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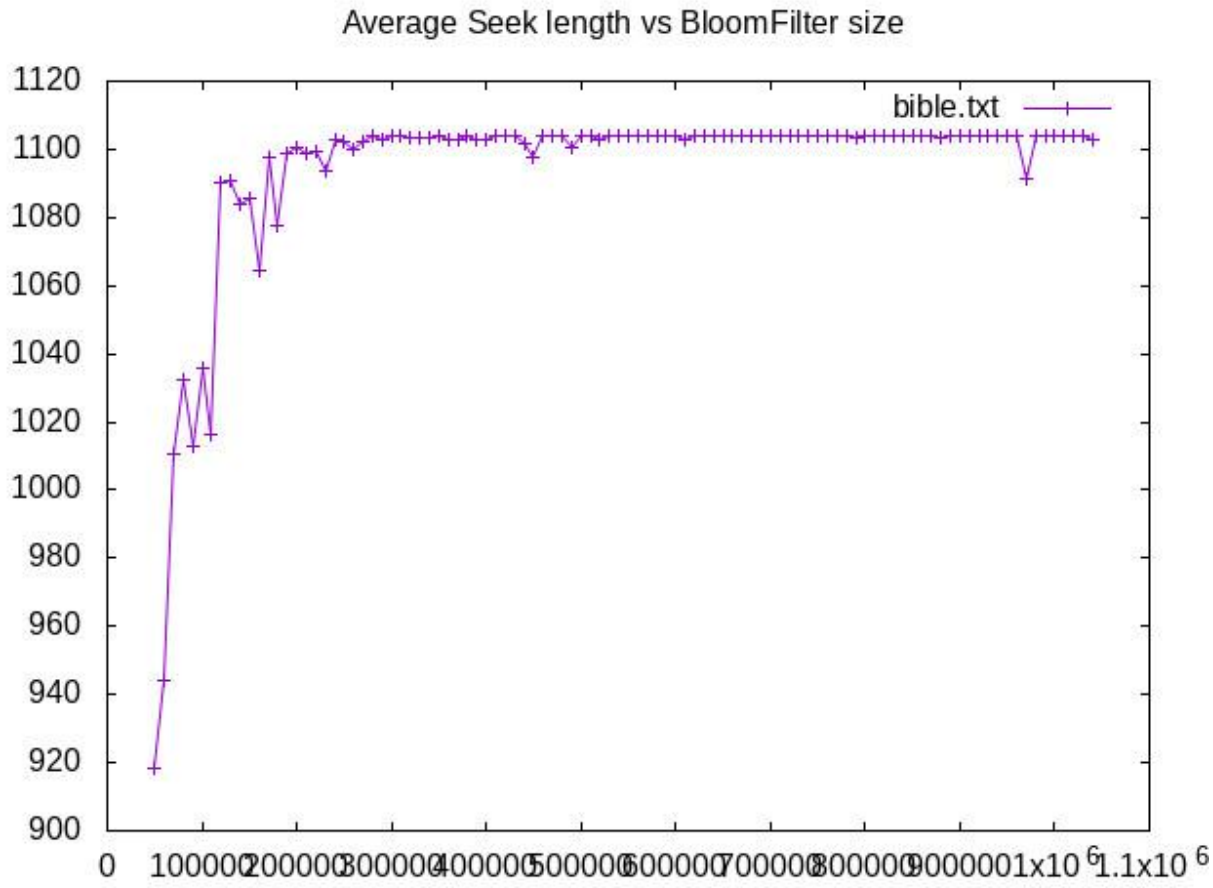
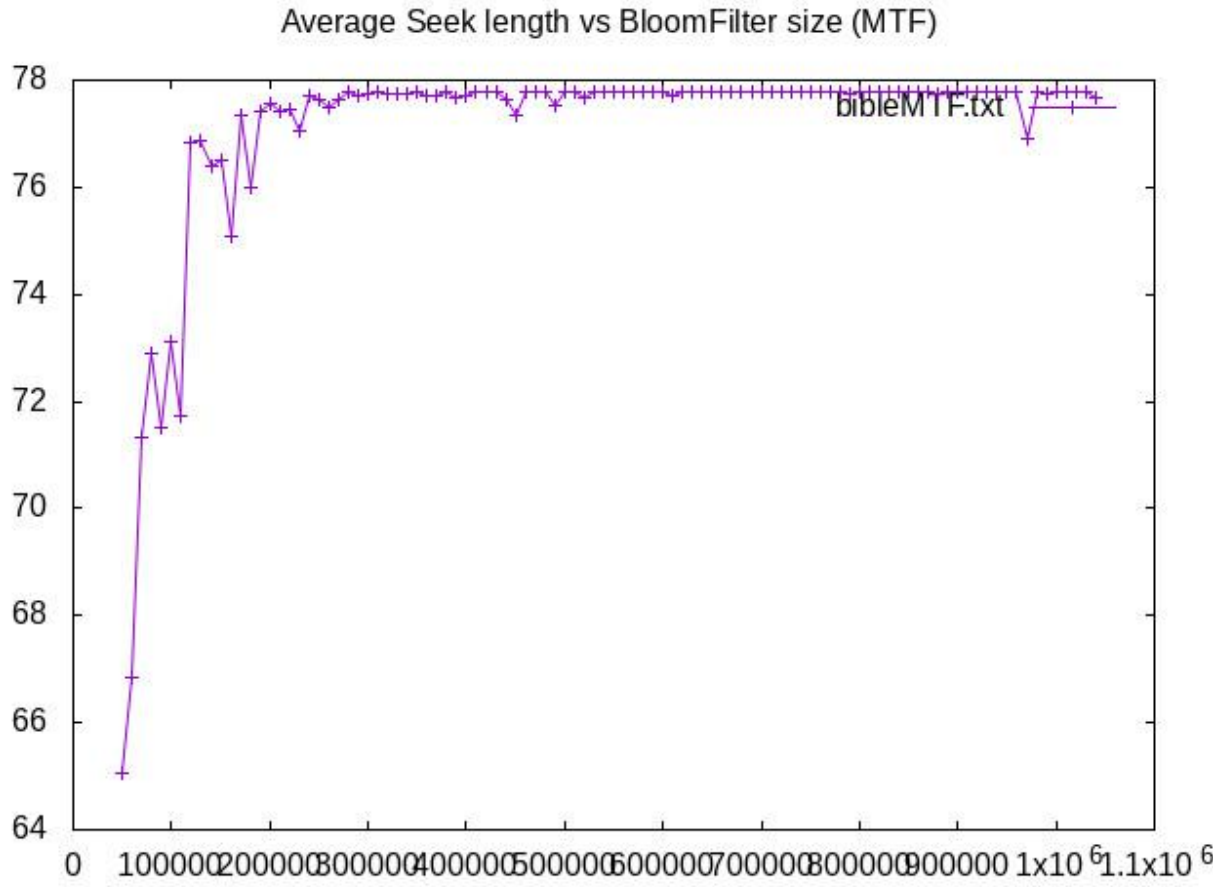
CSE13S Spring 2021
Assignment 7: The Great Firewall of Santa Cruz
WriteUp

