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CS104 HW3 - Part 4: Heaps
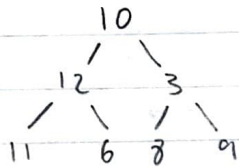
10/19/22

4a)

Starting array [10, 12, 3, 11, 6, 8, 9] (7-elements so size = 7)
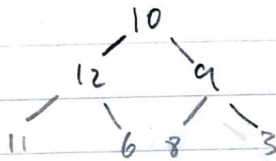 · index of last non-leaf node = (size/2) - 1 = 2

Starting heap:

```
           10
          /  \
        12     3
       /  \   / \
      11   6 8   9
```

Heapify (array, 7, 2) which means heapify 3
 · Swap 3 and 9

```
          10
         /  \
       12    9
      /  \   / \
     11   6 8   3
```
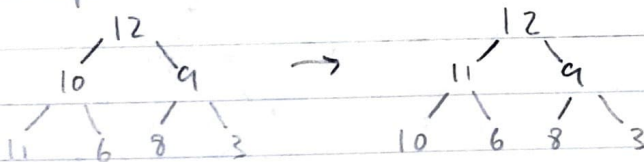
Heapify (array, 7, 1) which means heapify 12
 · Nothing happens since 12's children are both smaller.
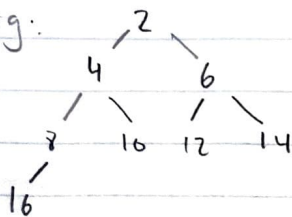
Heapify (array, 7, 0) which means heapify 10.
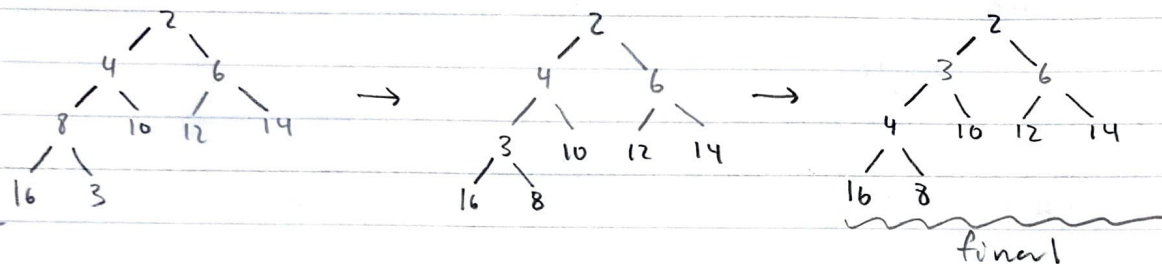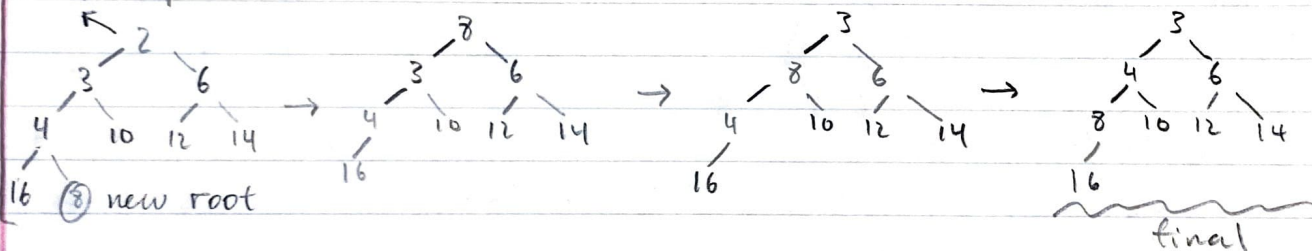 · Swap 10 and 12, then recursive call, swap 10 and 11.

```
       12                    12
      /  \                  /  \
    10    9       →       11    9
   /  \   / \            /  \   / \
  11   6 8   3          10   6 8   3
```

Done ✓

4b)

Initial Config.

• Insert 3

final

Pop top element

16 ⑧ new root

final

Pop top element.

⑯ new root

final.

Insert 5

final