PROJECT REPORT

on

Tic Tac Toe Using VB.Net

Submitted By:

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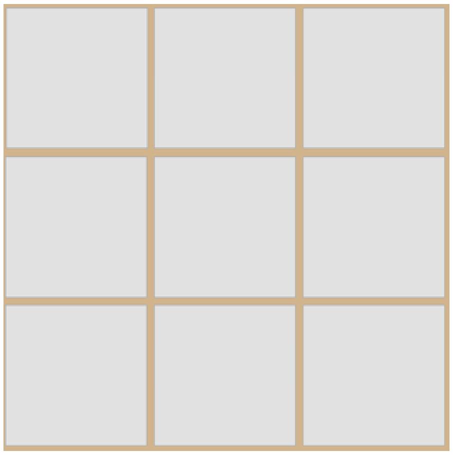
Contents

1. Abstract

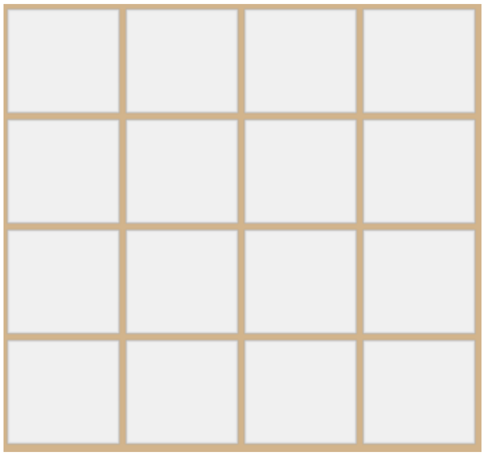
Our project name is the Tic-Tac-Toe game which is created in VB.NET windows form application. This game is very popular and is fairly simple by itself. It is a two-player game. In this game, there is a board with n x n squares. In our game, it is 3 x 3 squares as well as 4 x 4 squares that can be filled with a cross (X) or a circle (O). The game will toggle between the players by giving the chance for each player to mark their move. Tic-Tac-Toe's goal is to be one of the players to get three or four same symbols (O OR X) in a row - horizontally, vertically, or diagonally on a 3 x 3 grid or 4 x4 grid. The player who does so is the winner. The game ends in a draw if all the squares are filled with Os or Xs but not in a row, column, or diagonal. The program will update after each player makes their move and check for the conditions of the game as it goes on. The overall program works without any bugs and can be use in multiple platforms.

2. Introduction

The Tic-Tac-Toe game is most familiar among all the age groups. The friendliness of Tic-Tac-Toe games makes them ideal as a pedagogical tool for teaching the concepts of good sportsmanship. The game is a very good brain exercise. It involves looking ahead and trying to figure out what the person playing against you might do next. Games provide a real source of enjoyment in daily life. Games also help improve the physical and mental health of humans. Apart from daily life physical games, people also play computer games. These games are different from those physical games because they do not involve much physical activity but rather mental and emotional activities. Getting games to reach back to the user of a game has always been a long hard question for game programmers. Because let's just face it, a good game that doesn't challenge the user's ability to play the game doesn't keep the user around very long. It also helps the user to be mentally fit because if he or she is alone they can also play it with the computer. Let's know how to play Tik Tak Toe with the help of an example Though traditionally, the first player goes with "X", you can allow the first player to decide whether to go with "X"s or to go with "O"s. After the first player goes, then the second player should put down his symbol, which will be different from the symbol of the first player. The second player can either try to block the first player from creating a row of three/four or focus on creating their row of three. Ideally, the player can do both. the first player to draw three of their symbols in a row, whether it is horizontal, vertical, or diagonal, has won tic-tac-toe. However, if both players are playing with optimal strategy, then there's a good chance that no one will win because you will have blocked all of each other's opportunities to create a row of three/four.



3x3



4x4

3. Important classes used in the project

Many important classes and functions are used in this project which is important to know to proceed further. Classes and function areas are the following

3.1. Resetbutton()

As the name suggests It is a class that is used to reset the text and color of all the tiles in 3X3 and 4X4 format. so, it will be fairly easier to reset the game and we can play it from the start so that we can make our code more efficient. It is different for 3X3 and 4X4 format the only difference is that4 X4 have 16 buttons and 3X3 have 9 buttons. In Resetbutton() we also change the visibility of XTURN to true and OTURN to false. So that we can play the game again from the starting

3.2.Checkforwin()

This class is different for 3X3 format and 4X4 format. This class check the winning conditions and if all the button fill then declare the game draw it is used after every turn for 3X3 format chances of winning are 8 which are 3 horizontal 3 vertical, and 2 angular winning chances and for the 4X4 format winning chances are 10 which are 4 horizontal,4 verticals and 2 angular winning chances first we will discuss the 3X3 format code

3.2.1.Checkforwin() 3X3

In this, we have a total of 9 buttons in 3X3 table form we have 8 winning chances which are 3 horizontal 3 vertical, and 2 angular winning chances and if any of these conditions are true then a message box will be openly telling that the person /computer has won the game and Checkforwin() 3X3 function also check if all the buttons are filled and still there is no winning condition then declare the game draw By using message box and execute Resetbutton() and then if any one of the players has won the game then do the addition of scores for the person has won.

Winning chances in 3X3 format are as follow

1) Button1 = button2 = button3 = X/O
2) Button4 = button5 = button6 = X/O
3) Button7 = button8 = button9 = X/O
4) Button1 = button4 = button7 = X/O
5) Button2 = button5 = button8 = X/O
6) Button3 = button6 = button9 = X/O
7) Button1 = button5 = button9 = X/O
8) Button3 = button5 = button7 = X/O

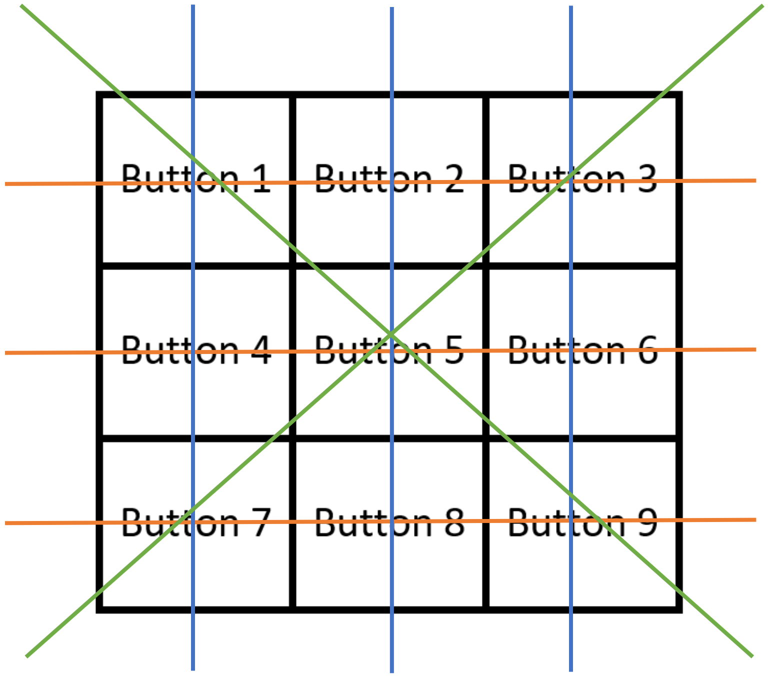


Figure 1

3.2.2. Checkforwin() 4X4

In this, we have a total of 16 buttons in 4X4 table form we have 10 winning chances which are 4 horizontal,4 verticals and 2 angular winning chances if any of these conditions are true then a message box will be openly telling that the person /computer has won the game and Checkforwin() 4X4 function also check if all the buttons are filled and still there is no winning condition then declare the game draw and execute Resetbutton() and then if any one of the players has won the game then do the addition of scores for the person who have won

