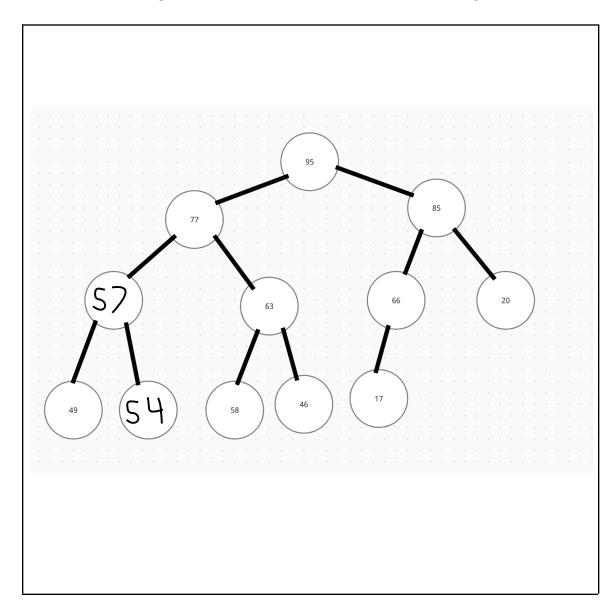
PA 7 Part 1: Heap Worksheet

DSC 30 Spring 2021 - Marina Langlois

| Name | James Lu |
|------|----------|
| PID | |

1. Insert the following elements in the given order to an empty **binary (d = 2) max-heap**. Draw the tree representation of the heap after all insertions.

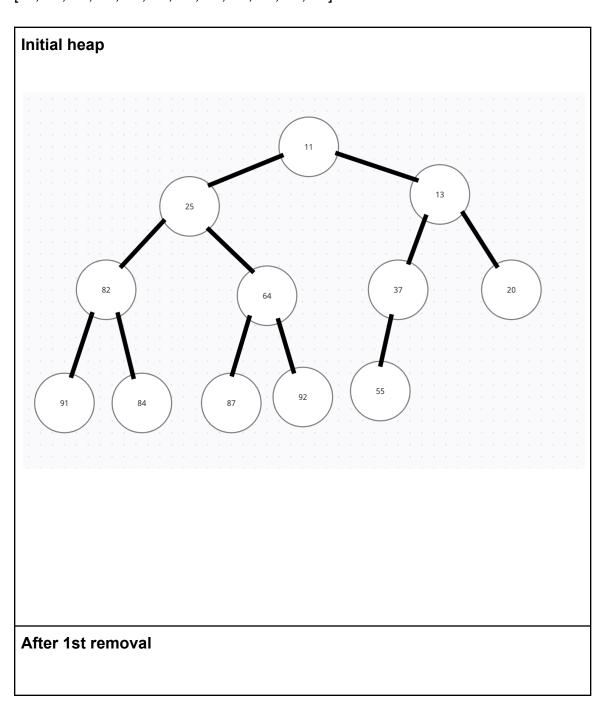
Elements to insert: [77, 49, 66, 85, 58, 17, 20, 54, 57, 63, 46, 95]

