Sub. Code : 21AIE111

Sub Name : Data Structure and Algorithms

Name of the Project : TIC TAC TOE USING ARRAY

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ABSTRACT

- Our project has been built based on “ **Tic-Tac-Toe** ”
- In the Tic-Tac-Toe game, you will see the approach of the game is implemented.
- In this game, the player have to play by typing number from 1 to 9 and X will be displayed on the box which the number represent.
- For example, if you have to select any number then for X or O will be shown on the print board, and turn for next will be there.

SOFTWARE USED

Visual Studio Code with built-in JDK.

- **Eclipse IDE.**
- **Referred sources : -**
  - ✓ GIT HUB
  - ✓ STACK OVERFLOW
  - ✓ TENSOR FLOW

CODE:

```
import java.util.Random;
import java.util.Scanner;

public class TicTacToe {

	public static void main(String[] args) {

		Scanner scanner = new Scanner(System.in);

		char[][] board = {{' ', ' ', ' '},
		                  {' ', ' ', ' '},
		                  {' ', ' ', ' '}};

		printBoard(board);

		while (true) {
			playerTurn(board, scanner);
			if (isGameFinished(board)){
				break;
			}
			printBoard(board);

			computerTurn(board);
			if (isGameFinished(board)){
				break;
			}
			printBoard(board);
		}
		scanner.close();
}


private static boolean isGameFinished(char[][] board) {

        if (hasContestantWon(board, 'X')) {
                printBoard(board);
                System.out.println("Player wins!");
                return true;
        }

        if (hasContestantWon(board, 'O')) {
                printBoard(board);
                System.out.println("Computer wins!");
                return true;
        }

        for (int i = 0; i < board.length; i++) {
                for (int j = 0; j < board[i].length; j++) {
                        if (board[i][j] == ' ') {
                                return false;
                        }
                }
        }
        printBoard(board);
        System.out.println("The game ended in a tie!");
        return true;
}
```

```
	private static boolean hasContestantWon(char[][] board, char symbol) {
		if ((board[0][0] == symbol && board [0][1] == symbol && board [0][2] ==
symbol) ||
			(board[1][0] == symbol && board [1][1] == symbol && board [1][2]
== symbol) ||
			(board[2][0] == symbol && board [2][1] == symbol && board [2][2]
== symbol) ||


			(board[0][0] == symbol && board [1][0] == symbol && board [2][0]
== symbol) ||
			(board[0][1] == symbol && board [1][1] == symbol && board [2][1]
== symbol) ||
			(board[0][2] == symbol && board [1][2] == symbol && board [2][2]
== symbol) ||


			(board[0][0] == symbol && board [1][1] == symbol && board [2][2]
== symbol) ||
			(board[0][2] == symbol && board [1][1] == symbol && board [2][0]
== symbol) ) {
			return true;
		}
		return false;
	}



	private static void computerTurn(char[][] board) {
		Random rand = new Random();
		int computerMove;
		while (true) {
			computerMove = rand.nextInt(9) + 1;
			if (isValidMove(board, Integer.toString(computerMove))) {
				break;
			}
```

```
        }
        System.out.println("Computer chose " + computerMove);
        placeMove(board, Integer.toString(computerMove), 'O');
}


private static boolean isValidMove (char[][] board, String position) {
        switch(position) {
                case "1":
                        return (board[0][0] == ' ');
                case "2":
                        return (board[0][1] == ' ');
                case "3":
                        return (board[0][2] == ' ');
                case "4":
                        return (board[1][0] == ' ');
                case "5":
                        return (board[1][1] == ' ');
                case "6":
                        return (board[1][2] == ' ');
                case "7":
                        return (board[2][0] == ' ');
                case "8":
                        return (board[2][1] == ' ');
                case "9":
                        return (board[2][2] == ' ');
                default:
                        return false;
        }
}
```

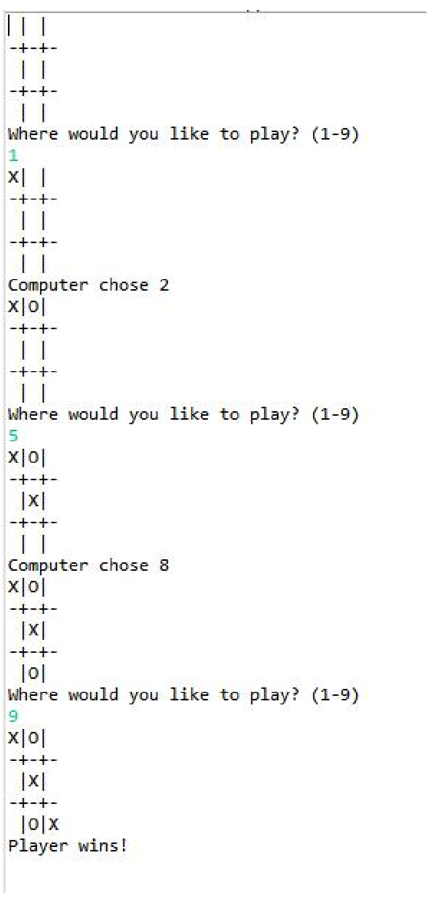
```
private static void playerTurn(char[][] board, Scanner scanner) {
        String userInput;
        while (true) {
                System.out.println("Where would you like to play? (1-9)");
                userInput = scanner.nextLine();
                if (isValidMove(board, userInput)){
                        break;
                } else {
                        System.out.println(userInput + " is not a valid move.");
                }
        }
        placeMove(board, userInput, 'X');
}


private static void placeMove(char[][] board, String position, char symbol) {
        switch(position) {
                case "1":
                        board[0][0] = symbol;
                        break;
                case "2":
                        board[0][1] = symbol;
                        break;
                case "3":
                        board[0][2] = symbol;
                        break;
                case "4":
                        board[1][0] = symbol;
                        break;
                case "5":
                        board[1][1] = symbol;
                        break;
                case "6":
                        board[1][2] = symbol;
                        break;
                case "7":
                        board[2][0] = symbol;
                        break;
                case "8":
                        board[2][1] = symbol;
                        break;
                case "9":
                        board[2][2] = symbol;
                        break;
                default:
                        System.out.println(":(");
        }
    }



        private static void printBoard(char[][] board) {
        System.out.println(board[0][0] + "|" +  board[0][1] + "|" +  board[0][2] );
        System.out.println("-+-+-");
        System.out.println(board[1][0] + "|" +  board[1][1] + "|" +  board[1][2] );
        System.out.println("-+-+-");
        System.out.println(board[2][0] + "|" +  board[2][1] + "|" +  board[2][2] );
    }
}
```

OUTPUT:



```
 | |
-+-+-
 | |
-+-+-
 | |
Where would you like to play? (1-9)
1
X| |
-+-+-
 | |
-+-+-
 | |
Computer chose 2
X|O|
-+-+-
 | |
-+-+-
 | |
Where would you like to play? (1-9)
5
X|O|
-+-+-
 |X|
-+-+-
 | |
Computer chose 8
X|O|
-+-+-
 |X|
-+-+-
 |O|
Where would you like to play? (1-9)
9
X|O|
-+-+-
 |X|
-+-+-
 |O|X
Player wins!
```

CONCLUSION:

- ❖ In the Tic-Tac-Toe game, you will see the approach of the game is implemented.
- ❖ In this game, the player have to play by typing number from 1 to 9 and X will be displayed on the box which the number represent.
- ❖ As a future scope we are planning to add GUI and few graphics can so that the game can be more attractive.