3) (10 pts) DSN (Tries)

Write a function that takes the root of a trie (*root*) and returns the number of strings in that trie that **end** with the letter *q*. The *count* member of the node struct indicates how many occurrences of a particular string have been inserted into the trie. So, a string can be represented in the trie multiple times. If a string ending in *q* occurs multiple times in the trie, all occurrences of that string should be included in the value returned by this function.

The node struct and function signature are given below. You must write your solution in a **single** function. You cannot write any helper functions.

```
typedef struct TrieNode
{
   // Pointers to the child nodes (26 total).
   struct TrieNode *children[26];

   // Indicates how many occurrences of a particular string are contained
   // in this trie. If none, this is set to zero (0).
   int count;
} TrieNode;

int ends_with_q_count(TrieNode *root)
{

      int i;
      int retval = 0;

      // Grading: 2 pts
      if (root == NULL)
            return 0;

      // Grading: 1 pt loop to 26, 1 pt retval +=, 1 pt rec call
      for (i = 0; i < 26; i++)
            retval += ends_with_q_count(root->children[i]);

      // Grading: 2 pts NULL check, 2 pts retval +=
      // Note: 'q' - 'a' = 16. This can go before the for also.
      if (root->children['q' - 'a'] != NULL)
            retval += root->children['q' - 'a']->count;

      // Grading: 1 pt
      return retval;
}
```

Computer Science Foundation Exam

January 16, 2021

Section II A

ALGORITHMS AND ANALYSIS TOOLS

SOLUTION

Directions: You may either directly edit this document, or write out your answers in a .txt file, or scan your answers to .pdf and submit them in the COT 3960 Webcourses for the Assignment "Section II A". Please put your *name, UCFID and NID* on the top left hand corner of each document you submit. Please aim to submit 1 document, but if it's necessary, you may submit 2. Clearly mark for which question your work is associated with. If you choose to edit this document, please remove this cover page from the file you submit and make sure your *name, UCFID and NID* are on the top left hand corner of the next page (first page of your submission).

Question #	Max Pts	Category	Score
1	10	ANL	
2	5	ANL	
3	10	ANL	
TOTAL	25		

You must do all 3 problems in this section of the exam.

Problems will be graded based on the completeness of the solution steps and not graded based on the answer alone. Credit cannot be given unless all work is shown and is readable. Be complete, yet concise, and above all be neat. For each coding question, assume that all of the necessary includes (stdlib.h, stdio.h, math.h, string.h) for that particular question have been made.