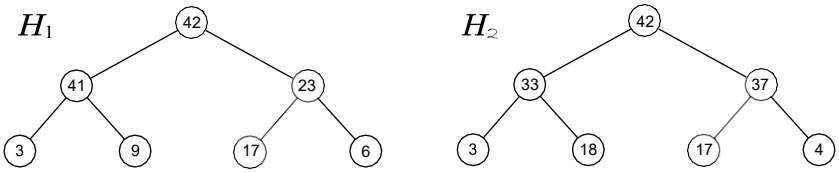
Exercise 1



H_1 and H_2 are max heaps. A max heap is a priority queue where the biggest key is in the root, and the definition of the heap order is that any node must have a key that is bigger than all its descendants'.

Draw H_1 after a *deleteMax* operation.

Draw H_2 after an *insert* operation with key 35.

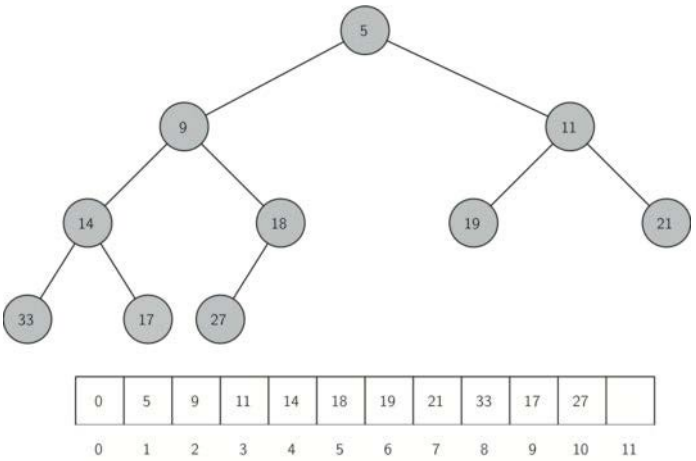
Exercise 2

A priority queue can be implemented as a simple array of integers in which the first element is left unused for addressing purposes. Can the array below represent a priority queue? Please explain your answer.

{0,17,21,23,44,32,65,38,56,46,69,33,77,67,56,39,61,60,62,50,71}

Exercise 3

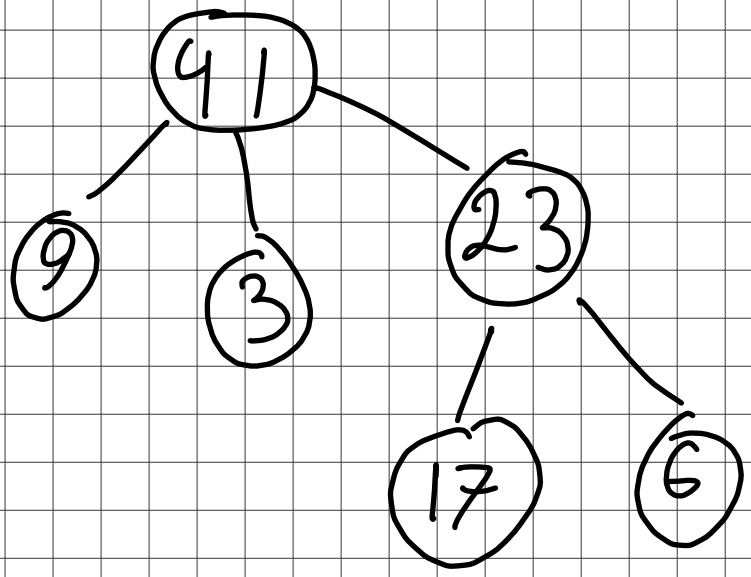
The figure below represents a priority queue implemented in a simple array.



