Priority Queue ADT

Min Priority Queue ADT

state

Set of comparable values
- Ordered based on "priority"

behavior

insert(value) – add a new element to the collection.

removeMin() – returns the element with the smallest priority, removes it from the collection.

peekMin() – find, but do not remove the element with the smallest priority.

Uses:
- Operating System
- Well-designed printers
- Some Compression Schemes (google Huffman Codes)
- Sorting
- Graph algorithms

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Implementing Priority Queues: Take I

Maybe we already know how to implement a priority queue.
How long would `insert` and `removeMin` take with these data structures?

	Insert	removeMin
Unsorted Array		
Unsorted Linked List		
Sorted Linked List		
Sorted Circular Array		
Binary Search Tree		

For Array implementations, assume that the array is not yet full.
Other than this assumption, do **worst case** analysis. (amortized bounds will match).

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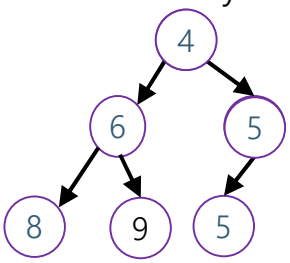
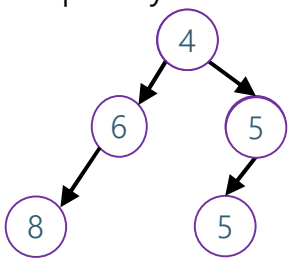
Tree Words

Complete – every row is completely filled, except possibly the last row, which is filled from left to right.

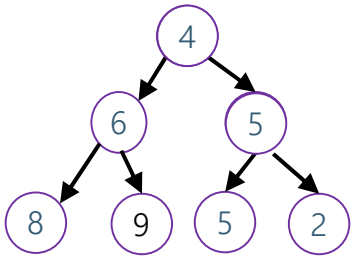
Perfect – every row is completely filled



Complete, but not perfect



Neither



Both Perfect and Complete

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An Optimization

On Exercise 2, you'll index from 0 rather than 1. Details are different!

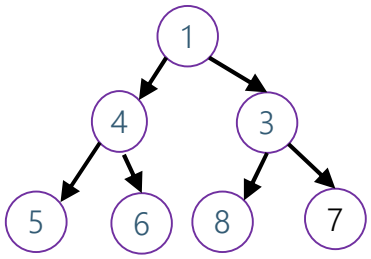
If I'm at index i, what is the index of:

My left child, right child and parent?

My left child:

My right child:

My parent:



	1	4	3	5	6	8	7			
0	1	2	3	4	5	6	7	8	9	10

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