

C-PROGRAMMING PROJECT REPORT

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CONTEXT

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CONTENTS:

PAGE NO:

1.	PROJECT TITLE	3
2.	AIM	3
3.	ABSTRACT	3
4.	TECHNOLOGIES USED	5
5.	SAMPLE SCENARIO	6
6.	ASSUMPTION TAKEN	7
7.	DETAILS HANDLED	8
8.	SAMPLE INPUT AND OUTPUT	11
9.	ALGORITHM	15
10.	END USER	16
11.	CONCLUSION	17

TITLE :-

- TIC TAC TOE

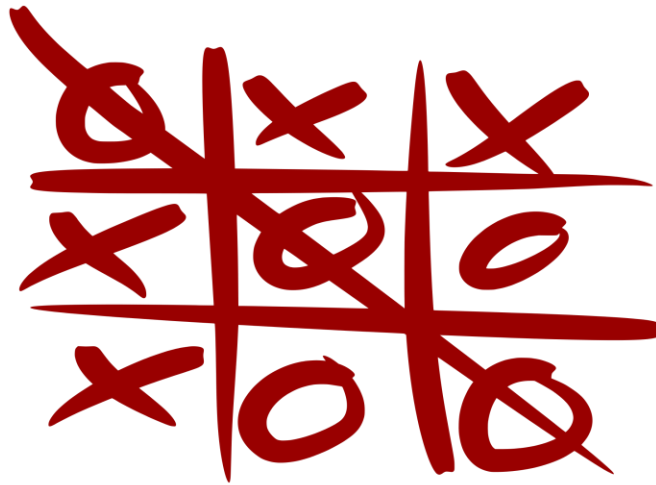
AIM :-

- TO develop a program that changes the classical style of playing TIC TAC TOE with the help of pen & paper to a new and modern age style of playing TIC TAC TOE with the guidance of a computer or any OS.

ABSTRACT:-

- In general TIC TAC TOE, The game is played with the help of pen and paper. And the game is the dual player game. In this game, The players have to choose either 'X' (or) 'O'.
- In this game, there are three rows and columns the players can place their respective characters in any one of the blocks, and later. Each player can draw their respective character only once in a single block. And each block should be with a single type of character.
- The player who gets a completely straight line which consists of three similar characters and the straight line formed can be vertically (or) horizontally (or) diagonal line then the player wins the game. If the case mentioned above is not satisfied and if all the blocks are complete with any of the characters without forming a straight line of three same characters then the game is given a draw.
- This TIC TAC TOE game with the same logic we are going to develop the game in the computer with the help of C-program & its editors.

- In this game, the user will be playing the game with the computer rather than playing with the other player.
- The player gets the first chance to make a move and he will be given 'X' as his character always
- The developer can play this game whenever he wants rather than depending on others like the user to play this game on the computer. This game helps the developer to increase his IQ and it helps him to improve his problem-solving skills. And it helps as a stress reliever.
- By successfully building this game the developer can improve his skills in programming and encourages him to build more games successfully.



TECHNOLOGIES USED:-

- CODING LANGUAGE USED :-

C-PROGRAMMING

- TECHNICAL SPECIFICATIONS :-

CPU :- INTEL CORE I5 10THGEN

RAM :- 8GB DDR4

OS :- WINDOWS 10

SYSTEM TYPE :- 64 BIT OPERATING SYSTEM, x64 based processor

SAMPLE SCENARIO :-

1. After successfully running the program the computer prints the statements, stating that user is playing against the computer and user is given the first chance to make his move and start the game.
2. The user should enter the co-ordinates of row and column in which he want to place his character.
3. After entering the co-ordinates, the computer automatically makes its move by placing its character in the TIC TAC TOE matrix.
4. If in case the co-ordinates entered by the player does not exist in the matrix or the co-ordinates are occupied by any character then the computer asks the user to give new co-ordinates.
5. This process continues until the end of the game
6. There are only three possible ways to complete the game they are
 - case 1 :- player wins :
 - if the player wins the game the computer prints the statement “ player won the game ”
 - case 2 :- computer wins :
 - if the computer wins the game the computer prints the statement
“ computer won the game ”
 - case 3 :- draw :
 - if all the rows and columns are filled up by the characters and there is no empty space to place a character then the computer prints the statement “ the match is draw ”

