

Assignment 7 Write Up: The Great Firewall of Santa Cruz

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December 3, 2021

This write up is to show the changes in stats when the size of the Bloom Filter and the Hash Table are changed. Those stats are the number of look ups, average branches traversed, and binary tree heights. There will be graphs to help support the answers that are given.

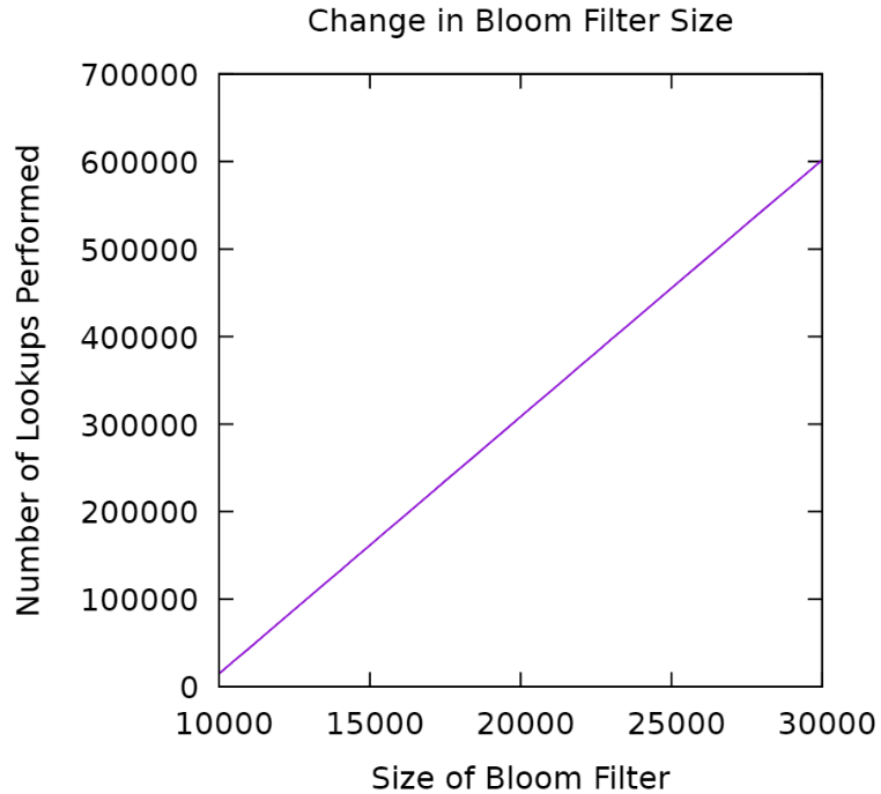
When either the Bloom Filter size or the Hash Table size is not being tested, here are the default values.

- Bloom Filter Size Default: 1048576
- Hash Table Size Default: 65536

The sentence that was type for all of the tests is:
"hello there i am stupid but people are y"

This was randomly thought of by me.

