PROJECT REPORT

Project: CARO Game
Subject: Object-Oriented Programming CSC10003
Ho Chi Minh University of Science

Prepared by:

- Dang Hoan My - 19127216
- Truong Minh Nhut - 19127237
- Huynh Trong Phuc - 19127510

Instructor:
Dr. Truong Toan Thinh, Ph.D

INTRODUCTION

Briefly Game Description

Caro game is known in several different names from other countries, such as Five in a Row in English and Gomoku in Japan. This is an abstract strategy board game, it can be played using in any size of the board, in our product, it's fixed in 15x15.

Two players alternate turns placing X or O inside the box by using W — A — S — D to move and Enter to tick the box on an empty intersection. The winner is the first player to form an unbroken chain of 5 boxes horizontally, vertically or diagonally.

In our program, the mode which is available, is only the Player vs. Player.

Team & Work Assignments

Group 3A forms from 3 members who have separately responsibility for some tasks as mentioned below:
1 - Dang Hoan My - 19127216 * Interface + Save process + Writing report + Presentation materials
2 - Truong Minh Nhut - 19127237 * Interface + Load process + Main menu
3 - Huynh Trong Phuc - 19127510 * Interface + Animation, music in the whole program

Link to Code

https://studenthcmusedu-my.sharepoint.com/:f:/g/personal/19127216_student_hcmus_edu_vn/EhMGw--ELJZLim2NUXJL4IgBfUfYtvdy5V94zk671SGDTQ?e=ggwAqB

PROGRAM DESCRIPTION

Each part in this section will be listed from the most to the least importantly with brief explanation of functions or elements which are involved.
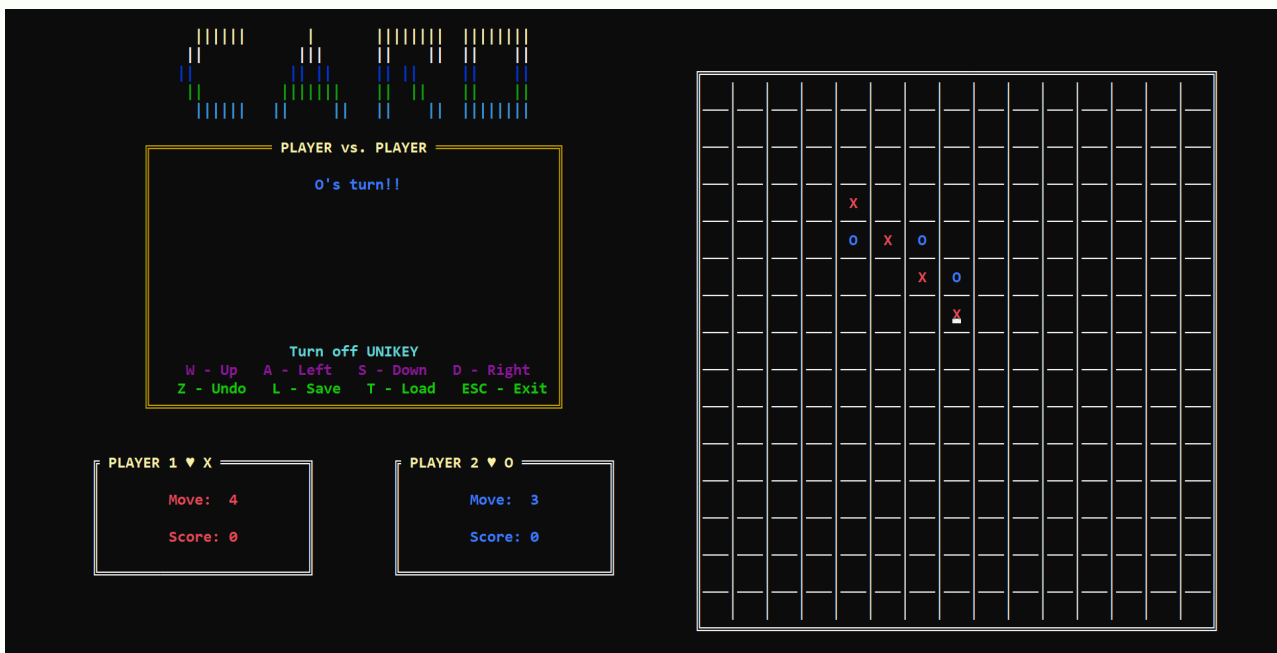
Recognize win - lose - draw in the Game