GRAPH 1:



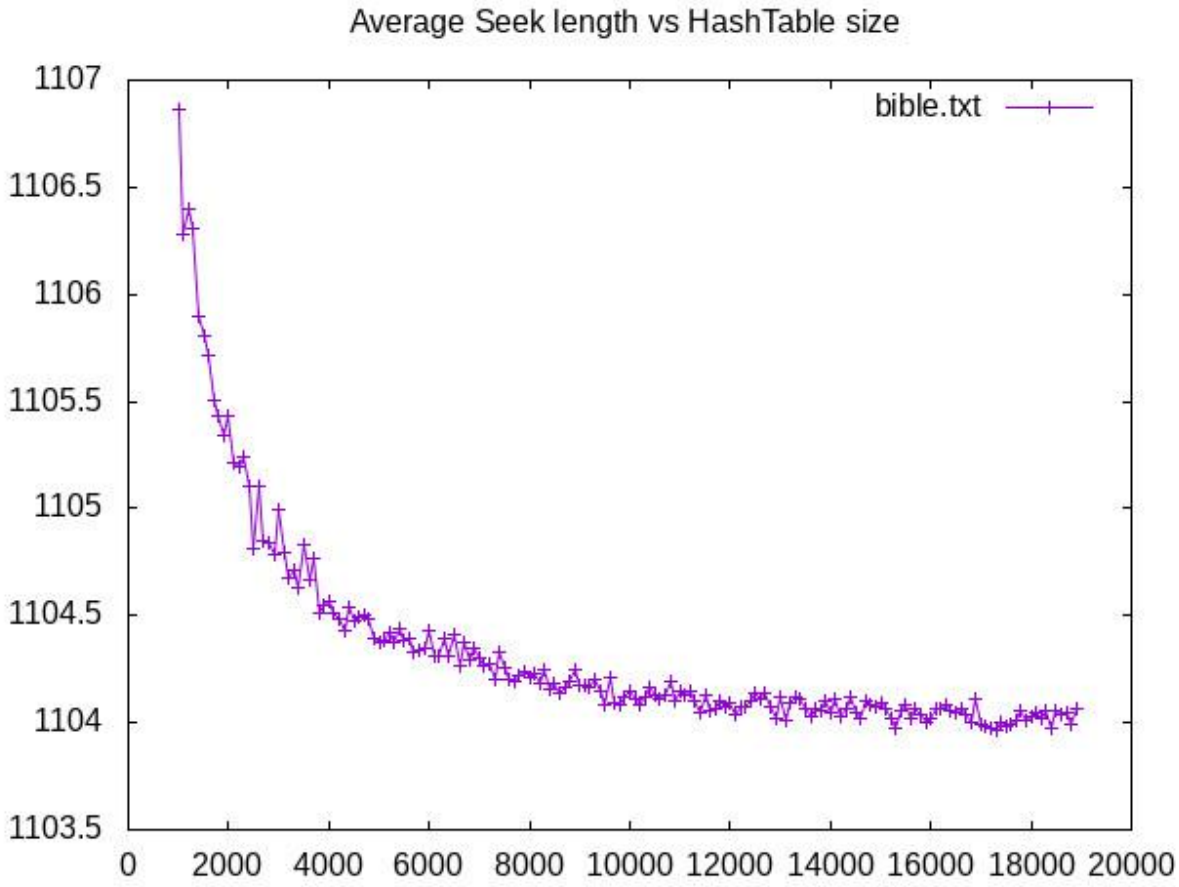
This graph describes the Average Seek Length of the main program as BloomFilter size rises. The x-axis represents BloomFilter size. The y-axis represents the Average Seek Length. As the BloomFilter size increases, the Average Seek Length increases.

