

Abraham Meza

Kostas Alexis

CS 302 – 1001

November 6, 2019

Heap Data Structure Program Output

Section 2. Exercise on using STL for Heaps

In this exercise, your goal is to familiarize yourself with respect to how to use the STL to implement and operate on a heap data structure.

Exercise 1. Using STL for Heaps

Utilize STL to

1. Make a heap consisting of 100 random integers.
2. Add a new value that is the mean of the random values you created in the previous step.
Floor the value if needed.
3. Delete the maximum element of the heap and
4. Sort the heap.

Terminal View:

```

////////////////////
/////  Heap Data Structure  /////
////////////////////

The current heap (Random Integers):
198 194 188 193 182 180 182 192 157 175 181 133 155 133 176 165 163 134 155 115 158 120 157 132 118 125 57 96 64 56
149 154 134 117 160 121 76 143 139 113 102 136 140 109 83 91 79 125 123 43 67 118 122 1 12 83 25 46 3 2 51 121 101 5
5 7 72 1 60 4 81 67 46 3 68 39 115 117 129 74 102 4 81 3 75 108 17 113 45 48 14 64 54 2 38 12 48 119 93 17 24

The mean of the current heap is: 95
The maximum element of the current heap is: 198

The current heap w/ added mean value:
198 194 188 193 182 180 182 192 157 175 181 133 155 133 176 165 163 134 155 115 158 120 157 132 118 125 57 96 64 56
149 154 134 117 160 121 76 143 139 113 102 136 140 109 83 91 79 125 123 43 67 118 122 1 12 83 25 46 3 2 51 121 101 5
5 7 72 1 60 4 81 67 46 3 68 39 115 117 129 74 102 4 81 3 75 108 17 113 45 48 14 64 54 2 38 12 48 119 93 17 24 95

The mean of the current heap is: 95
The maximum element of the current heap is: 198

The current heap w/ maximum element deleted:
194 193 188 192 182 180 182 165 157 175 181 133 155 133 176 154 163 134 155 115 158 120 157 132 118 125 57 96 64 56
149 95 134 117 160 121 76 143 139 113 102 136 140 109 83 91 79 125 123 43 67 118 122 1 12 83 25 46 3 2 51 121 101 55
7 72 1 60 4 81 67 46 3 68 39 115 117 129 74 102 4 81 3 75 108 17 113 45 48 14 64 54 2 38 12 48 119 93 17 24

The mean of the current heap is: 94
The maximum element of the current heap is: 194

The current sorted heap (Ascending Order):
1 1 2 2 3 3 3 4 4 7 12 12 14 17 17 24 25 38 39 43 45 46 46 48 48 51 54 55 56 57 60 64 64 67 67 68 72 74 75 76 79 81
81 83 83 91 93 95 96 101 102 102 108 109 113 113 115 115 117 117 118 118 119 120 121 121 122 123 125 125 129 132 133
133 134 134 136 139 140 143 149 154 155 155 157 157 158 160 163 165 175 176 180 181 182 182 188 192 193 194

The mean of the current heap is: 94
The maximum element of the current heap is: 194

```

Copy/Paste Terminal Text:

```

////////////////////////
/////  Heap Data Structure  /////
////////////////////////

```

The current heap (Random Integers):

```

198 194 188 193 182 180 182 192 157 175 181 133 155 133 176 165 163
134 155 115 158 120 157 132 118 125 57 96 64 56 149 154 134 117 160
121 76 143 139 113 102 136 140 109 83 91 79 125 123 43 67 118 122 1 12
83 25 46 3 2 51 121 101 55 7 72 1 60 4 81 67 46 3 68 39 115 117 129 74
102 4 81 3 75 108 17 113 45 48 14 64 54 2 38 12 48 119 93 17 24

```

The mean of the current heap is: 95

The maximum element of the current heap is: 198

The current heap w/ added mean value:

```

198 194 188 193 182 180 182 192 157 175 181 133 155 133 176 165 163
134 155 115 158 120 157 132 118 125 57 96 64 56 149 154 134 117 160
121 76 143 139 113 102 136 140 109 83 91 79 125 123 43 67 118 122 1 12
83 25 46 3 2 51 121 101 55 7 72 1 60 4 81 67 46 3 68 39 115 117 129 74
102 4 81 3 75 108 17 113 45 48 14 64 54 2 38 12 48 119 93 17 24 95

```

The mean of the current heap is: 95

The maximum element of the current heap is: 198

The current heap w/ maximum element deleted:

```

194 193 188 192 182 180 182 165 157 175 181 133 155 133 176 154 163
134 155 115 158 120 157 132 118 125 57 96 64 56 149 95 134 117 160 121
76 143 139 113 102 136 140 109 83 91 79 125 123 43 67 118 122 1 12 83
25 46 3 2 51 121 101 55 7 72 1 60 4 81 67 46 3 68 39 115 117 129 74
102 4 81 3 75 108 17 113 45 48 14 64 54 2 38 12 48 119 93 17 24

```

The mean of the current heap is: 94

The maximum element of the current heap is: 194

The current sorted heap (Ascending Order):

```

1 1 2 2 3 3 3 4 4 7 12 12 14 17 17 24 25 38 39 43 45 46 46 48 48 51 54
55 56 57 60 64 64 67 67 68 72 74 75 76 79 81 81 83 83 91 93 95 96 101
102 102 108 109 113 113 115 115 117 117 118 118 119 120 121 121 122
123 125 125 129 132 133 133 134 134 136 139 140 143 149 154 155 155
157 157 158 160 163 165 175 176 180 181 182 182 188 192 193 194

```

The mean of the current heap is: 94

The maximum element of the current heap is: 194