Based on the location of index inside the board, each circumstance is checked carefully.

if (i < _size - 4 && j < _size - 4) {
     Check the row ([i][j] -> [i + 4][j];
     Check the column ([i][j] -> [i][j + 4];
     Check the diagonal ([i][j] -> [i + 4][j + 4];
}
if (i >= _size - 4 && j < _size - 4) {
     Check the column ([i][j] -> [i][j + 4];
}
if (i < _size - 4 && j >= _size - 4) {
     Check the row ([i][j] -> [i + 4][j];
}
if (i > 3 && j < _size - 4) {
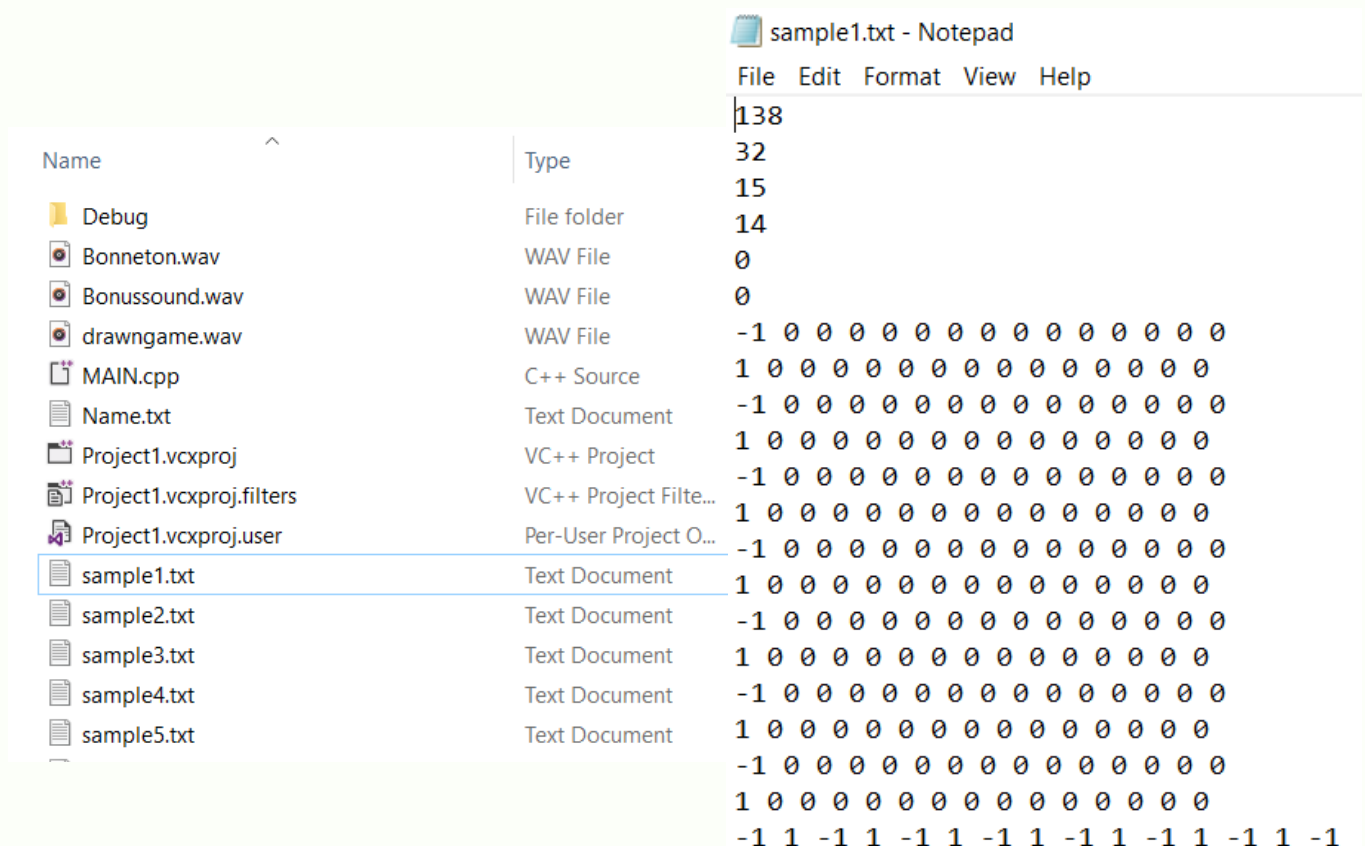   Check the diagonal ([i][j] -> [i - 4][j + 4];
}

Save Process

The **SAVE** commands are executed from _Board and _Game class and shown in the interface of playing game. That means Players are in the game, can press L to save the unfinished game.

