VIETNAM NATIONAL UNIVERSITY HO CHI MINH CITY

UNIVERSITY OF SCIENCE

★★★

INTRODUCTION TO PROGRAMMING PROJECT REPORT

TIC TAC TOE GAME

Student Name: Ngô Ngọc Liên

Student ID: 21127341

Class: 21CLC10

Instructors: Mr. Vũ Quốc Hoàng

Ms. Trần Thị Thảo Nhi

Mr. Bùi Huy Thông

Ms. Phan Thị Phương Uyên

Hồ Chí Minh City – 2021

PREFACE

This is my report on the Tic Tac Toe game programming project for the subject Introduction to Programming. There is a limit on the number of papers so this report is written as briefly as possible. Hopefully, this report will describe clearly the game formation and operation.

About the project score, I want you to grade it in terms of the Project 2 expert part. Over the last 3 weeks, I have been thinking day and night, reading books, searching on the Internet, learning from my friends, etc. I am proud that I tried my best and completed on my own such a huge project for the first time in my life.

While coding this program, I tried to achieve every single element in the checklist. Some of the features in my program may not be perfectly the same as you required. I hope you will go for it and count them in my total score.

Many thanks to all of my teachers in the subject Introduction to Programming. Thanks also to all of the friends, websites, and youtube videos that supported me in this project.

TABLE OF CONTENTS

I. PROJECT FEATURES

1. Board design

I used 2D-array and struct to draw any board of any size. There is a struct named B with 2 variables: size as an integer value and board as a character 2D-array. 2D-array board holds the value of every square defined with the indexes of rows and columns.

2. Icon design

The board cannot change its color but the makers inside any square are colored like the players' names so that they can recognize their markers. That is a special point in my game that both players can choose the same markers that appeared in different colors. Besides, players can set their own icons but they must be one character only.

3. Game mode

- There are only 2 modes in my program: Single player game (to wit playing with computer) and Two players game.
- Players can set your board in any size (even 1x1 and 2x2) as long as the size does not exceed 26. (because column indexes use English alphabet, consisting of only 26 letters)
- The statistical outcome is deleted when players do not want to replay the game with the setting (mode and size) they have chosen.

4. Game input and control

- Program only gets input from keyboard.
- To make a choice of an option, use number only.
- To confirm your choice, press ENTER.

5. Game interface

5.1. Color

- Game title and result annoucement are yellow.
- Any error message is printed in red. (with sound effect)
- Hint is printed in pink.
- Player 1's name and marker are both displayed in blue.
- Player 2's name and marker are both displayed in green.

5.2. Animation

- Screen is all cleared when printing new menu, new board after each move, etc.
- When quitting the game, there is always a goodbye message with sparkling animation.

6. Sound effect

Let me introduce a super magical feature that I recently added. Unlike many other classmates, I didn't use any .wav or .mp3 files to play music. To encounter this wonderful feature, please be patient when you quit the game (only after you have logged in). I love this part the most and am certain that this is a unique way to play sound that only my game possessed (compared to other classmates' games).

7. Account setting

- Signing up for a new account: username and password can contain any special characters, can be 1-25 characters long, and must not contain any spaces. If a username already exists, user has to choose another one.
- To play game, user needs to log in. An error message will occur if username and password do not match.
- Forget your username or password? Create a new account!

II. SOURCE CODE ORAGANIZATION

1. Functions organization

My program consists of 33 functions (not included main function), grouped into 4 sections as follows.

1.1. Functions supporting interface:

- Changing text and background color function (needs windows.h library)
- Gotoxy function (needs windows.h library too): used for cursor
- 11 functions for illustrating game design

1.2. Functions supporting sound effect

- print_error: used to print an error message with an alert sound
- sound_Noel: used together with print_Noel to display a twinkling message with "We wish you a Merry Christmas" song, which was arranged by myself. How did

I find the way to do this? Wondering if there was a way to make a specific sound of a musical note, I searched Google and found the amazing Beep function from windows.h library. It needs 2 parameters which are frequency of sound and time duration to play that sound.

1.3. Function supporting account (working on file)

This function includes 4 main parts: printing account options using print_account_options function, signing up, logging in, and quitting the game.

1.4. Functions for game operation

- Functions supporting game's body: including 6 functions, used to check if a player's move is valid, check if either player wins, allow players to move around the board (using gotoxy function), convert console coordinates into board indexes, suggest a move for players.
- Functions for game's body: including 2 functions representing for 2 modes: single player mode and two players mode. Both of them work on supporting the game's body functions to run the game.
- Functions for game's ending: including 2 functions
  - Statistical_outcome function: print the number of matches players have played and the number of times a player wins in the mode that they have chosen before.
  - Replay_game function: ask players whether to replay the game with the same mode and board size they have chosen or to end the game. If they choose the latter, the outcome is reset and they get back to main menu.
- Function for entire game operation: including only one function called start_game, which is the headquarter of the game. It takes the value from print_main_menu function to operate the game.

