

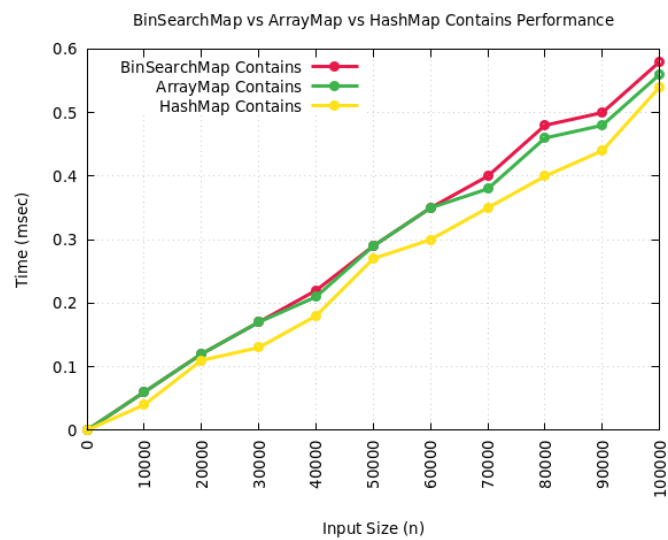
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FILE: HW-6_WriteUp.pdf

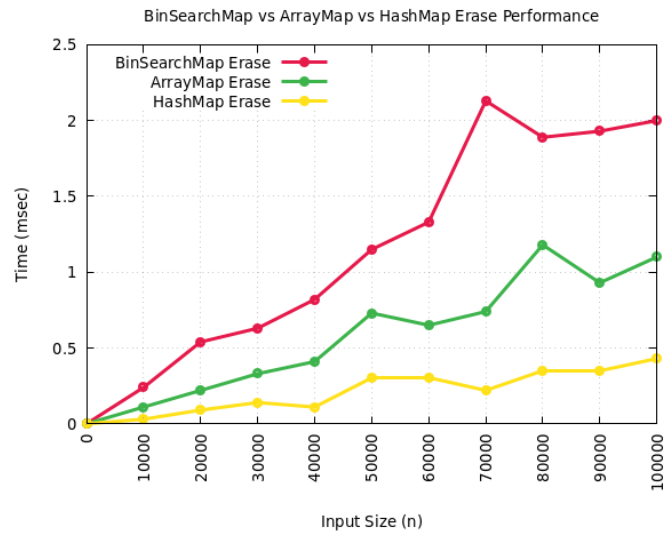
DATE: Fall 2021

DESC: This pdf goes over the basics accomplished throughout all the HW-6 related files

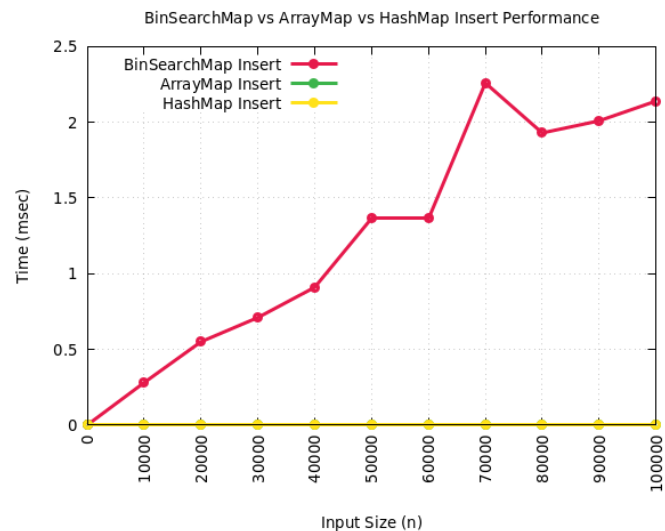
Graphs / Explanation



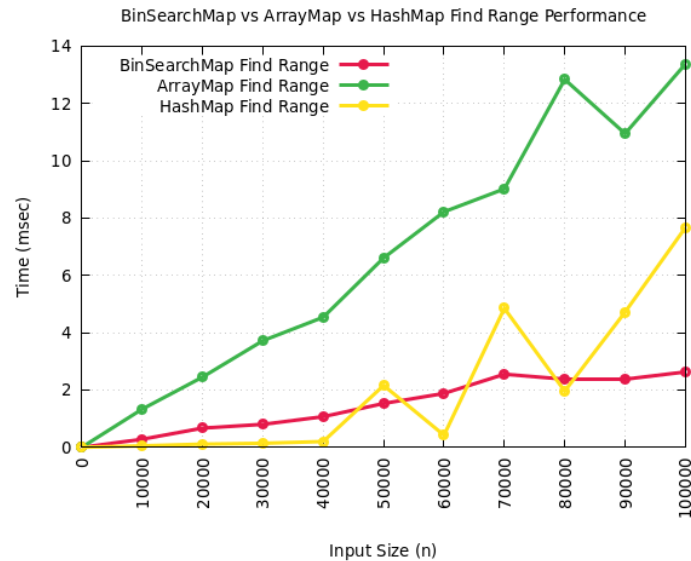
This is the graph that shows the performance of the contains function. In this graph the HashMap outperforms the other types. This is because HashMap only needs to check 3 or 4 chains in a linked list because it knows where the value should be by using its hash function. Also the artifacts are ignored in this analysis.