<u>Winning chances in 4X4 format are as follow</u>

1) Button1 = button2 = button3 = button4 = X/O

2) Button5 = button6 = button7= button8 = X/O
3) Button9 = button10 = button11= button12 = X/O
4) Button13 = button14 = button15 = button16 = X/O
5) Button1 = button5 = button9 = button13 = X/O
6) Button2 = button6 = button10 = button14 = X/O
7) Button3 = button7 = button11 = button15 = X/O
8) Button4 = button8 = button12 = button16 = X/O
9) Button1 = button6 = button 11=button16 = X/O
10) Button4 = button7 = button10 = button13 = X/O

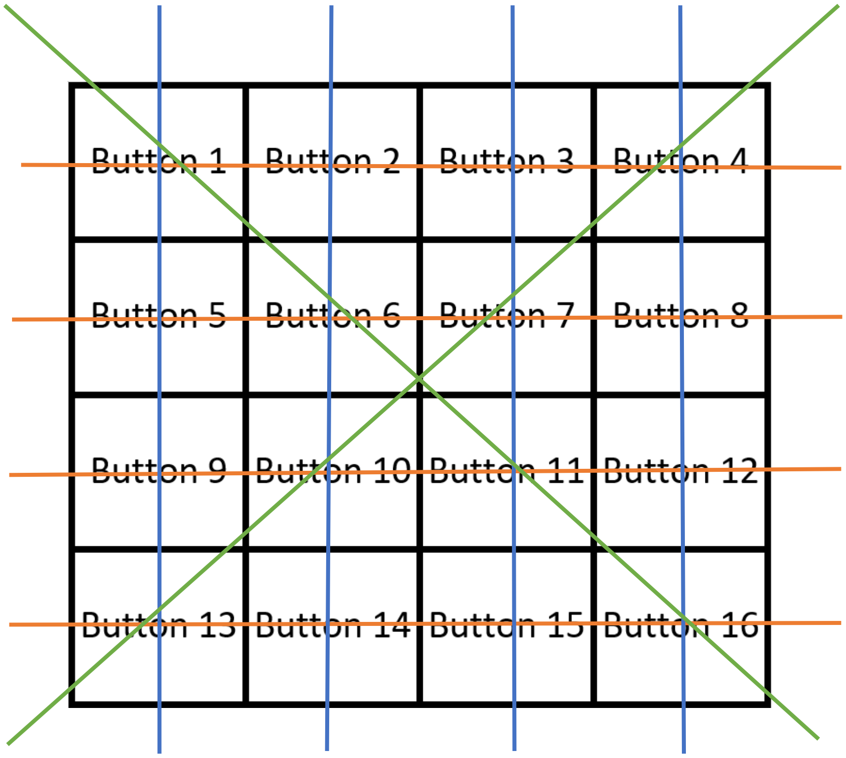


Figure 2

3.3. Winnernerfu()

It is the function that is used In Computerturn0 and ComputerturnX to check if a possible chance of winning is thereby using the value of cor it checks that if the cor value satisfies any statement which is given below

Code for Winnerfu() is as follows

```
Public Function Winnerfu(ByVal cor As Char)

Return (Button1.Text = "X" And Button2.Text = "X" And Button3.Text = "X"
And Button4.Text = cor Or
Button5.Text = "X" And Button6.Text = "X" And Button7.Text = "X" And
Button8.Text = cor Or
Button9.Text = "X" And Button10.Text = "X" And Button11.Text = "X" And
Button12.Text = cor Or
Button13.Text = "X" And Button14.Text = "X" And Button15.Text = "X" And
Button16.Text = cor Or
Button1.Text = "X" And Button5.Text = "X" And Button9.Text = "X" And
Button13.Text = cor Or
 Button2.Text = "X" And Button6.Text = "X" And Button10.Text = "X" And
Button14.Text = cor Or
Button3.Text = "X" And Button7.Text = "X" And Button11.Text = "X" And
Button15.Text = cor Or
Button4.Text = "X" And Button8.Text = "X" And Button12.Text = "X" And
Button16.Text = cor Or
Button1.Text = "X" And Button6.Text = "X" And Button11.Text = "X" And
Button16.Text = cor Or
Button4.Text = "X" And Button7.Text = "X" And Button10.Text = "X" And
Button13.Text = cor Or
Button1.Text = "O" And Button2.Text = "O" And Button3.Text = "O" And
Button4.Text = cor Or
Button5.Text = "O" And Button6.Text = "O" And Button7.Text = "O" And
Button8.Text = cor Or
Button9.Text = "O" And Button10.Text = "O" And Button11.Text = "O" And
Button12.Text = cor Or
Button13.Text = "O" And Button14.Text = "O" And Button15.Text = "O" And
Button16.Text = cor Or4
Button1.Text = "O" And Button5.Text = "O" And Button9.Text = "O" And
Button13.Text = cor Or
Button2.Text = "O" And Button6.Text = "O" And Button10.Text = "O" And
Button14.Text = cor Or
Button3.Text = "O" And Button7.Text = "O" And Button11.Text = "O" And
Button15.Text = cor Or
Button4.Text = "O" And Button8.Text = "O" And Button12.Text = "O" And
Button16.Text = cor Or
Button1.Text = "O" And Button6.Text = "O" And Button11.Text = "O" And
Button16.Text = cor Or
Button4.Text = "O" And Button7.Text = "O" And Button10.Text = "O" And
Button13.Text = cor)

    End Function
```

3.4.Computerturn0

It is a function that is used when the user has selected the X symbol the and computer symbol is O. It is an algorithm that is used to perform a turn first it selects l the unfilled buttons in a list and then check if any of the buttons in the list help to win the game using Winnerfu() if yes there is possible winning chances then it will perform its turn else then it will put all the corner once in a list and then check if any of the corner buttons are empty if yes then fill one of them randomly else it will proceed further and then we put the middle one in the list and execute the turn of the computer and the code for ComputerturnO 3X3 and 4X4 are different because the number of winning chances and number of buttons /tiles are more in 4X4 and length of code is also more as compare to 3X3 format.

