COP 4331 – Object-oriented Programming

Project 5

Due: Friday, December 4th 11:59 P.M. CST

Objective:

The final project for this class is to create the game of Tetris. This game will be written using JavaFX, and must meet the requirements in this description. Many of the specifics and design choices are left up to your group to decide. You must provide a UML diagram along with your final project.

Problem Description:

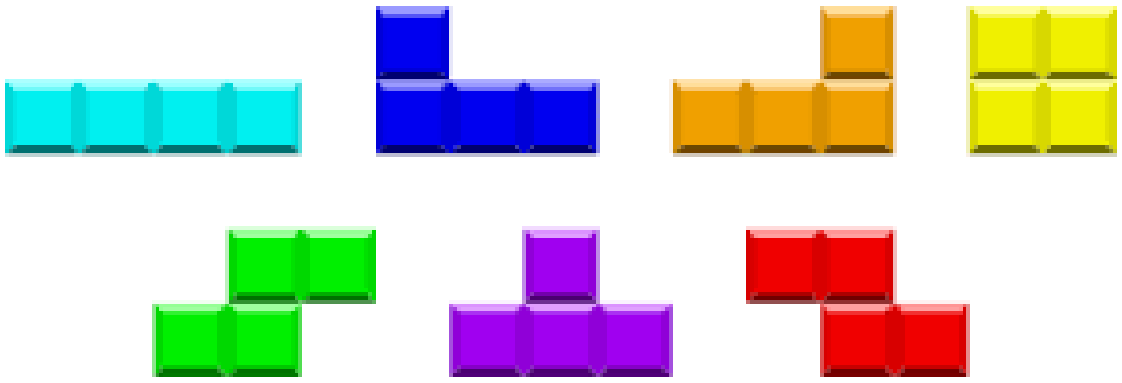
There are many different versions of Tetris. The version we will be making is based off of the traditional Tetris rules. The following is a description of the traditional game taken from Wikipedia:

Game pieces in Tetris are called Tetriminos. A random sequence of Tetriminos fall down the playing field (a rectangular vertical shaft, called the "well" or "matrix"). The objective of the game is to manipulate these Tetriminos, by moving each one sideways (if the player feels the need) and rotating it by 90 degree units, with the aim of creating a horizontal line of ten units without gaps. When such a line is created, it disappears, and any block above the deleted line will fall. When a certain number of lines are cleared, the game enters a new level. As the game progresses, each level causes the Tetriminos to fall faster, and the game ends when the stack of Tetriminos reaches the top of the playing field and no new Tetriminos are able to enter. Some games also end after a finite number of levels or lines.

As for your game, you are able to choose when a new level begins. To get a better idea of how the game is played, there are multiple free Tetris games online that can be played in the web browser.

Tetriminos

There are seven standard Tetriminos in Tetris. Each Tetrimino is composed of four individual blocks. The standard playing pieces are displayed here:



Creating Your UML:

There are multiple programs that can be found online for creating a UML diagram. The program that has been used thus far in class is called ObjectAid (http://www.objectaid.com/) and is used through Eclipse. Other possible tools include ArgoUML (http://argouml.tigris.org/) and UMLet (http://www.umlet.com/). The notation used is slightly different between each tool and there are other tools out there. Some of these tools will allow you to automatically generate your UML diagram from your source code.

Programming Specifications:

The following are constraints on the final design and implementation of your project:

- This program must be written using JavaFX. You should not be using AWT or Swing to complete this project.
- You should use the standard size for the Tetris grid. The dimensions are 10 wide and 20 high.
- You must have an initial game menu that at minimum allows the user to start a game, resume a game, view the top ten best scores, or quit the game. This means that you will need to be able to save games to resume.
- Your main game screen must show the game being played, a preview pane for the next piece, the current level, the current score, and the number of completed lines.
- You should have multiple levels where each higher level results in the pieces dropping at a slightly higher (but still noticeable) speed.
- Players should be able to increase the rate that a piece is falling by holding a key. The speed should return to normal when that key is released.
- While the game is in progress, you should play the Tetris theme.
- You should be able to pause the game. When the game pauses, it should display the controls for the game.
- Apply good object-oriented design principles. Use polymorphism whenever appropriate, maintain encapsulation, do not duplicate logic, and do not combine multiple responsibilities in classes.

Challenges:

The challenges for this project result in minor enhancements to gameplay. The enhancements that you can look at making include:

- Allowing the user to configure settings such as controls and sounds.
- You should add sounds for when the piece gets into its final position and when a row is cleared.
- You should look at how to speed up the playing of the Tetris theme as each level increases

Another challenge that you may try to complete is to add two player versus mode to the game. Two players each have their own game screen and one controls the game using the arrow keys,

while the other controls their game with the W,A,S,D keys. The winner is the one who receives the higher score.

Note: Challenges are not for extra credit and should not be submitted. The purpose of challenges is to give you ideas for expanding on a project. Challenges are meant to be for fun.

Submission Instructions:

Submit your project using the eLearning dropbox. Remember that all students who turn in their projects by the due date that receive a B or better will receive an added 0.5% on their final overall average.

For this project, submit a zip file containing all files required to run your project.