

AE498MPA (Fall 2007)

Homework 3: Tour Guide

Tim Bretl

Due at 3PM on November 16, 2007

Basic assignment

You will create an application that guides the user from an arbitrary starting point past as many predefined landmarks as possible, returning to the same point within a fixed amount of time. You may use any method of localization (GPS, wifi, etc.) and any method of giving directions to the user *except* calling landmarks by name (for example, “walk to Talbot Lab”). Satellite time, latitude and longitude, and total number n of landmarks visited will be logged to a `.txt` file, where each line has the form `t lat lon n`.

Contest

The contest will begin in the Engineering Quad at 3PM on November 16. First, we will walk to a random location on campus. Then, each group in turn will give their phone to Prof. Bretl for a short tour lasting t minutes (where $10 < t < 30$ minutes, to be announced on the day of the contest). The group that guides Prof. Bretl to the most landmarks, while returning him to the starting point within t minutes, is the winner. (If he arrives late, you lose!) Each member of the winning group will receive a prize, as well as everlasting fame.

Deliverables

Submit an annotated python script (and any other code) and a brief summary of your solution approach. Also submit logged data from the contest. Within each group, all members will receive the same grade.

Preliminary data

To complete this assignment, you will need two things: a list of landmarks, and a map that allows you to calculate travel times. We will create these things as a group.

Everything will take place between Wright on the West and Mathews on the East. A/A/G are responsible for zone 1, between University and Springfield; D/D/S are responsible for zone 2, between Springfield and Green; C/H/K are responsible for zone 3, between Green

and Chalmers/Oregon; and R/B/V/M are responsible for zone 4, between Chalmers/Oregon and Gregory.

Each team will represent their zone by a graph that consists of nodes and edges. Each node has a name (for example, “Front entrance to the Illini Union” for a landmark, or “waypoint” for any non-landmark), a unique ID with three digits beginning with the zone (for example, 301), and a latitude and longitude (for example, 40.109722 and -88.227222). Each edge has the ID’s of two nodes as endpoints (for example, 301 and 302) and a length in meters (for example 25.2). All data will be saved in a text file titled `ZoneX.txt` (replace X with the number of your zone) on the SharedData page of the wiki, with the following format:

```
(‘Front entrance to the Illini Union’, 301, 40.109722, -88.227222)
(‘waypoint’, 302, 40.110, -88.227)
...
(301,302,25.2)
(301,305,10.0)
...
```

Edges will be more useful if they are “simple.” In other words, try to make each edge correspond to walking in a nearly-straight line on a sidewalk. (See Fig. 1.)

You can create this data any way you like. One possibility is to use the detailed campus map provided on the wiki: http://www.ae.uiuc.edu/~tbret1/cgi-bin/wiki.pl/download/campus_detail.pdf But it may be easier (and more accurate) simply to use the software you created in your first homework, which asked you to find your location and to compute distance traveled (exactly the data you need here).

By Wednesday, November 7, all groups are required to have made a graph with at least 15 landmarks (and enough additional waypoints so the graph has only one connected component), and to have saved this graph on the wiki.

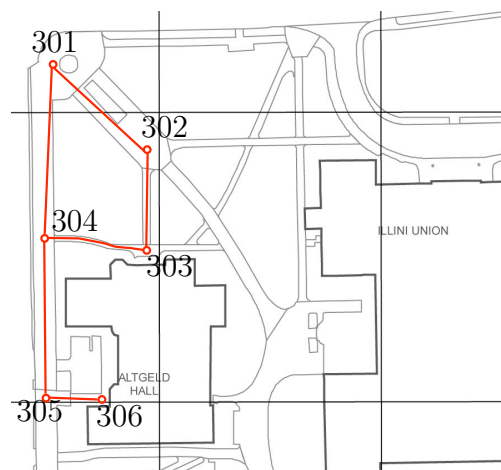


Figure 1: A fragment of a graph for zone 3.