Chapter 21

A Priority Queue:
The Binary Heap
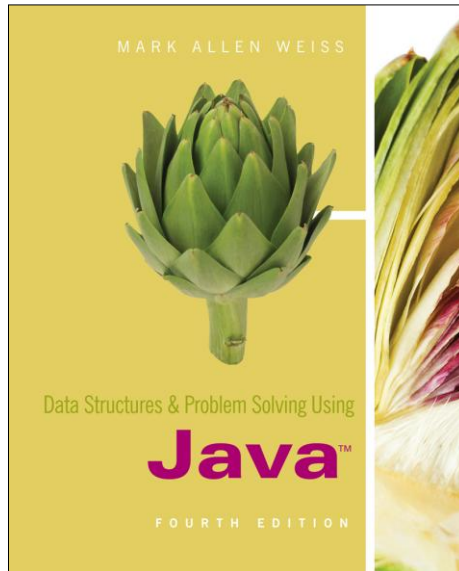
Addison-Wesley
is an imprint of
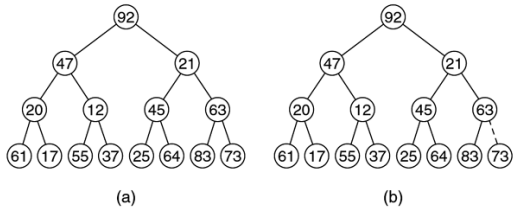
PEARSON

```
1   /**
2    * Establish heap order property from an arbitrary
3    * arrangement of items. Runs in linear time.
4    */
5   private void buildHeap( )
6   {
7       for( int i = currentSize / 2; i > 0; i-- )
8           percolateDown( i );
9   }
```
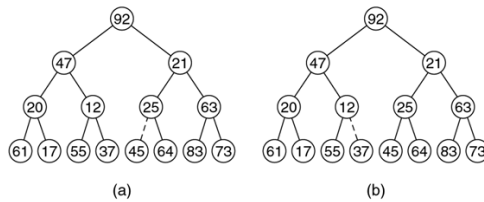
figure 21.16

Implementation of the linear-time `buildHeap` method

figure 21.17

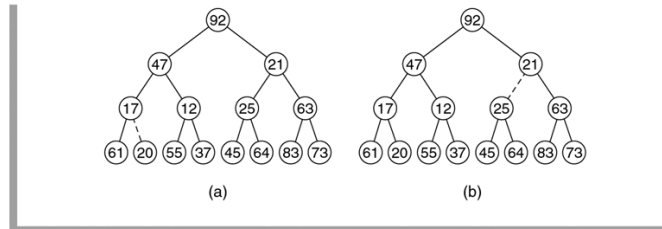(a) Initial heap;
(b) after
`percolateDown(7)`

(a)

(b)

figure 21.18

(a) After
`percolateDown(6)`;
(b) after
`percolateDown(5)`

(a)
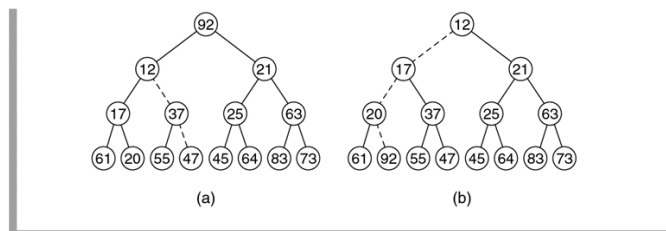
(b)

2

figure 21.19

(a) After
percolateDown(4);
(b) after
percolateDown(3)

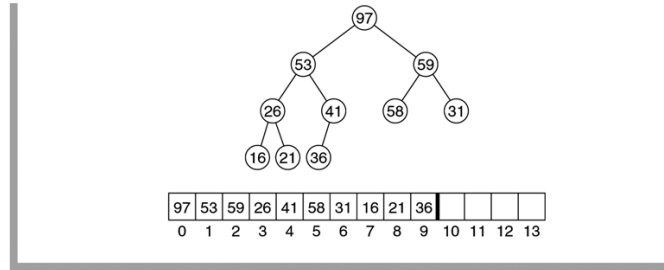(a)   (b)

figure 21.20

(a) After
percolateDown(2);
(b) after
percolateDown(1)
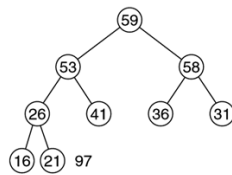and buildHeap
terminates

(a)   (b)

3

figure 21.25

Max heap after the `buildHeap` phase

97	53	59	26	41	58	31	16	21	36				
0	1	2	3	4	5	6	7	8	9	10	11	12	13

figure 21.26

Heap after the first deleteMax operation

59	53	58	26	41	36	31	16	21	97				
0	1	2	3	4	5	6	7	8	9	10	11	12	13

4
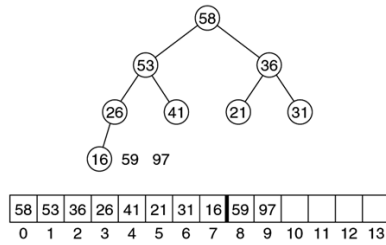
figure 21.27

Heap after the second deleteMax operation