PPS- MINI PROJECT

Tic-tac-toe

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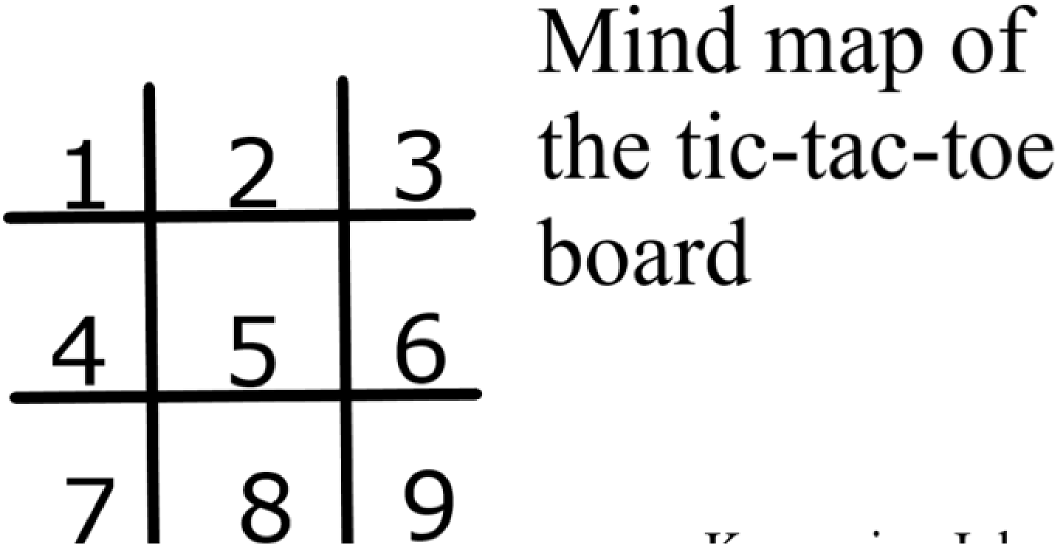
Problem definition:

Tic-tac-toe is a paper-and-pencil game for two players, X and O, who take turns marking the spaces in a 3×3 grid. The player who succeeds in placing three of their marks in a horizontal, vertical, or diagonal row wins the game. Here, I have developed a mini project in C Tic Tac Toe game – a simple console application without graphics. It is the same noughts and crosses or the Xs and Os, the other names for Tic-Tac-Toe, we have played with paper and pencil during our school days! This Tic Tac Toe game in C is compiled in Code::Blocks with gcc compiler.

Abstract:

While making a Tic Tac Toe game using C language, we paid special attention to the use of arrays. The Xs and Os are kept in different arrays, and they are passed between several functions in the code to keep track of how the game goes. With the code here one can play the game choosing either X or O **against the computer**.

This Tic Tac Toe C game is such that one will have to input a numeric character, from 1 to 9, to select a position for X or O into the space/block one wants. For example: if one is playing with O and they input 2, the O will go to the first row – second column. If they want to place O in the third row – first column, you have to enter 7. And, it is similar for the other positions.



List of functions used:

void menu()

In this mini project, this function displays the menu or welcome screen of this project. With this function, you can select whether you wish to play the game with X or with O or can even exit the game.

void go(int n)

For deciding whose turn it is

void start_game()

For the scenario in which the computer wins

void check_draw()

For the scenario in which the game comes to a draw

void draw_board()

void player_first()

For the scenario in which the player wins

void put_X_O(char ch, int pos) – This function puts one of the numerical characters one inputs into the respective position in Tic-Tac-Toe. For example: if one is playing with X and they input 2, the X will go to the first row – second column. If they want to place X in the third row – first column, they have to enter 7. And, it is similar for the other positions.

void gotoxy (int x, int y) – This function allows the user to print text in any place on the screen.