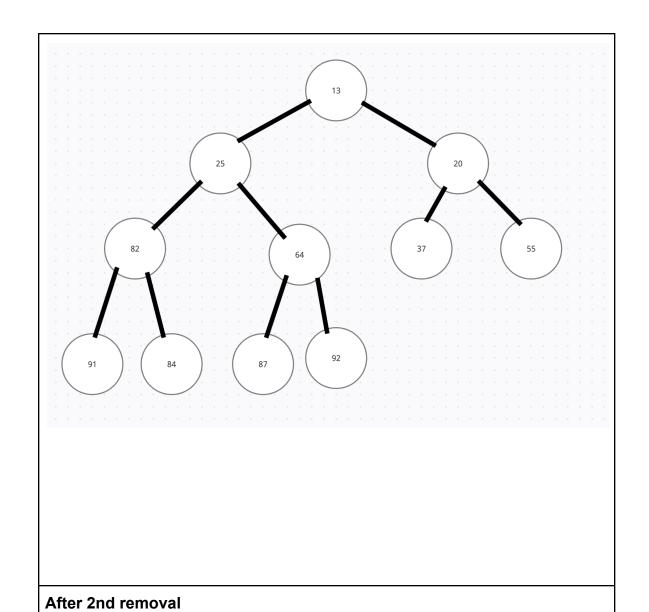


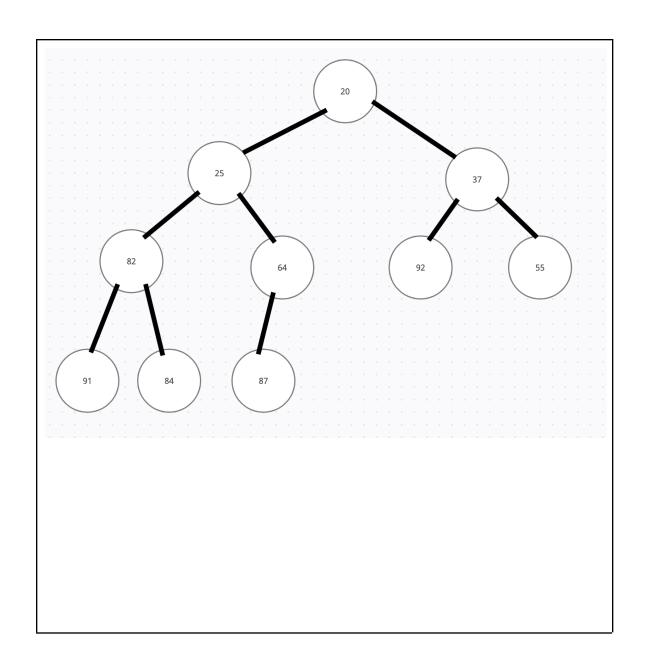


2. Remove the top element 5 times from the given **binary min-heap** and draw the tree representations of the initial heap and the heap after **each** removal.

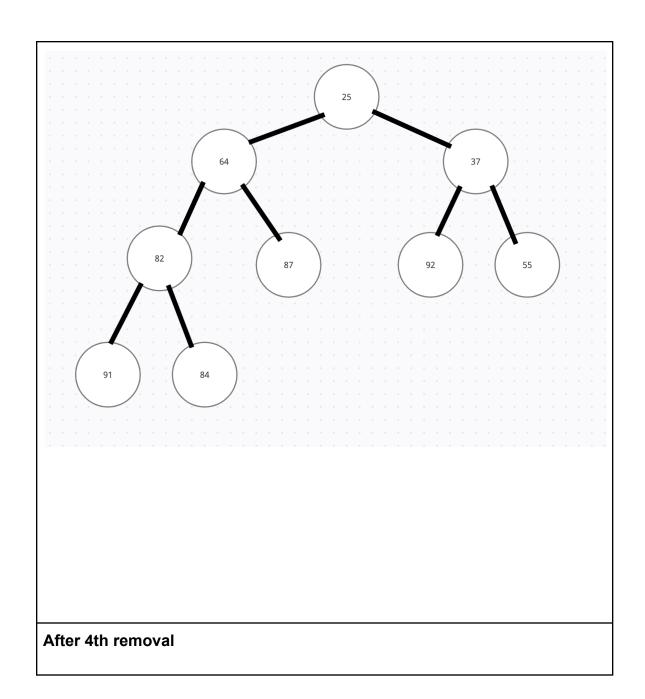
Array representation of the initial heap: [11, 25, 13, 82, 64, 37, 20, 91, 84, 87, 92, 55]

