CHAPTER 9

Priority Queues

All the programs in this file are selected from

Ellis Horowitz, Sartaj Sahni, and Susan Anderson-Freed "Fundamentals of Data Structures in C /2nd Edition", Silicon Press, 2008.

Outline

- Single- and Double-Ended Priority Queues
- Leftist Trees
- Min-Max Heaps
- Double-Ended Heap (Deap)

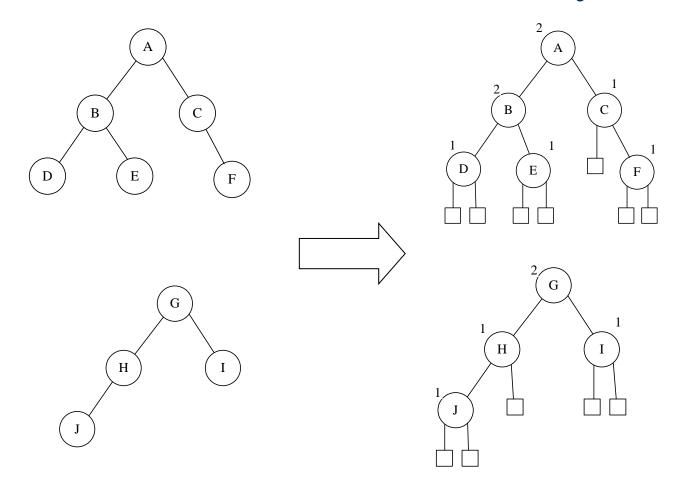
Single- and Double-Ended Priority Queues (1/2)

- Single-Ended Priority Queues
 - Return an element with minimum priority
 - Insert an element with an arbitrary priority
 - Delete an element with minimum priority

Single- and Double-Ended Priority Queues (1/2)

- Double-Ended Priority Queues
 - Return an element with minimum priority
 - Return an element with maximum priority
 - Insert an element with an arbitrary priority
 - Delete an element with minimum priority
 - Delete an element with maximum priority

Leftist Trees-Extended binary trees

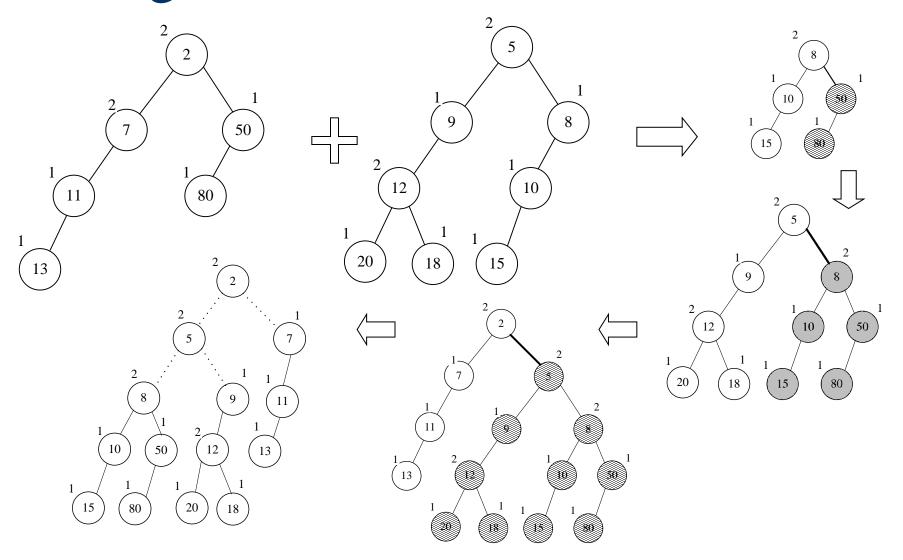


Leftist Trees

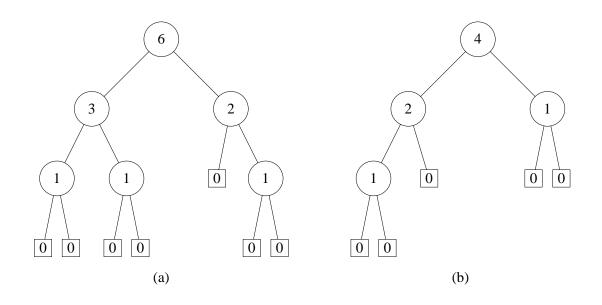
- *Shortest(x)*: the length of a shortest path from x to an external node
- A *leftiest Tree* is a binary tree such that if it is no empty, than

