

CSE 4510 Interdisciplinary CS — HW2
Due 5pm, Feb 20, 2014
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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`