

# Data Structures and Algorithm

## Tic-Toe Game

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## Introduction

I have to design a board based game using any of the algorithms that I have learned in the lectures. I have made tic-toe 3x3 board game which is based on array algorithm. The game consists of two players playing against each other at a time. To start the game both players has to write their names to begin the game with automatic default allotted sign 'X' and 'O'. Players can select any box from the provided positions depending on the turn. A players must align its allotted character in a straight line vertically, horizontally or in a lash from right top to left bottom or vice versa. The first player to complete its line on a 3x3 diagonal will complete the game as winner or if no player has able to complete the line will result in a draw.

A menu has been added on the start of the game from which users can select to start a new game. They can also see the past list of winners. To make the game relaxing and not so silent a kick of old arcade music has also been added when a player wins a game.

## Design

Designing this game was pretty easy as I have already chosen a simple array algorithm. On the start of the game a menu appears on the screen. On pressing '1' the game begins and it asks the names for the players after the players has entered their respective names the program automatically assigns 'X' to the first player and 'O' to the second. After getting the character the game gets started. Every player has an equal turn to give a mark on the desired box from 1 to 9 which is available as shown in (fig 1.0). For example player one choose a position 6 on the board, when he writes number 6 on the given line the program saves its text which is 'X' on the same position that he has selected as shown in (fig 2.0). Every Time a player select his desired position gets saved on the board, which eventually is saved on the array pointer position (fig 3.0).

The coding has been implemented on its own function the real game code is written in the game functions (fig 4.0). This consists of four functions: diagram, player one, player two & win functions. As these are only for the game functions. There are few more functions defined as player name, background music which is played when a player win the game along with file function which stores the winner names into a text file and shows the winners name on the console, when the function is called

from the main menu. In the main function a small menu has been implemented with a switch statement which then calls every other function for example 1 for playing the game, 2 for showing the winners name from a text file & 3 for exiting the game as shown in (fig 5.0).

Fig(1.0)

1	2	3
4	5	6
7	8	9

Fig (2.0)

1	2	3
4	5	X
7	8	9

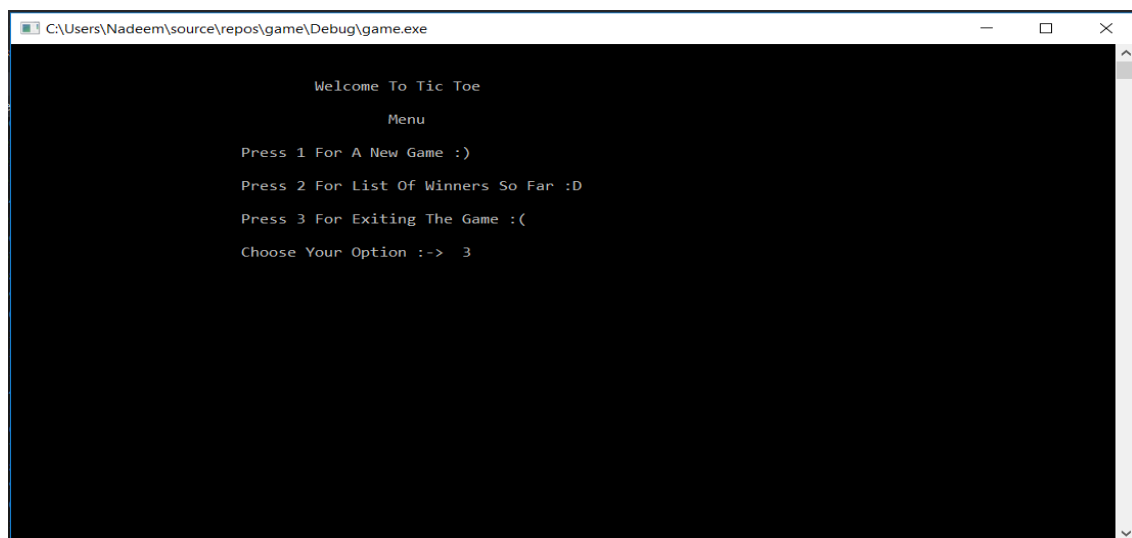
Fig (3.0)

[illegible]

Fig (4.0)

```
void game()
{
    diagram(); //calling diagram function
    player1(); // calling player 1 function
    diagram(); //calling diagram function
    player2(); //calling player 2 function
    diagram();
    player1();
    diagram();
    player2();
    diagram();
    player1();
    diagram();
    player2();
    diagram();
    player1();
    diagram();
    player2();
    diagram();
    player1();
    diagram();
    b = win();
    if (b == 1)
        printf("\n\n\n\n Player %s Won", t1);
    if (b == 2)
        printf("\n\n\n\n Player %s won", t2);
    if (b == 3)
        printf("\n\n\n\n Match Is Drawn Between %s & %s", t1, t2);
    _getch();
}
```

Fig (5.0)



Every Function has its own code defined within the function.

## Enhancements

It would be lovely to add few more features to the game.