 $Shortest(leftchild(x)) \ge Shortest(rightchild(x))$

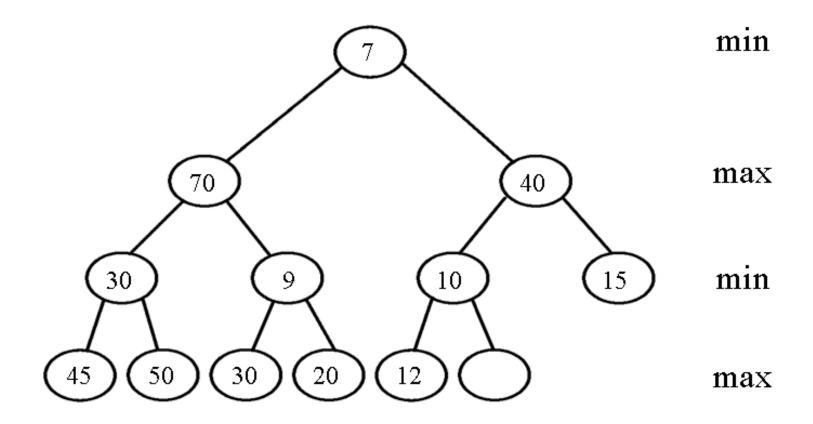
Height-Biased Leftist Trees



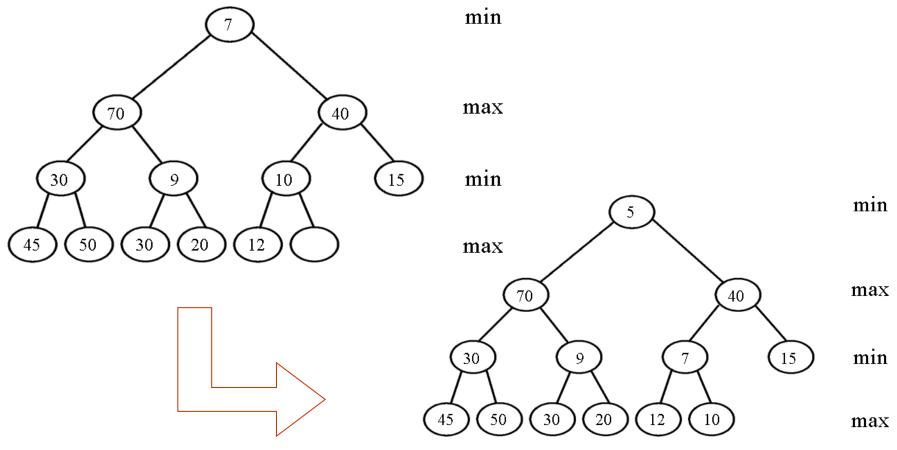
Weight-Biased Leftist Trees



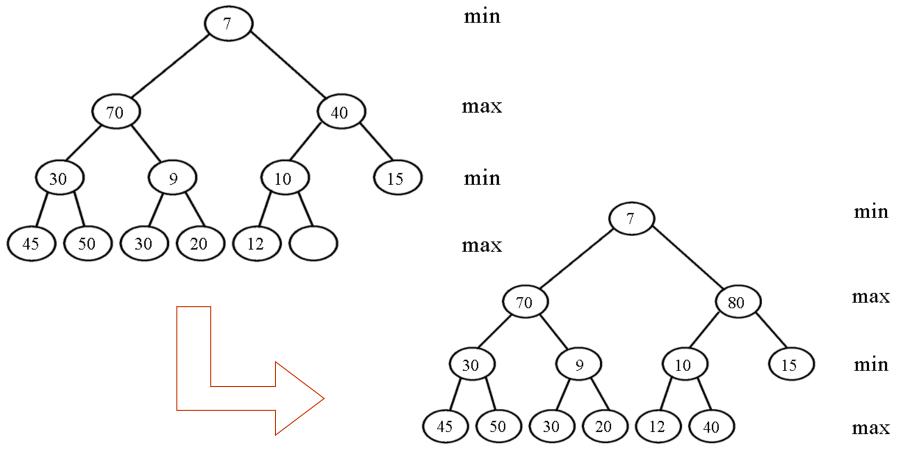
Min-Max Heaps



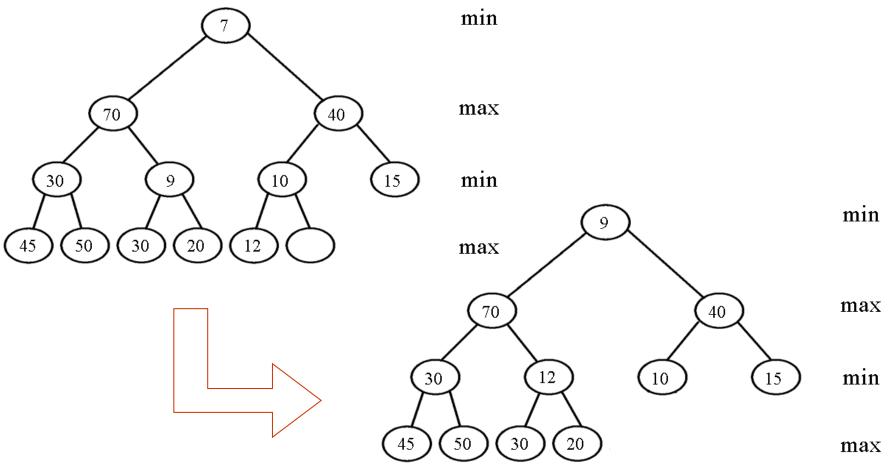