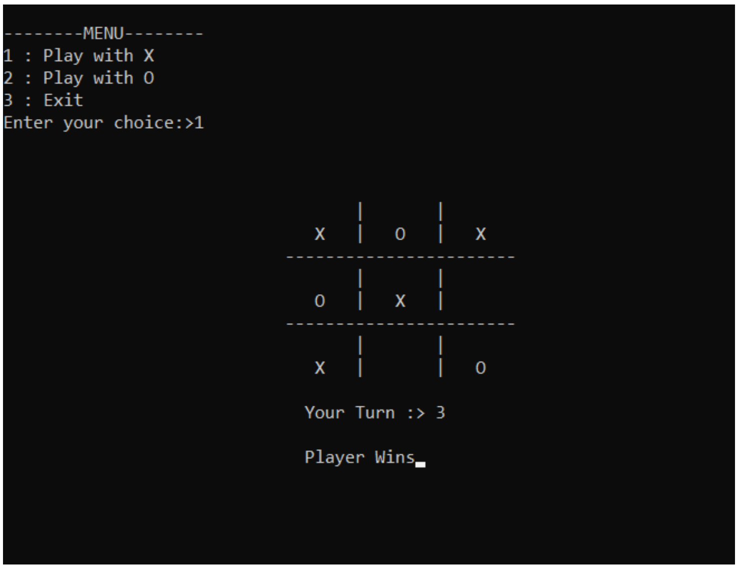
Code:

```
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
#include <windows.h>

int board[10] = {2,2,2,2,2,2,2,2,2,2};
int turn = 1,flag = 0;
int player,comp;

void menu();
void go(int n);
void start_game();
void check_draw();
void draw_board();
void player_first();
void put_X_O(char ch,int pos);
COORD coord= {0,0}; // this is global variable
//center of axis is set to the top left cornor of the screen
void gotoxy(int x,int y)
{
   coord.X=x;
   coord.Y=y;
   SetConsoleCursorPosition(GetStdHandle(STD_OUTPUT_HANDLE),coord);
}

void main()
{
   system("cls");
   menu();
   getch();

}

void menu()
{
   int choice;
   system("cls");//to clear the previous screen
   printf("\n--------MENU--------");
   printf("\n1 : Play with X");
   printf("\n2 : Play with O");
   printf("\n3 : Exit");
   printf("\nEnter your choice:>");
   scanf("%d",&choice);
   turn = 1;
   switch (choice)
   {
   case 1:
      player = 1;
      comp = 0;
      player_first();
      break;
   case 2:
        player = 0;
        comp = 1;
        start_game();
        break;
    case 3:
        exit(1);
    default:
        menu();
    }
}

int make2()
{
    if(board[5] == 2)
        return 5;
    if(board[2] == 2)
        return 2;
    if(board[4] == 2)
        return 4;
    if(board[6] == 2)
        return 6;
    if(board[8] == 2)
        return 8;
    return 0;
}

int make4()
{
    if(board[1] == 2)
        return 1;
    if(board[3] == 2)
        return 3;
    if(board[7] == 2)
        return 7;
    if(board[9] == 2)
        return 9;
    return 0;
}

int posswin(int p)
{
// p==1 then X   p==0  then  O
    int i;
    int check_val,pos;

    if(p == 1)
        check_val = 18;
    else
        check_val = 50;

    i = 1;
    while(i<=9)//row check
    {
        if(board[i] * board[i+1] * board[i+2] == check_val)
        {
            if(board[i] == 2)
                return i;
            if(board[i+1] == 2)
                return i+1;
            if(board[i+2] == 2)
                return i+2;
        }
        i+=3;
    }

    i = 1;
    while(i<=3)//column check
    {
        if(board[i] * board[i+3] * board[i+6] == check_val)
        {
            if(board[i] == 2)
                return i;
            if(board[i+3] == 2)
                return i+3;
            if(board[i+6] == 2)
                return i+6;
        }
        i++;
    }

    if(board[1] * board[5] * board[9] == check_val)
    {
        if(board[1] == 2)
            return 1;
        if(board[5] == 2)
            return 5;
        if(board[9] == 2)
            return 9;
    }

    if(board[3] * board[5] * board[7] == check_val)
    {
        if(board[3] == 2)
            return 3;
        if(board[5] == 2)
            return 5;
        if(board[7] == 2)
            return 7;
    }
    return 0;
}

void go(int n)
{
    if(turn % 2)
        board[n] = 3;
    else
        board[n] = 5;
    turn++;
}

void player_first()
{
    int pos;
```

```
   check_draw();
   draw_board();
   gotoxy(30,18);
   printf("Your Turn :> ");
   scanf("%d",&pos);

   if(board[pos] != 2)
      player_first();

   if(pos == posswin(player))
   {
      go(pos);
      draw_board();
      gotoxy(30,20);
      //textcolor(128+RED);
      printf("Player Wins");
      getch();
      exit(0);
   }

   go(pos);
   draw_board();
   start_game();
}

void start_game()
{
// p==1 then X   p==0  then  O
   if(posswin(comp))
   {
      go(posswin(comp));
      flag = 1;
   }
   else if(posswin(player))
      go(posswin(player));
   else if(make2())
      go(make2());
   else
      go(make4());
   draw_board();

   if(flag)
   {
      gotoxy(30,20);
      //textcolor(128+RED);
      printf("Computer wins");
      getch();
   }
   else
      player_first();
}

void check_draw()
{
   if(turn > 9)
   {
        gotoxy(30,20);
        //textcolor(128+RED);
        printf("Game Draw");
        getch();
        exit(0);
    }
}

void draw_board()
{
    int j;

    for(j=9; j<17; j++)
    {
        gotoxy(35,j);
        printf("|       |");
    }
    gotoxy(28,11);
    printf("-----------------------");
    gotoxy(28,14);
    printf("-----------------------");

    for(j=1; j<10; j++)
    {
        if(board[j] == 3)
            put_X_O('X',j);
        else if(board[j] == 5)
            put_X_O('O',j);
    }
}

void put_X_O(char ch,int pos)
{
    int m;
    int x = 31, y = 10;

    m = pos;

    if(m > 3)
    {
        while(m > 3)
        {
            y += 3;
            m -= 3;
        }
    }
    if(pos % 3 == 0)
        x += 16;
    else
    {
        pos %= 3;
        pos--;
        while(pos)
        {
            x+=8;
            pos--;
        }
    }
    gotoxy(x,y);
    printf("%c",ch);
}
```

