

Saturday, 12
September 15

Crux

Lecture -19

Data Structures -8

Priority Queues, Heaps and
Mixed Problems

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Data Structures so far

1. Linked Lists
2. Stacks and Queues
3. Dynamic Arrays
4. Trees(Generic + Binary)
5. BST
6. 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

Selection Sort?

Implement using sorted List

1. Min
2. RemoveMin
3. Insert

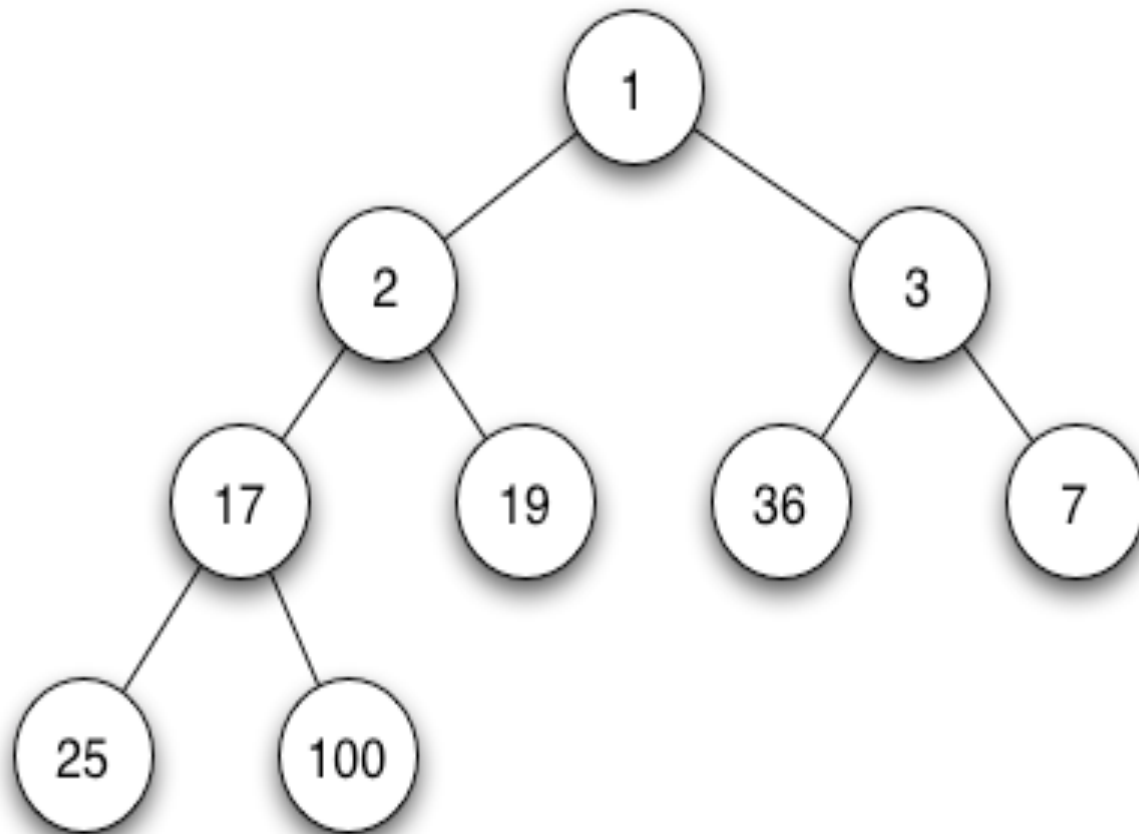
Insertion Sort?

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

Heap Sort

Inplace Heap Sort

Building a Heap in $O(n)$



Your Turn

1. Implement Heap



Thank You !!😊

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