

Course Project: 20%

Submission Deadline: Last Lecture, Tue. Dec 4, 2012

**ENGR 3770U and CSCI 3070U:
Design and Analysis of Algorithms, Fall 2012**

This project includes the following two individual parts, A and B.

A) Finding the Convex Hull for a set of points in a plane (2D): 10%

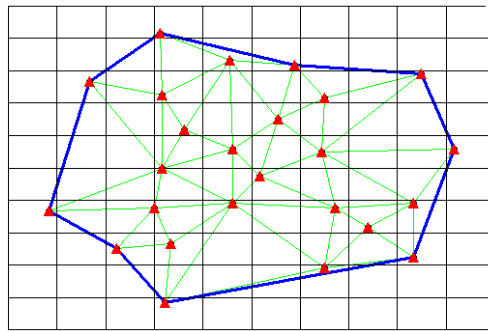


Figure 1: A sample convex hull

You need to implement **one** of the following algorithms or you can design your **own** algorithm:

- a) Quick-Hull
- b) Chan's algorithm
- c) Marriage-before-conquest
- d) Gift wrapping
- e) Monotone chain
- f) Incremental convex hull algorithm
- g) Graham scan

Inputs: Points $(x_1, y_1), (x_2, y_2), \dots, (x_n, y_n)$ are entered using mouse clicking

Outputs: Visualizing of the points and the corresponding convex hull, similar to Figure 1.

B) Calculating the shortest-path for a GPS receive: 10%



You need to select an area in GTA using the Google map, similar to Figure 2.

It should contain **at least 30 main intersections**.

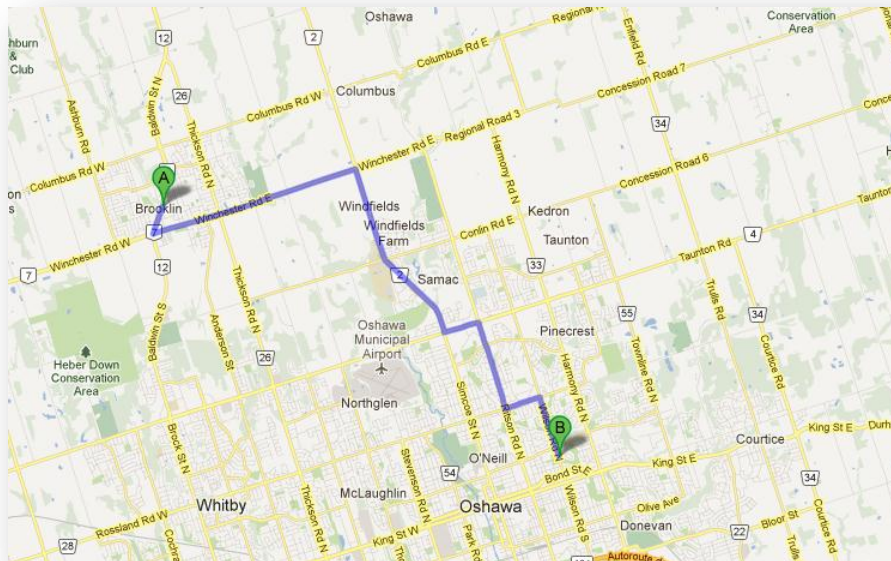


Figure 2: Sample selected map.

Inputs: Intersections A: source, and B: destination

Outputs: Calculating and indicating the shortest-path from A to B (see Figure 2), by using **one** of the following algorithms:

- 1) Dijkstra's Algorithm
- 2) Bellman–Ford Algorithm

What do I need to deliver?

- 1) **Report (hard copy), including: Comprehensive explanation of the implemented algorithms, four sample results for each algorithm, complexity analysis of each algorithm (calculating Big-O), and conclusion.**
- 2) **CD including: Word file or PDF file of the report + source codes (including comments)+ .exe files (if any)**