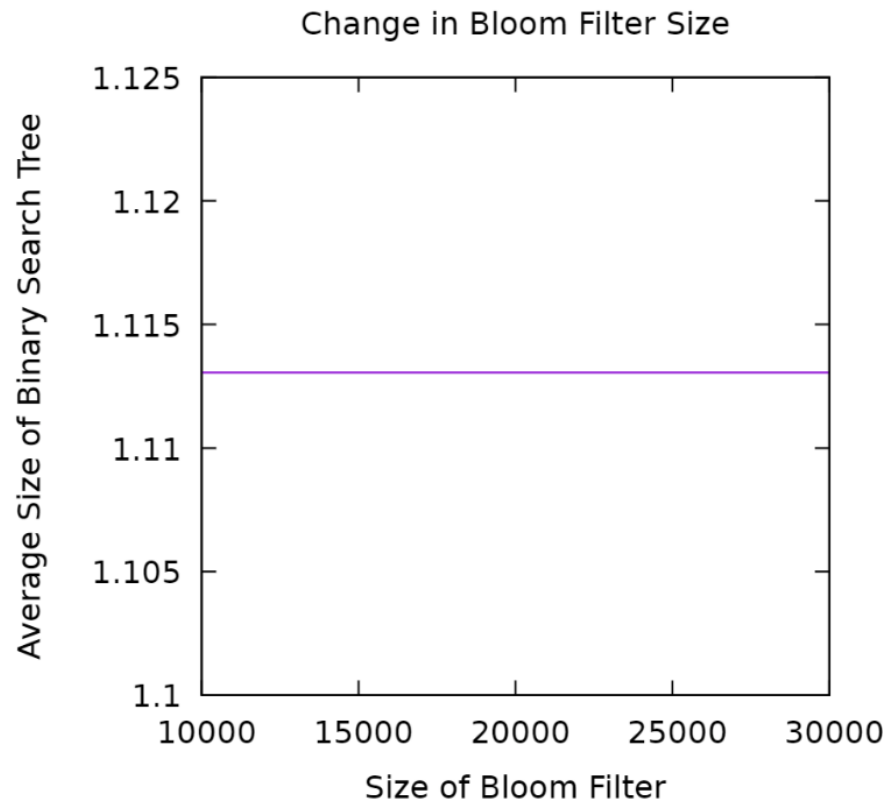
1 Change in Bloom Filter Size: Look ups



- This graph displays what happens to the number of look ups performed when the size of the Bloom Filter is increased. As you can see, the number of look ups increases as the size of the Bloom Filter also increases.

This shows that if the user were to input smaller sizes for the Bloom Filter, there would be fewer look ups, for the Hash table, that would be required. And vice versa. Knowing that, if the user wanted to have less look ups, they would use a smaller Bloom Filter size.

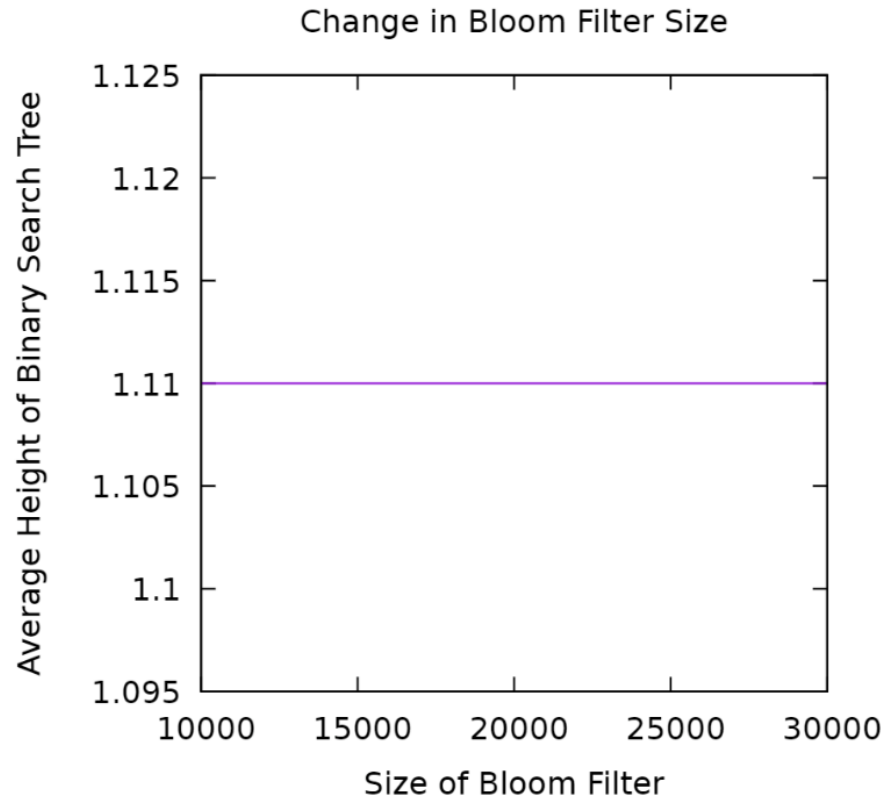
2 Change in Bloom Filter Size: BST Size



- This graph displays what happens to the average Binary Search Tree size when the size of the Bloom Filter is increased. As the graph shows, there is no change in the BST size when the Bloom Filter size increase .

So what this tells us is the changing the Bloom Filter size has no effect on the BST size. Later on you will see that changing the Hash Table size is what changes the size of the BST. The user should realize that the Bloom Filter size will have no effect on their binary search tree size.

