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PROJECT 2 REPORT
TICTACTOE GAME

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Introduction to Programing

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1 General Information

Project 2 - Expert Version

Hightlights:

- has colorful User Interface
- Users cannot type out of range
- The difficulty in single player mode is from normal to hard

Requirements:

- Windows OS
- GNU Compiler Collection (for compiling from source code)

2 Features

2.1 Board Design

- This is the combination of struct and 2D array
- Players can choose how many rows and columns in their game.
- Max rows that game support: 18
- Max columns that game support: 18
- Best experience: from 3 to 10 rows and columns
- Players can select their color.
- The name of players will show on the board.
- The color of BOT always different from the player in single player mode.

2.2 Game Mode

This game has 2 mode:

- **Singleplayer:** players must login or register to access this mode. They will fight with my BOT in this game.
- **Multiplayer:** two players will fight with each other in this game.

2.3 Gameplay

This game is very simple. Players must use their symbols (their names or X and O by default) to fill the board. Who can make a continuous series with a number of that player symbols (the number must be set before playing, default is 3) in a diagonal, horizontal or vertical row before the other is the winner.

Use W,A,S,D or ARROW KEY for navigation
Use ENTER or SPACE to select, edit and confirm

Common settings in two game mode:

- **Rows:** set the number of the rows of the board (from 3 to 12)
- **Columns:** set the number of the columns of the board (from 3 to 18)
- **Win with:** set the length of the continuous series of marks for winner.(from 3 to the minimum of row and colum)
- **Time restriction:** set the timmer for this game. After a number of turns, this game will end. By default, it was set 0, which mean this feature is off.(players can set from 0 to product of row and column)
- **Background sound:** default value is off. Change to on if you want to play background music in the game.

In singleplayer mode: In addition to the above settings, players can customize their symbols color, and the BOT color will depend on it.

In Multiplayer mode: both player can customize their symbols, their colors.

In-game for both mode: player can get a "Move Suggestion" or Undo a move to make game more fun.

2.4 Display interface

- This game allows players to customize their color.
- It use a cursor, which is controled by the keyboard, to navigate around.
- When a player use "Move Suggestion", the border of Suggestion Point will change from white to the player color

