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EECS560
Lab 7b Write Up
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Overall Organization:

The Data was divided into four modules, cooresponding to min5 build-by-insert, minMax build bottom up, min5 random function, and minMax random function. Each of these modules was further divided into trials based on a certain size, (50,000, 100,000, 200,000 and 400,000). Each of those trials had five run-throughs, which were averaged for a final comaparison value- which is used to compare the relative effectiveness of the two heaps.

Data Generation:

The data was generated using the c++ functions srand and rand. When building the data structures (or using random functions) both data structures received the same values to build. This is because the seed cooresponding to the random generator for the run through was the same for each iteration of the corresponding functions.

Summary of the Results:

Rather than bore you with a three-page long table of values you could just as easily generate by running my program, here are the highlights:

Data Structure	Operation	Size of Input	Average Time over 5 trials
Min5Heap	Build by Insert	50000	.0022296
Min5Heap	Build by Insert	100000	.0038278
Min5Heap	Build by Insert	200000	.0033472
Min5Heap	Build by Insert	400000	.005144
MinMax	Bottom up Build	50000	.0042196
MinMax	Bottom up Build	100000	.0084502
MinMax	Bottom up Build	200000	.016861
MinMax	Bottom up Build	400000	.0337274
Min5Heap	RandomFunction	50000	.0115252
Min5Heap	RandomFunction	100000	.0213682
Min5Heap	RandomFunction	200000	.0374022
Min5Heap	RandomFunction	400000	.0636542
MinMax	RandomFunction	50000	.0003316
MinMax	RandomFunction	100000	.0007056
MinMax	RandomFunction	200000	.0013618
MinMax	RandomFunction	400000	.0033226

In summary, constructing the minMax heap took about twice as long as constructing the min5heap, however in terms of operations, the minMax heap outpreformed the min5 heap nearly three to one. This leads me to conclude that when a large amount of data storage is needed, and the data structure is not likely to be operated on frequently, a Min5Heap is preferable to a minMax heap. However, if the application frequently operates on the data structure, the minMax heap is preferrable, because of its much smaller random function trial time.

Observation and Conclusion:

The Data was rather uniform except for one instance, the Min5Heap buildByInsert 200000 trial was actually faster than the Min5Heap build by insert 100000 trial. I assumed this was an error at first and debugged my code, and after much prodding have concluded that this is an anomaly due to the random numbers being more favorable during the 100000 trial