Indiana University Southeast

Assignment 5

Binary Search Trees

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In this assignment, we are given the same task as our Programming Assignment 4. In that we are to implement a spell checker, but this time we are to use Binary Search Trees (BST) instead of Linked Lists. I can't help, but find it humorous that I was complaining about the runtime of Assignment 4 and how I contemplated using a quicker sorting method if I had just had more time. Nevertheless, here I am doing it for Programming Assignment 5.

The problem itself is that we are given two text files: one called "oliver.txt'' that contains an entire novel with hundreds of thousands of words and another one called "random_dictionary.txt" that is a list of words in random order. We are instructed to create 26 separate BSTs, rather than linked lists like before, with one BST for each letter of the alphabet. Then we would read the dictionary line by line and sort each word into its corresponding BST. Once that was finished we had to read in the Oliver novel, separating each line into words, and remove certain characters that would cause the comparator to fail. After the words were clean and ready to compare we searched through the corresponding BST depending on the first letter of the word to see if it was in one of the sub dictionaries. Then after all the words in the novel had been searched for, we had to output how many comparisons there were for each word found and not found in the dictionaries, how many words were found and not found, and what the average number of comparisons for found and not found words was.

My program for assignment 4 was very rough and took over 10 hours to run. This time around with BSTs I yielded nearly identical results in only 19 seconds. The average comparisons went from the middle 3000s and 7000s to below 20. In concept, it is very easy to understand why it is so much quicker, but usually when you put things into practice they don't hold up to their concepts. I've never been so blown away by an assignment in my life. Obviously, I expected BSTs to be quicker, but I never thought it would change so drastically. So, in conclusion, BSTs are very cool, as am I. I wonder if Dr. H really reads these. I'd better go turn this in or he'll kill me.

Outputs:

Words Found: 916179
Words Not Found: 62412
Comparisons For Words Found: 14910749
Comparisons For Words Not Found: 689058
Average Comparisons For Found Words: 16
Average Comparisons For Not Found Words: 11