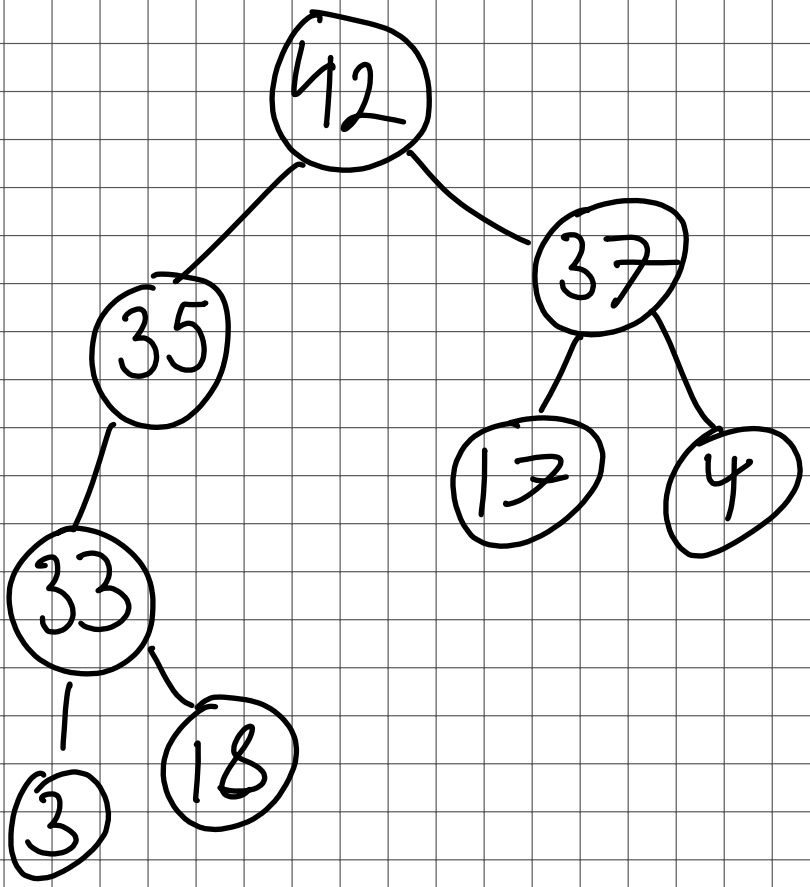
Show the contents of the priority queue (draw it or show the array) after the following three operations have been performed: first you must add an element with the value of 7 (`insert(7)`), then an element with the value of 15 is added (`insert(15)`), and finally the smallest element is removed (`deleteMin()`).

