Slide 1

Algorithms
FOURTH EDITION

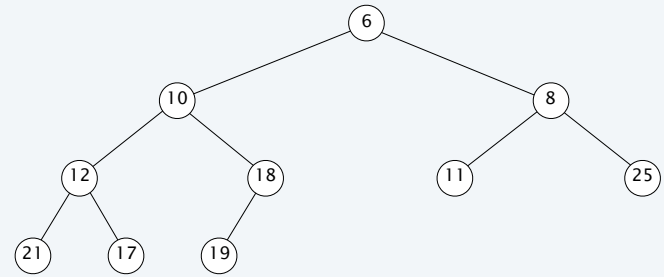ROBERT SEDGEWICK | KEVIN WAYNE

DATA STRUCTURES II

‣ binary heap demo

Lecture slides by Kevin Wayne
http://www.cs.princeton.edu/~wayne/kleinberg-tardos

Last updated on 7/25/17 11:07 AM

2

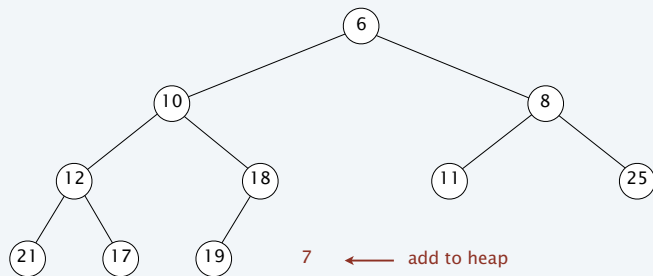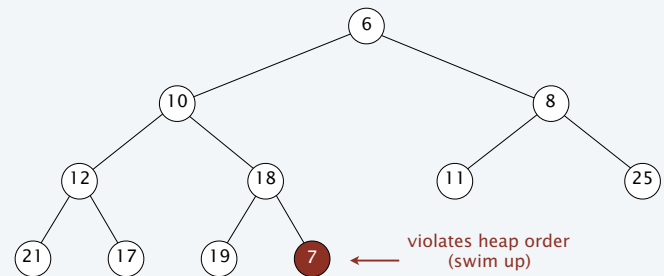## Slide 2

Binary heap demo

heap ordered

2

Slide 3

Binary heap demo

Insert. Add node at end; repeatedly exchange element in child with element in parent until heap order is restored.

insert 7

7 ⟵ add to heap

3

Slide 4

Binary heap demo

Insert. Add node at end; repeatedly exchange element in child with element in parent until heap order is restored.
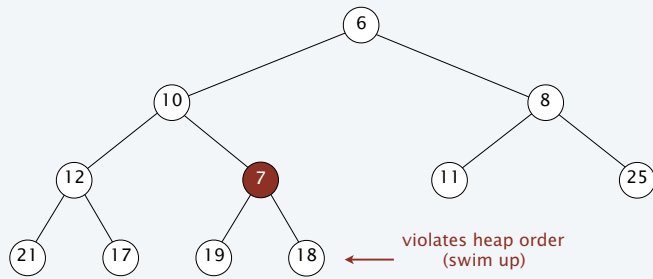
insert 7

violates heap order
(swim up)

4

Binary heap demo

Insert. Add node at end; repeatedly exchange element in child with element in parent until heap order is restored.

insert 7

violates heap order
(swim up)
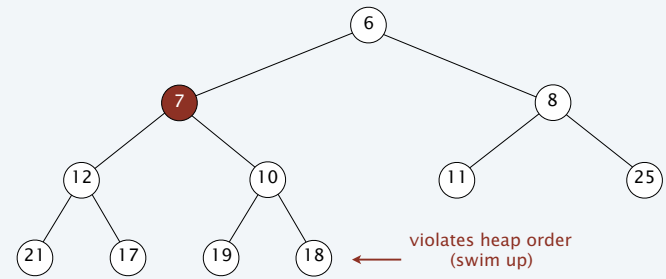
Binary heap demo

Insert. Add node at end; repeatedly exchange element in child with element in parent until heap order is restored.

insert 7

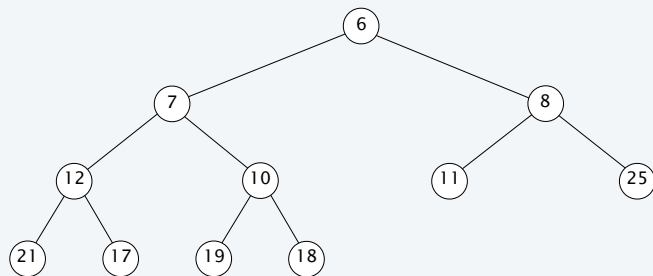
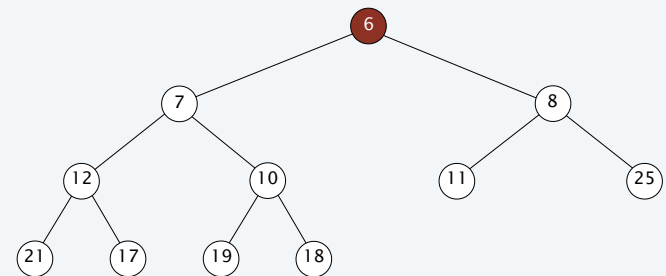violates heap order
(swim up)

Binary heap demo

heap ordered

Binary heap demo

Extract min. Exchange root node with last node; repeatedly exchange element in parent with element in larger child until heap order is restored.

extract the minimum

Binary heap demo

Extract min. Exchange root node with last node; repeatedly exchange element in parent with element in larger child until heap order is restored.

