# CSE 4510 Interdisciplinary CS — HW2
# Due 5pm, Feb 20, 2014
# Submit Server: Class = intercs , Assignment = hw2

Given a map, origin, and destination, we would like to provide turn-by-turn directions.

1. Use Java to implement:
   (a) Greedy algorithm: `Greedy.java` has the `main` method
   (b) Dijkstra's algorithm: `Dijkstra.java` has the `main` method
2. Input:
   (a) Command line argument: map file (scale: $m$ mile for each $x$ or $y$ unit; *street name*, $x_1$ $y_1$ $h_1$, $x_2$ $y_2$ $h_2$, ...)
      i. `melbourne.txt` posted on the course web site
      ii. create a second data set with at least 10 intersections and 2 curvy streets in a real city [Google Maps has house numbers by zooming in]
   (b) Keyboard from user: origin and destination addresses
      i. house number
      ii. street name
3. Output:
   (a) each line has:
      i. turn direction ("continue," "turn right," "turn left")
      ii. street name (the same street name should not appear on consecutive lines)
      iii. distance (in miles with 1 decimal place; in feet if shorter than .1 mile)
   (b) since we are using real street names, house numbers, and distance, the directions should be similar to Google Maps (except when it uses streets not in our maps)
4. Provide a report (pdf):
   (a) As you know, a cell phone or car is highly mobile and could change locations frequently. Hence, localization needs to be efficient so that the location can be updated frequately to be accurate.
      i. Solve and simplify (show your steps) the equations for $x$ and $y$ to **minimize** the number of arithmetic operations need to be performed on the "input" variables: $x_1, y_1, d_1, x_2, y_2, d_2, x_3, y_3, d_3$
      ii. How many arithmetic operations are needed to calculate $x$ and $y$?
   (b) Compare the two algorithms:
      i. quality of output
      ii. time/speed
      iii. space/memory
5. Provide `readme.txt`
   (a) how to compile your programs (on hopper.cs.fit.edu or code.fit.edu)
   (b) how to run the two algorithms
   (c) sample output of each algorithm for each input data set
6. Submit: source code, report, your data set, and `readme.txt`