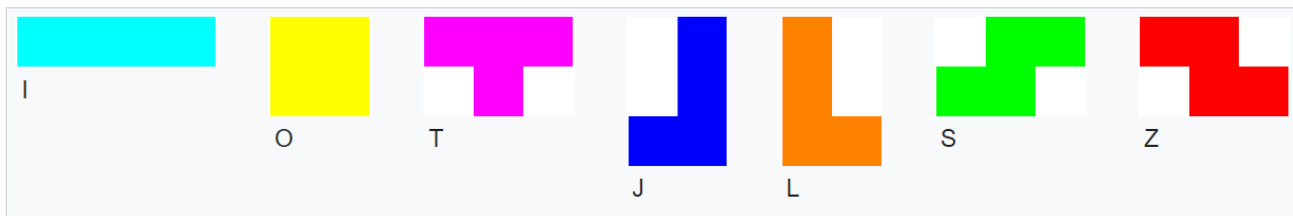


Gebze Technical University
Department of Computer Engineering
CSE 241/501
Object Oriented Programming / Programming
Fall 2021
Homework # 1
Your First C++ Program
Due date Oct 27th 2022

You will write a C++ program that will represent Tetris pieces (tetrominos), which are shown below labeled from I to Z.



Your class named Tetromino can represent any of the above shapes, it can rotate (left and right) the pieces, and print them on the screen. You will use 2D vectors of characters to represent each tetromino. We will not use colors for this homework and the shapes will be represented by letters. For example, the tetromino T will be shown on the screen as

TTT
T

The same tetromino will be shown like below if it is rotated to the right once.

T
TT
T

Your class will have at least the following public functions (you may write additional public or private functions)

- Constructor: will take an enum parameter to represent one of the above tetromino
- rotate will take parameter to rotate the tetromino (left and right)
- print will print the current tetromino on the screen
- canFit function will take another tetromino and the relative position of the other tetromino. If the other can fit at the specified position without any holes, then it returns true, otherwise it returns false. For example, if this object is an O tetromino, we can fit an L tetromino to the right. Similarly, if this object is an O tetromino, we cannot fit a Z tetromino to the right but we can fit an S tetromino to the right.

If you do not know how to play Tetris, there are online places such as <https://tetris.com/> which can be useful to learn it and have some fun!

Your program will do the following

1. When your program starts, you will ask the user how many tetrominos will be created in a vector of tetrominos.
2. Then you will print each tetromino on the screen
3. Then you will rotate each tetromino as many times as necessary so that they fit together horizontally as good as possible. The best-fit case is where there is no space between them.
4. Finally, you will print each tetromino in this rotated form.

Notes:

- Do not use any functions from the standard C library (like `printf`), do not use C arrays. For math functions you may use standard C functions.
- Use C++11 strong enum types for representing Tetrominos
- Use C++ standard classes such as string, vector, list, etc.
- Your program should have header file and implementation files
- Use all the OOP techniques that we have learned in the lectures such as consts, C++11 features (range for loops, strong enums, auto keyword, decltype keyword, etc.)
- Do not forget to indent your code and provide meaningful comments.
- Check the validity of the user input.
- **Test your programs very carefully at least with 5 different runs. For some runs use trivial cases such as 3 O tetriminos.**
- You should submit your work to the Teams page using the instructions from the TAs.

Example run

How many tetrominos?

3

What are the types?

O

T

L

Your tetrominos

OO

OO

TTT

T

L

L

LL

Horizontally best-fit tetrominos

T

OOTT L

OOTLLL