KHOA CÔNG NGHỆ THÔNG TIN
TRƯỜNG ĐẠI HỌC KHOA HỌC TỰ NHIÊN

Introduction to programming

TIC TAC TOE

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1 Overall

Welcome to the Tic Tac Toe game, proudly brought to you by Mr. Vo Chanh Tin, a freshman at the University of Science, VNU-HCM.

This project includes the following:

The program is written in the *C++* programming language. It includes the ***expert level*** of the Project Regulation, which means there are a lot of settings for you to explore.

The report is to guide user through the installation of the game, project structure, illustration, etc., and is written in LaTeX markup language.

Special thanks to all the teachers who support me to continue working on this project.

Vo Chanh Tin
Long Xuyen City, 12/2021

2 Software Features

2.1 Board Design

+ The board, which is defined by ***struct***, contains:

— *2-Dimensional char array:* To hold which player is choosing the (x, y) cell.

— *The board settings:* To save on/off status of PvE mode, cheat mode, move suggestion, etc.

+ The board size is also flexibly adjusted, the user can enter how many rows and columns they want to play.

+ The cell can automatically adapt its size to fit the player name length.

2.2 Game play

+ Game rules: The game is designed for two players who will take turns marking the cells on the board. The player who succeeds in placing three of their marks in a horizontal, vertical, or diagonal row is the winner. There will be a forced tie if the board is full.

+ *PvP (Person versus Person)* and *PvE (Person vs Environment)* game modes.

+ There are also many features: Cursor desgin, save game, time restriction mode, etc.

2.3 Interface

+ The user can change color of the board background and the color of the player name.

+ The board plays an animation every time the user interacts with the board.

2.4 Other features

+ Account administration: Users can create, login, and delete accounts, etc.

+ Background music: The project includes an audio file for this feature, the user can configure this in the game settings.

+ Minimax algorithm with Alpha-beta pruning: A recursive algorithm for choosing the next move in an n-player game, is implemented in this project, that means if users play in PvE mode, computer will never lose.

3 Source code

3.1 Structure

+ ***setPlayerNameColor():*** Set player name color.
+ ***changeBoardBackgroundColor():*** Change the board background color.
+ ***turnOnBackgroundMusic():*** Turn on background music.
+ ***printBoard():*** Print the board.
+ ***checkWinning():*** Check if any player wins the game.
+ ***Minimax_PLR1():*** Determine the best move for 1st player.
+ ***Minimax_PLR2():*** Determine the best move for 2nd player.
+ ***getPlayerPosition():*** Get position of the cursor.
+ ***saveGame():*** Save game to file.
+ ***printStaticticalOutcome():*** Print statistical outcomes.
+ ***loadSavedGame():*** Load saved game from file.
+ ***deleteSavedGame():*** Delete saved game from file.
+ ***accountManagement():*** Account management.

3.2 Installation

+ The game is specifically designed for the ***Windows*** operating system, it **HAS NOT BEEN TESTED** on any other operating system.
+ To turn on background music, the user has to link ***'winmm.lib'*** to the project. Otherwise, the project can't be compiled.
+ The compiler which is needed to compile this project is **TDM-GCC 4.9.2**.
+ There is an audio file for the background music feature, the user must not rename the file and must place the file in the folder containing the project.

4 Illustration

Link video demo: `https://youtu.be/m7pABtphu_s`

Figure 4.1: Gameplay

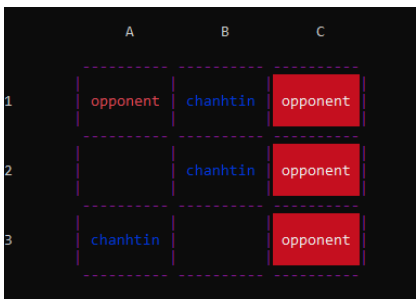

Figure 4.2: Winning check

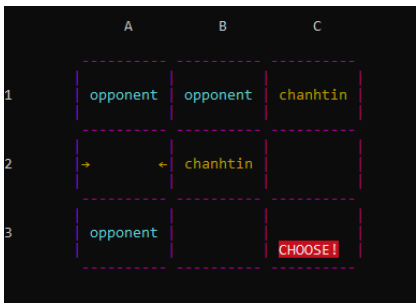

Figure 4.3: Move suggestion

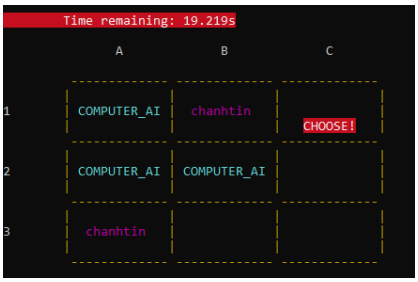

Figure 4.4: Time restriction

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