CS 315: Algorithms	Spring 2025

Programming Project 1: Convex Hull

Assigned: Friday, January 17	Due: Friday, February 7, 5:00 pm

1 Introduction

In this project, you will write a Java application that computes and visually displays the the convex hull of a set of points chosen (using a graphical user interface) by the user. Your code should implement either the Gift Wrap algorithm or Graham Scan algorithm.

2 Minimum Required Functionality

Your application must provide at least the following minimum criteria:

- It must employ Java Swing classes to implement the graphical user interface.

- The user interface must consist of one large all encompassing JFrame containing:

  - A JCanvas representing Euclidean 2-space.
  - A JPanel containing two JButtons. The first of these JButtons, the "convex hull" button, should, when pressed, examine the set of points currently displayed in the JCanvas, generate the corresponding convex hull, and display the convex hull superimposed over the original point set on the JCanvas. The second JButton should clear the JCanvas.

- The user must be able to add points to the JCanvas by left-clicking the mouse over a desired position on the canvas. (Drawn points should have a minimum diameter of five pixels – please be reasonable if you are using larger than that.)

- A user should receive an updated diagram (i.e. reflecting all points currently on the canvas) if they add points and then hit the convex hull button.

- Your program *must not* display debugging information, either in the graphical interface, or on the command line, unless the user requests it. (You are not required to implement debugging functionality for the user.)

3 Deliverables

You should provide me with a single jar, tar, or zip file containing *all* original source code and files required to build the application. This includes any files (of any type, including source files, data files, configuration files, etc.) required by your application that I may have provided for your use. The name of your file (e.g., for a jar file) should be ¡netId¿Project1.jar, where ¡netID¿ is, well, your network ID. So for example, my submisson would be dszajdaProject1.jar. The name of the source file containing the `main` method must be `ConvexHull.java`. (Note that there is no ¡netID¿ part of the class name. That is only required as part of the jar, tar, or zip file name).

4 Submission

Your single submission file should be attached to an email sent to

convex_.nl1l19k6h7cvp8bw@u.box.com

This has the effect of placing your submission in the correct submission folder in my Box directory tree.