PIC 10B Section 1 - Homework # 1 (due Friday, April 5, at 6 pm)

You should upload each .cpp and .h file separately and submit them to CCLE before the due date/time! Your work will otherwise not be considered for grading. Do not submit a zipped up folder or any other type of file besides .h and .cpp.

Be sure you upload files with the precise name that you used in your editor environment otherwise there may be linker and other errors when your homeworks are compiled on a different machine. Also be sure your code compiles and runs on Visual Studio 2017.

TIC TAC TOE

This homework will entail building a Tic-Tac-Toe game.

The main purpose of this homework is to review prerequisite material. You are allowed to use any logical approaches you wish, *provided your code conforms to the detailed description given in this document.* Consider this a chance to review loops and conditional statements, class objects, member functions, etc.

Please refer to the syllabus for how the work will be graded: note that more than half of the marks come from good coding practices and code documentation. The program should execute in the following manner. You must make sure the output matches the format below.

The *'s just indicate nested processes: they are not actually part of the output.

This is a Tic Tac Toe game!
How many rounds would you like to play? [*USER ENTERS A NUMBER*]
Please enter the name of player 1: [USER ENTERS A NAME]
Thanks. Please enter the name of player 2: [USER ENTERS A NAME]
Let the game begin!
*This will be repeated while the number of rounds played has not exceeded the number of rounds chosen
**This will be repeated each round until one of the players has 3 in a row, 3 down, 3 in a diagonal, or the board is full.
Board is displayed in a table format with pipes (|) and dashes (-), with 1 2 3 indicating row and column, and with player 1 represented by x's and player 2 by o's. See display
It is [*THE CORRECT PLAYER'S TURN*].
Where would you like to play? Enter your row position and column position: row col:
[USER ENTERS ROW NUMBER SPACE A COLUMN NUMBER]
After the selection, the user's token should be placed at the square and the board should be displayed again
**

The board should be displayed after the round is over and a message (however you wish to convey the message) should say who won the round or state there was a draw if all 9 squares were filled but no one won; it should then give a summary of the current number of points each player has. The winning player should have their score increased by 1 and if there is a draw then neither player is awarded a point.
*

* When all the rounds have been played, there should be a final recap of the number of points and who the winner was (or state there was a draw if there was a tie in the scores)*

Further requirements:

- Your code **should allow player's with more than a single word name**. For example, "Alice Foo" and "Bob Bar" should be possible players. So when asked for the name of player 1, for example, "Alice Foo" should be allowed.
- You **must write a Player** class to store each players' information (name and score) and to update their information (increase their score if appropriate) and to retrieve their information (name and score).
- The players must be called by name during the game.
- The turns alternate starting with player 1 in the first move of round 1. Whoever plays last in a round *will play second* in the next round (assuming there is one).
- The rows must be numbered 1 to 3, and also the columns. The user will always enter the position of choice by entering two numbers with spaces between them.
- You can assume the user always enters a valid pair of numbers (within the 1-3 range) and will always select an open position (but it would be a good exercise to write code to test against this).

Some initial guidance to get you on your way...

1. Write the **Player** class first. Make sure you can create instances of the class, call its member functions, and that those member functions work correctly.

2. Using a **std::vector<std::string>** variable, create a representation of an empty game board with only the numbers 1-3, pipes, and dashes, but no x's or o's. Each row will be one of the **std::string**s stored in the vector. You may find the PIC 10A notes on Data Types and Classes useful here to review strings.

