15 marks

Russell Menezes – s3600950  
Oliver Muthusami - s

Algorithms & analysis COSC2123\_1750

Assignment 1 Report

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**Experimental Setup**

Data Scenarios

**Scenario 1 (varying ratio of additions to removals)**

For the first scenario, we tested 3 different ratio sizes of additions to deletions. We tested a 50% addition to deletion ratio, a 75% addition to deletion ratio and 100% addition to deletion ratio. The 3 different ratios are labelled as s1t1 50% ratio, s1t2 75% and s1t3 100% ratio.

Multiset Sizes

**Scenario 1 (varying ratio of additions to removals)**

For the first scenario, we used a sample of 1000 additions as it will allow us to accurately measure the performance of different Multisets by performing different ratios of additions and deletions across a large set so that it multisets with larger complexity more obviously show in a larger set of variables.

Generation of Scenarios

**Scenario 1 (varying ratio of additions to removals)**

For scenario 1 our data generator randomly selects a piece of data from the fixed set of data and then creates an add statement for it, it repeats this process as many times as specified, e.g. for scenario 1 where we are generating 1000 additions it repeats this process 1000 times. Similarly, the data generator does the same for the three different test cases but varies the amount of deletion statements written (500 removal statement, 750 removal statements and 1000 removal statements). The data generators also randomly select to either remove one or remove all for each remove statement.

Timing Table \*Times listed is in milliseconds\*

**Scenario 1 (varying ratio of additions to removals)**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **500 deletions** | **750 deletions** | **1000 deletions** |
| **Linked List** | 44.930055 | 40.229619 | 56.543437 |
| **Sorted Linked List** | 60.232897 | 61.700949 | 92.330926 |
| **Binary Search Tree** | 36.171009 | 39.540583 | 55.979618 |
| **Hash Map** | 23.841561 | 34.120320 | 33.405282 |
| **Balanced Tree** | 26.211109 | 33.393308 | 42.645012 |

Fixed Sets

For both scenarios, the fixed sets are generated using a random set of data to create a list of 500 string variables. This can be found in the generator folder in the file: ‘fixedset.txt’.

**Evaluation**

Scenario 1 (varying ratio of additions to removals)

Scenario 2 (varying number of searches vs additions/removals)

**Recommendations**