

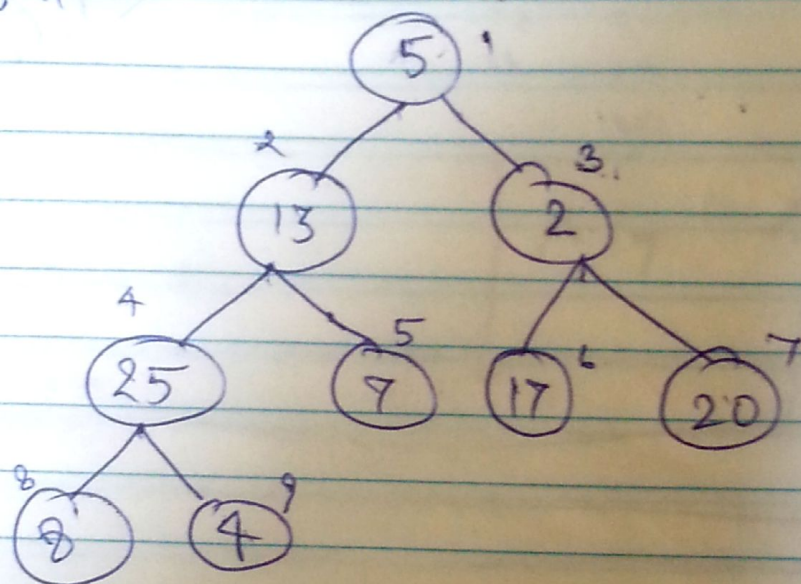
Lab-9 - Q.3. Soln

Here, the given array to sort is

$$A = \{ 5, 13, 2, 25, 7, 17, 20, 8, 4 \}$$

$$\Rightarrow n = 9 \Rightarrow \lfloor \frac{n}{2} \rfloor = \lfloor \frac{9}{2} \rfloor = 4$$

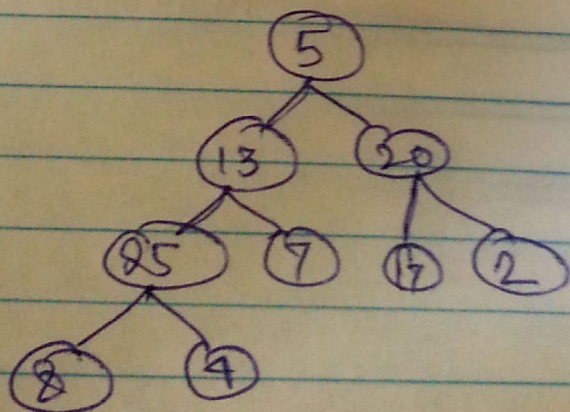
Now, we will use the build heap operation to create a heap tree from the given array. Let's first create a tree as follows:



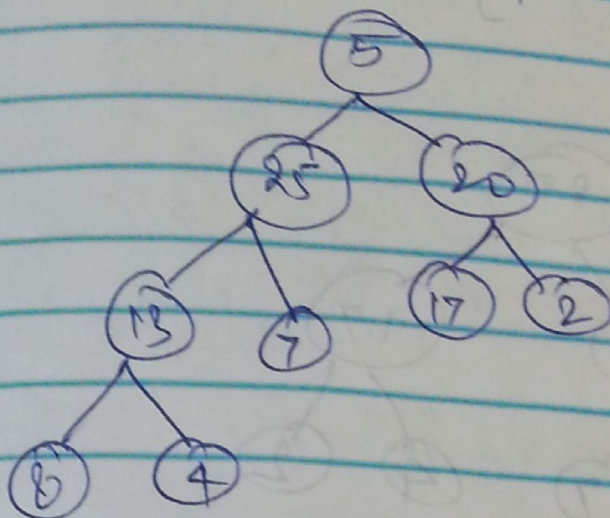
Now, we will use the heapify operation from $\lfloor \text{heap size} / 2 \rfloor$ down to 1.

Here, at $i=4$, the tree is correct.

