PA 7 Part 1: Heap Worksheet

DSC 30 Winter 2021 - Marina Langlois

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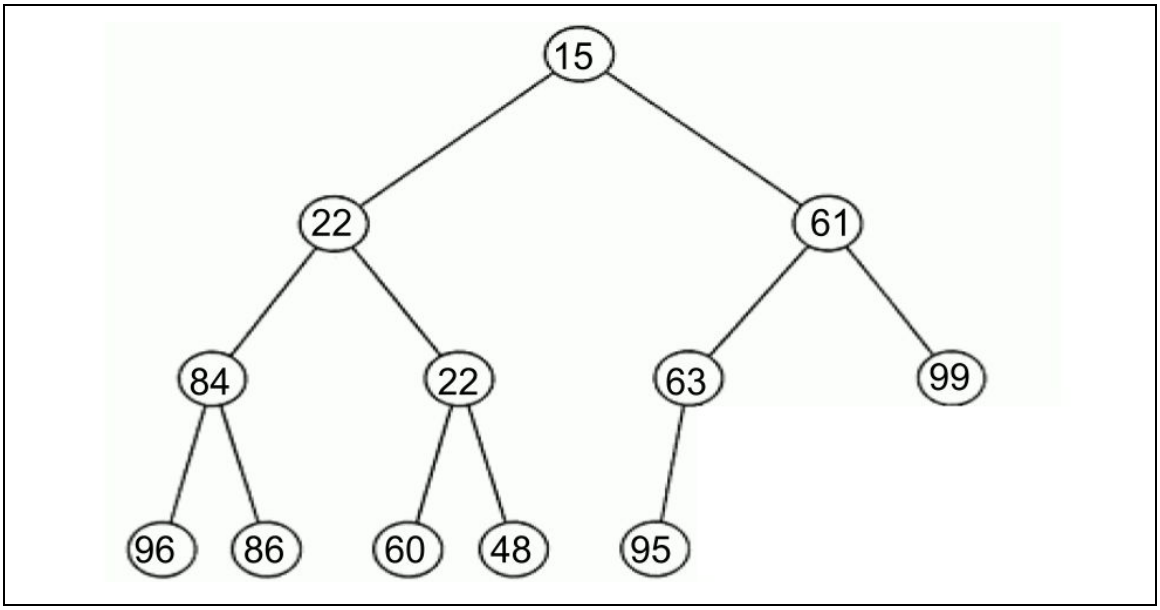
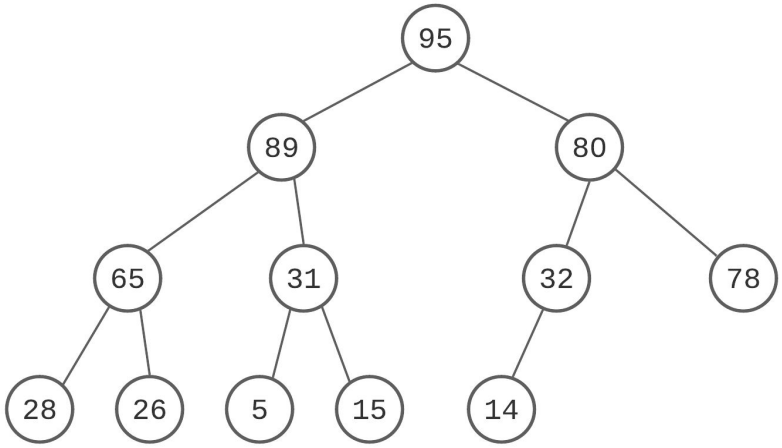
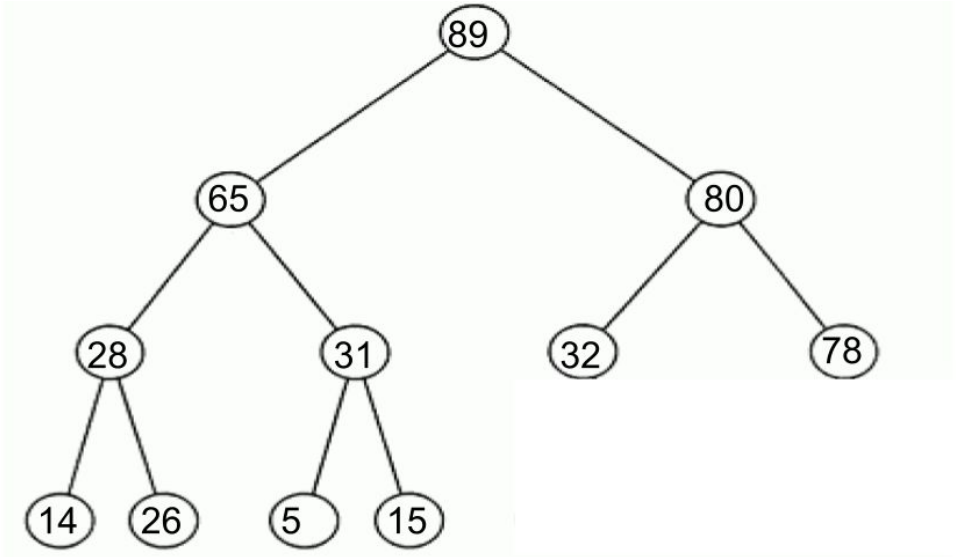
1. Insert the following elements in the given order to an empty binary (d = 2) min-heap. Draw the tree representation of the heap after all insertions.
   Elements to insert: [60, 96, 61, 15, 22, 63, 99, 84, 86, 22, 48, 95]



