MAR ATHANASIUS COLLEGE OF ENGINEERING

KOTHAMANGALAM

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Department of Computer Applications

Micro Project Report

TIC TAC TOE GAME

Submitted by

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Proposed Work

The Tic Tac Toe Game is a desktop-based strategic board game offering both Offline (Local Two-Player) and Online Multiplayer gameplay modes. Developed in Java using Swing and AWT, the project is focused on delivering a smooth, interactive, and modern user experience. It is designed for casual players as well as learners looking to explore GUI development and socket-based multiplayer programming in Java.

In offline mode, two players take turns on the same system, while online mode connects players over a network using server-client architecture. The GUI is dark-themed, responsive, and rich in feedback, showing clear indicators of turns, game results, and rematch prompts.

Core System Overview:
The system is composed of two major layers:

- Game Logic Engine – Handles player turns, move validation, win/tie conditions, board resets.
- Graphical User Interface (GUI) – Renders buttons, status messages, and handles user input.

Key Features:

- Local 2-player mode and real-time multiplayer mode over sockets.
- Turn-based interaction with styled symbol colors (Cyan for X, Red for O).
- Server generates Game ID for matchmaking; clients can join using this ID.
- Enhanced rematch system using restart requests and confirmations.
- Interactive UI with modern buttons, celebratory highlights, and animated transitions.

Modules and Functionalities

1. Player Interaction Module

Mouse-click-based input on tiles.
Rejects invalid inputs (occupied tiles, actions post game over).
Color-coded visual cues for X and O.
Responsive status updates like "Your Turn (X)", "O Wins!", etc.

2. Game Logic Module

Tracks player turns and move counts.
Detects victory on any row, column, or diagonal.
Identifies a tie after 9 moves with no winner.
Declares game results with visual and textual feedback.

3. Game State Management Module

Switches between:

Home Page
In-Game (Offline or Online)
Game Over
Rematch
Online module supports:
Game ID generation
Player joining
Connection loss detection

4. Visual Feedback and UI Module

Dark-themed visuals using custom fonts and styled components.

Styled JOptionPane dialogs for restart, quit, and network events.

Color effects:

Winning tiles turn green
Tie tiles turn orange
Dialogs show game result and options
Animated text and control buttons with hover effects.

5. Online Multiplayer Module

Client-server architecture over sockets.
Creator receives a Game ID; other player joins using it.
Messages passed using a simple protocol (e.g., MOVE, QUIT).
Both clients sync turn changes and restart states.
Handles network interruptions gracefully.

Functionalities:

1. Player Functionalities:

Click tiles to play (valid moves only).
Take turns with clear indicators.
Receive live updates about turns and game result.
Request or respond to rematch.
Quit game anytime and notify opponent.

2. Game System Functionalities:

Internal state tracks current turn and board state.
Visual highlights on win/tie.
Reset functionality to clear board.
Multiplayer restart via RESTART_REQUEST and RESTART_ACCEPTED.
Socket communication manages game state and flow.

3. General Features:

Java Swing UI with interactive buttons and labels.
Simple and scalable layout using BorderLayout & GridLayout.
Online play via TCP Sockets with PrintWriter and BufferedReader.
Exportable as executable JAR for any Java-enabled platform.
Easily extensible (AI bot, sounds, scoring system, animations).

Description of Technology Used and Its Features

Frontend (GUI):
Java Swing for rendering buttons, labels, and layout management.
AWT for event handling and dialog management.
GridLayout (Game Board), BorderLayout (Main Frame).

Game Logic:
Encapsulation and modular design with OOP.
Conditional logic for winner detection.
Status label updates per move.

Networking
Socket-based messaging with game protocol.
Game ID system for matchmaking.
Threaded message listeners ensure real-time sync.

Deployment
Runs as a JAR on Windows, Linux, or macOS.
Offline mode needs no network.
Online mode requires two systems on same LAN or accessible IP.
Detailed Working Flow:

Home Page:
Choose from: Start Offline Game, Online Mode, Quit.

Offline Mode:
Two local players alternate placing X and O.
Game ends with a win or tie.
Reset and Menu buttons available.

Online Mode:
One player clicks "Create Game", receives a Game ID.
Other player clicks "Join Game" and inputs Game ID.
Match begins with X and O assigned based on join order.

