3) (10 pts) DSN (Tries)

As an afficionado of Wordle, you're curious how many five letter words there are in a dictionary stored in a trie. Write a recursive function that takes in a pointer to a trie node and an integer k, representing the depth of the node in the trie, and **returns the number of five letter words** stored within that subtrie. A wrapper function is provided which makes the initial recursive call on the root node of the trie storing the dictionary. Please use the struct shown below. Assume all necessary includes.

```
typedef struct trieNode {
    int isWord;
    struct trieNode* children[26];
} trieNode;

int num5LetterWrapper(trieNode* root) {
    return num5Rec(root, 0);
}

int num5Rec(trieNode* root, int k) {

    if (root == NULL) return 0;                    // 2 pts
    if (k == 5) return root->isWord;               // 2 pts

    int res = 0;                                   // 1 pt
    for (int i=0; i<26; i++)                       // 1 pt
        res += num5Rec(root->children[i], k+1);    // 3 pts
    return res;                                    // 1 pt
}
```

Note: The NULL check can be done in the for loop instead, but either way, it's 2 pts to avoid a NULL ptr error.

Computer Science Foundation Exam

May 18, 2024

Section C

ALGORITHM ANALYSIS

NO books, notes, or calculators may be used,
and you must work entirely on your own.

SOLUTION

Question #	Max Pts	Category	Score
1	5	ANL	
2	10	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 <u>not</u> 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 <u>be neat</u>. For each coding question, assume that all of the necessary includes (stdlib, stdio, math, string) for that particular question have been made.