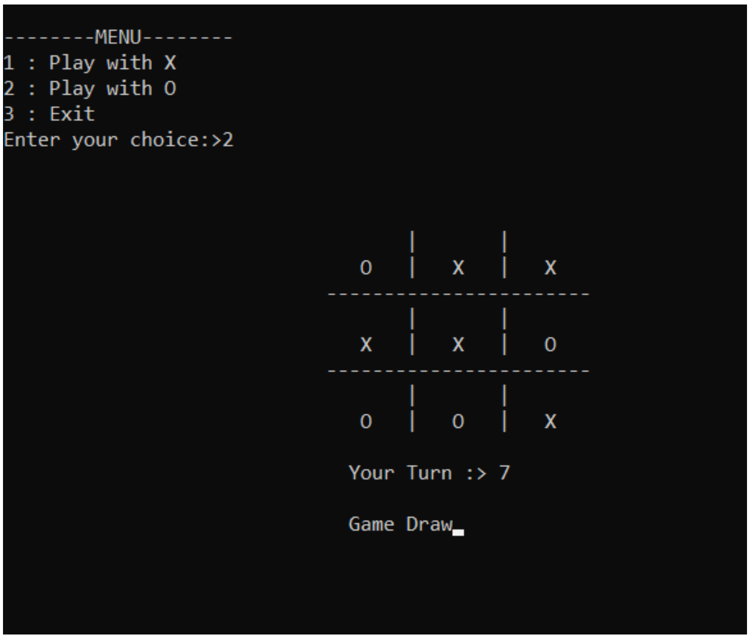
Game output Screenshots:

1) PLAYER WINS



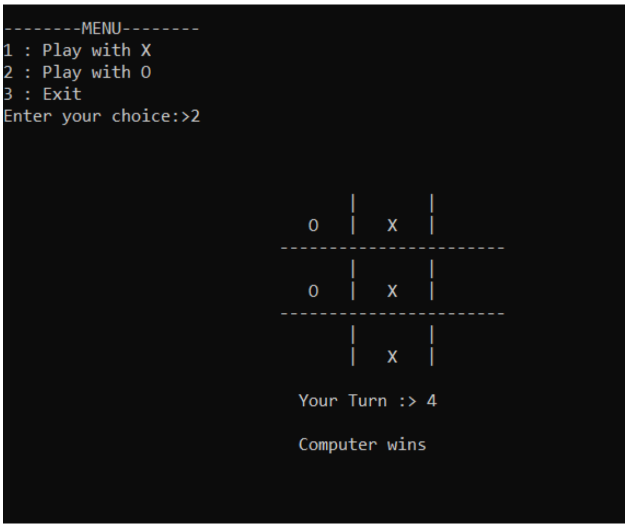
```
--------MENU--------
1 : Play with X
2 : Play with O
3 : Exit
Enter your choice:>1


                                  |       |
                              X   |   O   |   X
                           ----------------------
                                  |       |
                              O   |   X   |
                           ----------------------
                                  |       |
                              X   |       |   O

                              Your Turn :> 3

                              Player Wins_
```

2) GAME DRAW



```
--------MENU--------
1 : Play with X
2 : Play with O
3 : Exit
Enter your choice:>2


                                     |       |
                              O      |   X   |   X
                           -----------------------
                                     |       |
                              X      |   X   |   O
                           -----------------------
                                     |       |
                              O      |   O   |   X

                              Your Turn :> 7

                              Game Draw_
```

3) COMPUTER WINS



```
--------MENU--------
1 : Play with X
2 : Play with O
3 : Exit
Enter your choice:>2


                                     |       |
                              O      |   X   |
                           -----------------------
                                     |       |
                              O      |   X   |
                           -----------------------
                                     |       |
                                     |   X   |

                              Your Turn :> 4

                              Computer wins
```