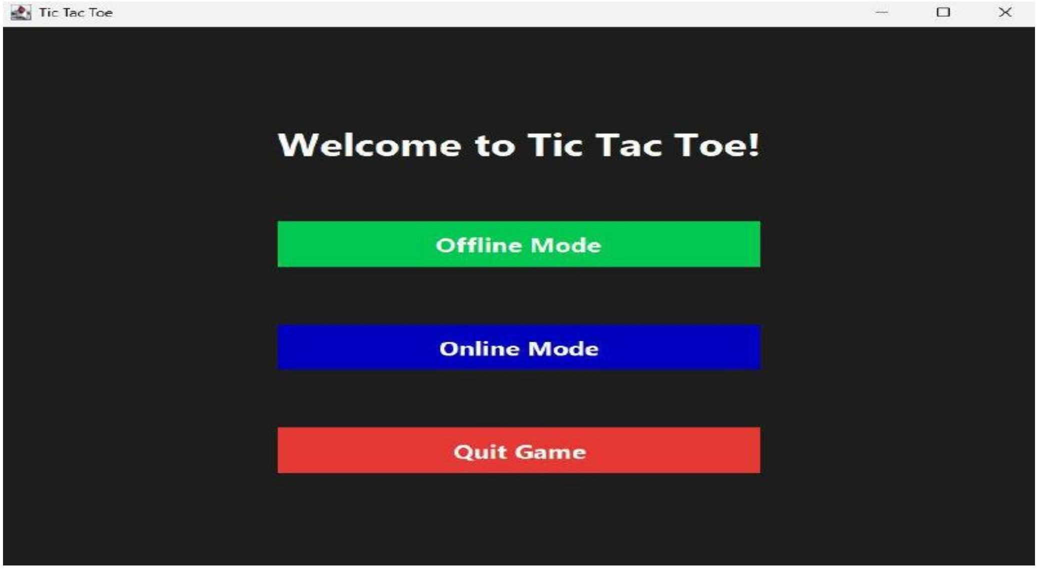
Gameplay:
Move updates shown in real time.
Status label indicates turn.
On win/tie, appropriate visuals shown.

Rematch System:
One player clicks Restart.
Opponent receives styled confirmation dialog.
On acceptance, game restarts on both sides.

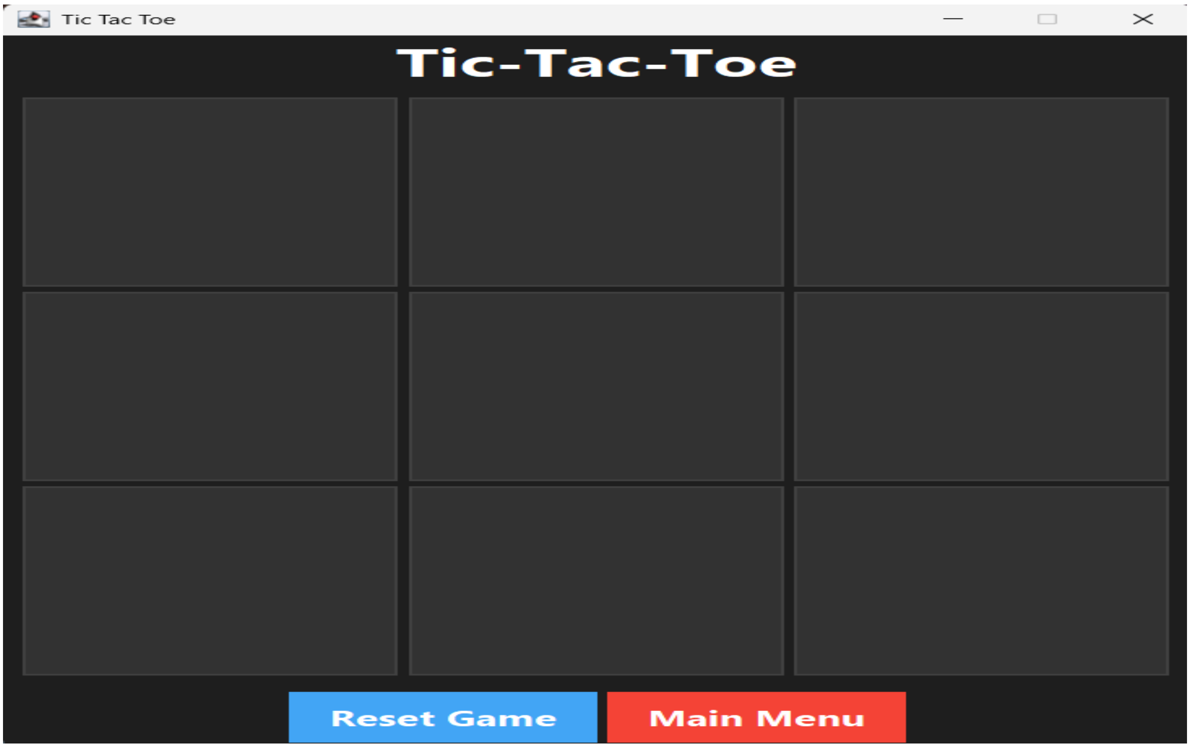
Exit Flow:
Player clicks "Leave Match" or closes game.
Opponent is shown "Opponent left the match"

