

Subject: Object Oriented Programming

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BS (SE)

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Answer sheet

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There are a total of 1 questions in this paper.

Max Marks: 20

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Question 1. Create a Tic Tac Toe game in java (use any java tool for coding ) and explain it in detail including screenshots?

Answer:

I created cli based tic tac toe game :

```
import java.util.Scanner;

public class TicTacToe {
    // creating Gameboard array
    static char[][] GameNumbers = {{'1','2','3'},{'4','5','6'},{'7','8','9'}};

    // declaring turnchoice number
    static int TurnChoice = 0;
    //storing Player as a char X or O
    static char Player = 'X';

    // using scanner to scan for input later
    public static Scanner sc = new Scanner(System.in);

    static void Board(){
// declaring board function to display board

        System.out.print(" \t\tT I C - T A C - T O E \n\n\n\n");

        System.out.print(" Player1 = X \n" + " Player2 = O \n\n");

        System.out.print("\t\t " + GameNumbers[0][0] + "\t|" + "\t" +
GameNumbers[0][1] + "\t|" + "\t" + GameNumbers[0][2] + "\t\n");

        System.out.print("\t\t " + "\t|" + "\t" + "\t|" + "\t" + "\t" + "\t\n");

        System.out.print("\t\t---" + "---" + "|" + "-----" + "-----" + "|" + "----" + "----" + "----\n");
    }
}
```

```

        System.out.print("\t\t " + GameNumbers[1][0] + "\t|" + "\t"+
GameNumbers[1][1] + "\t|" + "\t"+GameNumbers[1][2] + "\t\n");

        System.out.print("\t\t " + " " + "\t|" + "\t"+ " " + "\t|" + "\t"+" " + "\t\n");
        System.out.print("\t\t---" + "---" + "|" + "-----" + "-----" + "|" + "----" + "----" + "----\n");

        System.out.print("\t\t " + GameNumbers[2][0] + "\t|" + "\t"+
GameNumbers[2][1] + "\t|" + "\t"+GameNumbers[2][2] + "\t\n");

        System.out.print("\t\t " + "\t|" + "\t"+ " " + "\t|" + "\t"+" " + "\t\n");

        System.out.print("Player "+Player + ":");
        TurnChoice = sc.nextInt();

    }

// actual filling of array
static void Turns (){

    switch (TurnChoice) {
        case 1:
            if (GameNumbers[0][0] != 'X' && GameNumbers[0][0] != 'O' ) {
                GameNumbers[0][0] =Player;

            }else{
                System.out.println( "Please select Valid Box");
            }
            break;

        case 2:

            if (GameNumbers[0][1] != 'X' && GameNumbers[0][1] != 'O' ) {
                GameNumbers[0][1] = Player;

            }else{
                System.out.println("Please select Valid Box");
                Board();
            }

            break;
        case 3:

            if (GameNumbers[0][2] != 'X' && GameNumbers[0][2] != 'O' ) {
                GameNumbers[0][2] = Player;

```

```

    }else{
        System.out.println("Please select Valid Box");
        Board();
    }

    break;
case 4:

    if (GameNumbers[1][0] != 'X' && GameNumbers[1][0] != 'O' ) {
        GameNumbers[1][0] = Player;
    }else{
        System.out.println("Please select Valid Box");
        Board();
    }

    break;
case 5:

    if (GameNumbers[1][1] != 'X' && GameNumbers[1][1] != 'O' ) {
        GameNumbers[1][1] = Player;

    }else{
        System.out.println( "Please select Valid Box");
        Board();
    }
    break;
case 6:

    if (GameNumbers[1][2] != 'X' && GameNumbers[1][2] != 'O' ) {
        GameNumbers[1][2] = Player;

    }else{
        System.out.println("Please select Valid Box");
        Board();
    }

    break;
case 7:

    if (GameNumbers[2][0] != 'X' && GameNumbers[2][0] != 'O' ) {
        GameNumbers[2][0] = Player;