First, input the name of the file that Players want to save. If the number of files that is saved before that more than 5, Players are asked to delete one of these files, then input the numerical order of the file which is appeared with the name. The **NAME** of the **FILE** will be saved in a file call **_Name.txt_**. But the **NAME** appears the **FOLDER** of project is given a fixed name in the global vector <string> according to the order of the file that you saved. (Picture.1)

The **SAVE** process will run and the **LAST POSITION** of Players (x, y), the **MOVE**s in the game, **WINNING SCORE**s if Players have will be recorded in the file with the array that saves the whole **BOARD**.

A **SAVE** file is stored like this (Picture.2), with -1 is the X player, 1 is the O player and 0 presents for unchecked box.

Name	Type
📁 Debug	File folder
🔘 Bonneton.wav	WAV File
🔘 Bonussound.wav	WAV File
🔘 drawngame.wav	WAV File
MAIN.cpp	C++ Source
Name.txt	Text Document
Project1.vcxproj	VC++ Project
Project1.vcxproj.filters	VC++ Project Filte...
Project1.vcxproj.user	Per-User Project O...
sample1.txt	Text Document
sample2.txt	Text Document
sample3.txt	Text Document
sample4.txt	Text Document
sample5.txt	Text Document

sample1.txt - Notepad

File Edit Format View Help

```
138
32
15
14
0
0
-1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
-1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
-1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
-1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
-1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
-1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
-1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0
-1 1 -1 1 -1 1 -1 1 -1 1 -1 1 -1 1 -1
```

Picture.1   Picture.2

Load Process

There are 2 ways to LOAD a saved file game that mentioned above, using the same method although these are set up in 2 classes.

1. From main menu, select the **LOAD GAME**, then choose the file name that you desire to open by using W - S for up and down. The file will be loaded and Players are able to continue that game. (Picture.3)

2. While you are in the **Playing Screen**, you can select **T,** then input the numerical order of the file that is appeared beside the **NAME** of file, if you input the number that is unavailable or invalid, it will ask Players to input again. (Picture.4)

