Experiment No. 12
Course Project based on the content of the syllabus.
Date of Performance:
Date of Submission:

```
import java.awt.Dimension;
import java.awt.Color;
import java.awt.event.*;
import java.awt.Graphics;
import java.awt.Image;
import java.awt.Font;
import java.awt.Toolkit;
import javax.swing.JButton;
import javax.swing.JFrame;
import javax.swing.JPanel;
import javax.swing.ImageIcon;
import java.io.*;
import java.util.Scanner;

public class TicTacToe extends JPanel implements ActionListener {

    // core logic variables
    boolean playerX; // true if player X's turn, false if player O's turn
    boolean gameDone = false; // true if game is over
    int winner = -1; // 0 if X wins, 1 if O wins, -1 if no winner yet
    int player1wins = 0, player2wins = 0; // number of wins for each player
```

```
int[][] board = new int[3][3]; // 0 if empty, 1 if X, 2 if O

// paint variables
int lineWidth = 5; // width of the lines
int lineLength = 270; // length of the lines
int x = 15, y = 100; // location of first line
int offset = 95; // square width
int a = 0; // used for drawing the X's and O's
int b = 5; // used for drawing the X's and O's
int selX = 0; // selected square x
int selY = 0; // selected square y

// COLORS
Color turtle = new Color(152, 109, 142);
Color orange = new Color(255, 165, 0);
Color offwhite = new Color(0xf7f7f7);
Color darkgray = new Color(239, 227, 208);
Color pink = new Color(130, 92, 121);

// COMPONENTS
JButton jButton;

// CONSTRUCTOR
public TicTacToe() {
   Dimension size = new Dimension(420, 300); // size of the panel
   setPreferredSize(size);
   setMaximumSize(size);
   setMinimumSize(size);
   addMouseListener(new XOListener()); // add mouse listener
   jButton = new JButton("New Game");
   jButton.addActionListener(this); // add action listener
   jButton.setBounds(315, 210, 100, 30); // set button location
   add(jButton); // add button to panel
   resetGame();
}

public void resetGame() {
   playerX = true;
   winner = -1;
   gameDone = false;
   for (int i = 0; i < 3; i++) {
      for (int j = 0; j < 3; j++) {
         board[i][j] = 0; // all spots are empty
      }
   }
   getJButton().setVisible(false); // hide the button
}

public void paintComponent(Graphics page) {
   super.paintComponent(page);
   drawBoard(page);
```

```
    drawUI(page);
    drawGame(page);
}

public void drawBoard(Graphics page) {
    setBackground(turtle);
    page.setColor(darkgray);
    page.fillRoundRect(x, y, lineLength, lineWidth, 5, 30);
    page.fillRoundRect(x, y + offset, lineLength, lineWidth, 5, 30);
    page.fillRoundRect(y, x, lineWidth, lineLength, 30, 5);
    page.fillRoundRect(y + offset, x, lineWidth, lineLength, 30, 5);
}

public void drawUI(Graphics page) {
    // SET COLOR AND FONT
    page.setColor(pink);
    page.fillRect(300, 0, 120, 300);
    Font font = new Font("Helvetica", Font.PLAIN, 20);
    page.setFont(font);

    // SET WIN COUNTER
    page.setColor(offwhite);
    page.drawString("Win Count", 310, 30);
    page.drawString(": " + player1wins, 362, 70);
    page.drawString(": " + player2wins, 362, 105);

    // DRAW score X
    ImageIcon xIcon = new ImageIcon("orangex.png");
    Image xImg = xIcon.getImage();
    Image newXImg = xImg.getScaledInstance(27, 27, java.awt.Image.SCALE_SMOOTH);
    ImageIcon newXIcon = new ImageIcon(newXImg);
    page.drawImage(newXIcon.getImage(), 44 + offset * 1 + 190, 47 + offset * 0, null);

    // DRAW score O
    page.setColor(offwhite);
    page.fillOval(43 + 190 + offset, 80, 30, 30);
    page.setColor(darkgray);
    page.fillOval(49 + 190 + offset, 85, 19, 19);

    // DRAW WHOS TURN or WINNER
    page.setColor(offwhite);
    Font font1 = new Font("Serif", Font.ITALIC, 18);
    page.setFont(font1);

    if (gameDone) {
        if (winner == 1) { // x
            page.drawString("The winner is", 310, 150);
            page.drawImage(xImg, 335, 160, null);
        } else if (winner == 2) { // o
            page.drawString("The winner is", 310, 150);
            page.setColor(offwhite);
```

```
            page.fillOval(332, 160, 50, 50);
            page.setColor(darkgray);
            page.fillOval(342, 170, 30, 30);
        } else if (winner == 3) { // tie
            page.drawString("It's a tie", 330, 178);
        }
    } else {
        Font font2 = new Font("Serif", Font.ITALIC, 20);
        page.setFont(font2);
        page.drawString("", 350, 160);
        if (playerX) {
            page.drawString("X 's Turn", 325, 180);
        } else {
            page.drawString("O 's Turn", 325, 180);
        }
    }
    // DRAW LOGO
    Image cookie = Toolkit.getDefaultToolkit().getImage("logo.png");
    page.drawImage(cookie, 345, 235, 30, 30, this);
    Font c = new Font("Courier", Font.BOLD + Font.CENTER_BASELINE, 13);
    page.setFont(c);
    page.drawString("Tic Tac Toe", 310, 280);
}

public void drawGame(Graphics page) {
    for (int i = 0; i < 3; i++) {
        for (int j = 0; j < 3; j++) {
            if (board[i][j] == 0) {

            } else if (board[i][j] == 1) {
                ImageIcon xIcon = new ImageIcon("orangex.png");
                Image xImg = xIcon.getImage();
                page.drawImage(xImg, 30 + offset * i, 30 + offset * j, null);
            } else if (board[i][j] == 2) {
                page.setColor(offwhite);
                page.fillOval(30 + offset * i, 30 + offset * j, 50, 50);
                page.setColor(turtle);