```

```

        }else{
            System.out.println( "Please select Valid Box");
            Board();
        }

        break;
    case 8:

        if (GameNumbers[2][1] != 'X' && GameNumbers[2][1] != 'O' ) {
            GameNumbers[2][1] = Player;

        }else{
            System.out.println("Please select Valid Box");
            Board();
        }

        break;
    case 9:

        if (GameNumbers[2][2] != 'X' && GameNumbers[2][2] != 'O' ) {
            GameNumbers[2][2] = Player;
        }else{
            System.out.println("Please select Valid Box");
            Board();
        }

        break;

    default:
        System.out.println( "not implemented");
        break;
    }

}

// player change logic to change user after each turn
static void PlayerChange(){

    if(Player == 'X'){

        Player = 'O';

    }else{

        Player = 'X';

    }
}

```

```

}

// End Board
static void EndBoard(){

    System.out.print("\t\tT I C - T A C - T O E \n\n\n\n");

    System.out.print(" Player1 = X \n" + " Player2 = O \n\n");

    System.out.print("\t\t " + GameNumbers[0][0] + "\t|" + "\t"+
GameNumbers[0][1] + "\t|" + "\t"+GameNumbers[0][2] + "\t\n");

    System.out.print("\t\t " + " " + "\t|" + "\t"+ " " + "\t|" + "\t"+ " " + "\t\n");
    System.out.print("\t\t---" + "----" + "|" + "----" + "----" + "|" + "----" + "----" + "----\n");

    System.out.print("\t\t " + GameNumbers[1][0] + "\t|" + "\t"+
GameNumbers[1][1] + "\t|" + "\t"+GameNumbers[1][2] + "\t\n");

    System.out.print("\t\t " + " " + "\t|" + "\t"+ " " + "\t|" + "\t"+ " " + "\t\n");
    System.out.print("\t\t---" + "----" + "|" + "----" + "----" + "|" + "----" + "----" + "----\n");

    System.out.print("\t\t " + GameNumbers[2][0] + "\t|" + "\t"+
GameNumbers[2][1] + "\t|" + "\t"+GameNumbers[2][2] + "\t\n");

    System.out.print("\t\t " + " " + "\t|" + "\t"+ " " + "\t|" + "\t"+ " " + "\t\n\n");

    System.out.println("\t\t G A M E \t E N D E D");
}

public static boolean GameCheck(){

    if((GameNumbers[0][0] == GameNumbers[0][1] && GameNumbers[0][0] ==
GameNumbers[0][2]) || (GameNumbers[0][0] == GameNumbers[1][0] &&
GameNumbers[0][0] == GameNumbers[2][0]) || (GameNumbers[0][2] ==
GameNumbers[1][2] && GameNumbers[0][2] == GameNumbers[2][2]) ||
    (GameNumbers[2][0] == GameNumbers[2][1] && GameNumbers[2][0] ==
GameNumbers[2][2]) ||
    (GameNumbers[0][0] == GameNumbers[1][1] && GameNumbers[0][0] ==
GameNumbers[2][2]) ||
    (GameNumbers[0][2] == GameNumbers[1][1] && GameNumbers[0][2] ==
GameNumbers[2][0])){

        return false;
    }
}

```

```

    }else {

        return true;
    }

}

// winner decider
static char WinnerDecider(){

    if(Player == 'X'){

        return 'O';

    }else{

        return 'X';
    }

}

// main function starting point of every program
public static void main(String[] args){

    while (GameCheck() {
        Board();
        Turns();
        PlayerChange();

    }

    EndBoard();
    System.out.println(WinnerDecider() + "\t I S \t T H E \t W I N N E R" );

}

}

```

1. Firstly I created an array of 3x3 of type character then filled it with 123456789
2. Then I declared few variables like turnchoice as int to save the user selected index to mark
3. And then I declared a variable to hold player as char starting with X (initialized)
4. Then I created a scanner object to get input from the user
5. After this I created a function called board() which just prints the board layout and welcome and at the end of this function I took the value from the user input as index to next player
6. After this I created a function which is very much important in this game which is actually checking and marking user choice
7. I used switch statement to check for turnchoice variable to fill in correct spot in board array
8. After this I created PlayerChange function which changes the current user around like for example if the user is x it will become o used if statements
9. Then I created Endboard function which just prints Game Ended Screen

Now I created GameCheck function which return Boolean and which is use to check if anyone won the match and return true or false

