SENG2200/6220 –Programming Languages & Paradigms
Computer Lab for Week 5, Semester 1, 2020

Objectives

This lab aims enhance the understanding of polymorphism with the design and implementation (Java & C++). Discover and develop the understanding of factory pattern with polymorphism.

Questions

1. Draw a UML Class Diagram for a program that can take an array of lines of the form y=mx+b and sort it so the lines are in order from largest gradient to smallest and, if two lines have the same gradient (ie within 0.00005), from largest y-intercept to smallest. Be careful in how you allocate the various responsibilities to the classes in your design. Your class specification should include a toString() method for printing out the line "values".

2. Extend your design to include vertical lines, that will always have gradients that are "greater" than any line of the form above but will be ordered with respect to each other from highest x-intercept down to smallest.

3. Design an input/factory routine that will allow you to input data and create the various concrete line objects for your Q2 design. The input data will consist of two sets of (x, y) coordinates, with the line being defined as passing through these points.

4. Write the Q2/3 program in Java.

5. Convert your code from Q4 into C++.

6. How would you alter your design to specifically isolate horizontal lines (ie zero gradient, or within 0.00005 of zero)?