

1. Organization of Experimental Profiling

I have performed an experiment by running all BST, Min 5-Heap and Max 5-Heap using different random numbers ranging from 1m to 5m where m is equal to 1,000,000.

The CPU clock start and end time were noted for each build, deleteMin, and deleteMax operation for each tree structure and then finally their average was computed to evaluate the result. This operation is executed 5 times for each number set at different seed.

2. Input data generating using random number generator

To perform this I have used the standard Rand() function that generates random number and made it within the range of 1 to 5m using the mod function of 5m. For every number set (1m to 5m) I have used different seeding. So overall my experiment was performed for 5 numbers set 1m to 5m where each number or data was limited to 1 to 5m only and then for each number set 5 times the operation was performed for different seeding.

3. CPU time recording in C++.

CPU time was recorded using the provided TimerClass where start and end time duration was calculated in seconds and nanoseconds.

4. Data recording and analysis

Time duration for each table is noted and shown in the program's output for build, deleteMin and deleteMax.

5. Performance comparison, observations and summary.

.....Performance(BST).....					
	1,000,000	2,000,000	3,000,000	4,000,000	5,000,000
Build	0.921593	2.442426	4.111716	5.918170	7.764294
deleteMin	0.000476	0.001537	0.002607	0.003682	0.005024
deleteMax	0.000518	0.001694	0.002993	0.003916	0.005524

.....Performance(Min 5-Heap).....					
	1,000,000	2,000,000	3,000,000	4,000,000	5,000,000
Build	0.045863	0.093760	0.135547	0.176832	0.218340
deleteMin	0.000712	0.001806	0.002829	0.003968	0.005147
deleteMax	7.110833	28.493244	64.053157	114.083778	177.825807

.....Performance(Max 5-Heap).....					
	1,000,000	2,000,000	3,000,000	4,000,000	5,000,000
Build	0.044568	0.090503	0.130044	0.170551	0.211766
deleteMin	1.422229	5.696427	12.813593	22.813945	35.568313
deleteMax	0.000145	0.000365	0.000570	0.000786	0.001052

.....
Please choose one of the following commands
1.Performance Comparison
2.Exit

P.S As already stated above each operation was performed on the same number set for each table.

6. Conclusion

Hence from the above experiment I can conclude that the build operation, deleteMin in Min Heap and deleteMax in Max Heap can be performed in less time but when a deleteMax operation is required the Min Heap is not an ideal data structure and similarly Max Heap is not ideal for deleteMin operation.