INFO 6205 ASSIGNMENT 5 REPORT

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**Binary Search Tree**

**Hypothesis:**

For this Assignment, I performed an experiment to test the depth/height of a Binary Search Tree after M deletions and insertions is proportional to the square root of N, where N is the size of the tree.

**Variables:**

N : is the size of the tree. (can be initial size or final size)

M: numbers of insertions or deletions

**Test Cases Solutions:**

A screenshot of a social media post

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Then I implemented another class to test the deletion cases called BSTDeletion.java. First of all, I implemented two array lists, and put 100 numbers into array list, then shuffle them 100 times, then put them into the tree. (This is the initial tree). In the BSTSimple class, I added a method to find the maximum depth of the Tree called getNodeHeight(). Here is the screen Shot.

A screenshot of a social media post

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Then in the BSTDeletion class, I used a Boolean 0 or 1 to detect if I want to insert a key or delete a key. If it is 0 insert the key, if it is 1 delete the key. Here is the screen shot. A screenshot of a social media post

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Then I calculate the average maximum depth, I found out the result is nearly to be square root of initial size for the tree.

Here is the Screen shot for the data I have:

A close up of text on a white background

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From the table above, We can see both graph are growing slowly and the final depth is very close to square root of N when N is 100.

Here is the final size graph:A screenshot of a cell phone

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We can see there are not really a relationships between M and final size.

Here is the screen shot for N = 100 the various change for depth and sizeA screenshot of a social media post

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**Conclusion:**

After this experiment, I found out there are some relationships between numbers of insertion/ deletion and final depth. As the numbers of insertion/deletion getting bigger, the final depth is getting closer to square root *of N*, where N is the initial size of the tree.