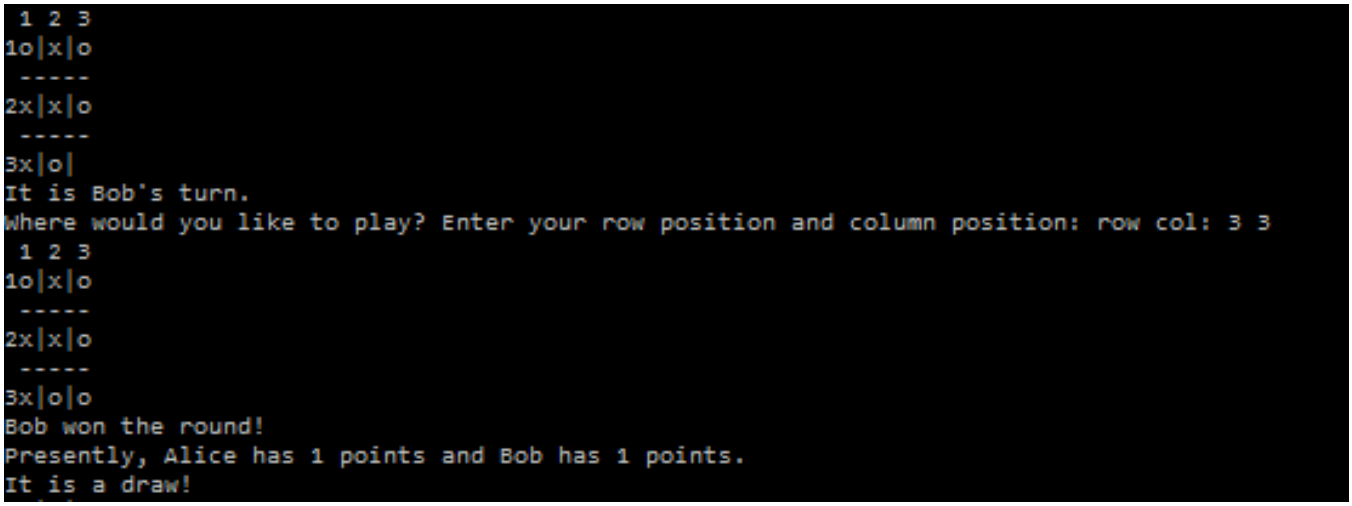
3. Write a loop that will print the empty board.

4. Write code that will prompt a user for a desired coordinate and update the variable to have an 'x' at that position. Check it works by printing the board.

5. Be careful with streams and residual characters in the buffer...

```
This is a Tic Tac Toe game!
How many rounds would you like to play? 2
Please enter the name of player 1: Alice
Thanks. Please enter the name of player 2: Bob
Let the game begin!
 1 2 3
1 | |
 -----
2 | |
 -----
3 | |
It is Alice's turn.
Where would you like to play? Enter your row position and column position: row col: 1 1
 1 2 3
1x| |
 -----
2 | |
 -----
3 | |
It is Bob's turn.
Where would you like to play? Enter your row position and column position: row col: 1 2
 1 2 3
1x|o|
 -----
2 | |
 -----
3 | |
It is Alice's turn.
Where would you like to play? Enter your row position and column position: row col: 2 2
 1 2 3
1x|o|
 -----
2 |x|
 -----
3 | |
It is Bob's turn.
Where would you like to play? Enter your row position and column position: row col: 3 1
 1 2 3
1x|o|
 -----
2 |x|
 -----
3o| |
It is Alice's turn.
Where would you like to play? Enter your row position and column position: row col: 3 3
 1 2 3
1x|o|
 -----
2 |x|
 -----
3o| |x
Alice won the round!
Presently, Alice has 1 points and Bob has 0 points.
```

```
 1 2 3
1 | |
 -----
2 | |
 -----
3 | |
It is Bob's turn.
Where would you like to play? Enter your row position and column position: row col: 1 1
 1 2 3
1o| |
 -----
2 | |
 -----
3 | |
It is Alice's turn.
Where would you like to play? Enter your row position and column position: row col: 1 2
 1 2 3
1o|x|
 -----
2 | |
 -----
3 | |
It is Bob's turn.
Where would you like to play? Enter your row position and column position: row col: 1 3
 1 2 3
1o|x|o
 -----
2 | |
 -----
3 | |
It is Alice's turn.
Where would you like to play? Enter your row position and column position: row col: 2 2
 1 2 3
1o|x|o
 -----
2 |x|
 -----
3 | |
It is Bob's turn.
Where would you like to play? Enter your row position and column position: row col: 3 2
 1 2 3
1o|x|o
 -----
2 |x|
 -----
3 |o|
It is Alice's turn.
Where would you like to play? Enter your row position and column position: row col: 2 1
 1 2 3
1o|x|o
 -----
2x|x|
 -----
3 |o|
It is Bob's turn.
Where would you like to play? Enter your row position and column position: row col: 2 3
 1 2 3
1o|x|o
 -----
2x|x|o
 -----
3 |o|
It is Alice's turn.
Where would you like to play? Enter your row position and column position: row col: 3 1
```


1 2 3
1o|x|o
2x|x|o
3x|o|
It is Bob's turn.
Where would you like to play? Enter your row position and column position: row col: 3 3
1 2 3
1o|x|o
2x|x|o
3x|o|o
Bob won the round!
Presently, Alice has 1 points and Bob has 1 points.
It is a draw!