3.4.1.Flow chart describing ComputerturnO

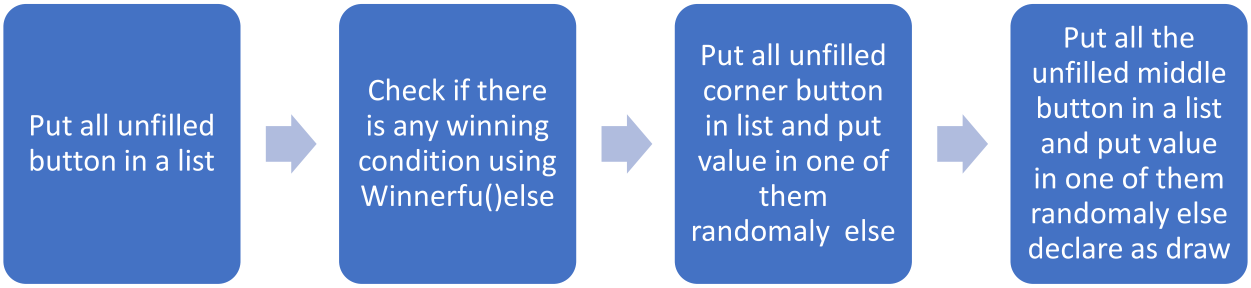

Put all unfilled button in a list
Check if there is any winning condition using Winnerfu()else
Put all unfilled corner button in list and put value in one of them randomaly else
Put all the unfilled middle button in a list and put value in one of them randomaly else declare as draw

Table 1

3.5. ComputerturnX

It is a function that is used when the user has selected the O symbol the and computer symbol is X. It is an algorithm that is used to perform a turn first it selects l the unfilled buttons in a list and then checks if any of the buttons in the list help to win the game using Winnerfu() if yes there is possible winning chances then it will perform its turn else then it will put all the corner once in a list and then check if any of the corner buttons are empty if yes then fill one of them randomly else it will proceed further and then we put the middle one in the list and execute the turn of the computer and the code for ComputerturnX 3X3 and 4X4 are different because the number of winning chances and number of buttons /tiles are more in 4X4 and length of code is also more as compare to 3X3 format.

3.5.1. Flow chart describing ComputerturnX

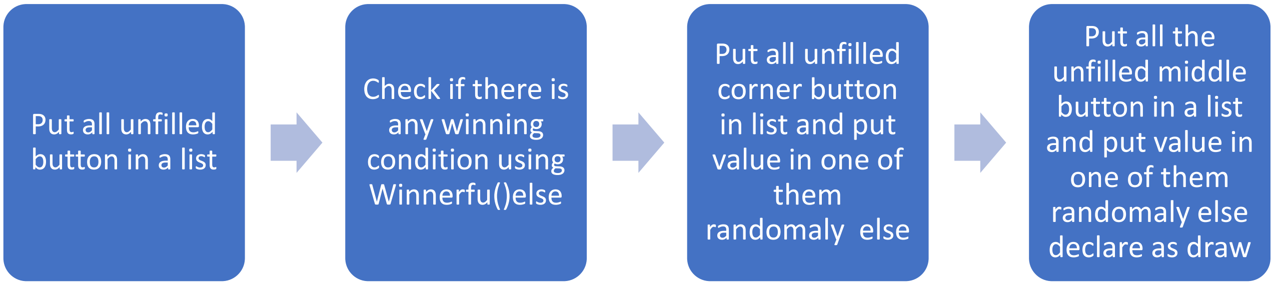

Put all unfilled button in a list
Check if there is any winning condition using Winnerfu()else
Put all unfilled corner button in list and put value in one of them randomaly else
Put all the unfilled middle button in a list and put value in one of them randomaly else declare as draw

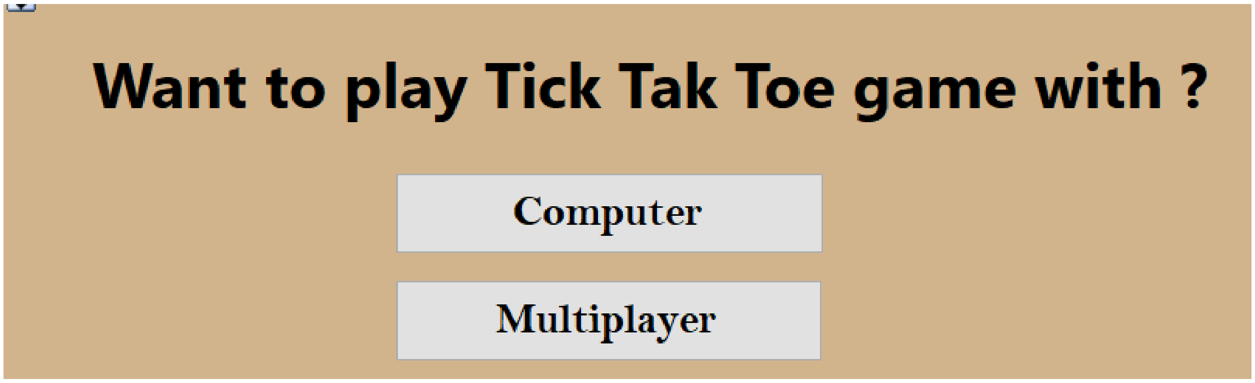
Table 2

4. Proposed design

This program is been created in vb.net windows form applications. We have created a tic tac toe game in which the user gets the option to play the game with humans as well as computers and even if he /she wants to play the game in 3x3 format or 4x4 format. This project is divided into 5 parts Main page, multiplayer 3X3 format, Multiplayer 4X4 format, with computer3X3 format, and computer 4X4 format.

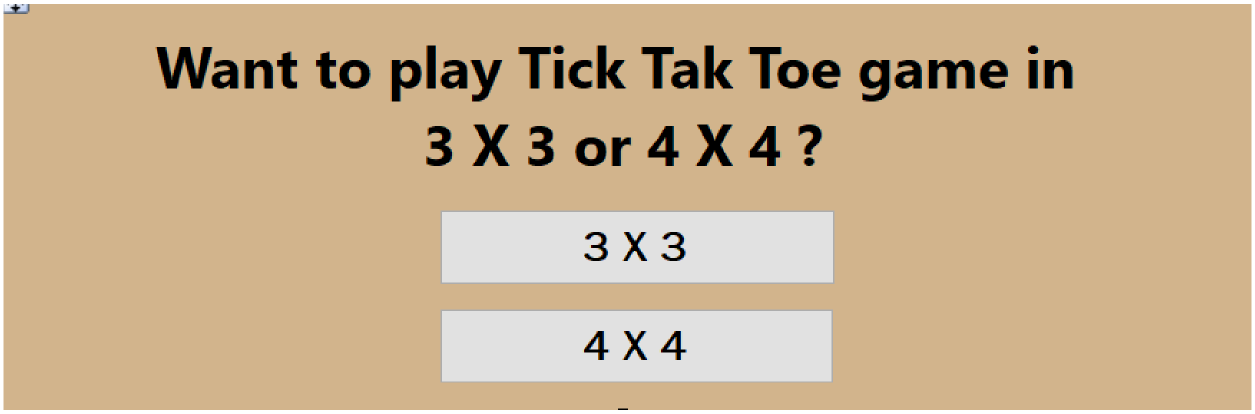
4.1. MAIN PAGE

The main page which is one of the most important forms in this program help user choose what he/ she wants to play in which format it has 3 panels MAIN(Figure1), COMPUTERT(Figure2), and MULTIPLAYERT (Figure 3). At first when the form loads main will display and the user will select if he or she wants to play with the computer or with another player if he/she selects the computer then COMPUTERT will show and let the user with chose if he or wants to play in 3X3 format or 4X4 format and if user select multiplayer in main then MULTIPLAYERT will show and let the user select if he wants to open play in 3X3 format or 4X4 format and according to user choice open next form and close this one



