

**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 (or C, C++, Python) 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 frequently 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`