Totally, loading file to play game needs to load name of file from **Name.txt** as mentioned in **SAVE** process to a <u>vector <string></u> then compare the index to the **global** <u>vector <string></u> that is given the fixed name to load the exact file that Players need to open.
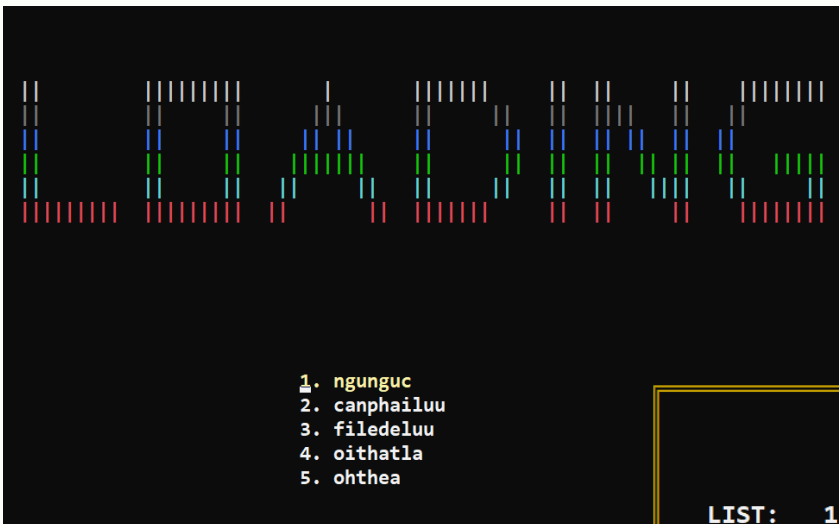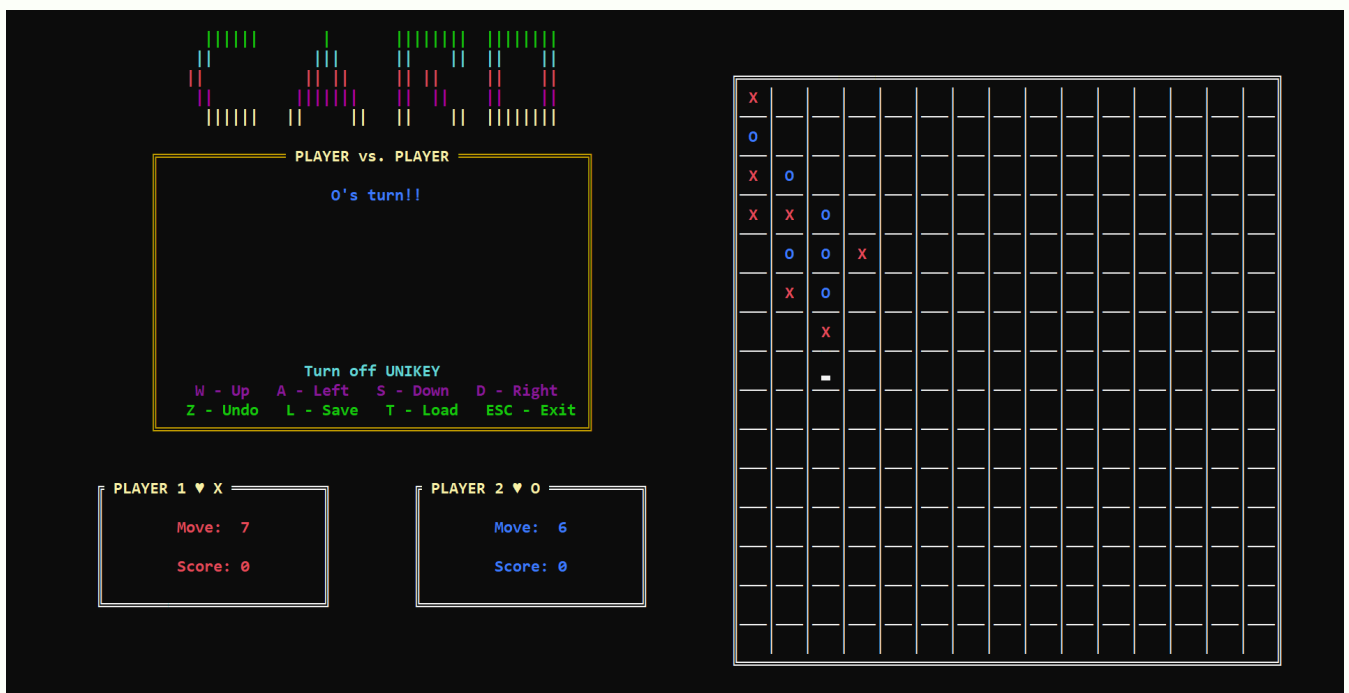

Picture.3
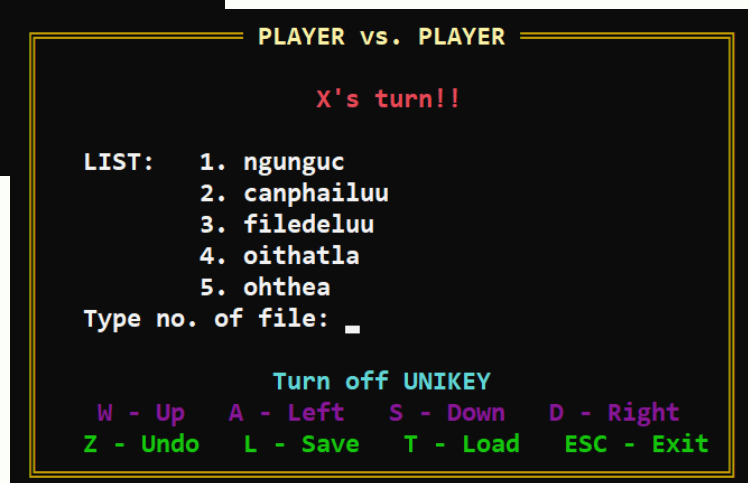
Picture.4

Creating Playing Interface

By using the **CP437**, there are some special character which is nice to be shown up and appeared on the play screen. Every time that Players tick the box while they are in the game, the CARO character will change the color.