ASSUMPTIONS TAKEN :-

- The player will be given 'x' and the computer is given 'o' as their playing characters respectively. The player gets the first chance to make the first move in the game
- In general, the output of any program will be printed in white color with a black background but in our program we are giving a unique color to each statement with a black background.
- The TIC TAC TOE matrices are represented in red color AND 'X' AND 'O' characters are also represented in red color in each step.
- The player should give the coordinates of the row and column in which he want to place his characters. The computer automatically places its character after the completion of the players move
- The player should not place his character in the same row and column more than once.
- There are only three possible ways to complete the game they are
 - case 1 :- player wins
 - case 2 :- computer wins
 - case 3 :- draw
- Technical limitations- required OS : Windows (or) mac
software requirements : C compiler ex: online g d b compiler, code blocks

DETAILS HANDLED :-

- **MAIN()** :- This is the main function block where the execution begins. In this function we are calling five functions they are :-
 1. MATRIX_INITIALIZATION()
 2. DISPLAY_MATRIX()
 3. PLAYER_MOVE()
 4. CHECK()
 5. COMPUTER_MOVE()
- Then it prints a menu which shows the user that he is playing against the computer and asking him to make his first move to start the game. And the computer wishes him "ALL THE BEST". After calling the MATRIX_INITIALIZATION() function the do while loop will start. In the do while loop we are calling some other functions. In do while function the computer goes into do and checks if done != ' ' and breaks the statement. If not it goes into while and checks whether done = ' '. next it goes into if statement checking whether done = 'X' then it prints player won the game. If not it goes into else statement and prints computer won the game. After coming out from the else statement it calls the DISPLAY_MATRIX() function.
- **Variables used :-**
 1. char done : it shows the value of check ()

- **MATRIX_INITIALIZATION()** :- This function is used to initialize the rows and columns of the matrix using nested for loops.

Variables used :-

- 1.int i : It is used to represent the no of rows
2. Int j : it is used to represent the no of columns

- **PLAYER_MOVE()** :- In this function the computer asks the player to enter the rows and columns in which the player want to place his character. Next the computer goes into the if statement and checks whether `TIC_TAC_TOE_MATRIX[X][Y] != ''` then the computer asks the user to give new co-ordinates or else it goes to else statement.

Variables used :-

1. Int x : the value of x represents the position of row
2. Int y : the value of y represents the position of column

- **COMPUTER_MOVE()** :- In this function the computer is given instructions to make its move by using nested for loops with their respective if statements. After coming out from the nested for loops the computer goes into the if statement and checks whether all the rows and columns are filled or not, if filled the computer prints that the game ends with a tie or else goes into the else statement and returns back to the nested for loops.

VARIABLES USED :-

1. int i : the value of i represents the position of row.
2. int j : the value of j represents the position of column.

- **DISPLAY_MATRIX()** :- This function is used to display the TIC TAC TOE matrix in red color.

VARIABLES USED :-

1. int i : i is used in the for loop to display the TIC TAC TOE matrix.

- **CHECK()** :- This function is used to check the logic which is useful to the computer to make its move in the game.

VARIABLES USED :-

1. int i : it is used in the for loops to check the logic for the computer.