GRAPH: 2



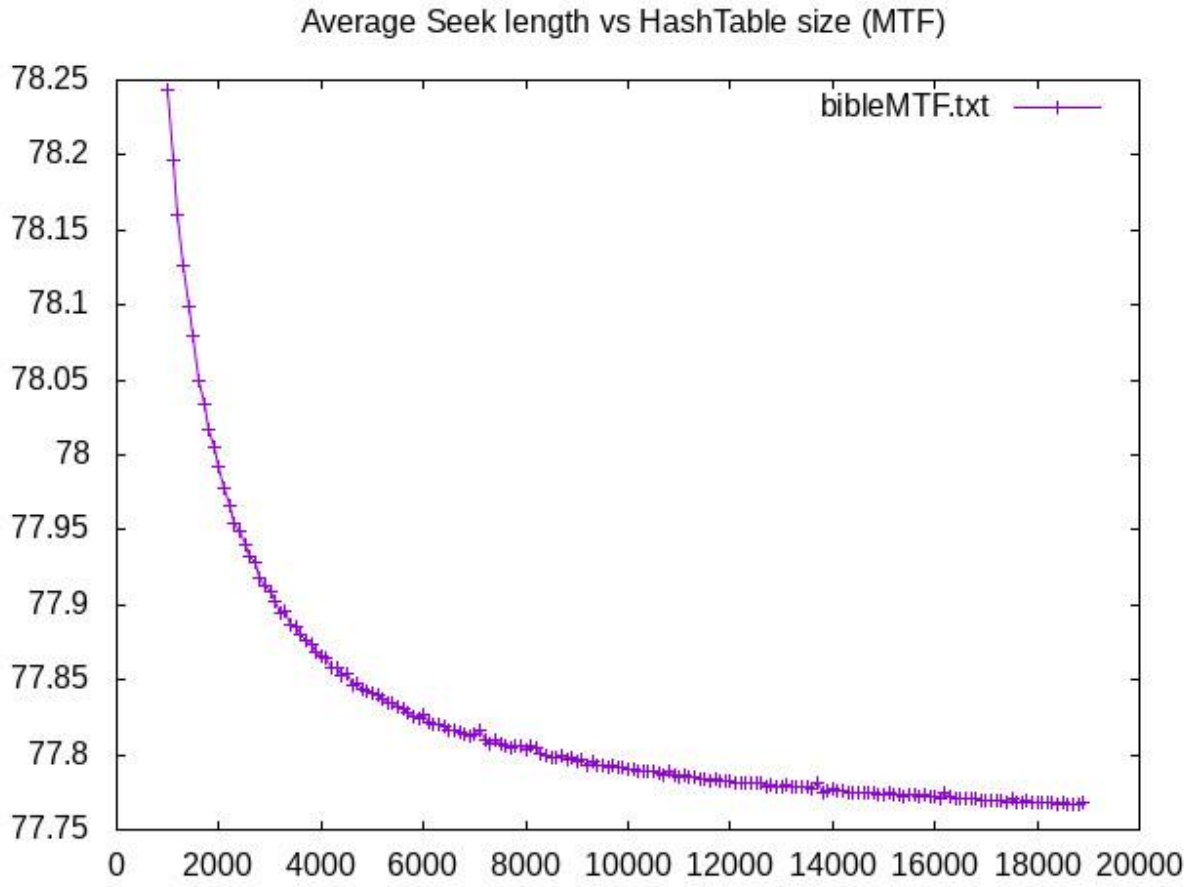
This graph describes the Average Seek Length of the main program with MTF(Move to front) on as BloomFilter size rises. The x-axis represents BloomFilter size. The y-axis represents the Average Seek Length. As the BloomFilter size increases, the Average Seek Length increases. The difference between this and non MTF is mainly that while the pattern is the same, it is orders of magnitude smaller than non MTF.

