Curtis Kargus

Reason for picking adjacency list over matrix.

I used an adjacency list over an adjacency matrix because the big O for space is only O(n) instead of O(n^2). In addition to this it is faster to go through all the stations since the adjacency list size is a 3 by n instead of an n by n. The other reason I used it was because there are no calculations needed to figure out who is adjacent to who. In an matrix [1][8] == 1 could mean that one is connected to eight or eight is connected to one or none of the above if each row or column doesn’t represent the same station number. So in order to avoid having to do this and make my code more versatile, because I don’t need rows or columns to represent station numbers I used an adjacency list.

How my algorithm works to solve the problem

Each coordinate point is put into a station then those stations are put into a list. Once all points have been added to the list each station in the list will find its two closet stations to it and if the distance for two points is equal then it will take the west most and if to points are equally west most it will take the south most. From there each station and who it’s connected to is stored in an adjacency the list first row being that station then the second and third row being the two stations that station is connected. To figure out if all points are connected I add the first column of station Id’s to a list then for each station in the list I add who their adjacent to, to the list so on and so forth until I have done this for all stations in the list. Also only unique station Id’s are added to that list. Then I compare that list to a list of all station ID’s if the two lists equal one another then all stations are connected otherwise they are not all connected.