Screenshots

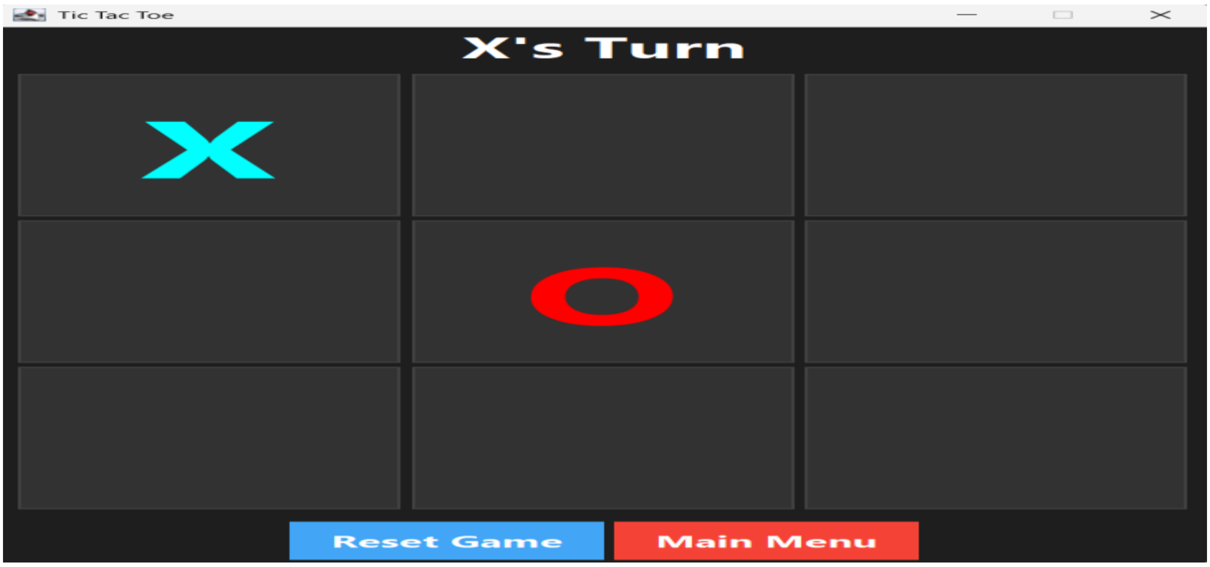
1. Home page



2. game starts

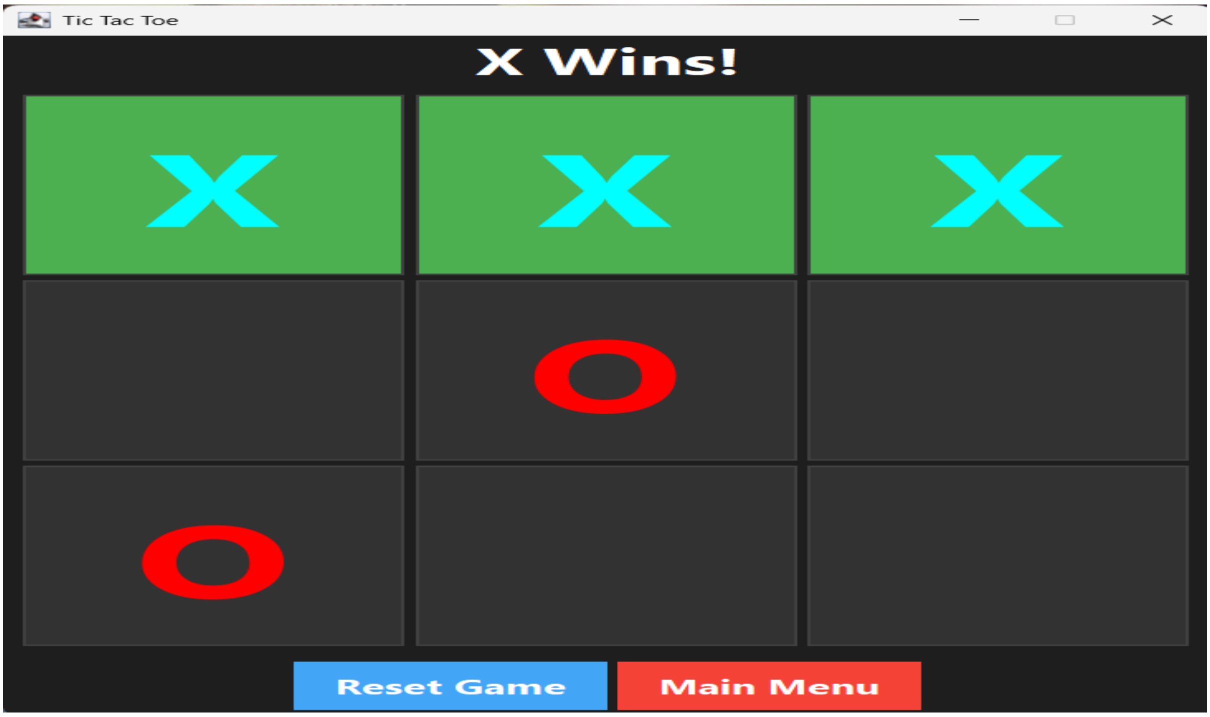