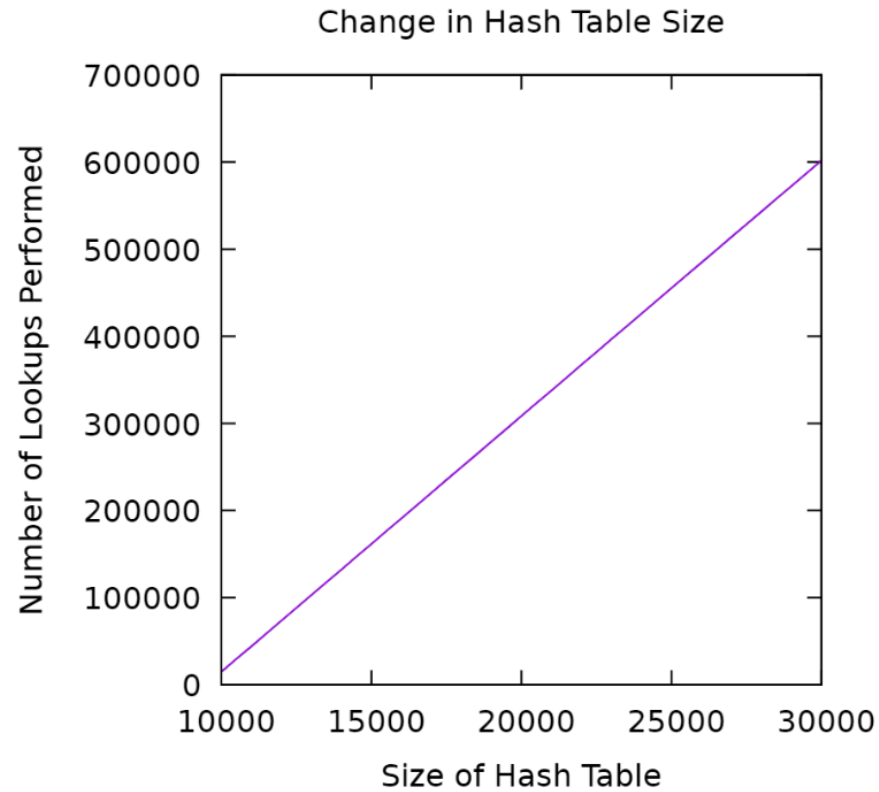
3 Change in Bloom Filter Size: BST Height



- This graph displays what happens to the average Binary Search Tree height when the size of the Bloom Filter is increased. As the graph shows, there is no change in the BST height when the Bloom Filter size increase .

So what this tells us is the changing the Bloom Filter size has no effect on the BST height. Later on you will see that changing the Hash Table size is what changes the height of the BST. The user should realize that the Bloom Filter size will have no effect on their binary search tree height.

