TIC-TAC-TOE

INTRODUCTION:

The **Tic-Tac-Toe** is a classic two-player game often used to introduce basic programming concepts and algorithms. The game is played on a 3x3 grid, where players take turns marking either an "X" or an "O" in an empty cell. The objective is to place three of their marks in a row, column, or diagonal. If no player achieves this by the time all spaces are filled, the game is a draw. We will implement **Tic-Tac-Toe**, with a focus on both Data Structures and Algorithms (DSA).

PROBLEM DOMAIN:

The **Tic-Tac-Toe** game is a well-known, simple, two-player game where the goal is to mark three consecutive squares in a row, column, or diagonal on a 3x3 grid with either "X" or "O". The game ends when one player wins by placing three of their marks in a line or when the grid is filled without a winner, resulting in a draw.

EXPECTED DOMAIN:

It includes several key areas related to game mechanics, user interaction, and algorithmic logic. The project domain spans a variety of domains, from simple game development to practical applications of algorithms and data structures.

REQUIREMENTS:

1. **Core Functionalities**:
    - Game Board Representation.
    - Player Turn Management.
    - Move Validation.
    - Win Detection.
    - Draw Detection.
    - Game Restart.
2. **User Interface**:
    - Main Window.
    - 3x3 Grid.
    - Turn Indicator.
    - Game Outcome Display.
    - Restart Button.
3. **Input Validation**:
    - Valid Move
    - Valid Player Turn
    - Game Over
    - Restart and Reset

DATASTRUCTURES:

- List
- Strings
- Boolean Flags
- Algorithmic Functions

METHODOLOGY:

- **Planning Phase:**
  - The planning phase focuses on understanding the problem, setting up the requirements, and identifying the necessary data structures and algorithms.
- **Design Phase:**
  - During the design phase, the system architecture and the detailed flow of the game are created. This phase focuses on creating an effective user interface and defining the game logic.
- **Implementation Phase:**
  - This phase involves writing the actual code to implement the game logic, GUI components, and interaction between the user and the program.
- **Testing Phase:**
  - In this phase, the game is tested for functionality, usability, and correctness.
- **Deployment Phase:**
  - Once the game is fully implemented and tested, it is deployed for use.

CONCLUSION:

The **Tic-Tac-Toe** game involve designing the game logic, building the graphical interface, implementing game features (like alternating turns, win/draw conditions), and ensuring **error-**free gameplay through testing.

OUTPUT: