Lab report

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(1) The overall organization of your experiment

The purpose of this lab was to implement a min 3-heap and compare its functionality with that of a binary search tree. We did this with two steps taking the average of the time to build the structure for a given amount of values and then testing the time to build the function.

(2) Data generation

To generate the data we did something very similar to our last lab. Using different srand keys we generate random arrays of size n upon which we added to the structures. Then using the same keys we randomly decided to do either an insert or remove of some kind (min, max, or a particular) on the structures

(3) Summary of the Results

Well the min heap was clearly better at building. It was quite bad at other functions mainly because (removing a particular value and removing the max are very inefficient) in a min heap
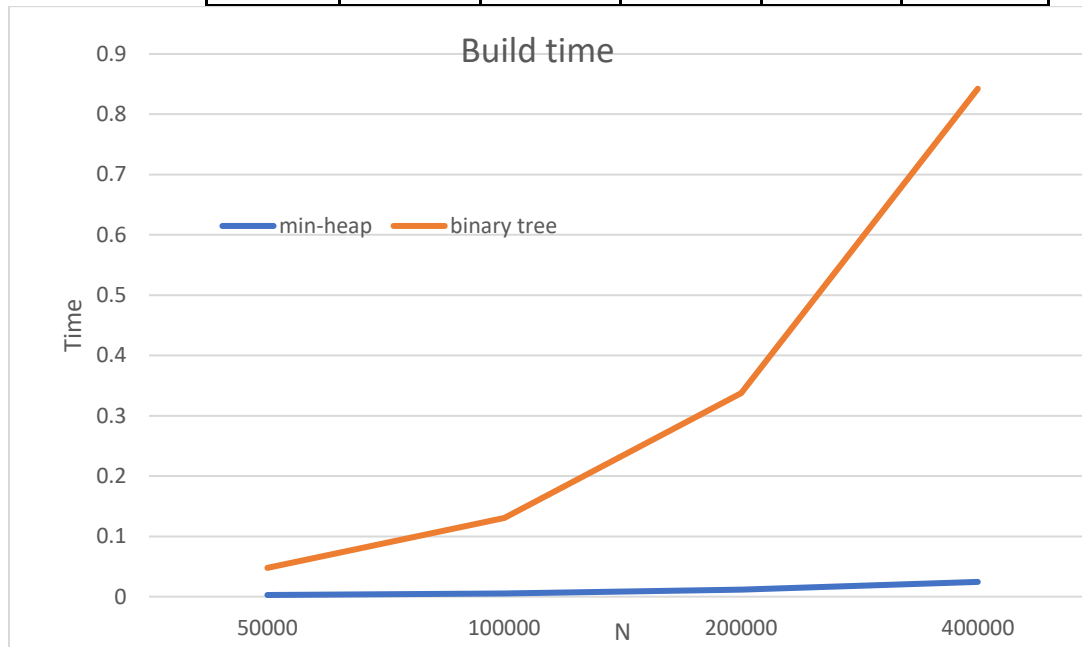
(4) Conclusion

Well a min heap can be constructed far quicker than a BST, and function's such as insert and delete min operate very quickly functions such as delete(x) and delete max are looking if down the values of an array making them really bad. So if you don't have to delete random values in the segment or the maximum value ever the min heap would be a better choice then binary search tree. But if you have to delete certain values or the max (although you could make a max very easily k-heap) then a Binary Search might be the better option.

	N	1	2	3	4	5	average
min heap	50000	0.003502	0.002572	0.002569	0.002586	0.002562	0.002807
	100000	0.006956	0.004956	0.005207	0.004998	0.004995	0.005529
	200000	0.015023	0.009869	0.009778	0.012546	0.012555	0.011804
	400000	0.026535	0.019836	0.02529	0.026347	0.026119	0.024502
functions	50000	0.561335	0.560493	0.574052	0.570269	0.555176	0.566537
	100000	2.26977	2.28541	2.27388	2.26722	2.26711	2.27407
	200000	8.97326	8.95724	9.02193	9.06191	8.95924	9.003585
	400000	36.1351	36.404	36.2585	36.7385	36.2475	36.38403

BST	50000	0.039918	0.035701	0.045431	0.055419	0.062438	0.047781
	100000	0.076253	0.082286	0.124862	0.174936	0.194564	0.13058
	200000	0.174809	0.220045	0.37026	0.444835	0.478627	0.337715
	400000	0.436175	0.645307	0.936503	1.0702	1.12371	0.842379
Begin of functions	50000	0.003749	0.004195	0.006085	0.007018	0.007679	0.005745
	100000	0.008414	0.009682	0.016727	0.016538	0.018096	0.013891
	200000	0.019438	0.02221	0.034963	0.042229	0.045554	0.032879
	400000	0.048028	0.056222	0.091358	0.09913	0.108097	0.080567

Build time

Functionality time

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