GRAPH: 3



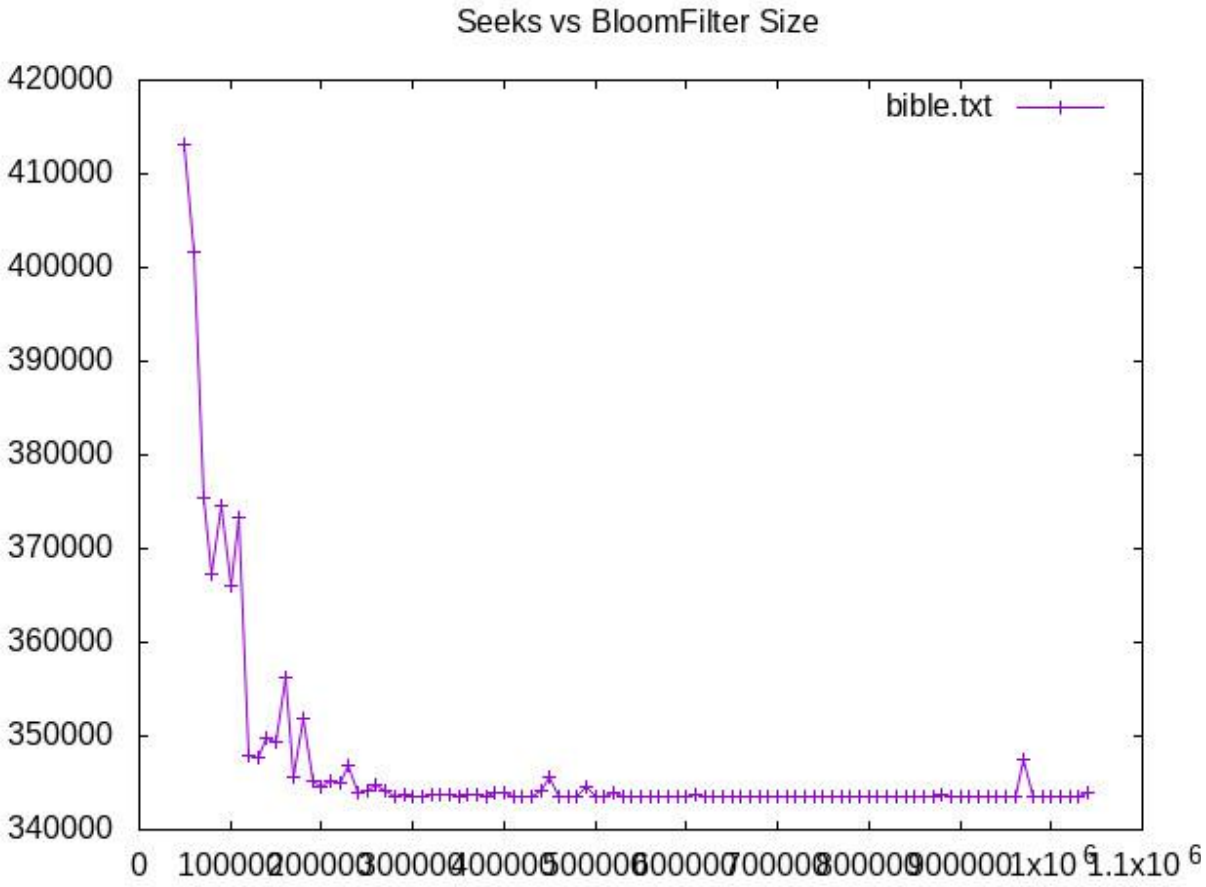
This graph describes the Average Seek Length of the main program as HashTable size rises. The x-axis represents HashTable size. The y-axis represents the Average Seek Length. The Average Seek length decreases as HashTable size increases.

