**Capstone Project Report**

1. Which data structure(s) did you use for part 1? Why did you select these data structures?

I chose a linked list to store the different food types. While another type is possibly more efficient, a linked list seemed reasonable, since we only needed to search through 15 food types.

1. What is the runtime (in asymptotic notation) of searching for a food type? Do you think there is a more efficient runtime?

The runtime is Θ(N) for the linked list. Each time it searches, it iterates through the entire linked list to find all possible matches. Using a hash map would likely have a more efficient runtime – possibly Θ(1), since each letter would map to a single key, which would then access the possible matching restaurants.

1. Which data structures did you use for part 2? Why did you select these data structures?

I chose a hash map of linked lists. Each linked list represented the restaurants for a given food type. Each linked list node stored a hash map with the restaurant information. I chose a hash map, because the number and value of food types were known. A linked list made it easy to iterate through the corresponding restaurants. The restaurant descriptors could be accessed in a consistent and descriptive way through the restaurant’s hash map.

1. What is the runtime (in asymptotic notation) of retrieving the restaurant data? Do you think there is a more efficient runtime?

The runtime is Θ(1). Each restaurant type maps to one linked list. I cannot think of a more efficient runtime that would achieve the same result.

1. Outside of this project, what are other innovative ways you can utilize data structures?

My primary field of study is GIS, so the graphs resonated as a way to solve network analysis questions. It is neat to understand the method behind the tools. Hash maps and heaps will be useful for efficiently storing and searching through attribute tables for specific values and min and max values.