                page.fillOval(40 + offset * i, 40 + offset * j, 30, 30);
            }
        }
    }
    repaint();
}

public void checkWinner() {
    if (gameDone == true) {
        System.out.print("gameDone");
        return;
    }
    // vertical
    int temp = -1;
```

```
if ((board[0][0] == board[0][1])
        && (board[0][1] == board[0][2])
        && (board[0][0] != 0)) {
    temp = board[0][0];
} else if ((board[1][0] == board[1][1])
        && (board[1][1] == board[1][2])
        && (board[1][0] != 0)) {
    temp = board[1][1];
} else if ((board[2][0] == board[2][1])
        && (board[2][1] == board[2][2])
        && (board[2][0] != 0)) {
    temp = board[2][1];

    // horizontal
} else if ((board[0][0] == board[1][0])
        && (board[1][0] == board[2][0])
        && (board[0][0] != 0)) {
    temp = board[0][0];
} else if ((board[0][1] == board[1][1])
        && (board[1][1] == board[2][1])
        && (board[0][1] != 0)) {
    temp = board[0][1];
} else if ((board[0][2] == board[1][2])
        && (board[1][2] == board[2][2])
        && (board[0][2] != 0)) {
    temp = board[0][2];

    // diagonal
} else if ((board[0][0] == board[1][1])
        && (board[1][1] == board[2][2])
        && (board[0][0] != 0)) {
    temp = board[0][0];
} else if ((board[0][2] == board[1][1])
        && (board[1][1] == board[2][0])
        && (board[0][2] != 0)) {
    temp = board[0][2];
} else {

    // CHECK FOR A TIE
    boolean notDone = false;
    for (int i = 0; i < 3; i++) {
        for (int j = 0; j < 3; j++) {
            if (board[i][j] == 0) {
                notDone = true;
                break;
            }
        }
    }
    if (notDone == false) {
        temp = 3;
    }
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    }
    if (temp > 0) {
        winner = temp;
        if (winner == 1) {
            player1wins++;
            System.out.println("winner is X");
        } else if (winner == 2) {
            player2wins++;
            System.out.println("winner is O");
        } else if (winner == 3) {
            System.out.println("It's a tie");
        }
        gameDone = true;
        getJButton().setVisible(true);
    }
}

public JButton getJButton() {
    return jButton;
}

public void setPlayerXWins(int a) {
    player1wins = a;
}

public void setPlayerOWins(int a) {
    player2wins = a;
}

public static void main(String[] args) {
    JFrame frame = new JFrame("Tic Tac Toe");
    frame.getContentPane();

    TicTacToe gamePanel = new TicTacToe();
    frame.add(gamePanel);

    frame.addWindowListener(new WindowAdapter() {
        public void windowOpened(WindowEvent e) {
            try {
                File file = new File("score.txt");
                Scanner sc = new Scanner(file);
                gamePanel.setPlayerXWins(Integer.parseInt(sc.nextLine()));
                gamePanel.setPlayerOWins(Integer.parseInt(sc.nextLine()));
                sc.close();
            } catch (IOException io) {
                // file doesnt exist
                File file = new File("score.txt");
            }
        }

        public void windowClosing(WindowEvent e) {
```

```
            try {
                PrintWriter pw = new PrintWriter("score.txt");
                pw.write("");
                pw.write(gamePanel.player1wins + "\n");
                pw.write(gamePanel.player2wins + "\n");
                pw.close();
            } catch (FileNotFoundException e1) {
            }
        }
    });
    frame.setDefaultCloseOperation(JFrame.EXIT_ON_CLOSE);
    frame.setResizable(false);
    frame.pack();
    frame.setVisible(true);
}

private class XOListener implements MouseListener {

    public void mouseClicked(MouseEvent event) {
        selX = -1;
        selY = -1;
        if (gameDone == false) {
            a = event.getX();
            b = event.getY();
            int selX = 0, selY = 0;
            if (a > 12 && a < 99) {
                selX = 0;
            } else if (a > 103 && a < 195) {
                selX = 1;
            } else if (a > 200 && a < 287) {
                selX = 2;
            } else {
                selX = -1;
            }

            if (b > 12 && b < 99) {
                selY = 0;
            } else if (b > 103 && b < 195) {
                selY = 1;
            } else if (b > 200 && b < 287) {
                selY = 2;
            } else {
                selY = -1;
            }
            if (selX != -1 && selY != -1) {

                if (board[selX][selY] == 0) {
                    if (playerX) {
                        board[selX][selY] = 1;
                        playerX = false;
                    } else {
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```
                    board[selX][selY] = 2;
                    playerX = true;
                }
                checkWinner();
                System.out.println(" CLICK= x:" + a + ",y: " + b + "; selX,selY: " + selX + "," + selY);

            }
        } else {
            System.out.println("invalid click");
        }
    }
}

public void mouseReleased(MouseEvent event) {
}

public void mouseEntered(MouseEvent event) {
}

public void mouseExited(MouseEvent event) {
}

public void mousePressed(MouseEvent event) {
}
}

@Override
public void actionPerformed(ActionEvent e) {
    resetGame();
}

}
```

OUTPUT:


Tic Tac Toe
New Game
Win Count
: 4
: 1
The winner is
Tic Tac Toe