Worksheet: Heaps

**Worksheet: Heap Practice**

**Group 11**

**In Preparation:** Read Chapter 11 on the Priority Queue ADT and Heaps

Insert the following values, in the order that they are given into a Min Heap. Show the tree after each insertion.

1. **30,20,50,10,5,70**

|  |  |
| --- | --- |
| 30 is added | 30 |
| 20 is added  Tree is filled from left to right  New element is placed in the next available position, then the tree is fixed by percolating up (while new element is less than parent, swap value with the parent) | Element is added  30  20  Percolating up  20  30 |
| 50 is added  Tree is filled from left to right | 20  30 50 |
| 10 is added  Tree is filled from left to right  New element is placed in the next available position, then the tree is fixed by percolating up (while new element is less than parent, swap value with the parent) | Element is added  20    30 50  10  Percolating up  10    20 50  30 |
| 5 is added  Tree is filled from left to right  New element is placed in the next available position, then the tree is fixed by percolating up (while new element is less than parent, swap value with the parent) | Element is added  10    20 50  30 5  Percolating up  5    10 50  30 20 |
| 70 is added | 5    10 50  30 20 70 |

1. Remove Min from the heap

Remove Min is equivalent to removing root

Root is replaced with the element in the last filled position

70

10 50

30 20

The heap is fixed by percolating down **(while greater than the smallest child, swap with the smallest child)**

10

20 50

30 70

3) Add 8 to the heap

Tree is filled from left to right

10

20 50

30 70 8

New element is placed in the next available position, then the tree is fixed by percolating up **(while new element is less than parent, swap value with the parent)**

8

20 10

1. 70 50

4) Remove Min from the heap

Remove Min is equivalent to removing root

Root is replaced with the element in the last filled position

50

20 10

1. 70

The heap is fixed by percolating down **(while greater than the smallest child, swap with the smallest child)**

10

20 50

1. 70