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CMSC 201: Data Structures

Lab 5 Report – SpellChecker (12/03/2020)

Warmup – Times for each sort to complete

Selection sort

real 3m33.721s
user 3m33.171s
sys 0m0.762s

Merge sort

real 0m2.377s
user 0m4.077s
sys 0m0.348s

Insertion Sort

real 1m8.240s
user 1m8.490s
sys 0m0.404s

Based off these results, Merge sort is clearly much faster than the rest.

Spellchecker – Which method is best?

Between Scheck and Bcheck, Bcheck seems to be the better choice as the program is able to check given words against the Spellchecker's dictionary much quicker. This is larger because, binary search enables us to narrow down our search within the Spellchecker's library without scanning through every single word in its dictionary.

Scheck on the other hand is forced to scan through the Spellchecker's dictionary and in the worst-case scenario where a word starts with the last few letters in the alphabet; nearly the entire dictionary will have to be scanned through.

On average, Bcheck will therefore be a faster method as the time taken to find each word is insensitive to the input and is much shorter than the worst case in Scheck. However, if the words we are checking all start with the first few alphabets, Scheck might be faster than Bcheck given that it is working in it's best case scenario

Jumble – recursive anagram method vs sorting method?

Un-jumbled words: liner, purge, ration, bleach (I haven't been able to solve the last word)

In this case the sorting method works far more effectively. This is because in the anagram method, the Spellchecker has to check each permutation of the word against it's dictionary where a word of N characters would have N! permutations, making the process far more computationally intensive as each word we provide as an argument makes Spellchecker look through it's dictionary several times (possible N!);

The sorting method instead works much faster as it only needs to scan through the dictionary once for each argument and then it uses one additional call to retrieve the

original word. While there is additional time spent sorting alphabets of words in the dictionary, this time spent is much less than scanning through the entire dictionary several times over.