CS302: Homework 5

Heaps of fun.

Exercise 1.

This assignment was very simple due to the use of the STL library. Creating a vector with 100 random elements, turning that into a heap, and performing some push and pop operations was the entirety of the assignment. I took the liberty of outputting the data after almost every step, and it helps to provide a visual representation of how the operations affect the heap.

There were no guidelines on how to generate the random numbers, so I followed the previous assignment's guideline of 200 being the maximum value.

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Vector initialized.

Generating 100 random integers...
194 124 108 118 46 154 30 103 27 32 109 66 150 17 17 20 192 105
119 97 2 39 81 31 62 102 169 19 180 4 28 127 128 136 45 127 42 27
182 69 59 92 87 9 109 105 182 101 162 101 150 165 92 183 148 154
86 69 173 18 73 1 145 154 89 142 81 131 169 63 152 181 155 39 142
16 96 124 69 11 177 171 128 69 155 76 23 193 146 148 11 19 101
109 125 190 51 6 121 173

Vector converted to heap.
194 193 190 192 182 183 180 169 182 177 148 173 169 173 145 154
152 181 124 171 155 146 125 162 154 165 150 154 69 73 28 127 142
136 118 155 142 96 119 97 128 92 87 124 109 105 109 101 121 101
150 102 92 108 148 19 86 30 17 18 4 1 17 20 89 128 81 131 103 63
45 127 105 39 42 16 27 27 69 11 69 59 32 69 2 76 23 9 39 109 11
19 101 46 81 31 51 6 66 62

Average value of elements is 98 and has been pushed into heap.
194 193 190 192 182 183 180 169 182 177 148 173 169 173 145 154
152 181 124 171 155 146 125 162 154 165 150 154 69 73 28 127 142
136 118 155 142 96 119 97 128 92 87 124 109 105 109 101 121 101
150 102 92 108 148 19 86 30 17 18 4 1 17 20 89 128 81 131 103 63
45 127 105 39 42 16 27 27 69 11 69 59 32 69 2 76 23 9 39 109 11
19 101 46 81 31 51 6 66 62 98

Maximum value of heap is 194 and has been popped from heap.
193 192 190 182 182 183 180 169 181 177 148 173 169 173 145 154
152 155 124 171 155 146 125 162 154 165 150 154 69 73 28 127 142
136 118 127 142 96 119 97 128 92 87 124 109 105 109 101 121 101
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150 102 92 108 148 19 86 30 17 18 4 1 17 20 89 128 81 131 103 63
45 98 105 39 42 16 27 27 69 11 69 59 32 69 2 76 23 9 39 109 11 19
101 46 81 31 51 6 66 62

Sorting the heap...

Heap sorted.
1 2 4 6 9 11 11 16 17 17 18 19 19 20 23 27 27 28 30 31 32 39 39
42 45 46 51 59 62 63 66 69 69 69 69 73 76 81 81 86 87 89 92 92 96
97 98 101 101 101 102 103 105 105 108 109 109 109 118 119 121 124
124 125 127 127 128 128 131 136 142 142 145 146 148 148 150 150
152 154 154 154 155 155 162 165 169 169 171 173 173 177 180 181
182 182 183 190 192 193