- 1) **Back ground Picture:** Every time a new game is started an old style arcade picture would be set for the game to be displayed.
- 2) **Choice for 'X' & 'O':** My Logic Automatically assign 'X' to the first player and 'O' to the second player, it can be improved by adding one more code of line in which the first players can choose either 'X' or 'O'.
- 3) **Back ground music:** As I have only set a small arcade music at the end of the game, it can be improved by adding multiple sounds while playing the game & there should be a small click sound when a player select a position with their character 'X' or 'O'.
- 4) **Bigger board more fun:** I can implement a bigger board size 9x9 in which each box contains a small tic tac toe game, a player must win each game in a straight diagonal, vertical or horizontal line to win the 9x9 board game.
- 5) **List of winners and losers:** I have only implemented the winners list, it can be redefined into a much better list which shows the total games played, winners name and the losers name along with number of wins with the same player.
- 6) **Home screen logo:** Welcome logo and when launching the tic tac toe logo can be added to the home screen before the menu can appear.
- 7) **X & O:** 'X' & 'O' can be replaced with more appealing characters for example 'X' can be replaced with more fascinating smiley characters with a specific background color of the box which can be selected in the start of the game by the respective players, the same way 'O' can be replaced on players liking.
- 8) **Redo/Undo:** A time frame of 5 seconds should run through after a player has selected the box to undo and change the box but we can set a limit of 2 undo in a game.

I would have improved the main menu for a better view for a gamer as they are playing the game in the late 90s, when there was a huge craze for arcade games specially SEGA and Atari games. While playing the game there should be a skip power to restrict opponent in which they don't get a turn to select their box, simply

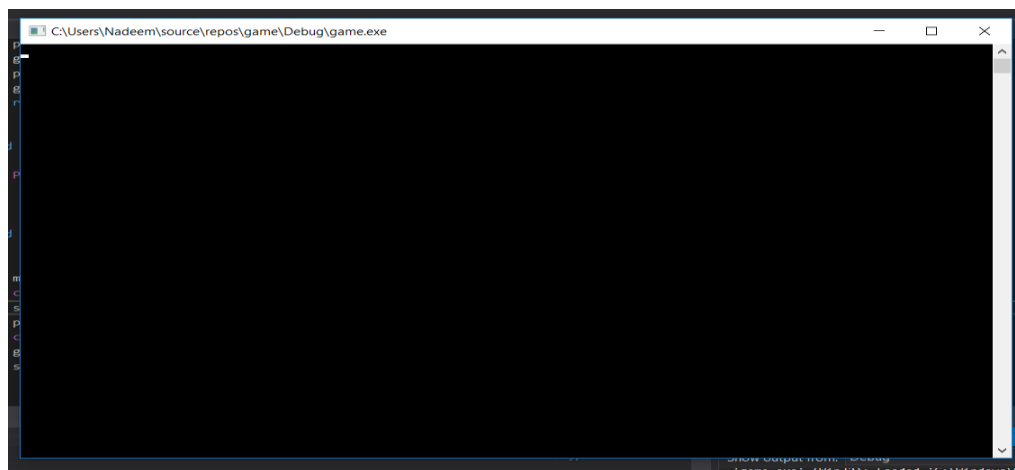
a player can have two turns at the same time giving them a bit advantage against the opponent.

## Critical Evaluation

Some of my features work and some don't. I tried to implement the soundtrack at the start of the game but it didn't work for me when the actual game kicks off. However, the soundtrack that was implemented at the end of game worked and no error occurred. Moreover, I tried various other features to implement and tried to make my game more attractive but I failed every time, which gives me blank page with 0% result as shown in (fig 6.0).

For the main menu, I focused on implementing few more things, as a switch statements which leads to other functions other than the game. Pressing 1 for the game, pressing 2 for the list of the past winners & press 3 for exiting the game. I am working on storing the winners name to a file and then retrieving the names by pressing 2 after this it will be displayed on the console box. This feature will may/may not be available before the final submission. Few of my features work poorly like the back ground song. I am not sure whether my code is bad or I am not calling the function at the right moment in the int main.

Fig (6.0)



## Personal Evaluation

I have already learned C language back in high school but haven't gone deep into the language. For examples using functions, structs etc. I have learned many new things thanks to online community like Stack over flow, GitHub & a professor from my last university who guided me with errors in the code. Choosing the algorithm was a bit hard for me as other algorithms was somehow a little hard to understand. I tried to implement enqueue and dequeue algorithm but could not get away with a result. I shifted back to basic array because of time shortage for the program to work and report to be written.

There were many issues with my codes as I am working on visual studio 2017. The library functions was not as same as it is in C with the help of internet studying. However I found solutions to most of my problems. Mostly my problems was with library functions but I tried to write all codes in a single function 'int main ()' and that giving me more & more errors. I contacted one of my past professor, as He gave me a little hint about using more than one function which clicked to me and got it working. I started using more functions and then calling them all to a single function 'int main ()'.

On the progress of my main game code, I faced some problems with the placement of user input, eventually found my solution after implementing different solutions into my code. After the main code for my game started working properly after that I got stuck with my background music and saving the winner name into a file. I tried different approaches to my code and my background music still remains the problem but somehow, I managed to run my background music at the end of the game when a player wins against his opponent. Working with file was a bit difficult for me as I know how the syntax work. One way or another I always end up with errors. For example winner name not found or couldn't load the winners list, even after searching online that could not get me file function to work. By the end one of my friend helped me by highlighting errors and told me to look into the specific part of the code and I managed to rectify most of the code and got it working by some extend.

With the right guidance and knowledge any work or assignment can be completed with healthy margin and it can also be expanded with new and innovative ideas. As, I had no one to help me out rather than getting some help online, fellows and professionals. I have only managed to make a tic tac toe game with basic functions. I could have made it better what it is now.