GRAPH: 4



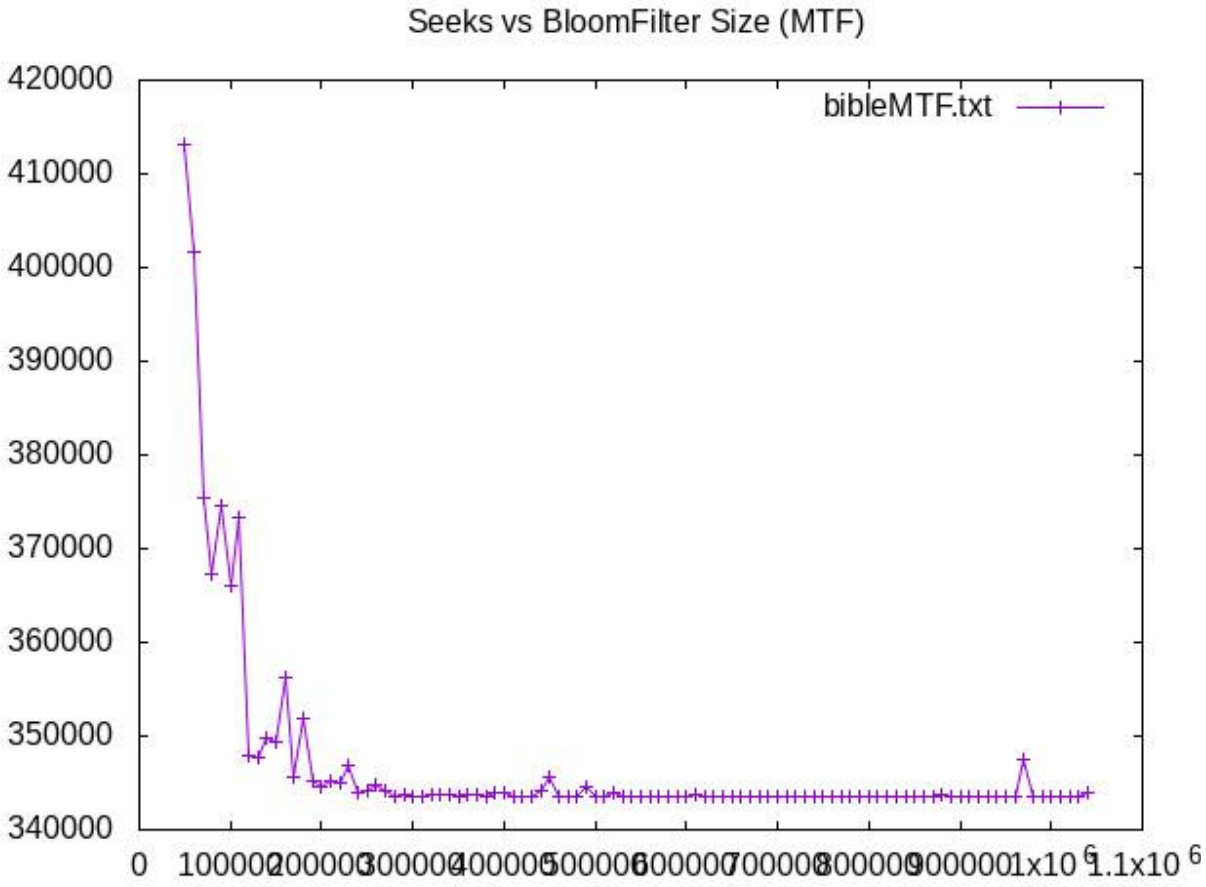
This graph describes the Average Seek Length of the main program with MTF on as HashTable size rises. The x-axis represents HashTable size. The y-axis represents the Seeks. The Average Seek length decreases as HashTable size increases. The difference between this and non MTF is mainly that while the pattern is the same, it is orders of magnitude smaller than non MTF.