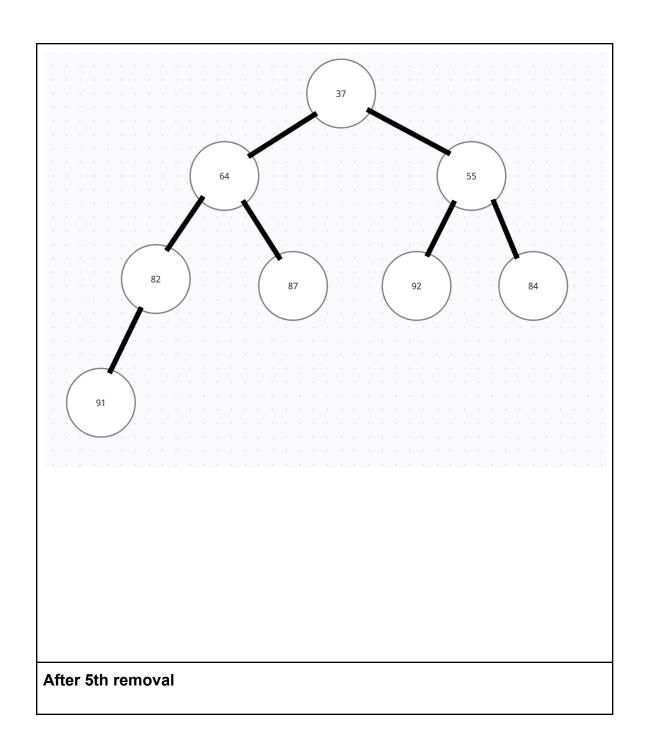


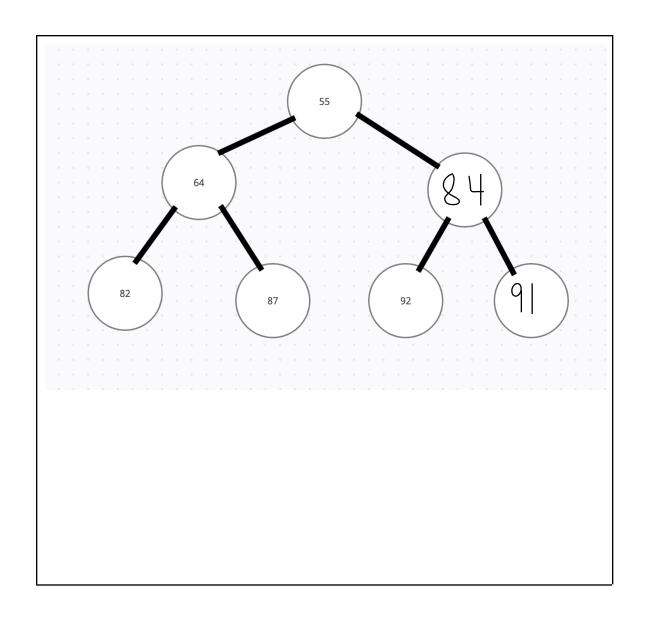




After 3rd removal

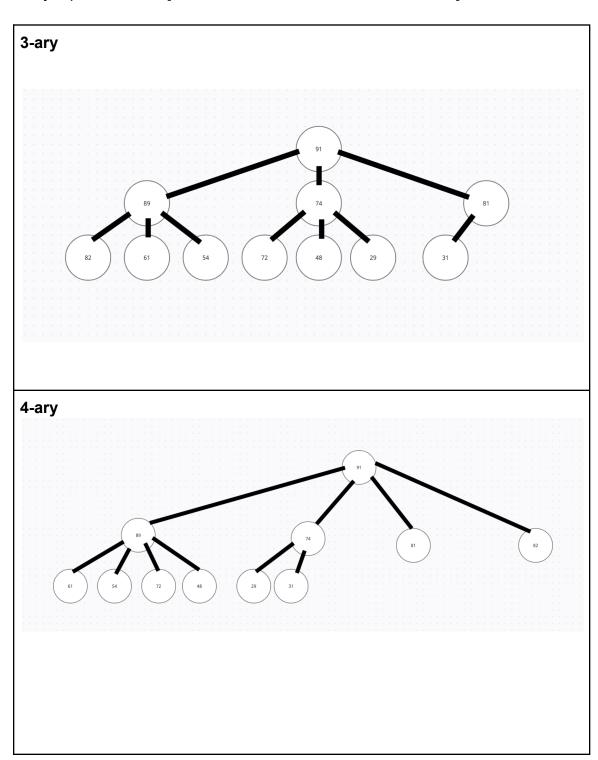






3. Draw the tree representations of the d-ary max-heaps from the following array representation. Choose d = {3, 4}.

Array representation: [91, 89, 74, 81, 82, 61, 54, 72, 48, 29, 31]



4. Write down the array representations of the given **3-ary max-heap** after each specified operation. Note that each operation should be performed on the result of the previous operation.

| Original | | | | | | | | | | | | |
|------------------------------|---------------------------------|----|----|----|----|----|----|----|----|----|----|--|
| 92 | 74 | 85 | 76 | 48 | 58 | 39 | 77 | 51 | 62 | 45 | | |
| After removing the top twice | | | | | | | | | | | | |
| 77 | 74 | 62 | 76 | 48 | 58 | 39 | 45 | 51 | | | | |
| After inserting 30 and 94 | | | | | | | | | | | | |
| 94 | 74 | 62 | 77 | 48 | 58 | 39 | 45 | 51 | 30 | 76 | | |
| After removing the top once | | | | | | | | | | | | |
| 77 | 74 | 62 | 76 | 48 | 58 | 39 | 45 | 51 | 30 | | | |
| After inserting 81 and 76 | | | | | | | | | | | | |
| 81 | 74 | 62 | 77 | 48 | 58 | 39 | 45 | 51 | 30 | 76 | 76 | |
| After ı | After removing the top 10 times | | | | | | | | | | | |
| 39 | 30 | | | | | | | | | | | |