3. Continuing Game



X's Turn

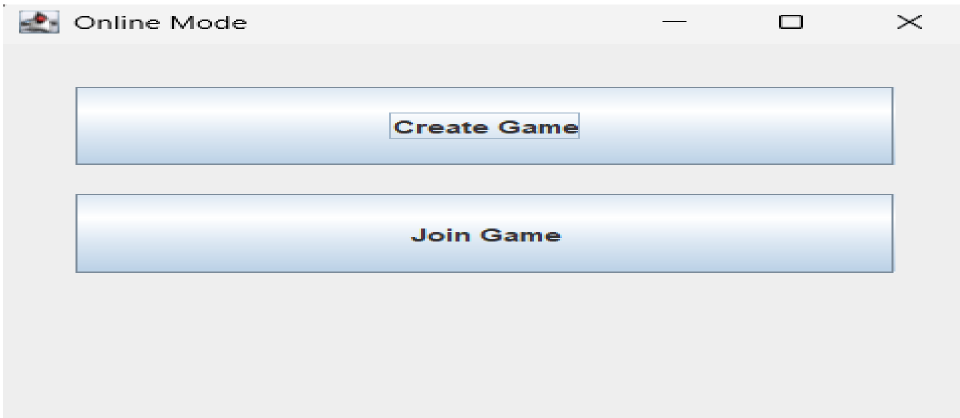
4. X Wins



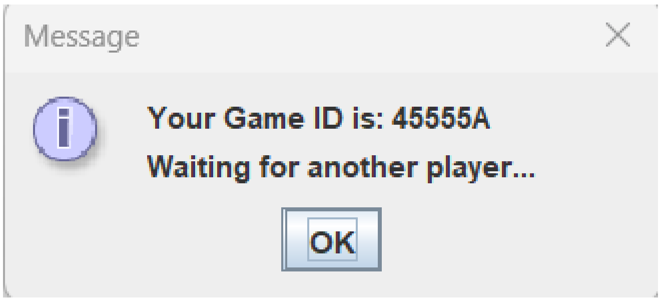
X Wins!