Min-Max Heaps-Insert 5



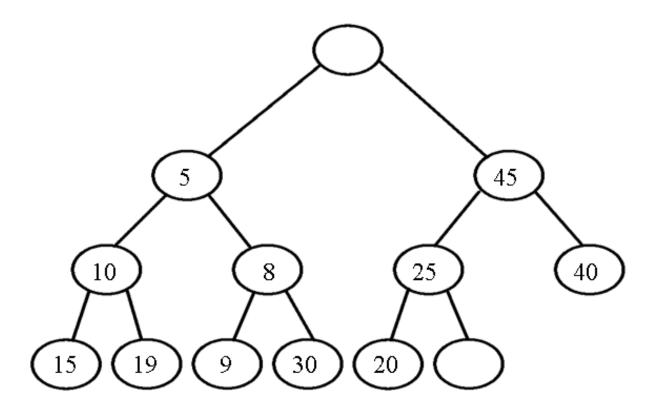
Min-Max Heaps-Insert 80



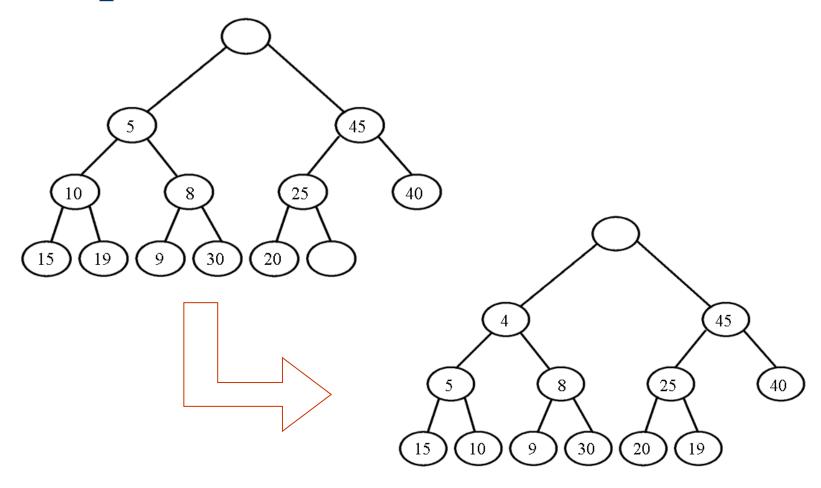
Min-Max Heaps-Delete Minimum



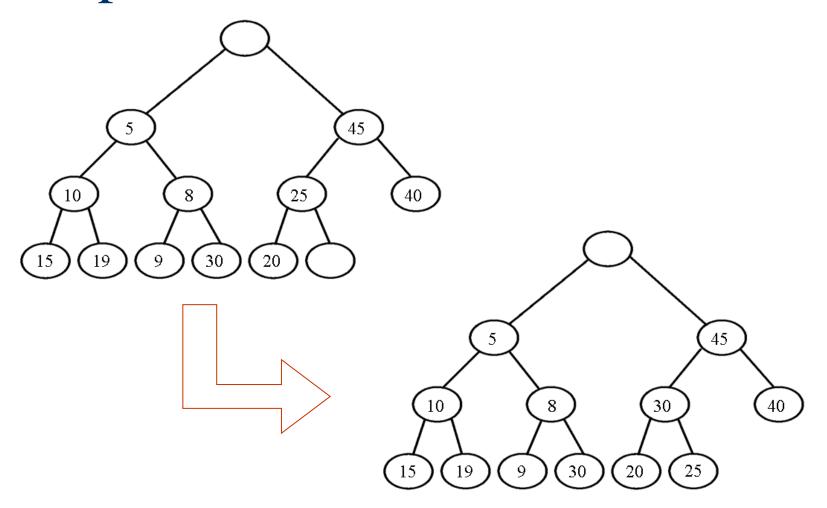
Double-Ended Heap (Deap)



Deap-Insert 4



Deap-Insert 30



Deap-Delete Minimum