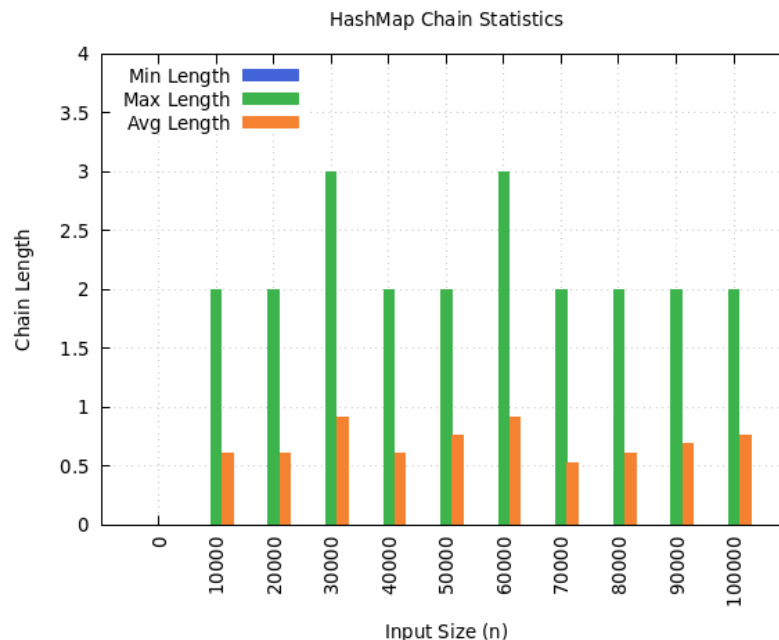
This is the graph that shows the performance of the erase function. Relating to hashmaps, the main conclusion is that it still outperforms both arraymap and binsearchmap. This is because similar to contains, hashmaps only need to check a few values because it knows where it should be in the map so it can instantly navigate there and delete it.



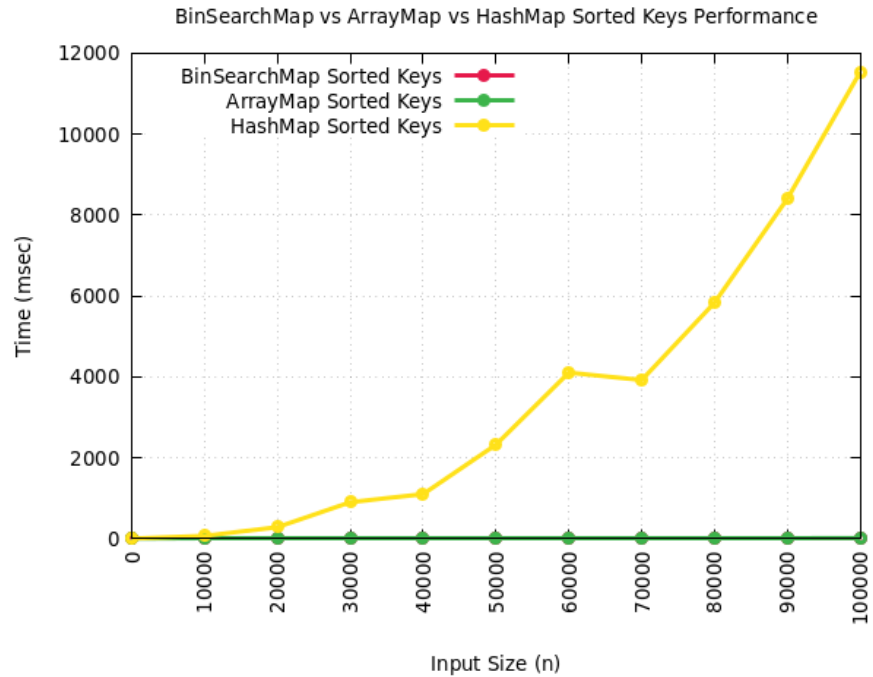
This is the graph that shows the performance of the insert function. Relating to hashmaps, the main conclusion is that it still outperforms both arraymap and binsearchmap. This is because similar to contains and erase, hashmaps only need to make one calculation, then traverse 2, maybe 3 indexes of a linked list.



This graph shows the performance of the findrange function. Although the hashmap implementation is faster than the arraymap version, after 80000 it appears to become slower than the binsearchmap. This makes sense because since hashmap uses a hash function, the ordering of the table is more complicated so you need to traverse the entire array looking for anything with a matching key.



This graph shows the statistics of the chain length. As predicted, they never go over 3. This is because if it ever goes over 3, resize and rehash will be called. Another thing to point out is how the average length is always below 1. This is because of the load threshold.



This final graph is for the sorted keys performance. Sorted keys traverses the entire array and does an arraysequence sort on it. Binsearchmap doesn't need to preform any sorting afterwards, whereas arraymap and hashmap do.

Table:

operation	ArrayMap	LinkedMap	BinSearchMap	HashMap
insert	1	NLogN	NLogN	1
erase	N	NLogN	NLogN	1
contains	NLogN	N	LogN	1
find keys	N	N	LogN	Logn
sorted keys	N	N	LogN	N

Issues I faced:

I faced no issues