5. Online Mode

a.chooses to create game or join game

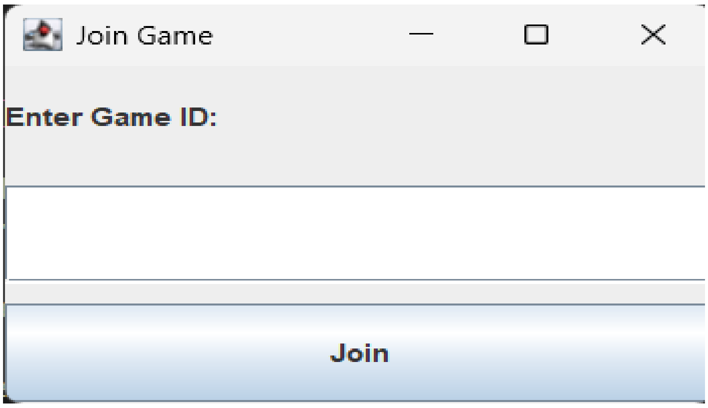


b. the player chooses create mode so gets the game id



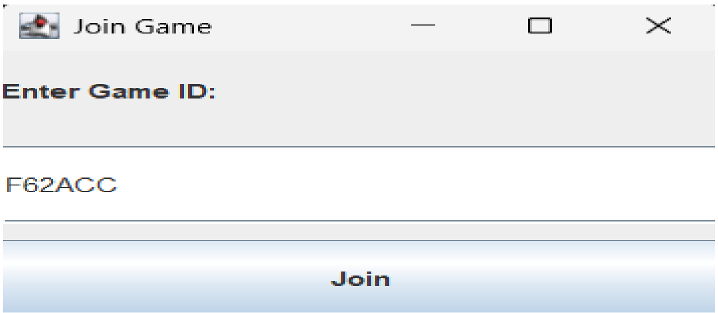
Your Game ID is: 45555A
Waiting for another player...

c.Opponent should enter game id to join the game



Enter Game ID:

d. **Opponent entered the game id**

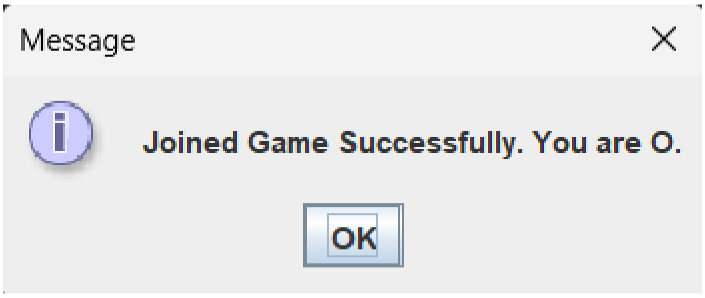


Join Game

Enter Game ID:

F62ACC

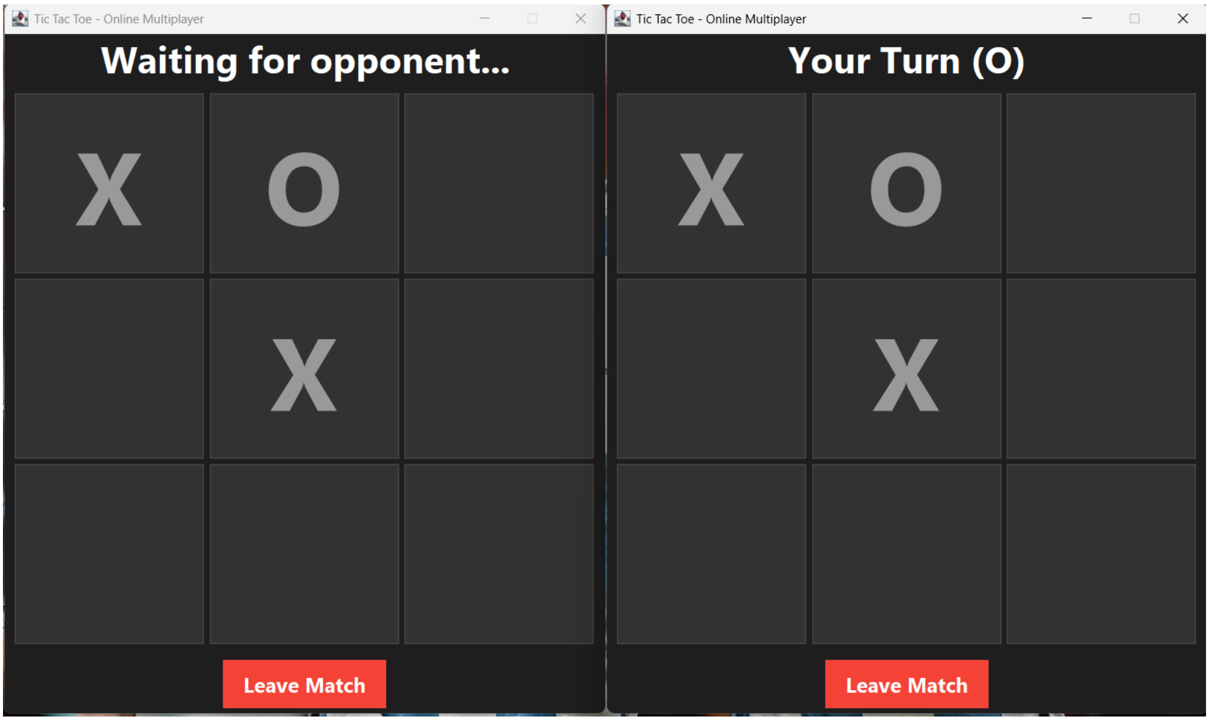
e. joined the game



Message

Joined Game Successfully. You are O.

