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CS261
8/10/2016

Written Questions

Hashing

1.
    a. "Banana"
    b. "mmnn"
2.
    a. If there was an element at index 999 then the table is full. If the table if full the load factor is 1. This is because load factor is the number of elements in the table divided by the total number of elements.
    b. If a chaining hash table is used index 999 will most likely be empty. This is because there are no words that are 999 characters long. Another reason is because of chaining, this make words with the same length go in the same cell of the array.
    c. If shifted sum was used instead I would say index 999 could likely be occupied. Lower case ASCII values are around 100, and that number is then multiplied by a power of 2. This makes getting a number to 999 very easy and likely.
3. Having a prime number table size prevents clustering of numbers.
4. The concatenation strategy is similar to shifting and summing because they both use the string itself to create the hash values. They both also create very large numbers for the hash value.

Graphs

1. No. Trees have V-1 edges.
2. It can have 380 edges.
3. Depth First Search
4. For a graph to be strongly connected it must have cycles. No cycle means that there is on point that is not connected so it will never be reached.
5. If the number of edges are small the an edge list would be better. This is because memory is in proportion to the number of edges, while a matrix is always O(n*n). When there are a large amount of edges, and finding if there is an edge is important an adjacency matrix is better. This is because only one value needs to be checked with an adjacency matrix to see if an edge is there. With a list you need to iterate through the list to check.