**44-642 Application Design: Patterns and Frameworks**

**Heaps KEY**

1. Insert the following elements into a heap, in the order listed here. Draw the binary tree representation of the resulting heap.

**2 17 10 8 12**

**SOLUTION**



1. Show the array representation of the heap from the previous problem.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** |
| **2** | **8** | **10** | **17** | **12** |

1. Add 9 to the above heap. Show the binary tree representation of the resulting heap.

**SOLUTION**



1. Remove the top element from the heap in the previous problem. Show the binary tree representation of the resulting heap.

**SOLUTION**



1. Insert the following elements into a heap, in the order listed here. Draw the binary tree representation of the resulting heap.

**19 18 3 8 20 15 12 9 23 14 7 37 50 22 2**

**SOLUTION**



1. Add 5 to the above heap. Show the binary tree representation of the resulting heap.

**SOLUTION**



1. Remove the top element from the heap in the previous problem. Show the binary tree representation of the resulting heap.

**SOLUTION**



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**SOLUTION**



1. Remove the top element from the heap in the previous problem. Show the binary tree representation of the resulting heap.

**SOLUTION**



1. Show the array representation of the heap in the previous problem. Show the index, as well as the value stored at each index.

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** | **10** | **11** | **12** | **13** |
| **7** | **8** | **12** | **9** | **14** | **18** | **15** | **19** | **23** | **20** | **22** | **37** | **50** |