6. playing in online mode



Tic Tac Toe - Online Multiplayer

Waiting for opponent...

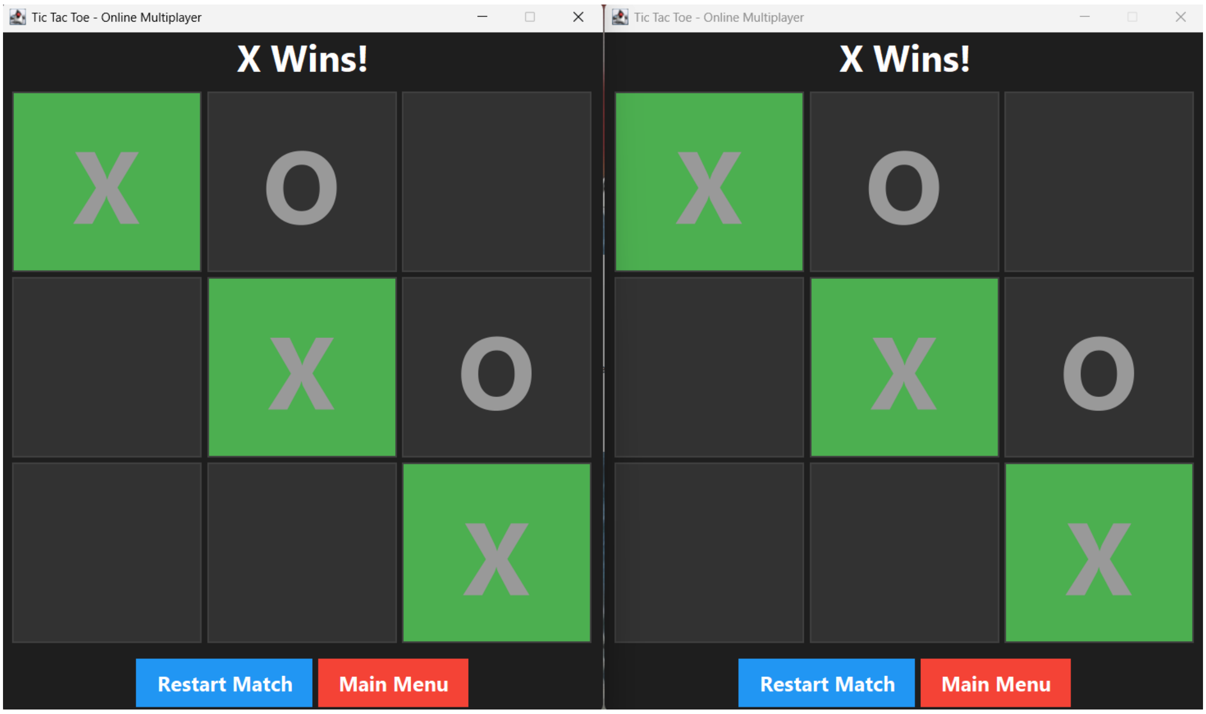
X	O	
	X	

Tic Tac Toe - Online Multiplayer

Your Turn (O)

