EE 200 Heaps + priority queues

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The setup

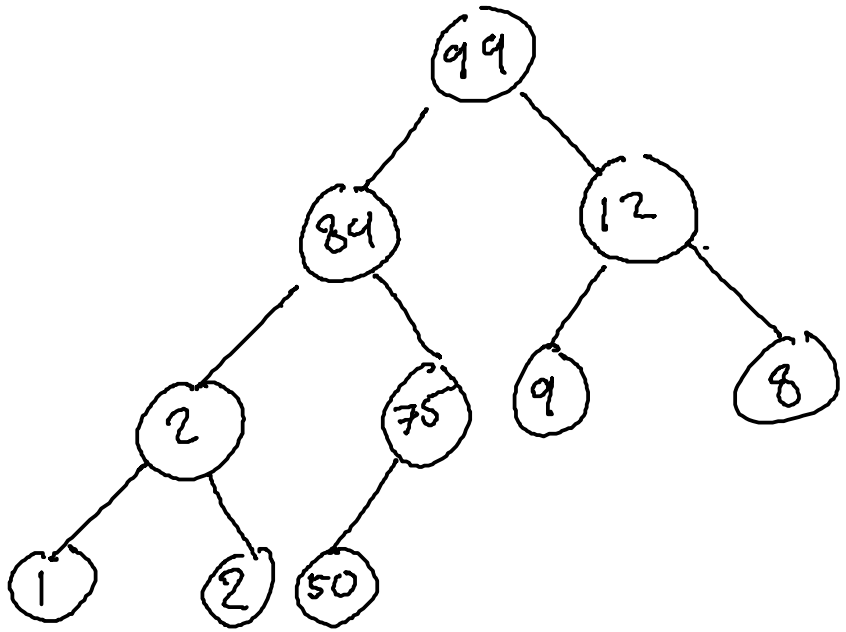
You want fast access to the largest (or smallest) element

Arbitrary items may be added, but only the largest will be removed

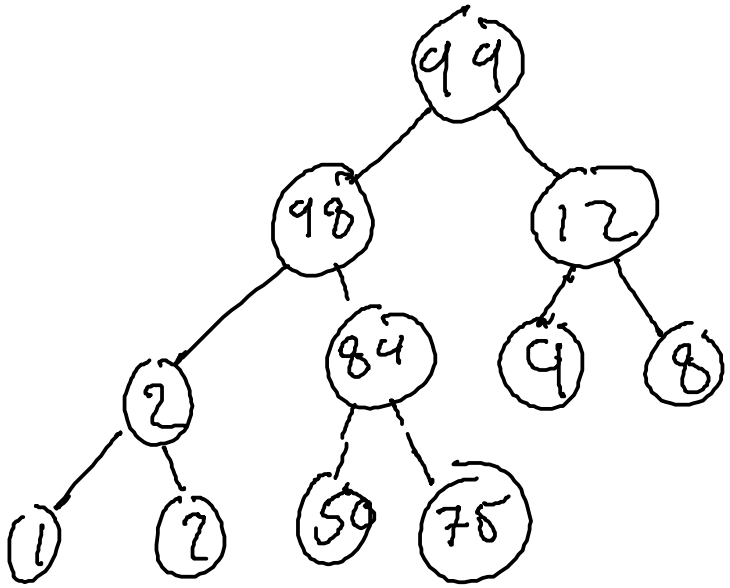
	Peek	Add / Insert	Remove largest
Array	N	1	N
Sorted Array	1	N	1
Linked list (sorted)	1	N	1
BST	log(N)	log(N)	log(N)
Heap	1	log(N)	log(N)

