Gebze Technical University
Department of Computer Engineering
CSE 241/505
Object Oriented Programming
Fall 2020
Homework # 3
Due date Nov 15th 2020

In this homework, you will write your game of Hex program in C++ using object oriented techniques. Your main class for this homework will be named **`Hex`**. This class will have a private inner class named **`Cell`** to represent a Hex cell. The class **`Cell`** will hold the position of the cell (A, B, C, etc) and the row number (1, 2, 3, etc). This class will also include all necessary setters/getters, constructors etc. Remember a cell can be empty, user (user1, user2) or computer, which will be represented by C++11 Enum types.

Next, write a class named **`Hex`** to represent and play the game. The class **`Hex`** will hold a vector of vector of **`Cell`** objects to represent the cells. In other words, this class will have **`vector< vector<Cell> > hexCells;`** in its private section.
The class **`Hex`** will also have the following features and functions

- There is no limit for the board but it should be larger than 5x5 and it should be square. Your game will resize according to the parameter for the constructor.
- There should be at least 3 constructors.
- The class will have functions to read and write from files. You will decide on the file format like you did in HW2.
- The class will have functions to return the current width and height of the board
- The class will have a function that displays the current board on the screen
- The class will have two functions named **play** that plays the game for a single step. First function does not take a parameter and it plays the computer. The second function takes a cell position and it plays the user.
- The class should have a function that returns if the game ended.
- The class should have a function named **playGame**. This function plays the game by asking the user the board size first then asks the user to play and the computer plays, etc.
- The class will have a static function that returns the number of marked (non-empty) cells in all the games. Be careful here because there could be more than one game active at the same time.
- The class will have a function that takes another object **`Hex`** as parameter and compares the Hex games. It returns true is the first game has more marked cells for the user, otherwise it returns false.
- Any other functions (public or private) needed.

Write your main function to test both classes. Make at least 5 objects of class **`Hex`** and play the games at the same time.
You will use all the object oriented techniques that we learned in the class including **`const, static, inline`** keywords.

Notes:

- Do not use any functions from the standard C library (like **`printf`**)

- Read the chapter about file input output for reading and writing text files using streams.
- Do not use anything that we did not learn in the lectures.
- Do not forget to indent your code and provide comments.
- Check the validity of the user input.
- **Test your programs very carefully at least with 10 different runs. Submit at least two saved files with the HW.**
- You should submit your work to the moodle page.