X	O	
	X	

7. x wins the game

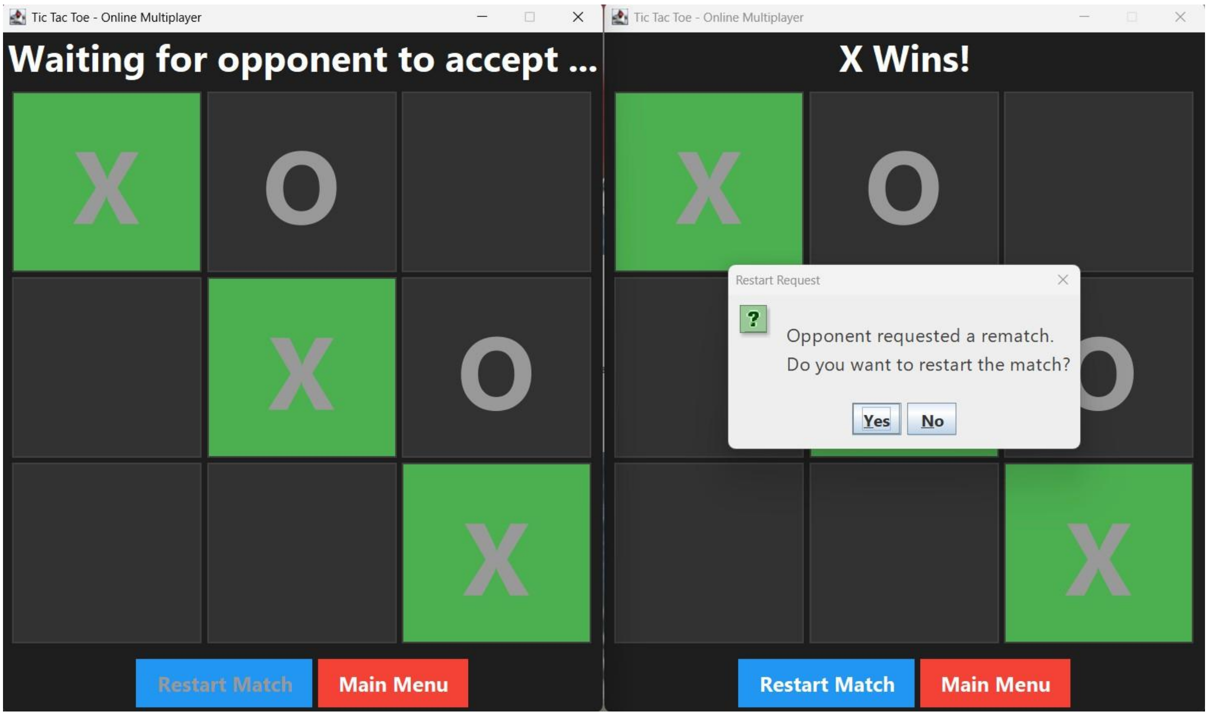


Tic Tac Toe - Online Multiplayer
Tic Tac Toe - Online Multiplayer
X
O
X
O
X
Restart Match
Main Menu
Restart Match
Main Menu

X Wins!

X Wins!

