**C++ 2019A - MTA - Exercises**

**Requirements and Guidelines**

The exercises in the course would require you to implement a game combining in some way two known games: [Pong](https://en.wikipedia.org/wiki/Pong) and [Tetris](https://en.wikipedia.org/wiki/Tetris).

Note: the exercise should be implemented in Visual Studio 2015 or later, with standard C++ libraries and run on Windows with Console screen of standard size (80\*25), using gotoxy for printing at specific location on screen (X, Y).

Submission is in MAMA, as single zip file containing only the code and the vcproj and sln files + readme.txt with IDs -- but without the DEBUG folder and without any compiled artifact.

**Exercise 1**

In this exercise you will implement a pong game for two players.

Pong game requires the player to move a “Board” using the keyboard, in order to hit a ball and “return” it to the other player, as in a tennis game. Note: Board means the line that is controlled by the player to hit the ball.

In our Pong game, once a player misses the ball a “copy” of his board will “drop” as in tetris game to the “lowest” position on his side of the screen (for the player on the right => board will go to the right, for the player on the left => board will go to the left) - and the new position of the board will go “up” by one, making him one step closer to losing.

In case “dropped boards” complete a full line, the entire line would disappear and the board would gain back five lines (go back five lines) - note: if there are old boards in these lines they will be deleted.

The player whose board reaches the position of “¼ of screen” as defined below - loses.

Keys:

|  |  |  |
| --- | --- | --- |
|  | Left Player | Right Player |
| UP | q or Q | p or P |
| DOWN | a or A | l (small L) or L |

**Menu**

The game shall have the following entry menu:

(1) Start a new game

(2) Continue a paused game

(8) Present instructions and keys

(9) EXIT

⇒ NOTE: option (2) would be presented only if the last game played is paused! ⇐

**Pausing a game**

Pressing the ESC key during a game pauses the game, clears the screen\* and presents the main menu with option (2) being presented!

\* for clearing the screen you are allowed to use: system("cls");

**Positions, Size etc.:**

**Board size and position** - when game starts the boards should be positioned as following:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | X | Top - Y | Bottom - Y | LOSE |
| Left Player | 4 | 10 | 12 | X == 20 |
| Right Player | 76 | 11 | 13 | X == 60 |

**Board char: #**

**Game Board Limits: MIN\_X = 1, MAX\_X = 79, MIN\_Y = 4, MAX\_Y = 24**

You can use the Y lines 0-3 for your own game design needs (e.g. presenting info).

**Ball shape, movement and initial position:**

Ball shall be modeled as the following shape using capital O (the letter ‘o’):

OO

OOOO

OO

Ball goes on screen in diagonal movement.

When the ball hits the Top or Bottom “Walls” of the screen it changes its Y direction.

When the ball hits the Board, it “animates” the hit by going one step “into” the board, e.g. when it hits the right board from below:

[1] [2] [3] [4] [5]

OO

OO OOOO

# # OO #OO #OOOO # OO

# OO #OOOO #OOO #OO #

# OOOO # OO #O # #

OO

and like this when it hits the right board from above:

[1] [2] [3] [4] [5]

OO

# OOOO # OO #O # #

# OO #OOOO #OOO #OO #

# # OO #OO #OOOO # OO

OO OOOO

OO

In a similar way, when it hits on the left.

When the ball hits the corner of the board it will jump back in diagonal, for example:

[1] [2] [3] [4] [5]

OO

OOOO OO OO

OO OOOO O OO OOOO

# # OO #OOO #OOOO # OO

# # #OO # OO #

# # # # #

**Adding Priorities:**

1. 2 players Pong game without Tetris and with Ball of size 1 - allows 80/100  
   (if written properly!!!)
2. 2 players Pong game with Tetris and with Ball of size 1 - allows 90/100  
   (if written properly!!!)
3. 2 players Pong game with Tetris and with Big Nice Ball - allows 100/100  
   (if written properly!!!)
4. 2 players Pong game with Tetris, Big Nice Ball + Ball Animation - allows 105/100  
   (if written properly!!!)
5. Extraordinary game - allows 110/100

(if written properly!!!)