Building a heap

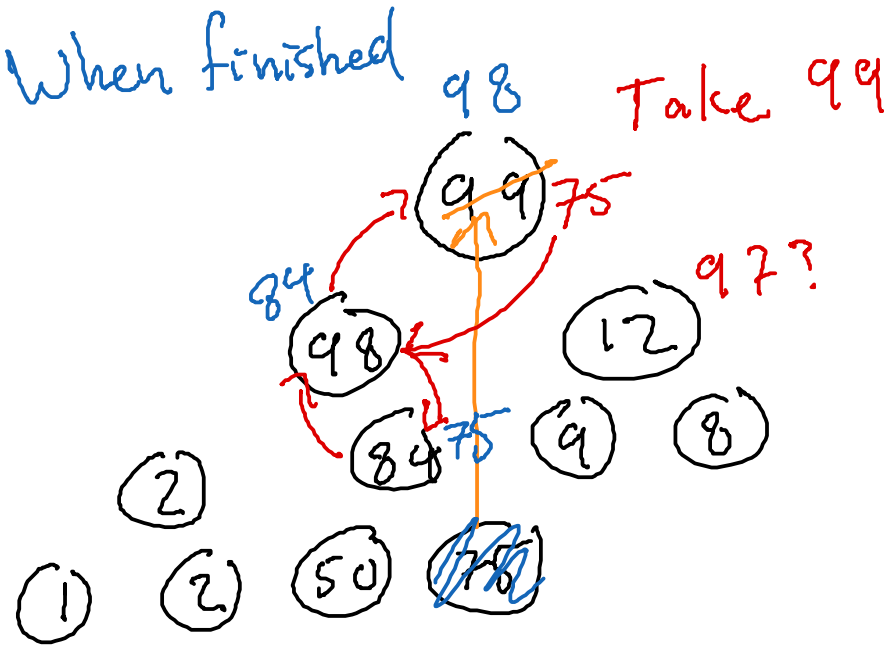
A heap is a **complete** tree,
where every node is greater than its children



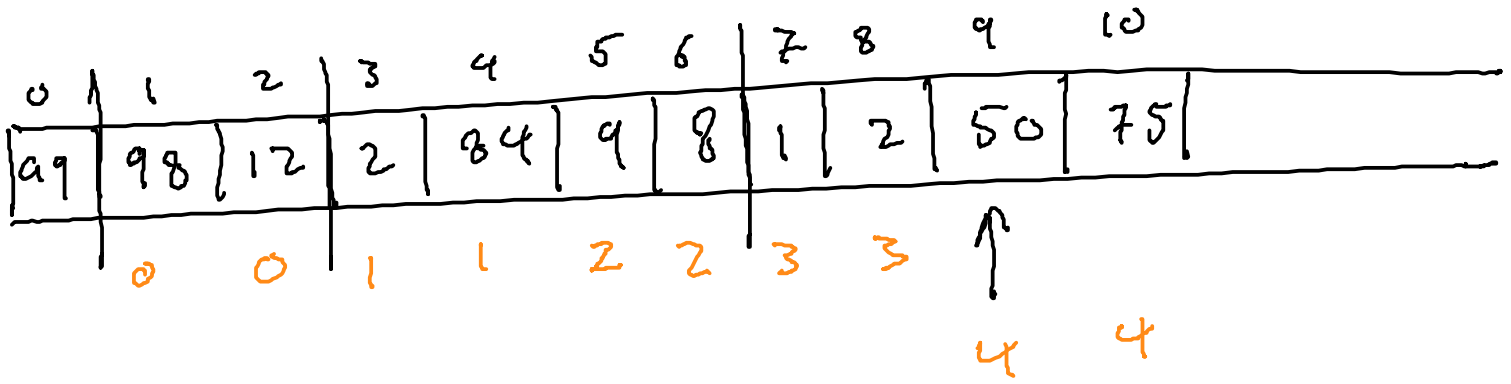
Insertion into a heap



Removal from the heap



Why not sort an array?



99

98 12

2 84 9 8

1 2 50 75

Why not sort an array?

Priority queues

Processor task scheduling

"next work" for Djikstra's algorithm and others

Service queues

Heapsort