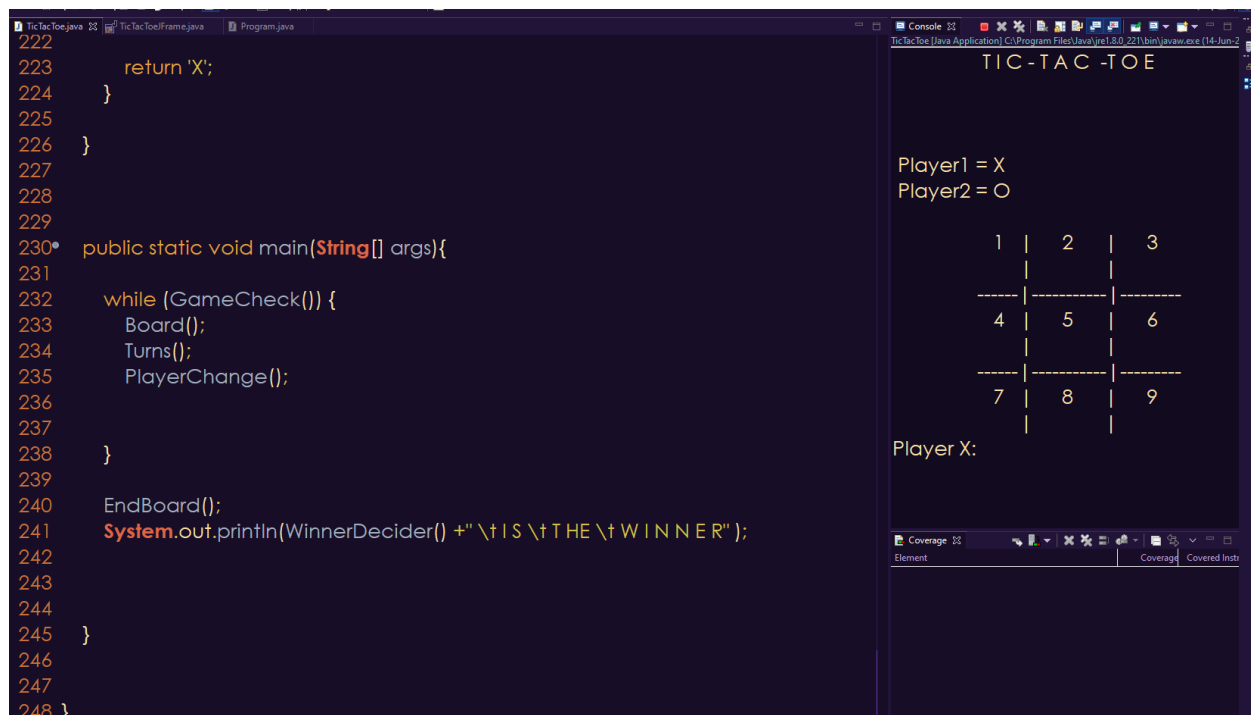
10. Then I created WinnerDecider function which checks which user won and returns char to be used in game win board

11. Then I created the main function and setup while loop to run as long as the gamecheck is false

Inside while loop I called 3 functions sequence wise board()  
turns() and PlayerChange()

Outside the While loop I called EndBoard function And printed the user won using winnerdecider function and some string

## OutPut:



The screenshot shows an IDE with two windows. The left window displays Java code for a Tic Tac Toe game. The right window shows the console output, which includes the game title 'TIC-TAC-TOE', player names 'Player1 = X' and 'Player2 = O', a 3x3 grid representing the game board, and the prompt 'Player X:'. The code in the left window includes a return statement for 'X', a while loop for the game logic, and a final print statement for the winner.

```
222
223     return 'X';
224 }
225
226 }
227
228
229
230 public static void main(String[] args){
231
232     while (GameCheck()) {
233         Board();
234         Turns();
235         PlayerChange();
236
237
238     }
239
240     EndBoard();
241     System.out.println(WinnerDecider() + "\t IS \t THE \t WINNER");
242
243
244
245 }
246
247
248 }
```

TIC-TAC-TOE

Player1 = X  
Player2 = O

1	2	3
4	5	6
7	8	9

Player X:



<terminated> TicTacToe [Java Application] C:\Program Files\Java\jre1.8.0\_221\bin\javaw

# TIC-TAC-TOE

Player1 = X  
Player2 = O

X		O		3
----- ----- -----				
O		X		6
----- ----- -----				
7		8		X

GAME ENDED  
X IS THE WINNER