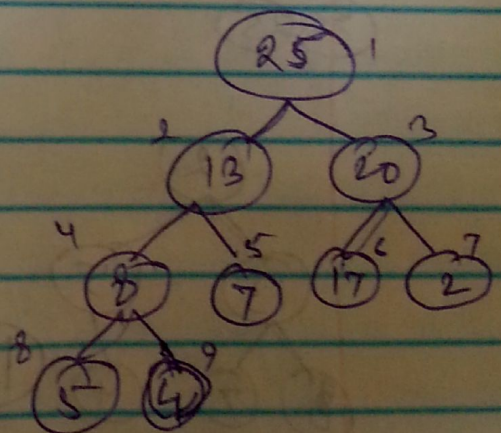
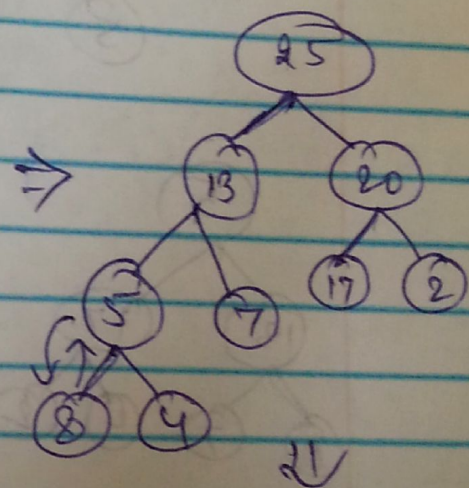
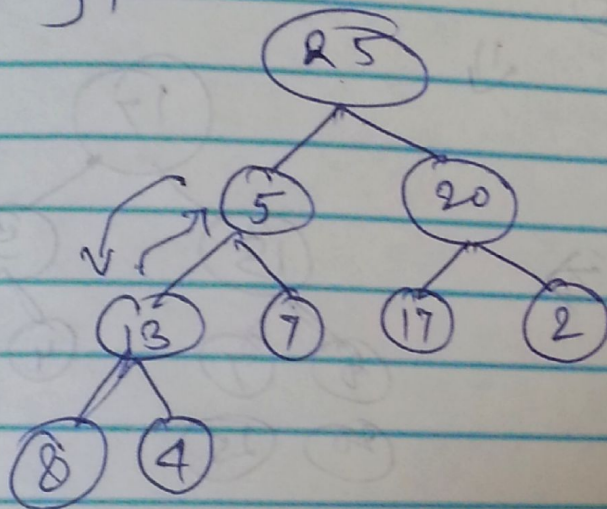
Now, at $i=3$, we swap 2 with 20 as