8. Requesting rematch with the same opponent

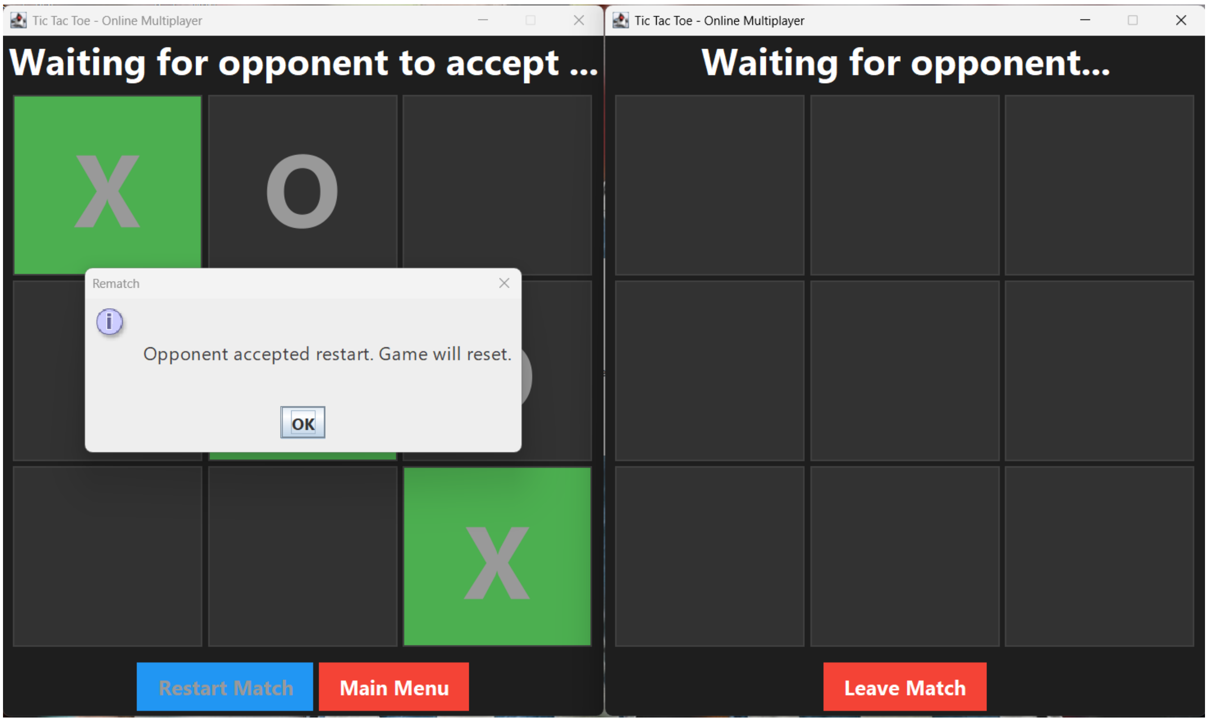


Waiting for opponent to accept ...

X Wins!

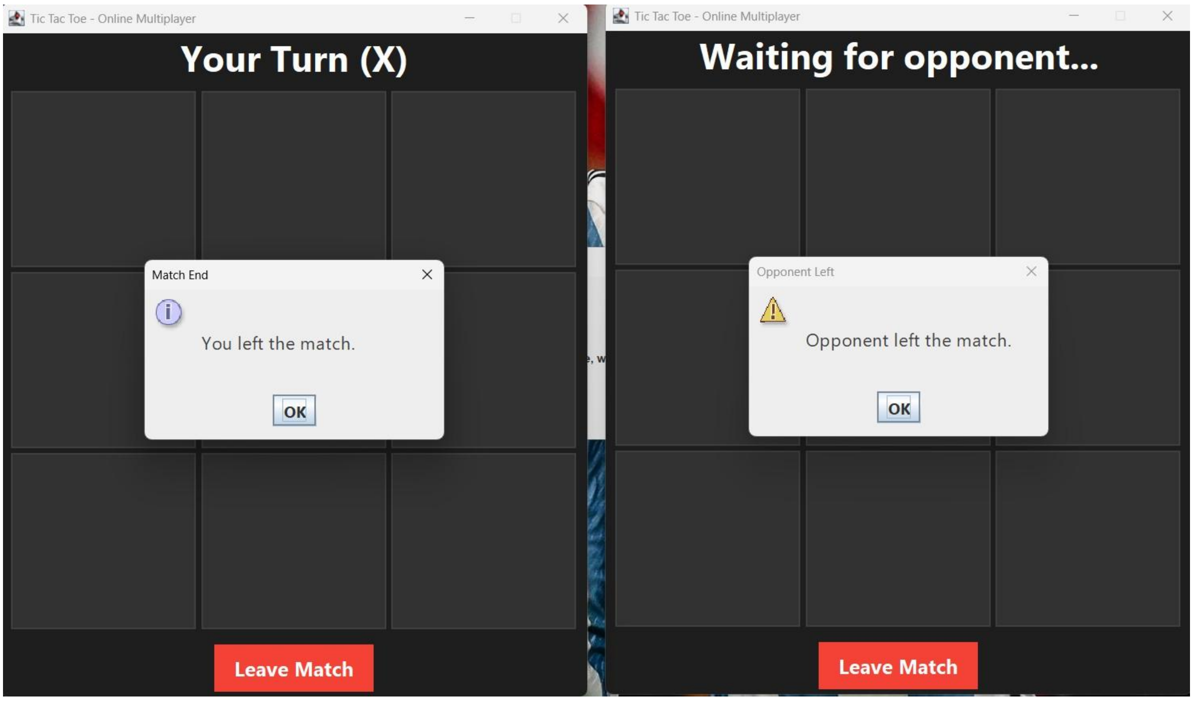
Opponent requested a rematch.
Do you want to restart the match?

9. The opponent accepted the rematch


Tic Tac Toe - Online Multiplayer
Waiting for opponent to accept ...
X
O
X
Rematch
OK
Restart Match
Main Menu
Tic Tac Toe - Online Multiplayer
Waiting for opponent...
Leave Match

Opponent accepted restart. Game will reset.

10. player left the match



You left the match.

Opponent left the match.

Conclusion

The Java-based Tic Tac Toe project delivers a full-fledged multiplayer and local game with robust logic, polished UI, and smooth experience. From casual desktop gaming to teaching core Java skills like Swing, event-driven design, and networking, the system is both fun and instructional. With its modular codebase and stylish interface, the game is ideal for further development into features like AI players, leaderboards, and more interactive visuals.