SAMPLE INPUT AND OUTPUT:-

- OUTPUT 1 :-

```
TIC TAC TOE ----- (PLAYER VS COMPUTER)
YOU ARE PLAYING AGANIST THE COMPUTER
COMPUTER :- ALL THE BEST
YOU CAN START THE GAME BY MAKING YOUR FIRST MOVE

  |  | 
--|--|--
  |  | 
--|--|--
  |  | 

ENTER THE COORDINATES OF ROW AND COLUMN :- 
```

- INPUT 1 :-

```
  |  | 
--|--|--
  |  | 
--|--|--
  |  | 

ENTER THE COORDINATES OF ROW AND COLUMN :- 1 2
```

• OUTPUT 2 :-

```
  O | X |  
---|---|---  
  |   |  
---|---|---  
  |   |  
ENTER THE COORDINATES OF ROW AND COLUMN :-
```

• INPUT 2 :-

```
ENTER THE COORDINATES OF ROW AND COLUMN :- 2 3
```

• OUTPUT 3 :-

```
  O | X | O  
---|---|---  
  |   | X  
---|---|---  
  |   |  
ENTER THE COORDINATES OF ROW AND COLUMN :-
```

• INPUT 3 :-

```

| |
ENTER THE COORDINATES OF ROW AND COLUMN :- 2 2

```

• OUTPUT 4 :-

```

O | x | O
---|---|---
O | x | x
---|---|---
    |
ENTER THE COORDINATES OF ROW AND COLUMN :-

```

• INPUT 4 :-

```

| |
ENTER THE COORDINATES OF ROW AND COLUMN :- 2 2

```

- OUTPUT 5 :-

```
  |  |  
ENTER THE COORDINATES OF ROW AND COLUMN :- 2 2  
THE COORDINATES WHICH YOU SELECTED ARE ALREADY SELECTED BY YOU (OR) BY THE COMPUTER (or) THE COORDINATES MAY NOT EXISTS IN THE TIC TAC TOE MATRIX  
SO PLEASE SELECT DIFFERENT COORDINATES  
ENTER THE COORDINATES OF ROW AND COLUMN :-
```

- INPUT 5 :-

```
ENTER THE COORDINATES OF ROW AND COLUMN :- 3 2
```

- OUTPUT 6 :-

```
PLAYER WON THE GAME
```

```
  O  |  X  |  O  
----|----|----  
  O  |  X  |  X  
----|----|----  
      |  X  |
```

ALGORITHM:-

- Step 1: Start.
- Step 2: player 1 chooses his character
- Step 3: player 1 makes his first move
- Step 4: the computer makes its second move
- Step 5: the player and the computer makes their moves alternatively
- step 6: If there are corner spaces (i.e. 1, 3, 7, 9), take it and go to Step 7.
- step 7: if the player has a chance to form a vertical/horizontal/diagonal line then block it. else go to step 8
- step 8: If there is the center position, take it and go to step 9.
- step 9: If there are side positions (i.e. 2,4,6,8), take it and go to Step 10.
- step 10: check the winning move of the computer and make it

- step 11: Check whether the computer's characters are in a vertical/horizontal/diagonal form. If it is there the system will win. And go to step 13. Else, Check whether the player's characters are in a vertical/horizontal/diagonal form. If it is there the system will win And go to step 13.
- step 12: the player wins or computer wins or the game is draw go to step 13
- step 13: the player chooses whether he wants to play the game again or end the game. if the player wants to play the game go to step 1 else go to step 14
- step 14: END.

END USER:-

- The player, who is using this program should have basic knowledge of the c program
- The players should know, how to play TIC TAC TOE both on the computer and with pen and paper
- Any person who is feeling alone or bored can play this game with the computer rather than feeling alone or waiting for other player.
- This game helps the player to increase his IQ and it helps him to improve his problem-solving skills. And it helps as a stress reliever

CONCLUSION :-

- THE TIC TAC TOE game is most familiar among all age groups.
- An algorithm of playing has been presented and tested that works in efficient way.
- overall the system works without any bugs.
- While implementing this project we got an opportunity to learn different C concepts got an domain knowledge about our project.