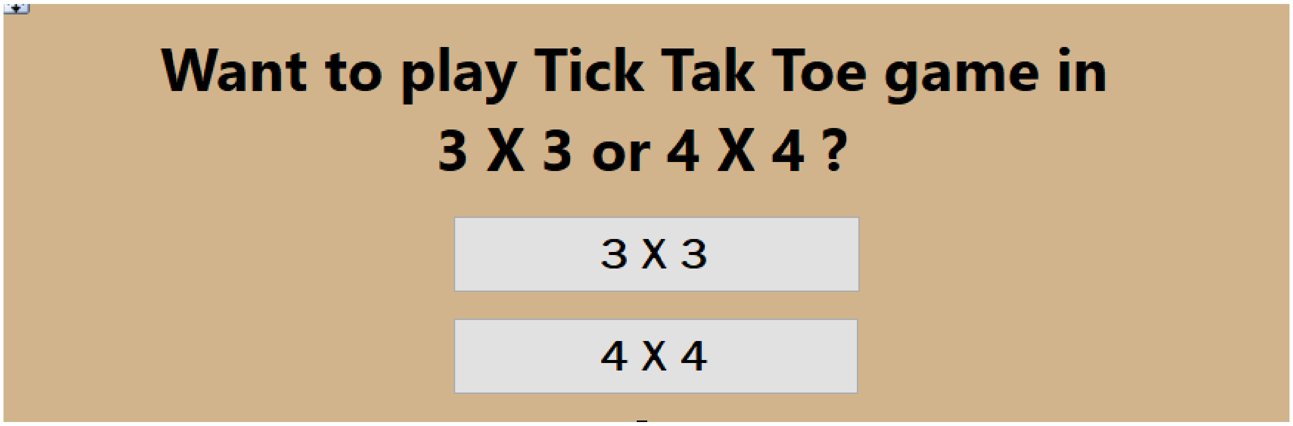
Want to play Tick Tak Toe game with ?

Figure 3



Want to play Tick Tak Toe game in
3 X 3 or 4 X 4 ?

Figure 4



Want to play Tick Tak Toe game in
3 X 3 or 4 X 4 ?

Figure 5

For code check out https://github.com/nishcheyk/tick-tak-toe-VB.NET-pc

4.1.1. Flow chart of how the Main page works

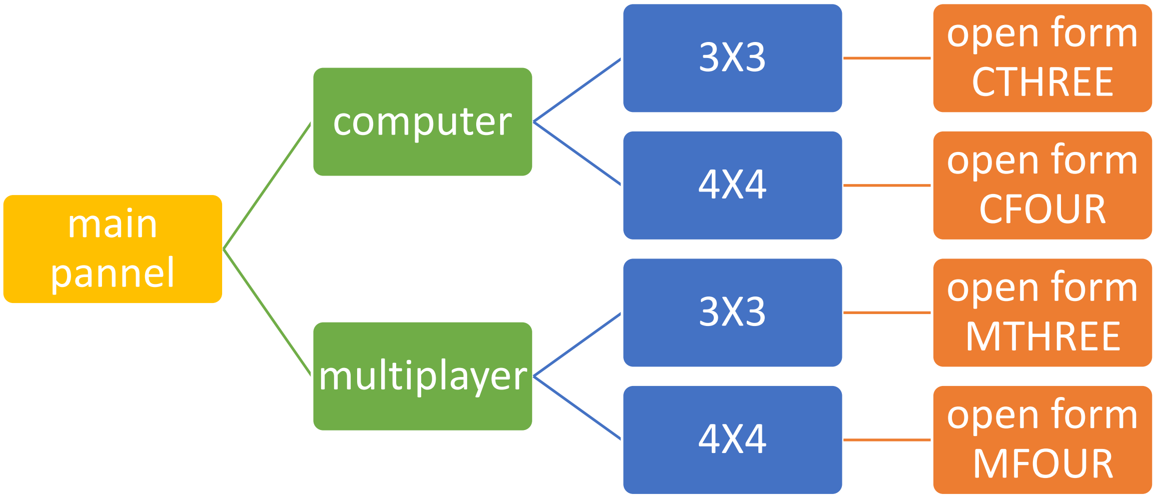


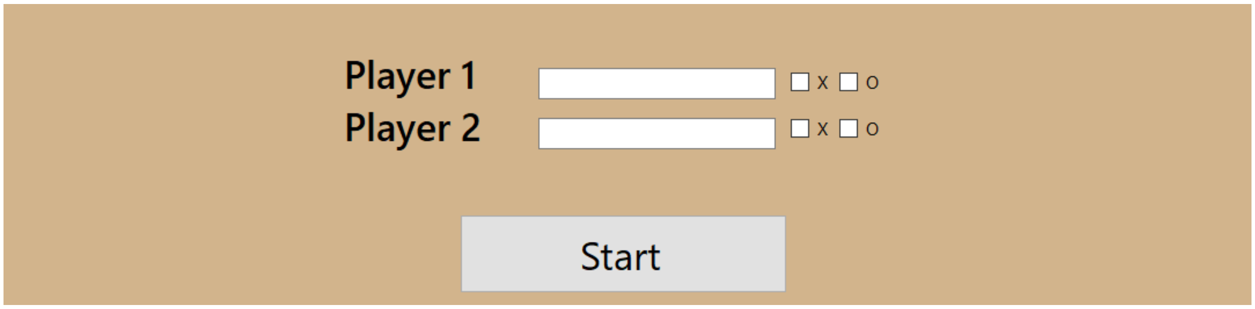
Table 3

4.2. MULTIPLAYER 3X3

This form is named MTHREE. In this form, the user can play the game with another player in the form of 3 X 3 tiles so that player can play we have 2 panels Start1 and tiktaktoe.

4.2.1. Start1

When this form loads first, we saw the Start1 panel which will take the name of the players of the player and when one player selects his / her symbol then another player's symbol automatically gets selected and vice versa. And if no symbols are selected and start is clicked then a MessageBox will display which tells to select any one symbol and when the symbol is selected and then start is clicked then Start1 gets hidden and the tiktaktoe panel shows



Player 1 □ x □ o

Player 2 □ x □ o

Figure 6

4.2.2. Tiktaktoe

This panel consists of a total of 11 buttons (9 columns, 2 functions) when the visibility of tiktaktoe changes it takes the data which is entered in Start1 and shows it in text boxes and when its visibility turn to true then xturn is visibility is on and oturn visibility is off and when a player with symbol X click the button on the tile its check if xturn visible is true or not if it is true then Then the button color change and text change to X. on every click on these all 9 buttons Checkforwin() get insisted to check if there is any winning condition satisfied and the xturn visibility change to false and return visibility turn true and visa versa if oturn visibility is true this loop goes on until Checkforwin() and all button gets fill get true and other two-button new game and reset button. The new game button will take us back to the MainPage and initialize Restbutton() and the reset button will initialize only Resetbutton() do not go back to the main menu. It also includes 2 labels which will tell us about the scores

