Nathanael Paulemon

CSC 212 – Data Structures

Assignment7

My answers are in YELLOW

Make sure your code is readable and well-documented. Each function must also begin with a title block that describes the task of the function, input parameters and return value.

1. Write a recursive function that takes a string as an input and returns the reverse of the string.
2. Write a recursive function rec\_stringthat produces the output shown below for the corresponding function calls. Write a main function to test the function.

Method call rec\_string(‘abcde’), will produce the following output:

\*

e

de

cde

bcde

abcde

Method call rec\_string(‘abc’), will produce the following output:

\*

c

bc

abc

1. Draw the 11-item hash table resulting from hashing the keys 12, 44, 13, 88, 23, 94, 11, 39, 20, and 16, using the hash function h(i) = (2i + 5) mod 11 and assuming collisions are handled by linear probing.
2. How many comparisons are needed to find39 in the table?

Only one comparison would be made since through linear probing each element is in one slot. And after hashing the keys through linear probing index number 6 has element 94 in its slot and since h(39) = 6 and 39 != 94 the search would fail and only that one slot would be checked once resulting in only one comparison.

1. How many comparisons are needed to determine that 5 is not in the table? Briefly explain.

Since h(5) = 4 and element 20 resides in index 4 and 20 != 5, and through linear probing only one slot is occupied only one comparison is made.

1. Draw the 11-item hash table of the previous exercise, assuming collisions are handled by chaining?
2. How many comparisons are needed to find39 in the table?

Since h(39) = 6 we’d have to search index 6. Since we drew our table thru chaining the nodes in index 6 are 94 followed by 39. Which means it would require two comparisons.

1. How many comparisons are needed to determine that 5 is not in the table? Briefly explain.

h(5)=4 therefore index 4 would be searched. Index for is occupied by 44 followed by 16 through chaining. It would require two comparisons to determine 5 doesn’t exist in the table.