GRAPH: 5



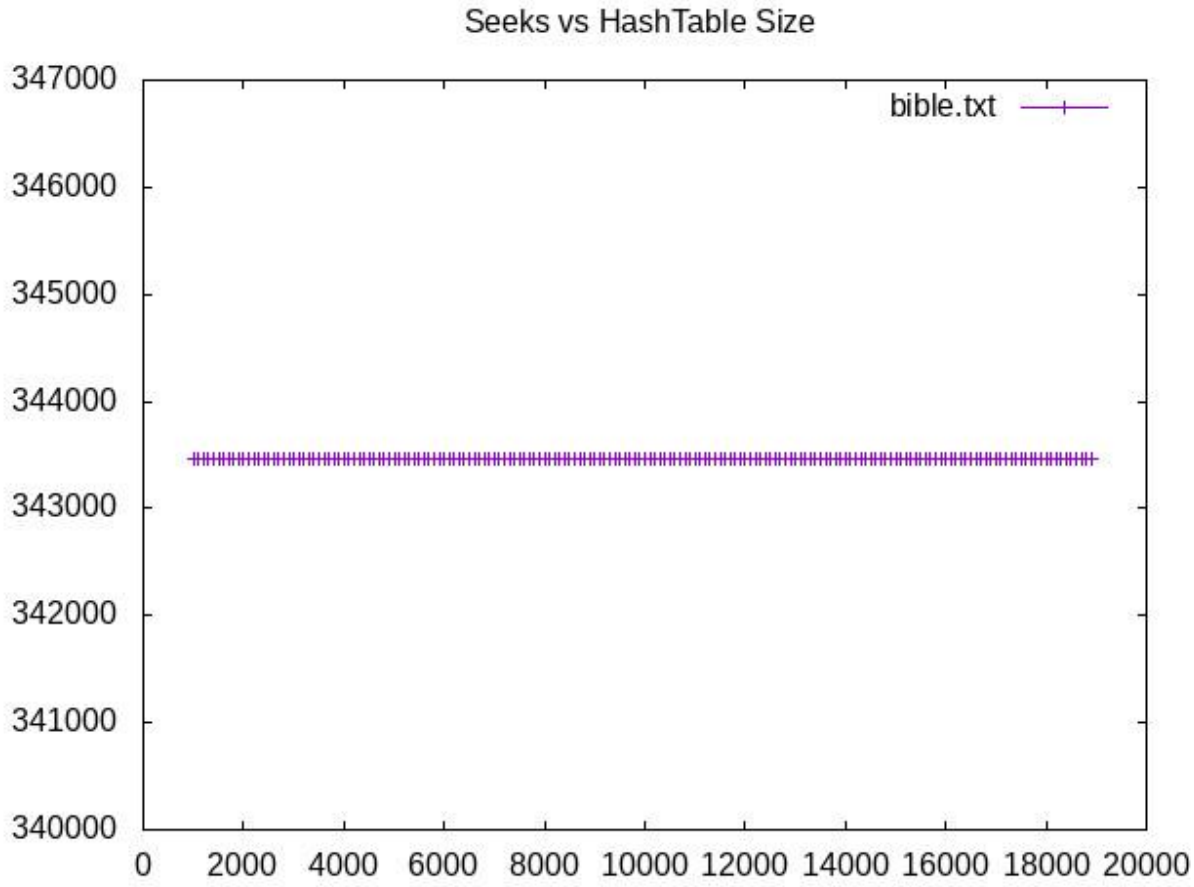
This graph describes the seeks of the main program as BloomFilter size rises. The x-axis represents BloomFilter size. The y-axis represents the Seeks. The amount of seeks drops as BloomFilter increases.

GRAPH: 6



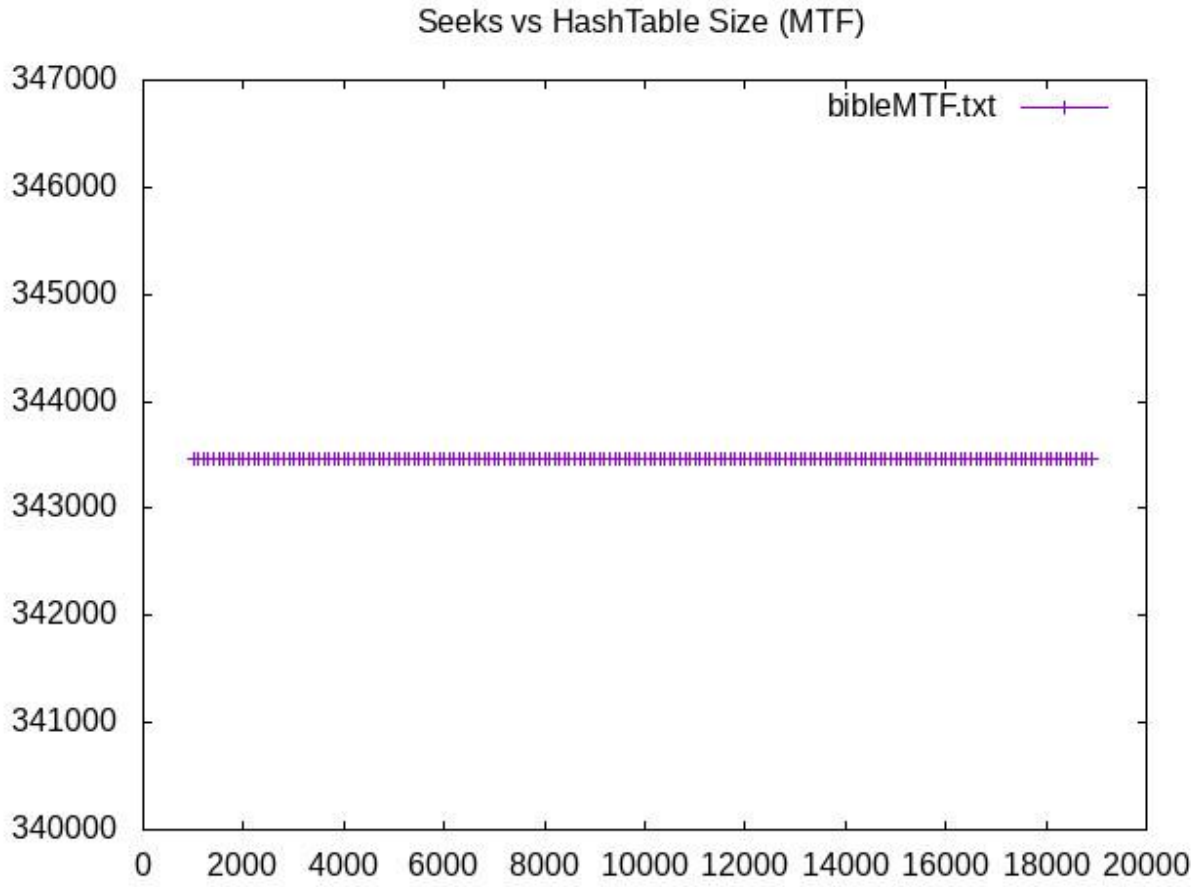
This graph describes the seeks of the main program with MTF ON as BloomFilter size rises. The x-axis represents BloomFilter size. The y-axis represents the Seeks. The y-axis represents the Seeks. The amount of seeks drops as BloomFilter increases. There is no difference between this and Non-mtf version