opg 1

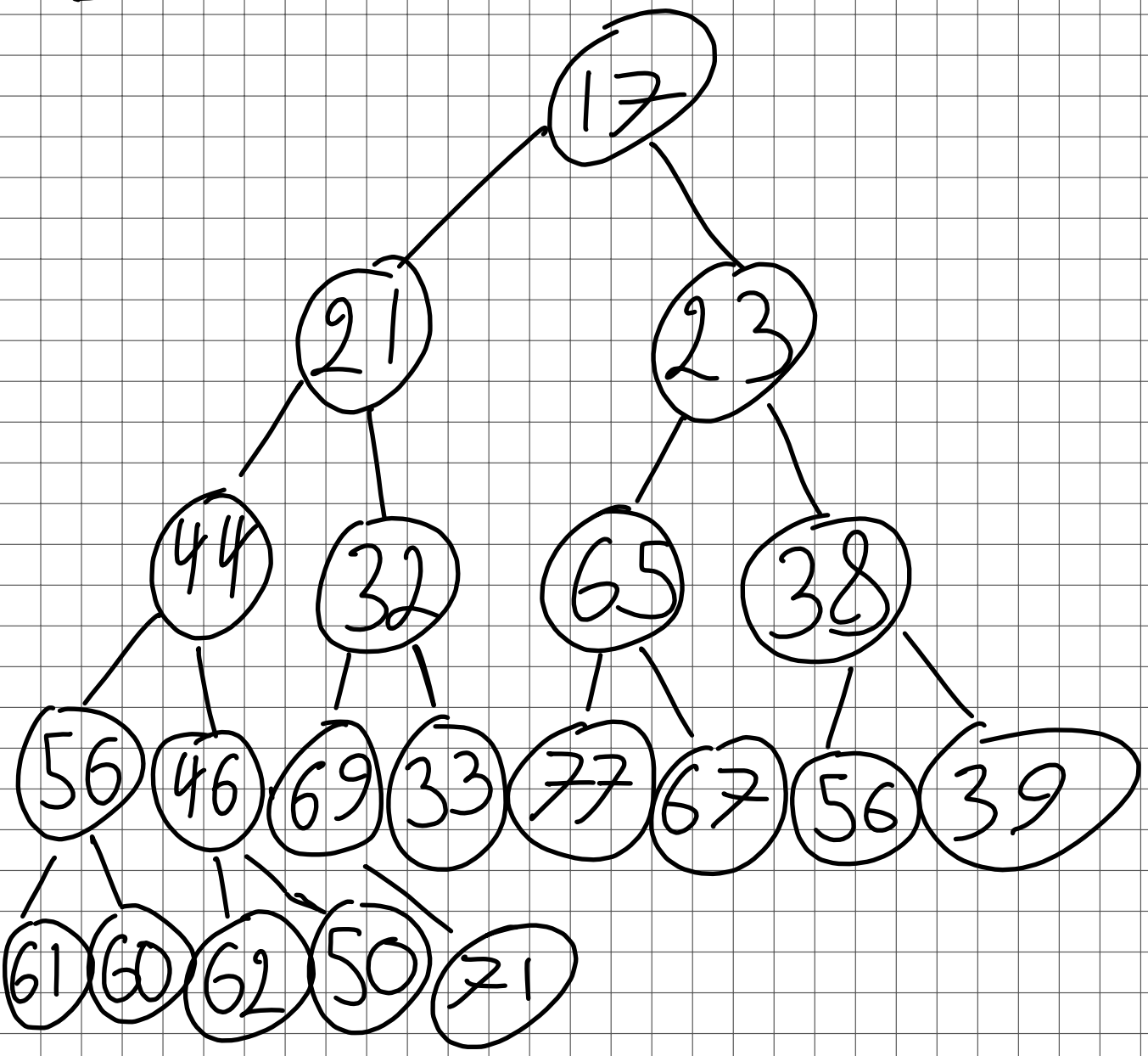
H_1 after a deleteMax operation



H_2 after 35 is inserted.

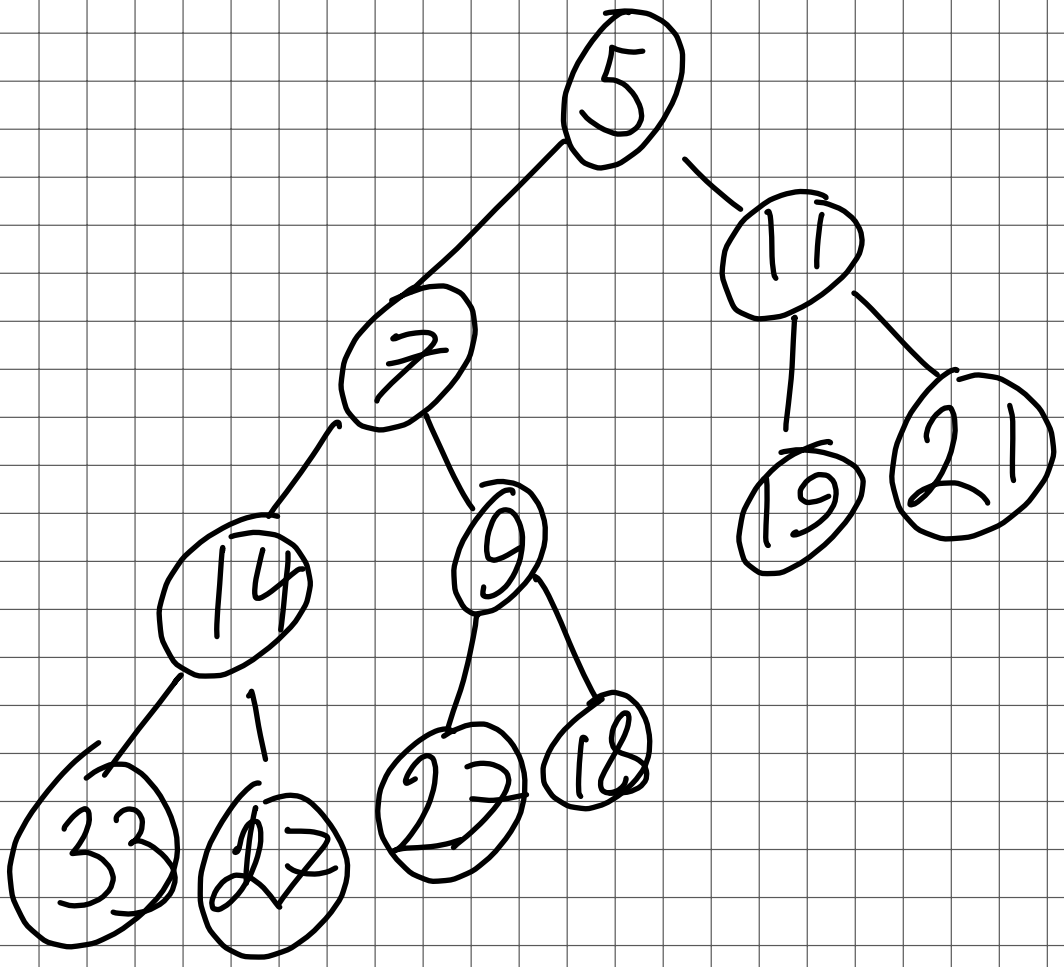


op92.