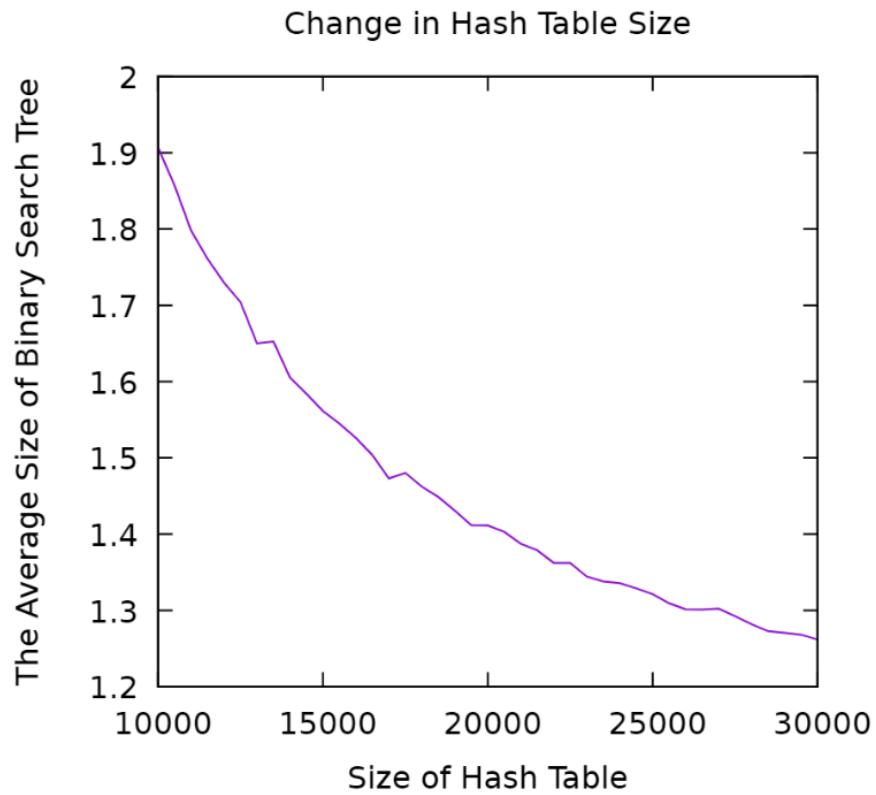
4 Change in Hash Table Size: Look ups



- This graph displays what happens when the size of the Hash Table increases. It shows that the average height of the binary tree will decrease.

This graph is the same as when the Bloom Filter size was changed. Showing that both of the changes will have similar effects on the number of look ups. Similarly to the Bloom Filter size change, if the user wants to have greater number of look ups, they can also increase the Hash Table size.

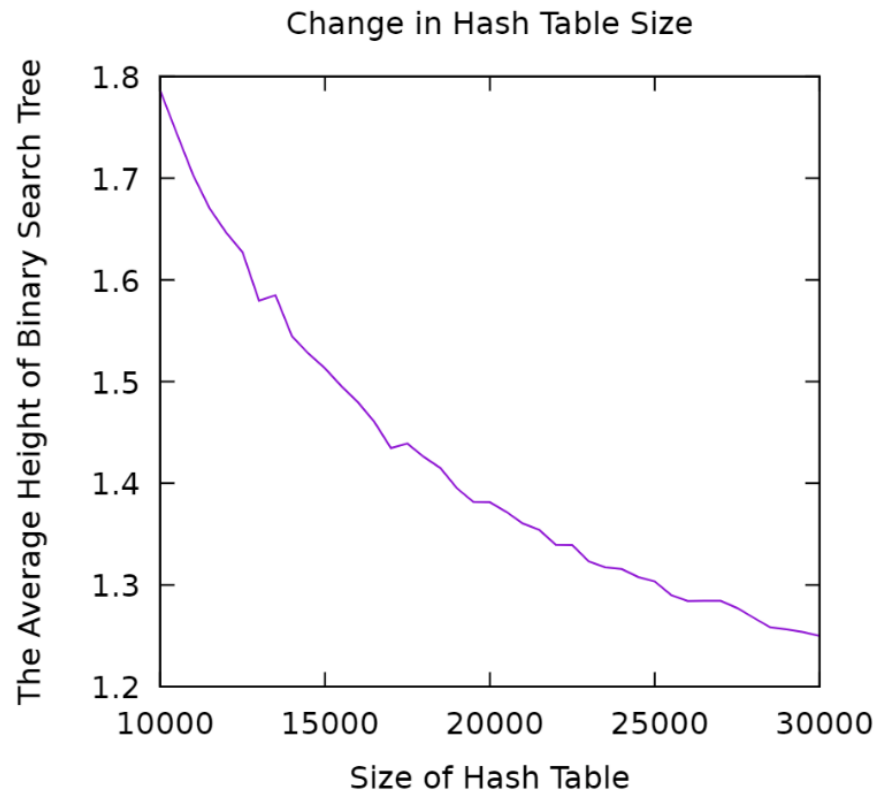
5 Change in Hash Table Size: BST Size



- This graph displays what happens when the size of the Hash Table increases. It shows that the Number of look ups that were required for the given input.

The decrease in the graph shows that the user inputting larger sizes for the Hash Table will overall affect the size of the binary search tree.

6 Change in Hash Table Size: BST Height



- This graph displays what happens when the size of the Hash Table increases. It shows that the average height of the binary tree will decrease.

The decrease in the graph shows that the user inputting larger sizes for the Hash Table will overall affect the height of the binary search tree. As you can see this graph looks similar to that one of the BST size change. This is because the size of the BST relates to the height of the BST. Meaning that they will be similar when it comes to the size of the Hash Table.

7 Conclusion

As you can see from the graphs that were displayed, changing both the Hash Table size and the Bloom Filter size has an effect on the binary tree and the number of look ups. While the number of look ups will continue to increase, the size and the height of the binary tree will decrease, as the sizes increase for the Hash Table size. Then, the Bloom Filter size will only have effect on the number of look ups and not the BST size and BST height.