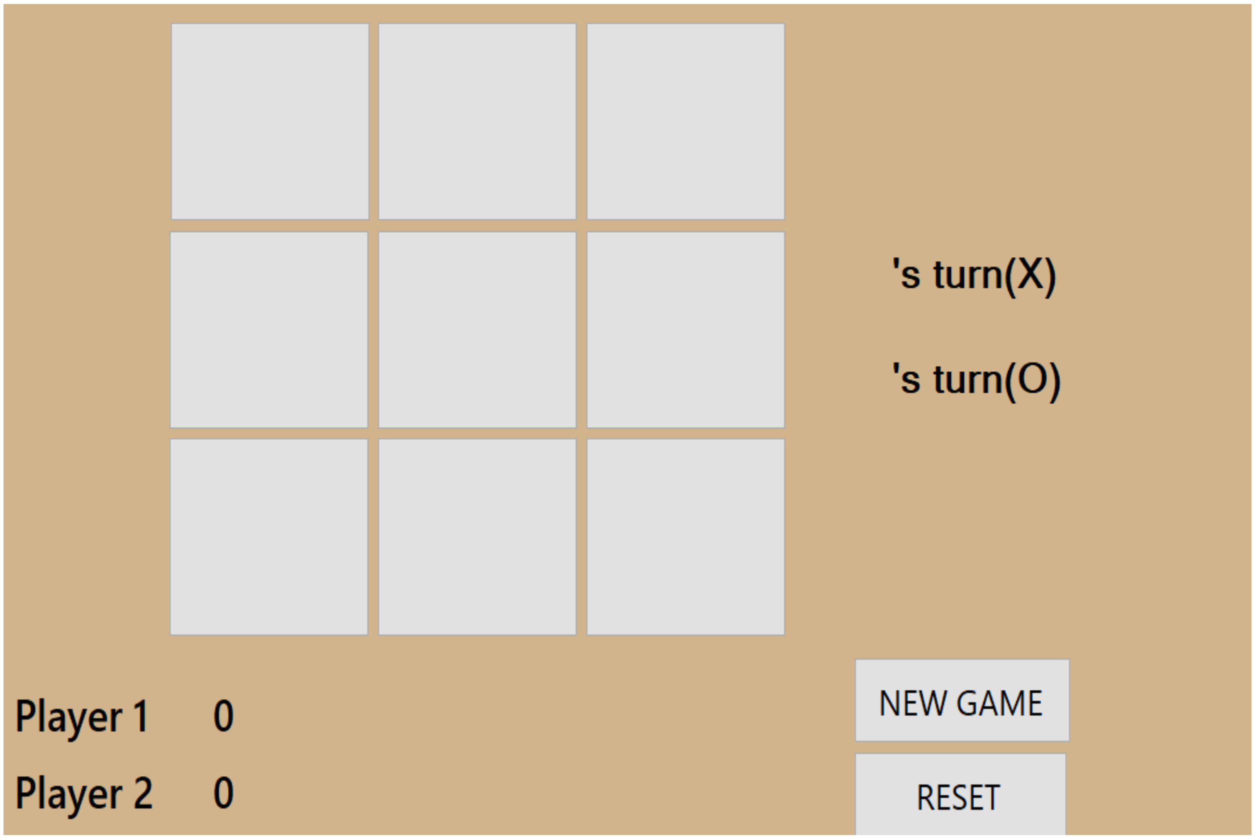


Figure 7

4.3. MULTIPLAYER 4X4

This form is named MFOUR. In this form, the user can play the game with another player in the form of 4 X 4 tiles so that player can play we have 2 panels Start1 and tiktaktoe.

4.3.1. Start1

When this form loads first, we saw the Start1 panel which will take the name of the players, and when one player selects his / her symbol then another player's symbol automatically gets selected and vice versa. And if no symbols are selected and start is clicked then a MessageBox will display which tells to select any one symbol and when the symbol is selected and then start is clicked then Start1 gets hidden and the tiktaktoe panel shows

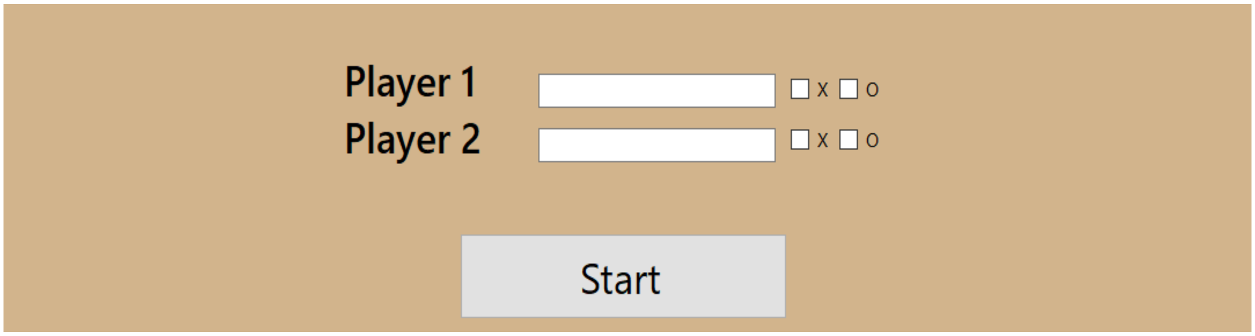


Figure 8

4.3.2. Tiktaktoe

This panel consists of a total of 18 buttons (16 columns, 2 functions) when the visibility of tiktaktoe changes it takes the data which is entered in Start1 and shows it in text boxes and when its visibility turn to true then xturn is visibility is on and oturn visibility is off and when a player with symbol X click the button on the tile its check if xturn visible is true or not if it is true then Then the button color change and text change to X. On every click on all 16 buttons Checkforwin() get insisted to check if there is any winning condition satisfied and the xturn visibility change to false and return visibility turn true and visa versa if the oturn visibility is true this loop goes on until Checkforwin() and all button gets fill get true and other two buttons new game and reset. The new game button will take us back to the MainPage and initialize Restbutton() and the reset button will initialize only Resetbutton() do not go back to the main menu. It also includes 2 labels which will tell us about the scores

