PROGRAMMING FUNDAMENTALS
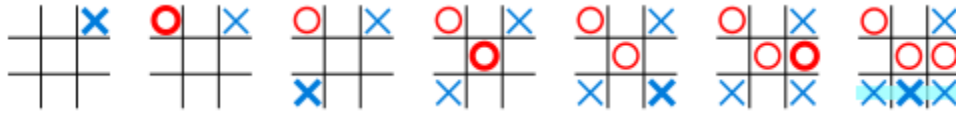
SEMESTER PROJECT

Introduction:

Tic-tac-toe is played on a three-by-three grid by two players, who alternately place the marks X and O in one of the nine spaces in the grid.

In the following example, the first player (X) wins the game in seven steps:

There is no universally-agreed rule as to who plays first, but in this article the convention that X plays first is used.

Players soon discover that the best play from both parties leads to a draw

Header files.:

stdio.h:

stdio.h stands for standard input-output header.
   This header file contains declarations of functions like printf, scanf, etc.
   In C, input and output are performed using streams, which are sequences of characters.
   There are two types of streams:
   1. Input Stream: If the flow of characters is from a device (e.g., keyboard) to the main memory, it's called input.
   2. Output Stream: If the flow of characters is from the main memory to a device (e.g., display screen), it's called output.

FILE:

   FILE* is a pointer to a structure representing a file.

   Functions like fopen, fprintf, fscanf, and fclose are commonly used for file input/output in C.

      To create a file, you can use fopen with "w" (write) mode.

      To read an existing file, you can use fopen with "r" (read) mode.

      To create and read a file, you can use fopen with "w+" (write and read) mode.

Functions:

A function is a block of code which only runs when it is called. You can pass data, known as parameters, into a function. Functions are used to perform certain actions, and they are important for reusing code.
The functions that are used in the code are:

- main()
- Checkwin()

- Board()

Main():

In the main function, the player is assigned with their mark i.e player 1 is assigned a mark 'X' and player 2 'O'. Then the player is asked to enter their choice from (1-9). As the player chooses its option a certain mark is placed there. This is done by using else if conditional statements.

Checkwin():

In this function the compiler checks whether any player has won, if the game is still in progress or if the game is over and it is a draw. This function is called in main as it checks the winner and displays the message accordingly.

Board():

This function is called in main() at the top, this function displays the board at the console output.

Console Output:

As the user enters 1, the mark will be placed at 1st position. And then it asks the 2nd player to take their turn.

```
        Tic Tac Toe

Player 1 (X)  -  Player 2 (O)


     |     |
  X  |  2  |  3
_____|_____|_____
     |     |
  4  |  O  |  6
_____|_____|_____
     |     |
  7  |  8  |  9
     |     |

Player 1, enter a number:
```

```
        Tic Tac Toe

Player 1 (X)  -  Player 2 (O)


     |     |
  X  |  O  |  3
_____|_____|_____
     |     |
  X  |  O  |  6
_____|_____|_____
     |     |
  X  |  8  |  9
     |     |

==>Player 1 win
```

Figure here the player 1 wins.

```
        Tic Tac Toe

Player 1 (X)  -  Player 2 (O)


     |     |
  X  |  X  |  O
_____|_____|_____
     |     |
  X  |  X  |  6
_____|_____|_____
     |     |
  O  |  O  |  O
     |     |

==>Player 2 win
```
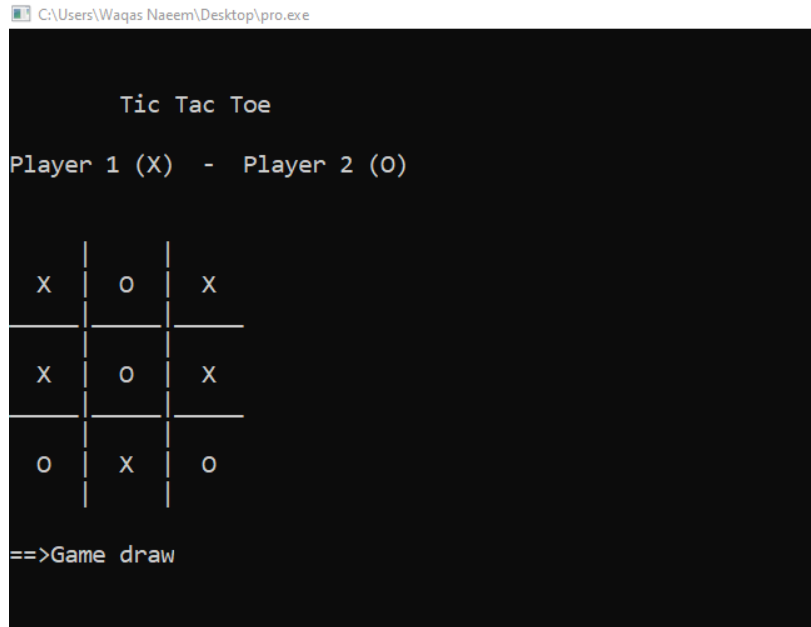
Figure here the player 2 wins.

Figure Here the game is draw

Benefits of the game:

Improves Strategic Thinking: Tic Tac Toe requires players to think ahead and anticipate their opponent's moves. This helps to develop strategic thinking and problem-solving skills.

1. Enhances Spatial Awareness: The game requires players to recognize and understand spatial relationships between the game board and the pieces. This helps to improve spatial awareness and visual perception.
2. Encourages Logical Reasoning: The game involves making logical decisions based on the available options. This helps to develop logical reasoning skills and decision-making abilities.
3. Promotes Social Interaction: Tic Tac Toe is a simple game that can be played with friends, family, or even strangers. Playing together promotes social interaction and can help to build friendships.
4. Helps to Develop Patience: Tic Tac Toe requires patience and persistence to win. Players must take their time and wait for the right opportunities to make their moves. This helps to develop patience and perseverance.
5. Provides Entertainment: Tic Tac Toe is a fun and entertaining game that can be played almost anywhere with just a piece of paper and a pen or pencil. It is a great way to pass the time and can provide hours of entertainment.
6. It helps save the environment as it doesn't involves pages.

Overall, Tic Tac Toe is a simple yet challenging game that provides numerous benefits, from improving strategic thinking and logical reasoning to promoting social interaction and providing entertainment.