

Monday, 23  
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# Crux

## Lecture -17

Data Structures -7

Priority Queues, Heaps

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# Data Structures so far

1. Linked Lists
2. Stacks and Queues
3. Trees(Generic + Binary)
4. BST
5. Maps

How to find min/max out of  
some elements?

# Priority Queues

# Priority Queues

```
Class PriorityQueue{  
    // accessor methods  
    int size();  
    boolean isEmpty();  
    Object min();  
    // update methods  
    void insert(Object priority, Object value);  
    void removeMin();  
}
```

# Implement using unsorted List

1. Min
2. RemoveMin
3. Insert

# Implement using sorted List

1. Min
2. RemoveMin
3. Insert

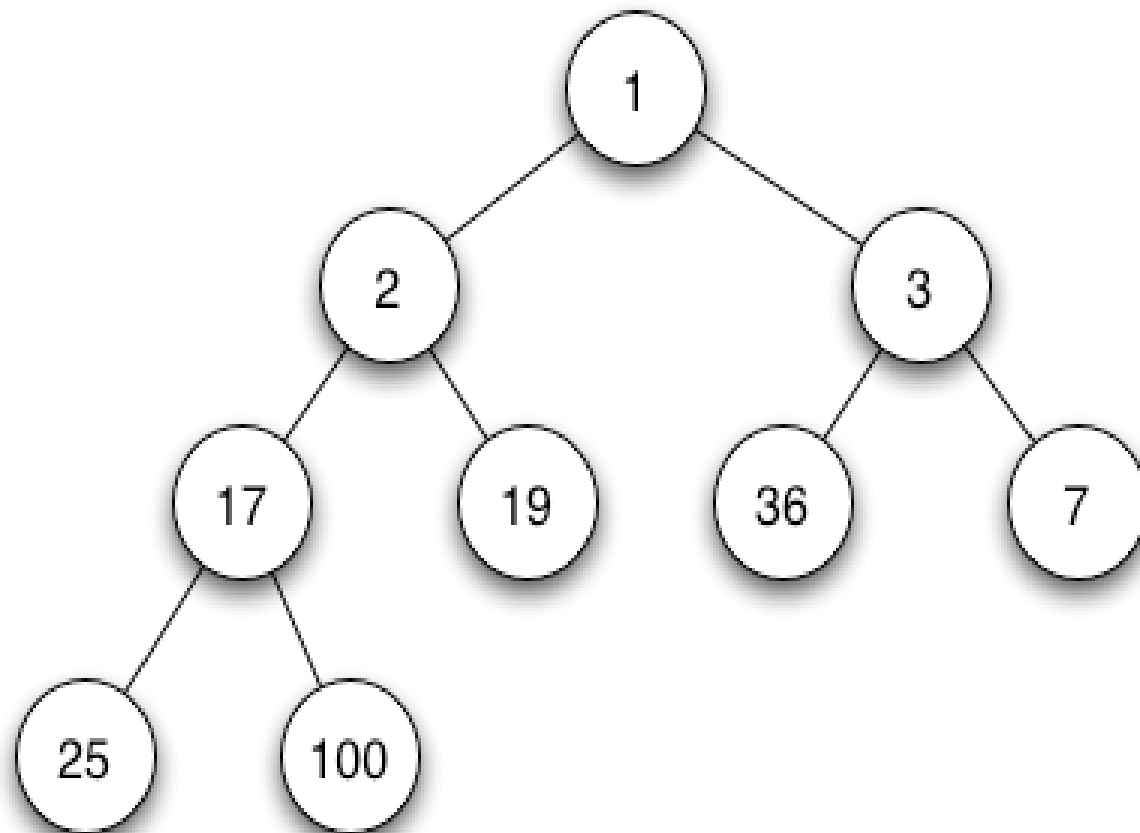
Any other options?



# Heaps

# Heap Data Structure

1. Binary Tree
2. Heap Order Property
3. Complete Binary Tree Property



What is the height of a complete binary tree?

# Complete Binary Tree

1. Add
2. Remove

# How to implement a complete binary tree

# How to implement Heap using CBT?

1. Min
2. Insertion
3. removeMin

# Building a Heap in $O(n)$



# Selection Sort?

# Insertion Sort?

# Heap Sort

# Inplace Heap Sort



# Thank You!

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