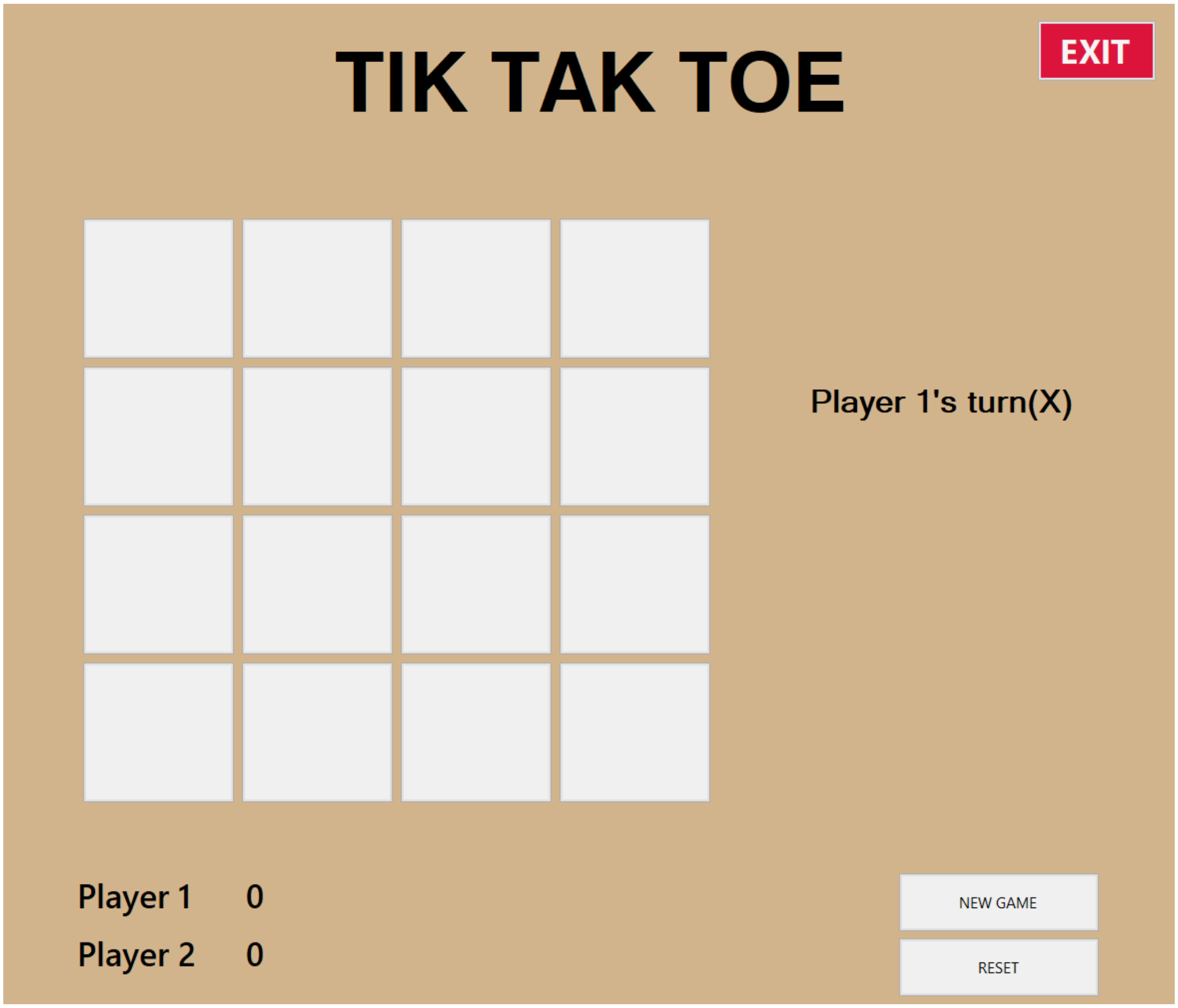


Figure 9

4.4. COMPUTER 3X3

This form is named CTHREE. In this form, the user can play the game with a Computer in the form of 3X3 tiles so that player can play we have 2 panels Start1 and tiktaktoe.

4.4.1. Start1

When this form loads first, we saw the Start1 panel which will take the name of the player and when the player selects his / her symbol then another symbol automatically gets selected for the computer if no symbols are selected and start is clicked then a MessageBox will display which tells to select any one symbol and when the symbol is selected and then start is clicked then Start1 gets hidden and the tiktaktoe panel shows

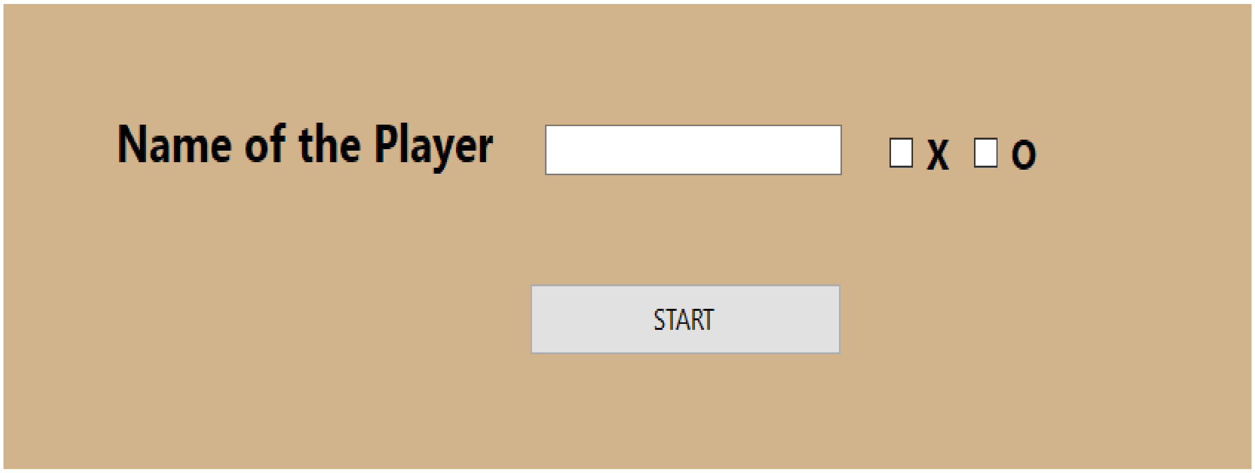
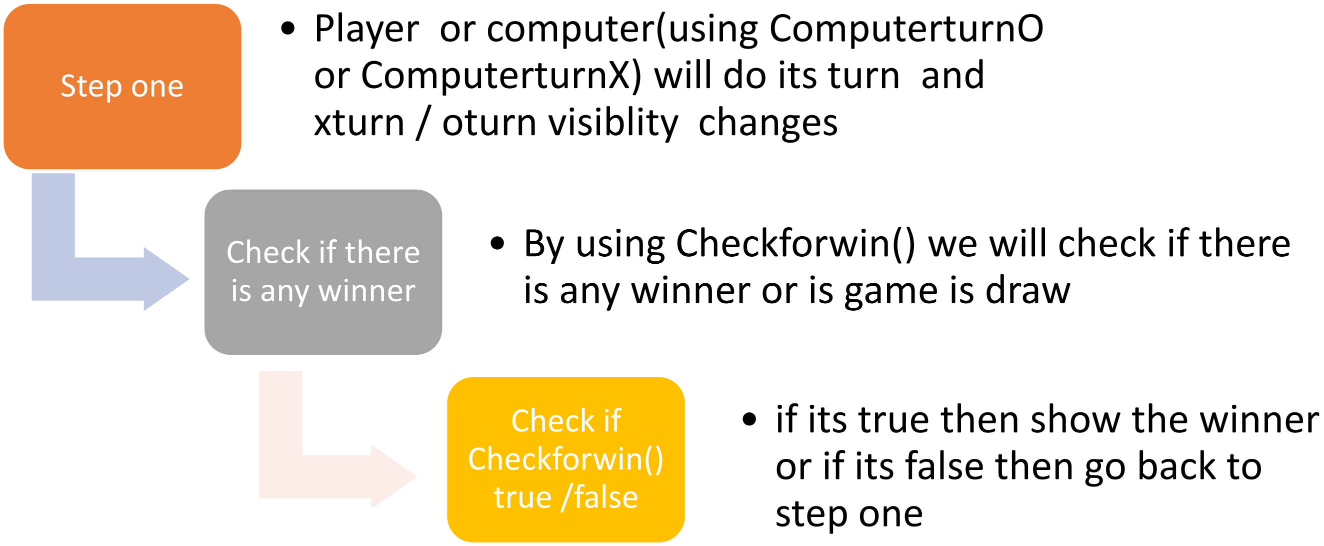