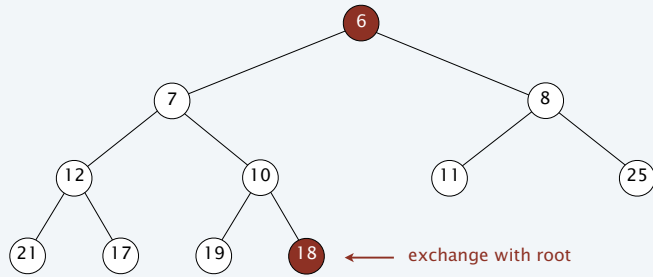**extract the minimum**

exchange with root

Binary heap demo

Extract min. Exchange root node with last node; repeatedly exchange element in parent with element in larger child until heap order is restored.

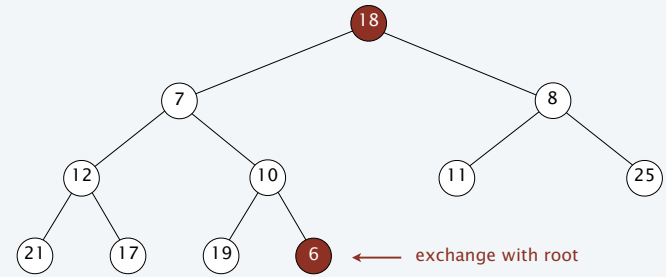**extract the minimum**

exchange with root

Binary heap demo

Extract min. Exchange root node with last node; repeatedly exchange element in parent with element in larger child until heap order is restored.
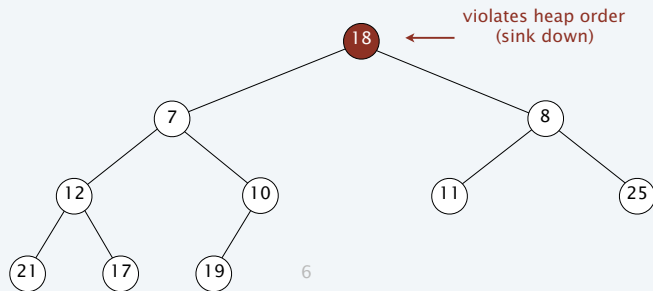
extract the minimum

violates heap order
(sink down)

Binary heap demo

Extract min. Exchange root node with last node; repeatedly exchange element in parent with element in larger child until heap order is restored.
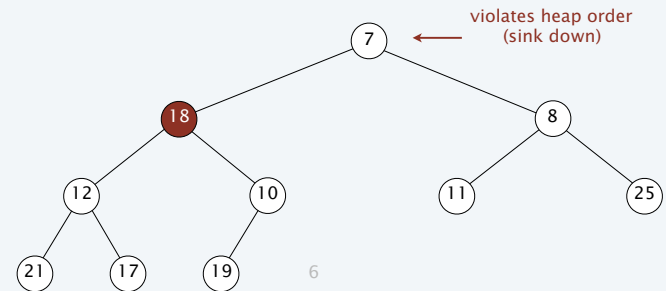
extract the minimum

violates heap order
(sink down)

Binary heap demo

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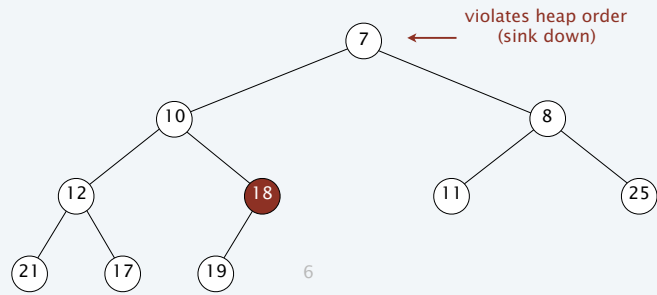
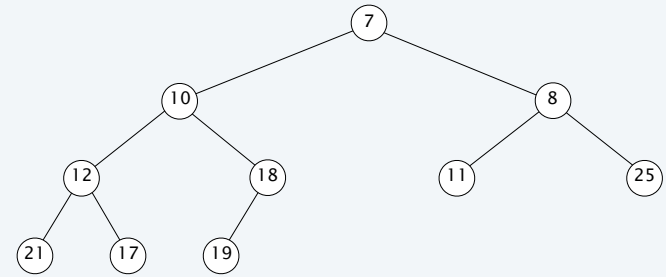**extract the minimum**

violates heap order
(sink down)

Binary heap demo

heap ordered