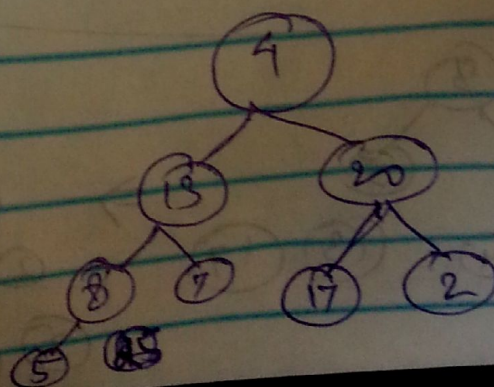
At $i = 2$, we swap 13 with 25 as



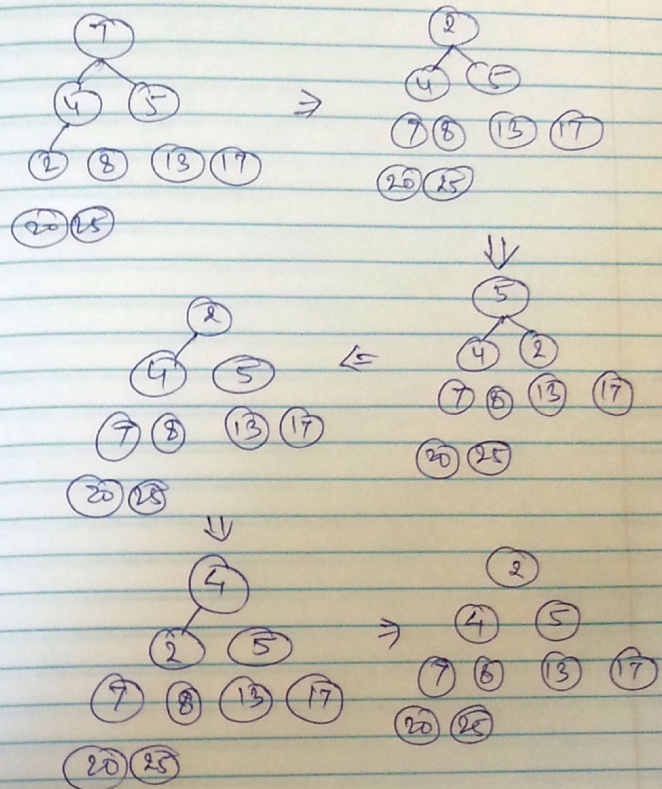
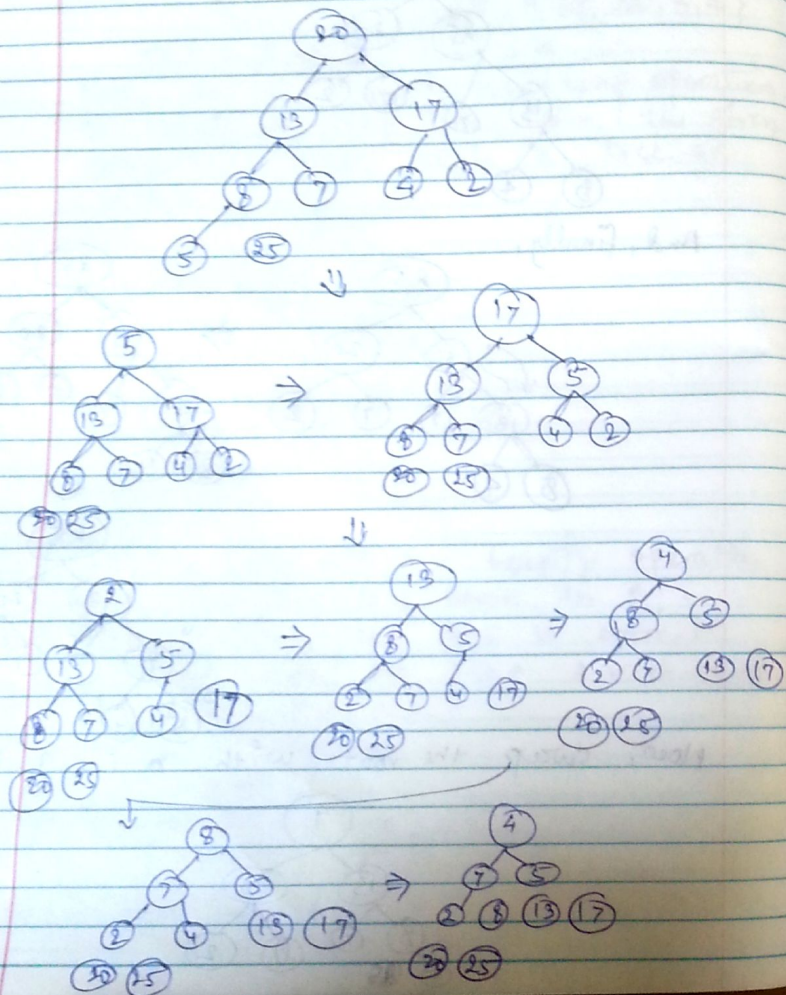
And, finally,



Now, swap the root with $i = 9$, i.e.,



we recursively do the same process as follows -



\therefore The sorted array will be

$$A = \{2, 4, 5, 7, 8, 13, 17, 20, 25\}$$

Ans