Introduction

Tic-tac-toe, also known as noughts and crosses, or Xs and Os/ "X'yO'sies", is a game for two players, X and O, who takes turns marking the spaces in a 3x3 grid. The player who succeeds in placing three of their marks in a diagonal, horizontal, or vertical row is the winner. It is a solved game with a forced draw assuming best play from both players. It is usually played on paper but as the technology evolved, here is a digital version of it.

This topic was chosen because it gives me an opportunity to implement and understand multiple C programing concepts.

Features :

It is often used as a pedagogical tool for teaching the concepts of good sportsmanship and the branch of artificial intelligence that deals with the searching of game trees. It is straightforward to write a computer program to play tic-tac-toe perfectly or to enumerate the 765 essentially different position (the state space complexity) or the 26,830 possible games up to rotations and reflections (the game tree complexity) on this space. If played optimally by both players, the game always ends in draw, making tic-tac-toe a futile game.

The game can be generalized to an m,n,k-game in which two players alternate placing stones of their own color on an mxn goal of getting k of their own color in a row. Tic-tac-toe is the (3,3,3)- game. Harary's generalized as a nd game. Tic-tac-toe is the game where n equals 3 and d equals 2. It can be generalized even further by playing on an arbitrary incidence structure, where rows are lines and cells are points.

Benefits:

Tic-tac-toe Game offers a few benefits. Here are just a few of them:

- *Good Sportsmanship*
  Like any game, tic-tac-toe also teaches a person to accept the defeat as well as acknowledge the win.
- *Prepares for more complex games*
  It prepares a person for more complex games because they have to think of multiple things at one time
- *Development of Coordination*
  Tic-tac-toe helps develop coordination, fine motor skills and visual skills
- *Mannerism*
  It helps one to learn how to follow rules and take turns
- *Concentration*
  It can help to improve a person's concentration as well as strategic thinking

Explanation:

- The game always starts with Player 1 (X), giving (1-9) numbers to mark the place.
- After Player 1 fills their mark on board, the turn changes to Player 2 (O).
- Computer checks if there is a Winner yet.
- If not, then it again checks if it is a draw situation.
- The game ends when :
  - ➢ It is a draw situation, i.e. a total of 9 moves have been completed and nobody has won.
  - ➢ Player 1 wins
  - ➢ Player 2 wins