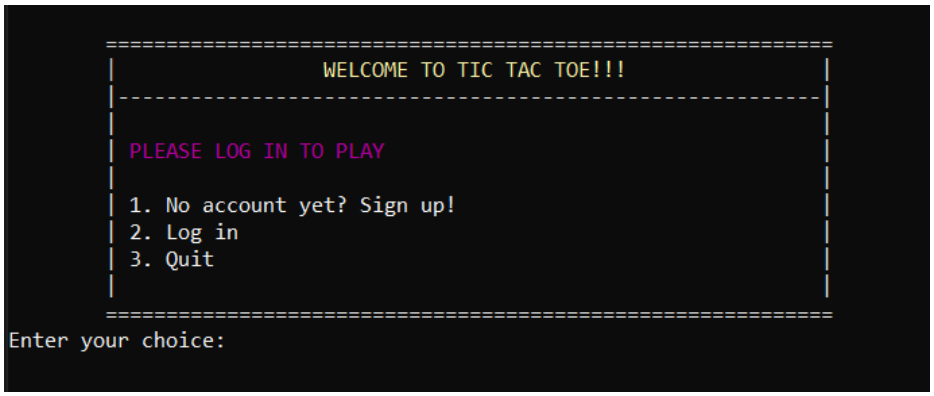
2. Run the program

My program can operate well on Microsoft Windows operating system and perhaps on any compilers. Due to the existence of windows.h library, I don't know if my program can run on macOS operating system. I didn't use any weird library that is needed to run the game.

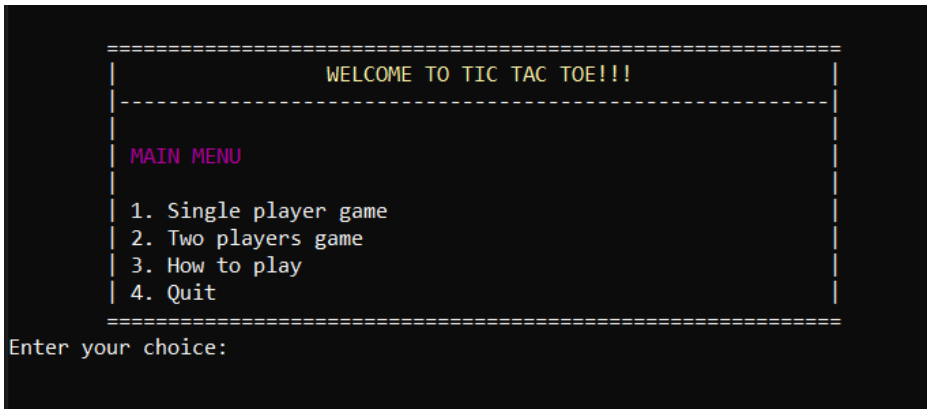
III. GAME DEMONSTRATION

Watch my game demo video here: https://youtu.be/d8zQ3LQ6nM8

- Account setting:

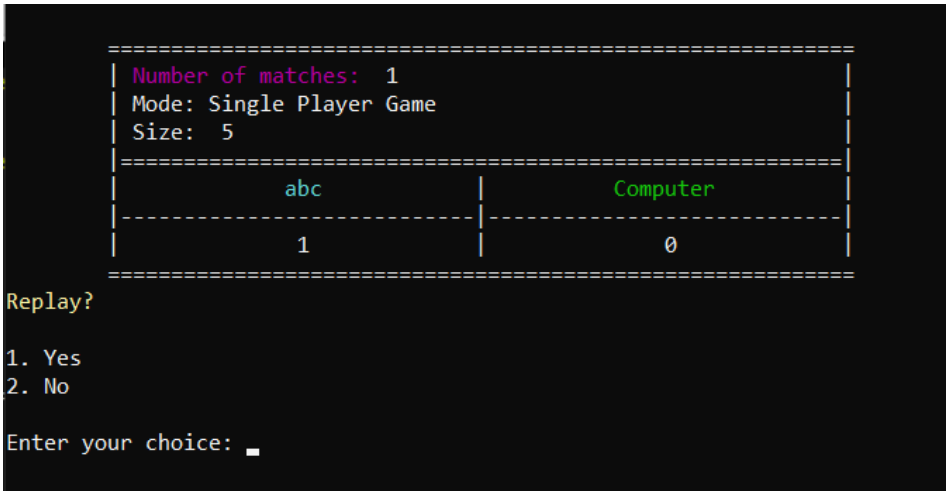


- Main menu:



- Game board:

❖ Statistical outcome:



❖ Ending screen:

V. REFERENCES

1. *Phạm Nguyễn Quang Nhân* – a friend of mine: He helped me with TextColor function and gotoxy function.
2. *Trần Bảo Ngọc* – a friend of mine: She was the first one to play and test my program.
3. *Lê Hoàng Nam* – a friend of my sister: He did nothing but tried to give me helpful advice in the beginning. He motivated me to do this project so his name is listed here.
4. *Stack Overflow* – I learned plenty of things from this Website.
5. Tony Gaddis - Starting out with C++ _ from control structures through objects-Pearson (2015) – I learned a lot from this book.
6. *xoaxdotnet – C++ Misc: Simple Sounds* – a Youtube video that I accidentally ran across when trying to find a way to play music. https://www.youtube.com/watch?v=zVV9CmzL-Go&list=LL&index=1
7. ProgrammingKnowledge – C++ Tutorial for Beginners 17 - How to Create Tic-Tac-Toe in C++ | Tic-Tac-Toe game in C++ – a video that my very first game version was based on. https://www.youtube.com/watch?v=KrH1qNVYKO0&list=LL&index=45&t=1393s