GRAPH: 7



This graph describes the seeks of the main program as BloomFilter size rises. The x-axis represents HashTable size. The y-axis represents the Seeks. The y-axis represents the Seeks. The amount of seeks stays the same as HashTable increases.

GRAPH: 8



This graph describes the seeks of the main program as BloomFilter size rises. The x-axis represents HashTable size. The y-axis represents the Seeks. The amount of seeks stays the same as HashTable increases. There is no difference between this and Non-mtf runs.

Since the equation for Average Seek length is links/seeks, we can rearrange that to become links = average seek length * seeks. **Links are the total size of all linked lists combined.** For varying HashTable sizes, seeks stay the same no matter what size of HashTable (Graph 7 & 8), thus the equation is simplified to links = average seek length for HashTable. From Graphs 3&4, it is clear that Average seek length decreases as HashTable increases. Assuming equal distribution of links for equal Linked lists, this means that as HashTable increases, the size of Linked Lists in the program decreases.

For BloomFilter this is more tricky. As BloomFilter size increases, the seek decreases (Graphs 5&6). However, Average Seek Length increases. (Graphs 1 & 2). The Equation thus becomes: links = increasing * decreasing as the bloom filter gets larger. Looking at Graphs 1 & 5, they look like exact mirror images of themselves. Thus the rate at which Average seeks increases is the same at the rate which Seeks decreases. However if you use a table and compare the results of increases and decreasing rates being multiplied:
(Example, not real data)

Average Seek Length	Seeks	Result (Linked List size)
1	1	1
1.1	0.9	0.99
1.2	0.8	0.96
1.3	0.7	0.91

From this table, it seems like the Linked List size decreases as BloomFilter size increases.

For all graphs, the general shape of the graph stays the same, while the values vary. Thus LinkedList sizes of MTF enabled programs will be proportional to the MTF disabled programs. Thus, as HashTable increases, the number of Links will increase. When Bloomfilter decreases, the amount of links will decrease.

Seeks is the variable we use to Calculate the amount of LinkedList lookups we perform. Each time we lookup, we increment Seeks by 1. From graphs 5 and 6, both Graphs trend downward as BloomFilter increases. While the amount of Lookups is the same for MTF enabled and disabled programs, the amount of Lookups will decrease if BloomFilter is increased.