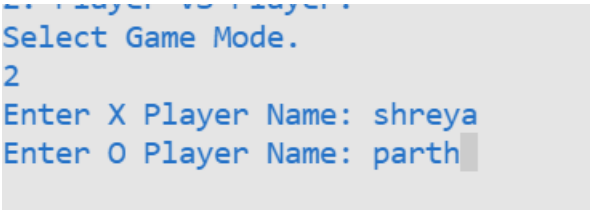

Figure 12

There are different functions in the code which will take the input for different players and after one of the player has won or if it is a draw the result is declared. (figure (13)).

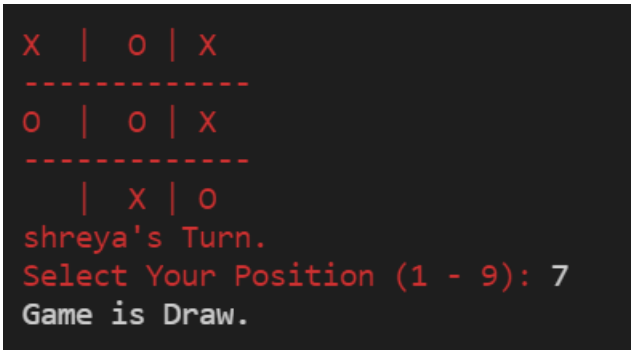

Figure 13

CONCLUSION

Building this project was a very knowledgeable and interesting experience for us. This game can be put to use for entertainment purpose and also can be used as a thinking ability enhancer as it is a strategy-based game.In the future we wish to do further additions to this project like linking it up with graphics using Graphical user Interface(GUI), adding larger grids to it making it more complex and entertaining these additions will be made keeping basic requirements for the device to run the code

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