Figure 10

4.4.2. Tiktaktoe

This panel consists of a total of 11 buttons (9 columns, 2 functions) when the visibility of tiktaktoe changes it takes the data which is entered in Start1 and shows it in text boxes and when its visibility turn to true then xturn is visibility is on and oturn visibility is off and when a player or computer which have symbol X click the button on the tile its check if xturn visible is true or not if it is true then Then the button color change and text change to X. on every click on these all 9 buttons Checkforwin() get insisted to check if there is any winning condition satisfied and the xturn visibility change to false oturn visibility turn true and visa versa if oturn visibility is true this loop goes on until Checkforwin() and all button get fill and game declared as draw and other two-button new game and reset button. The new game button will take us back to the MainPage and initialize Restbutton() and the reset button will initialize only Resetbutton() do not go back to the main menu. It also includes 2 labels which will tell us about the scores To explain better we will take an example to imagine the player has selected X or O as a symbol when the game starts X visibility is the true player will do his turn if he selected X or the computer will do his turn using ComputerturnX and if the player has selected X then the computer will do its turn using ComputerturnO when the player completes its turn and repeat until Checkforwin() get true

4.4.2.1. Flow chart to describe Computer 3X3



Step one

- Player or computer(using ComputerturnO or ComputerturnX) will do its turn and xturn / oturn visiblity changes

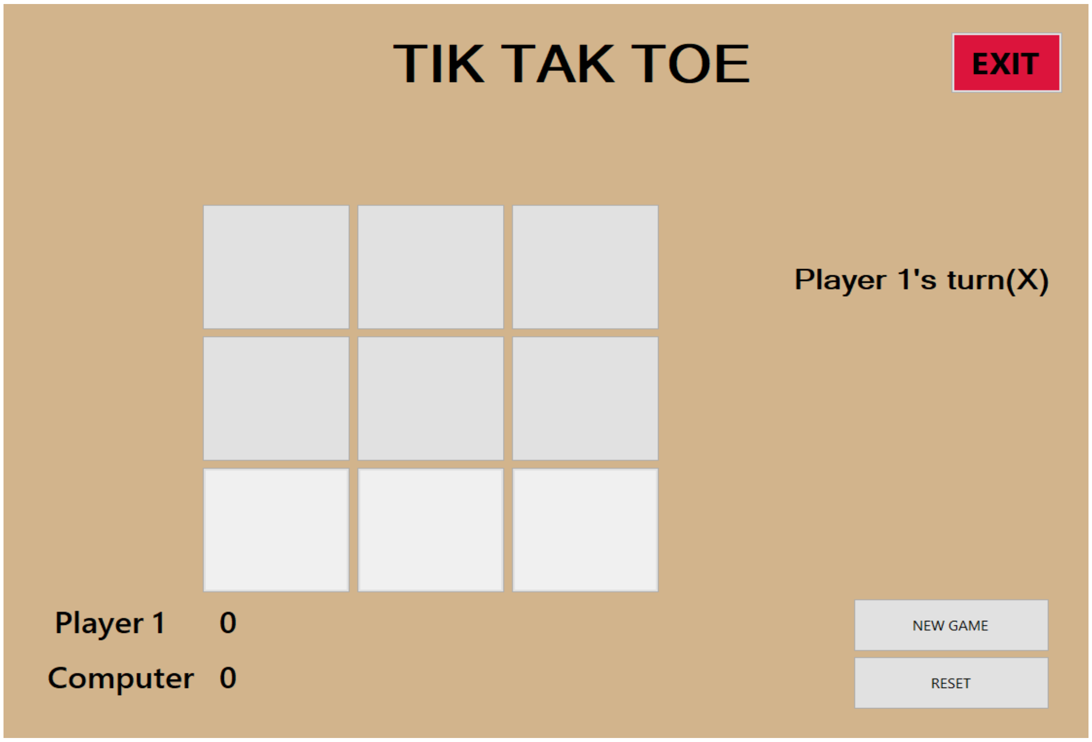
Check if there is any winner

- By using Checkforwin() we will check if there is any winner or is game is draw

Check if Checkforwin() true /false

- if its true then show the winner or if its false then go back to step one

Table 4



Player 1's turn(X)

Player 1 0

Computer 0

Figure 11

For code check out https://github.com/nishcheyk/tick-tak-toe-VB.NET-pc

4.5. COMPUTER 4X4

This form is named CFOUR In this form, the user can play the game with the computer in the form of 4 X 4 tiles so that player can play we have 2 panels Start1 and tiktaktoe.

4.5.1. Start1

When this form loads first, we saw the Start1 panel which will take the name of the player and when the player selects his / her symbol then another symbol automatically gets selected for the computer if no symbols are selected and start is clicked then a MessageBox will display which tells to select any one symbol and when the symbol is selected and then start is clicked then Start1 gets hidden and the tiktaktoe panel shows