There is a **MAIN BOARD** on the right, which is 15*15 in the size, using the provided classes and other functions to customize. Including the **Resize Console** function, **Remove Scroll Bar**, **Clear Screen**, **Change Font** and **Set Color**, it made a huge different and completely new interface.

Two Sub Board in the lower left are for counting **MOVE**s of 2 Players and the **WINNING SCORE**s, this is counted 1 for the winner every time that the game ends.

And another **Sub Board** in the upper left is called the **COMMAND BOARD**, all the Instructions will be shown up on this area, and the W - A - S - D also other shortcut keys, such as T, L and Z for Undo. (Picture.5)

Picture.5

Providing Main Menu

With the complex character to create the CARO character and rotate from the left to right, it gives a nice effect, combining with a funny song, it will be attractive.

Under **CARO** character is list in the **MENU**, include NEW GAME, LOAD GAME, INSTRUCTION and ABOUT.

- **NEW GAME** is to start a new game and then show the main BOARD to play.
- **LOAD GAME** is loading from the files that are saved before, mentioned in the **LOAD PROCESS**.
- **INSTRUCTION** shows briefly how to play this **CARO** game.
- **ABOUT** has the information of our Team with details, ID and our class also.

Especially, **ESC** key is used to **BACK TO MENU** or **EXIT**, based on each section and real circumstances. (Picture.6)

Picture.6

Animation of win - lose - draw

The Congratulations! music combines with the character from the CP437, it shows a vivid animation for Winner (Picture.7), Loser (Picture.8) also the Drawn Game (Picture.9).
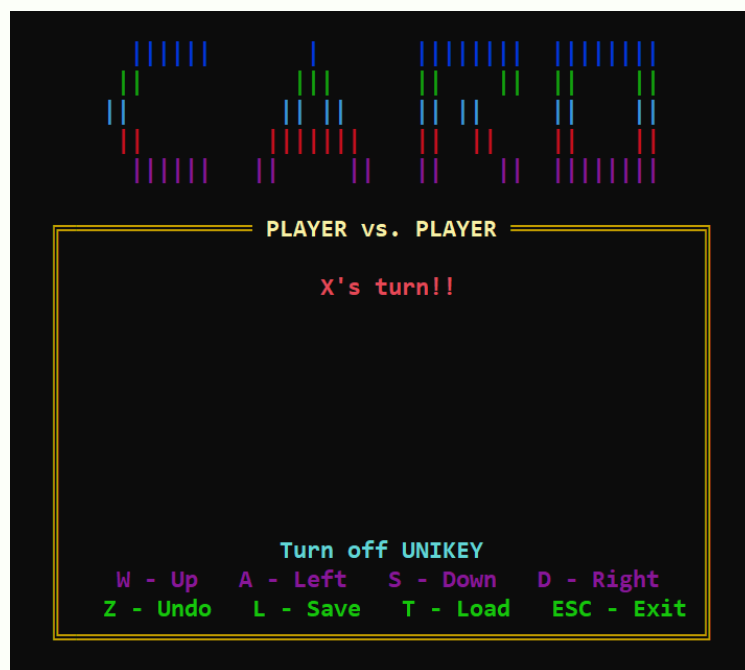

Picture.7

Picture.8

Picture.9

Other functions

Undo Process

Players can undo at the game by pressing the Z on the keyboard but Players only do this at one box. The key on this function is recheck the _pArr (_Point**) to 0 and print a Blank on the box that Players uncheck. (Picture.10)

Picture.10

Continue Game function

Every time Players press ESC when they are at the unfinished game to EXIT, the BOARD screen will be saved to the ContinueFile.txt and then LOAD to the screen if Players choose CONTINUE GAME at the menu. (Picture.6)

REFERENCES

- stackoverflow.com and cplusplus.com to support in _Common class to build Clear Screen, Resize Screen, Set Color, Change Font..., also fix the bugs during the process of creating this game.