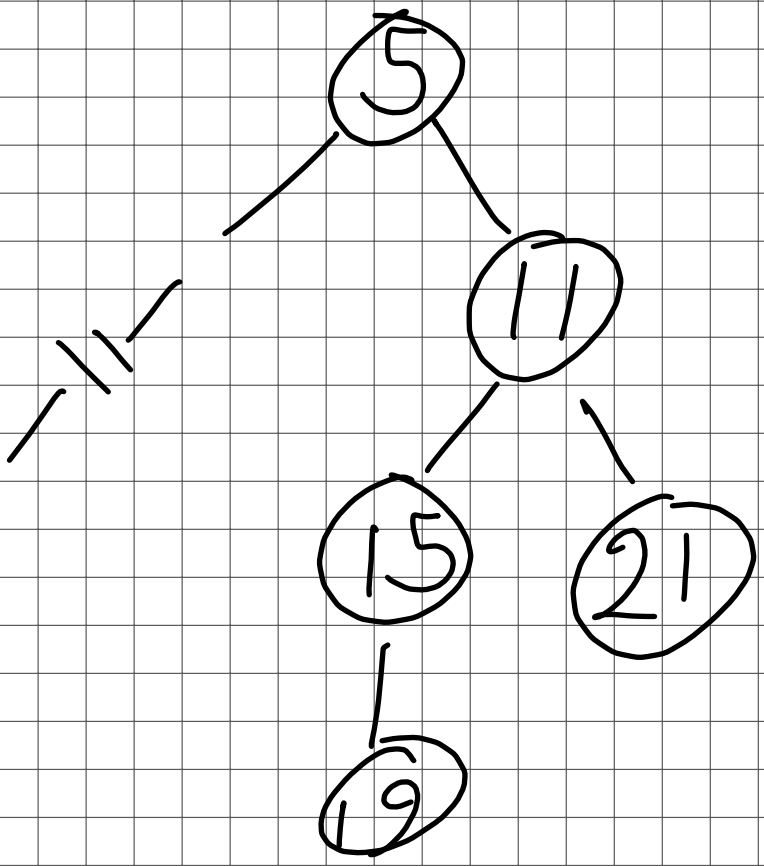


ops 3

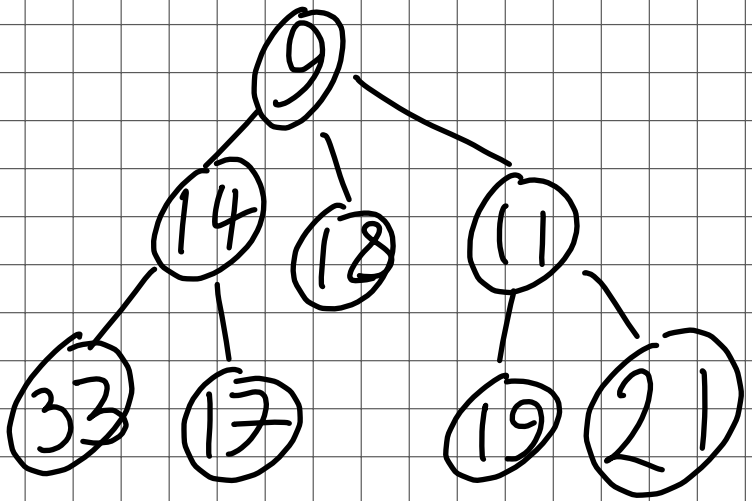
inser 7



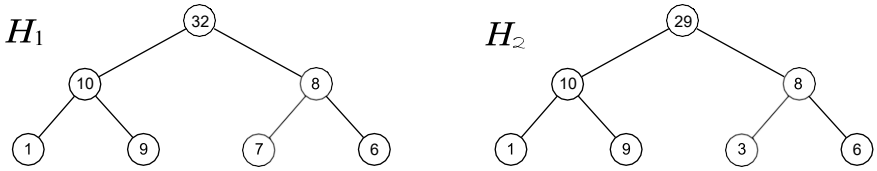
insert 15



deleteMin
vi sletter roden 5.



Exercise 4



H_1 and H_2 are max heaps. A max heap is a priority queue where the biggest key is in the root, and the definition of the heap order is that any node must have a key that is bigger than all its descendants'.

Draw H_1 after an *insert* operation with key 12.

Draw H_2 after a *deleteMax* operation.

Exercise 5

Consider the following array:

{0,4,17,12,20,25,15,38,22,30,24,45,67,18,40,42,36,56}

Can this array represent a *heap* (a priority queue)? Explain your answer.