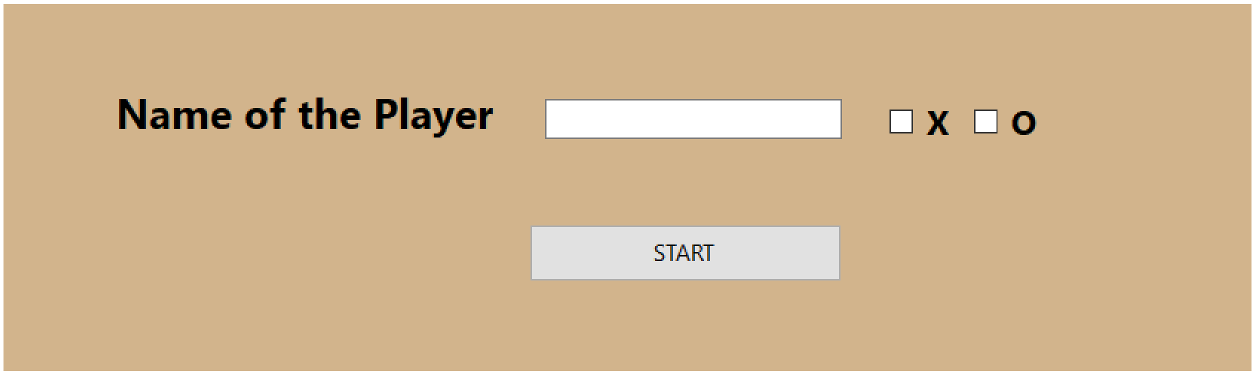
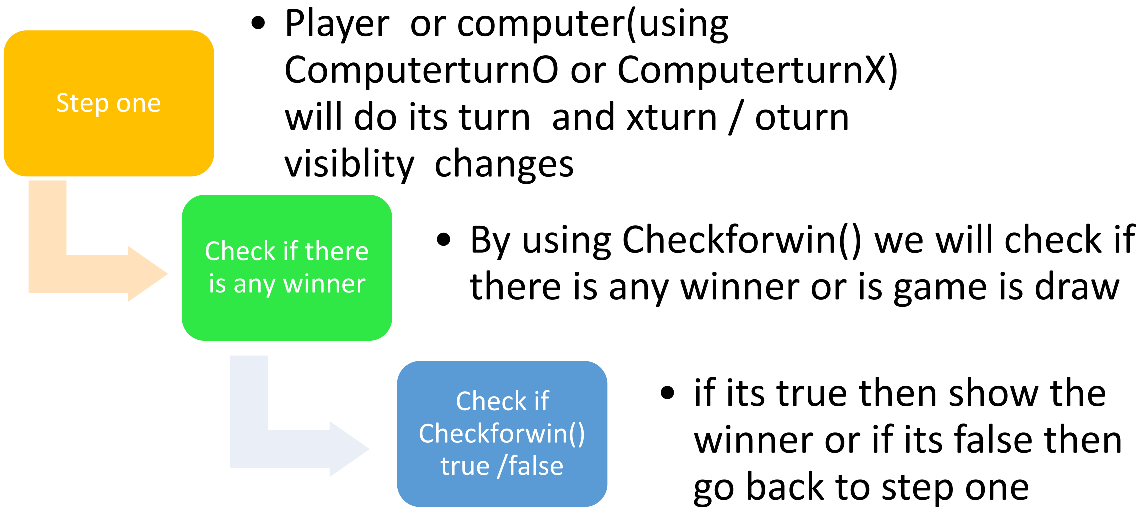


Figure 12

4.5.2. Tiktaktoe

This panel consists of a total of 11 buttons (9 columns, 2 functions) when the visibility of tiktaktoe changes it takes the data which is entered in Start1 and shows it in text boxes and when its visibility turn to true then xturn is visibility is true and oturn visibility is false and when a player or computer which have symbol X click the button on the tile its check if xturn visible is true or not if it is true then Then the button color change and text change to X. on every click on these all 9 buttons Checkforwin() get insisted to check if there is any winning condition satisfied and the xturn visibility change to false oturn visibility turn true and visa versa if oturn visibility is true this loop goes on until Checkforwin() and all button get fill and game declared as draw and other two-button new game and reset button. The new game button will take us back to the MainPage and initialize Restbutton() and the reset button will initialize only Resetbutton() do not go back to the main menu. It also includes 2 labels which will tell us about the scores To explain better we will take an example to imagine the player has selected X or O as a symbol when the game starts X visibility is the true player will do his turn if he selected X or the computer will do his turn using ComputerturnX and if the player has selected X then the computer will do its turn using ComputerturnO when the player completes its turn and repeat until Checkforwin() get true

4.5.2.1. Flow chart to describe Computer 4X4


Step one
Check if there is any winner
Check if Checkforwin() true /false

- Player or computer(using ComputerturnO or ComputerturnX) will do its turn and xturn / oturn visiblity changes
- By using Checkforwin() we will check if there is any winner or is game is draw
- if its true then show the winner or if its false then go back to step one

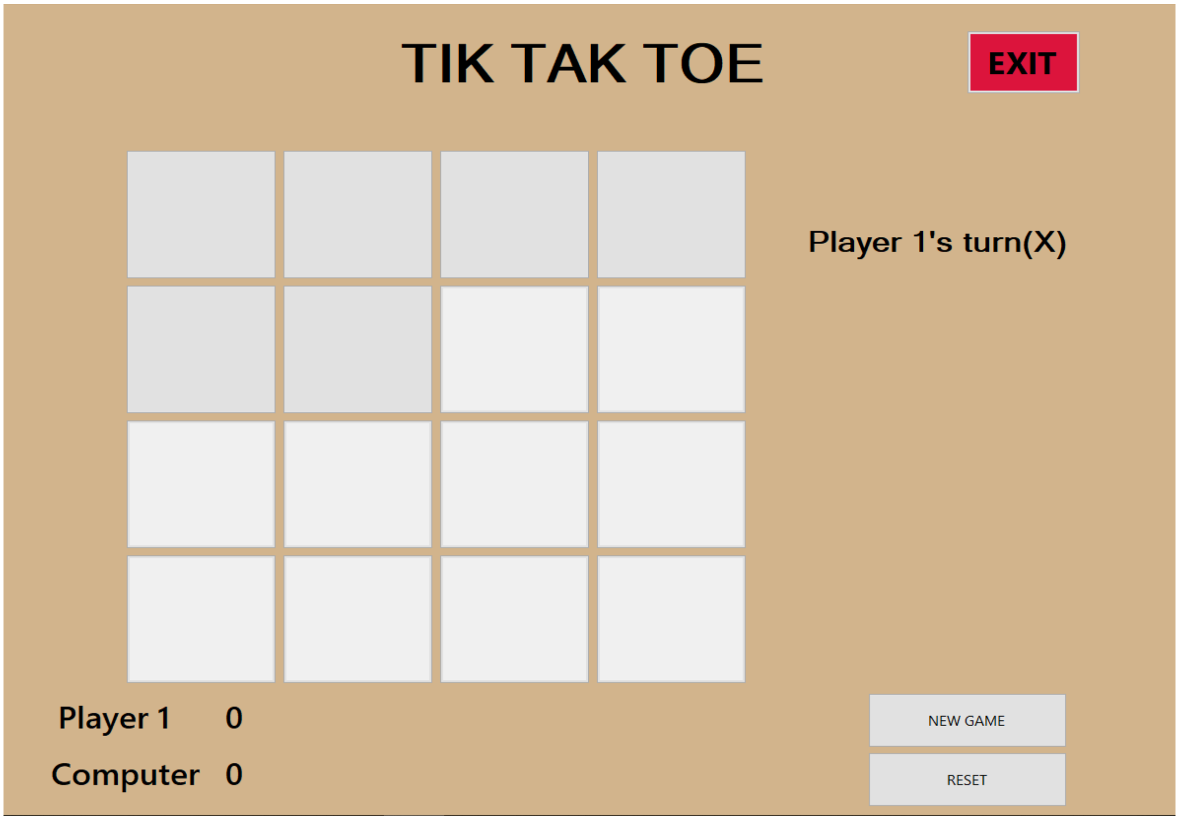


Figure 13

5. Limitations

- No keyboard access
- Can be played with only a mouse
- Many modes can confuse the user
- GUI maybe not be easier for many users

6. Future plan

- Add keyboard access
- Improved and sorted GUI
- More efficient background process for computer turn

For code check out https://github.com/nishcheyk/tick-tak-toe-VB.NET-pc

7. References

- https://csveda.com/mini-projects/tic-tac-toe-mini-vb-net-project/
- Eagles Artificial Intelligence by Amit Sood
- https://www.studocu.com/in/document/delhi-public-school-ghaziabad-society/variations-in-psychological-traits/tic-tac-toe-python-synopsis/17390589