

## Heaps, Heapsort - **Solution**

If in the exam you are asked to delete or remove or extract from a heap, it means delete the max element (if a max-heap) or the min element (in a min-heap). If asked to delete x (or remove x or extract x) then you must delete the element  $x$ .

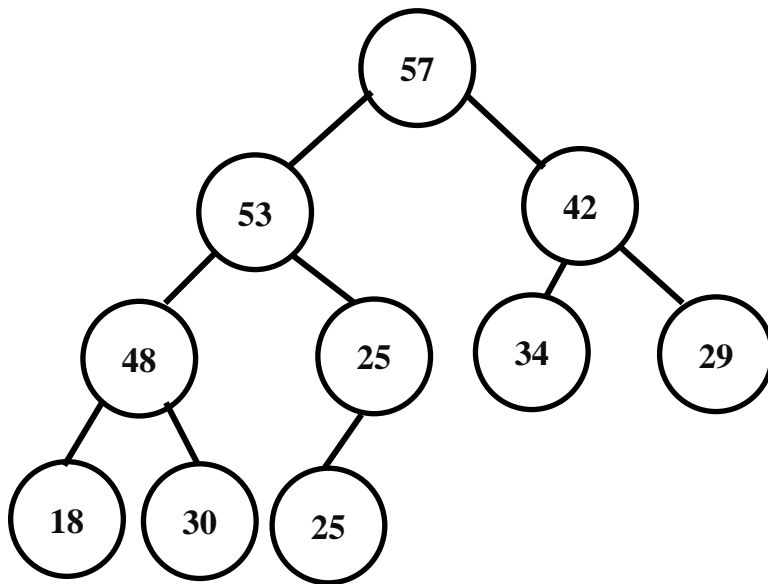
Any question that would ask to modify/adapt an algorithm, would provide the original code/pseudocode for that algorithm.

You must be able to write the code for the methods discussed in class.

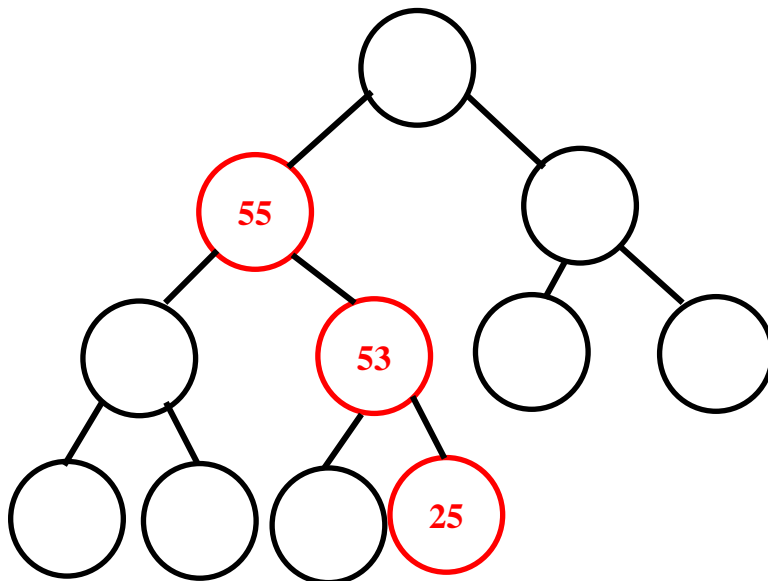
1. Book (CLRS) – heaps, heapsort
  - a. 6.1-1, 6.1-4, 6.1-5, 6.1-6 (CLRS 3-rd edition, page 153)
  - b. 6.2-1 to 6.2-6 (CLRS, page 156)
  - c. 6.3-1, 6.3-2
  - d. 6.4-1, 6.4-3
  - e. 6.5-1, 6.5-2, 6.5-6, 6.5-7, 6.5-8, 6.5-9. Also questions 6.5-3 and 6.5-4 (the code for the methods referred in the questions, would be provided in the exam in this case).

**P2.** (Heap operations. No code needed.)

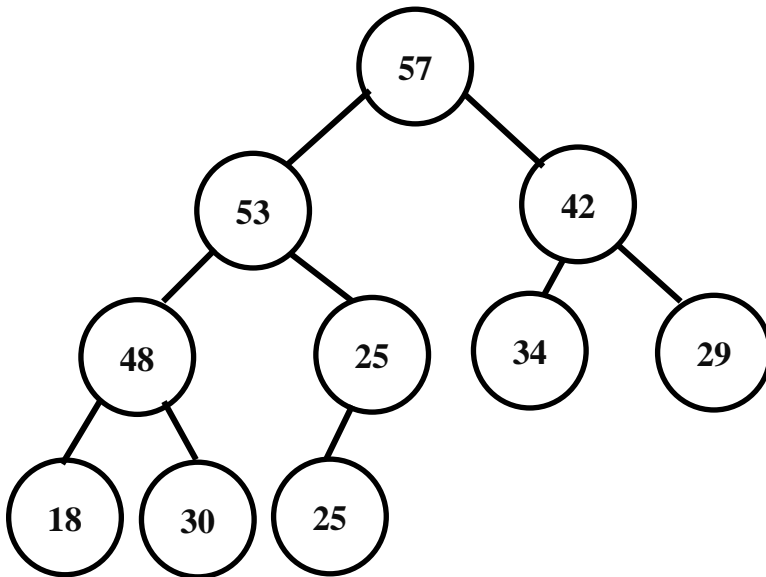
- a) (7 points) Insert **55** in the max-heap below. Show all the changes to the heap. (I Changed 5 to 55 to make it a more interesting example.)



**Redraw the heap and leave white the nodes whose value did not change and show values only in the modified nodes.**



b) (7 points) Perform one Extract operation on the heap below.



**Redraw the heap and leave white the nodes whose value did not change and show values only in the modified nodes.**

