CSE 410 (Computer Graphics Sessional)

Problem Statement:

You are to implement a 2D graphical version of the classic **Tic Tac Toe** game using **OpenGL**. The game is played by two players who alternate turns to mark the cells of a 3×3 grid. Player **X** moves first, followed by Player **O**. The game ends when one player achieves a win or when the grid is completely filled resulting in a draw.

Requirements

1. **Graphical Grid**:
    - Render a 3×3 grid (i.e., 9 square cells) using OpenGL.
    - Each cell should be clearly distinguishable.
2. **Turn Handling**:
    - Players alternate between **X** and **O**.
    - Player **X** starts the game.
3. **Input Interaction**:
    - Players press keys `1` to `9` to place their symbol.
    - The key corresponds to a cell based on row-major order:

1	2	3
4	5	6
7	8	9

4. **Marking and Validation**:

- Pressing a key places the player's symbol in that cell if it's unoccupied.
- Pressing a key for an already marked cell does nothing.

5. **Game End Conditions**:

- The game ends with a **win** when a player aligns 3 of their symbols horizontally, vertically, or diagonally.

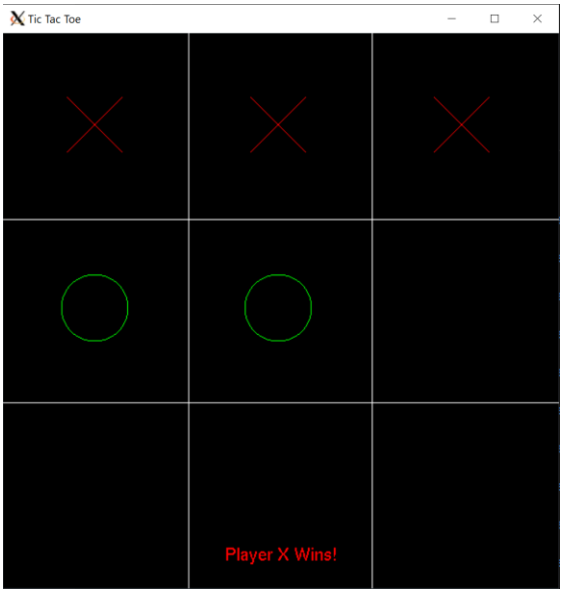
- The game ends with a **draw** when all cells are filled and no player has won.

6. **Game Over Display**:

- Display a message indicating the winner (e.g., "Player X Wins!") or "Draw!" at a visible position near the grid.

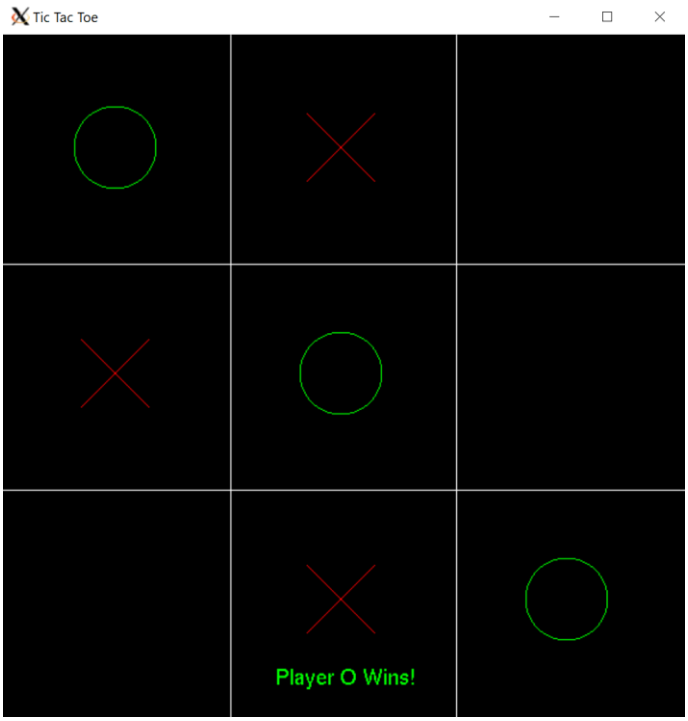
Sample Input

1. 1 4 2 5 3

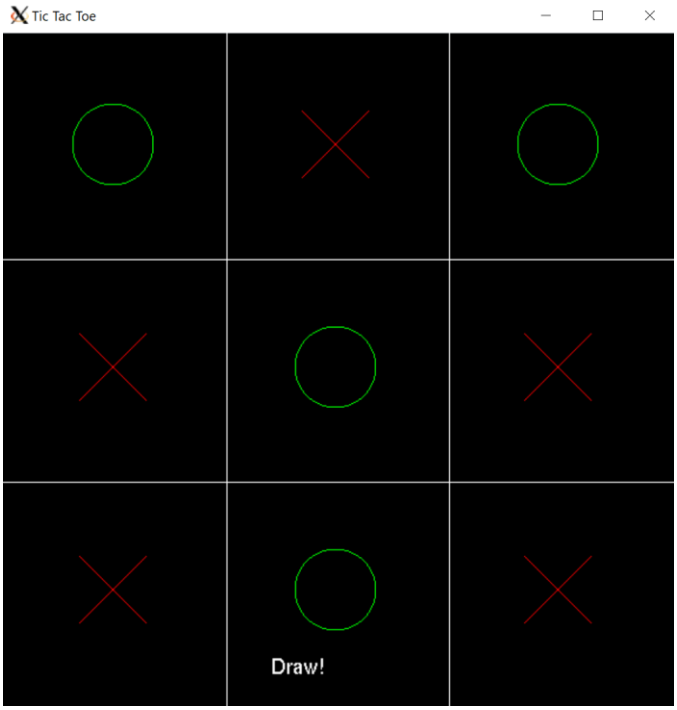


Explanation: When the game starts, it is now turn of Player X. When pressed 1, the first cell (row 1, col 1) is marked as ‘X’ and the turn goes to Player ‘O’. Player O presses 4 which marks ‘O’ in the fourth cell (row 2, col 1) and turn goes to Player ‘X’. As the game continues, player X wins marking 3 horizontal cells in the first row.

2. 2 1 4 5 8 9



3. 2 1 4 3 6 5 9 8 7



Helper Code:

You may use this function to draw a **text string** on the OpenGL window at a specified 2D position using bitmap fonts.

```
void drawText(const string& text, float x, float y)

{

    glRasterPos2f(x,y);

    for (char c: text)

        glutBitmapCharacter (GLUT_BITMAP_HELVETICA_18, c);

}
```

Parameters:

- text: The string to display.
- x: X-coordinate of the text position in OpenGL's 2D coordinate space.
- y: Y-coordinate of the text position in OpenGL's 2D coordinate space.