Below is some images of Interface



Figure 1: Settings

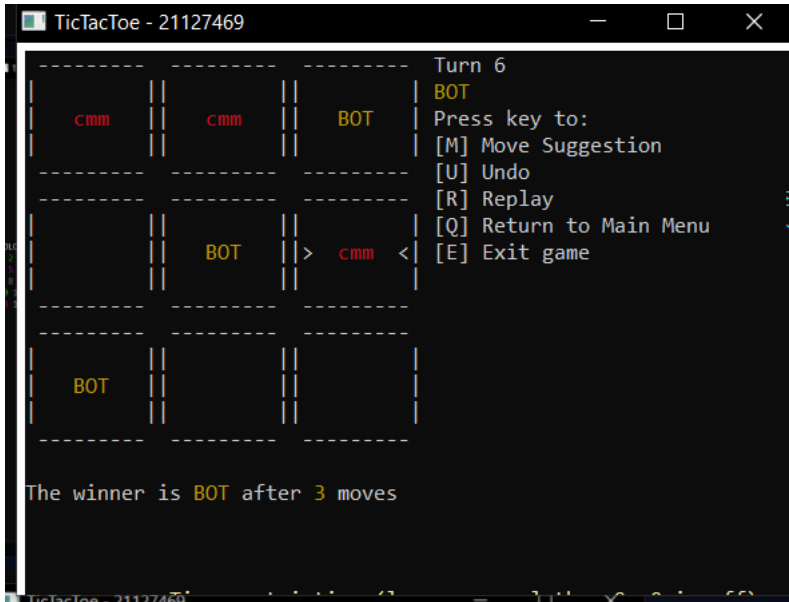


Figure 2: In game

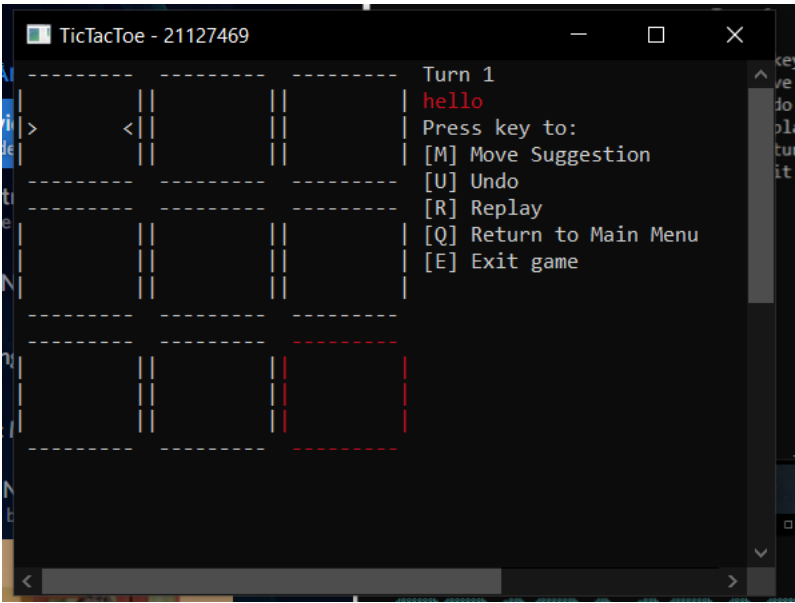


Figure 3: Move Suggestion

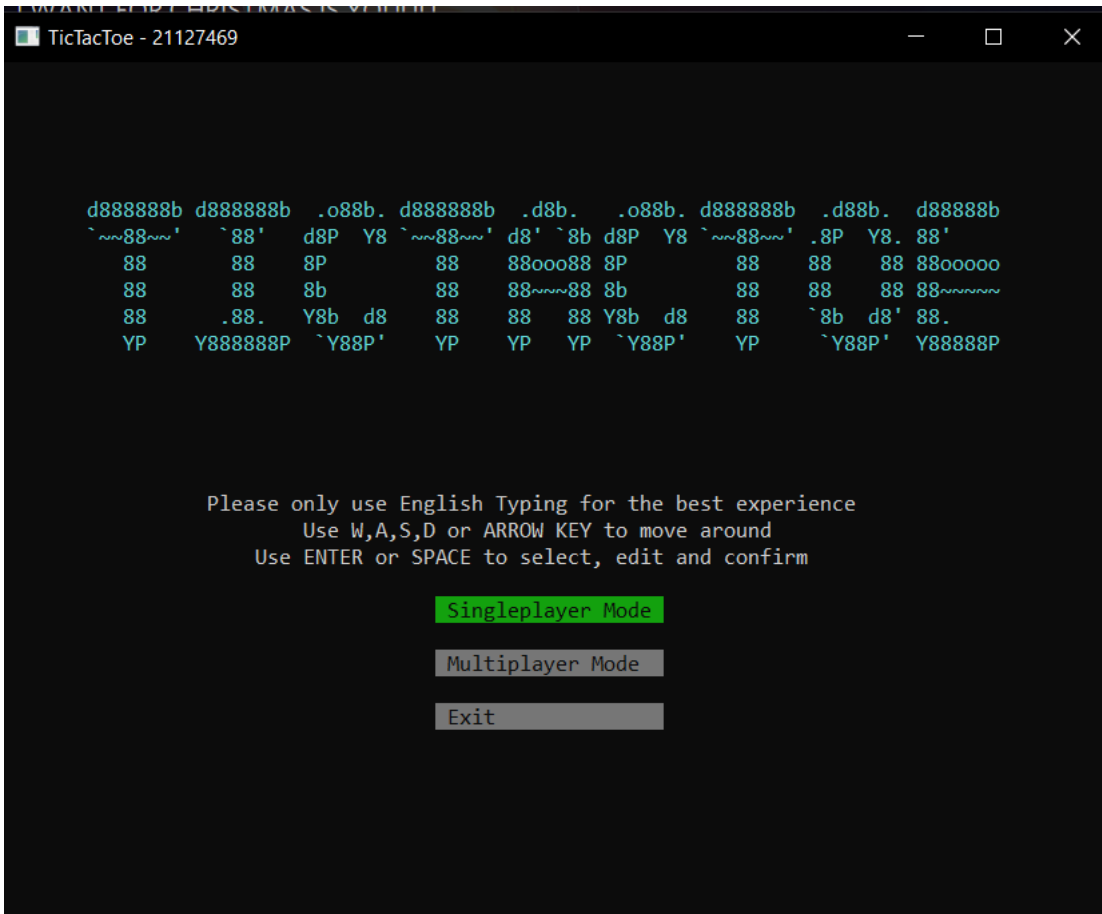


Figure 4: Main Menu

3 Source Code Structure

My code has 5 main structs:

- **Coordinate:** for show where the Coordinate of point in board
- **CoordinateStack:** a stack data structure for Coordinate, used for Undo feature.
- **Player:** preresent information of an player acocunt.
- **Point:** a point
- **Map:** a game matrix

Print game grid functions:

- `drawHorizontalLine()`: draw horizontal line of a point.
- `drawBlankVerticalLine()`: draw blank vertical line of a point
- `drawPoint()`: draw whole point
- `drawMap()`; draw whole map

Print game button and message:

- `printGameModeSelection()`
- `printSinglePlayerMenu()`: print account login menu
- `printMultiSetting()`: print Multiplayer Settings
- `printSingleSetting()`: print Singleplayer Settings
- `printNotice()`

Features function:

- `getAndUpdateVertical()`, `getAndUpdateVertical()`, `getAndUpdateMainDiagonal()`, `getAndUpdateMainDiagonal()` and `UpdateState()` is 5 key function for BOT and Move Suggestion features.
- `navigateToPoint()`, `MoveTo()` helps players use keyboard to control cursor.
- `inputCharArray()`, `inputPositiveInteger()` prevent missing and overflowing user data typing.
- `changeWindows()`, `showCursor()`, `setColor()` helps app use WindowsAPI for control User Interface
- `loadAccounts()`, `loadAccounts()`, `removeAccount()`, `removeAccount()`, `loginAccount()` is the account management system of this game.

4 Technical Infomation

- GNU Compiler Collection 10.3.0
- Windows OS for running
- Use `Windows.h` for UI and music
- Use *Name.txt* for ASCII ART name
- Use *Background.wav* for music
- **Compiler Command:** `-g tictactoe.cpp -o tictactoe.exe -lwinmm`

5 Reference

Background sound <https://www.youtube.com/watch?v=N3fLSxHrtJI>