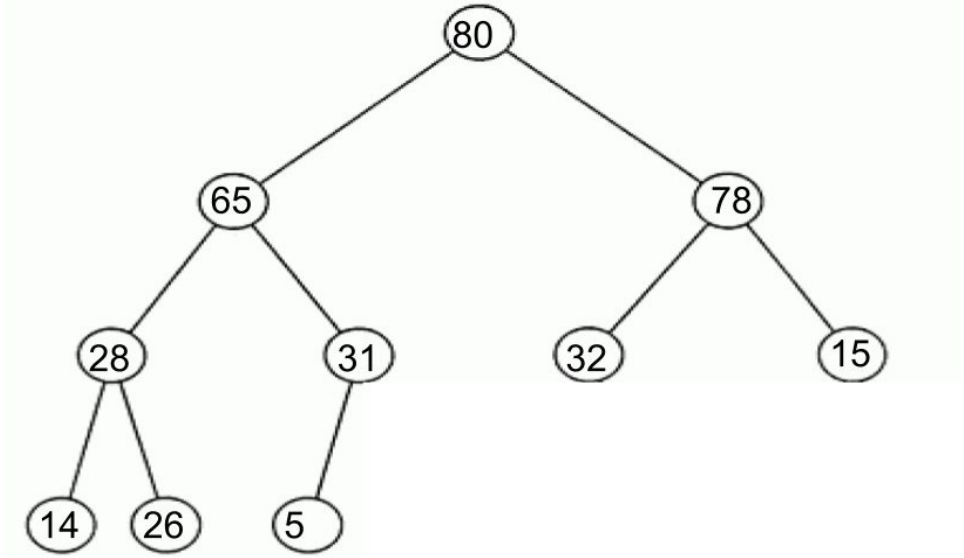
2. Remove the top element 5 times from the given heap and draw the tree representations of the heap after **each** removal.



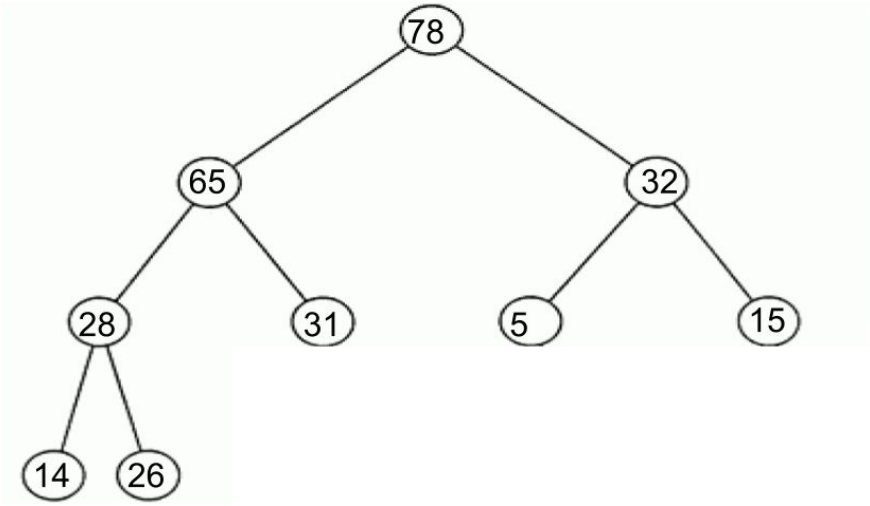
After 1st removal



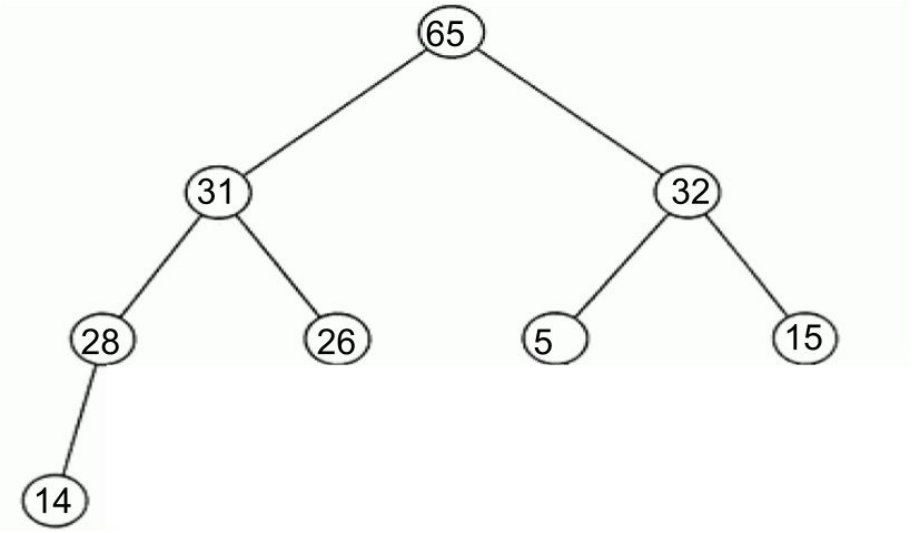
After 2nd removal



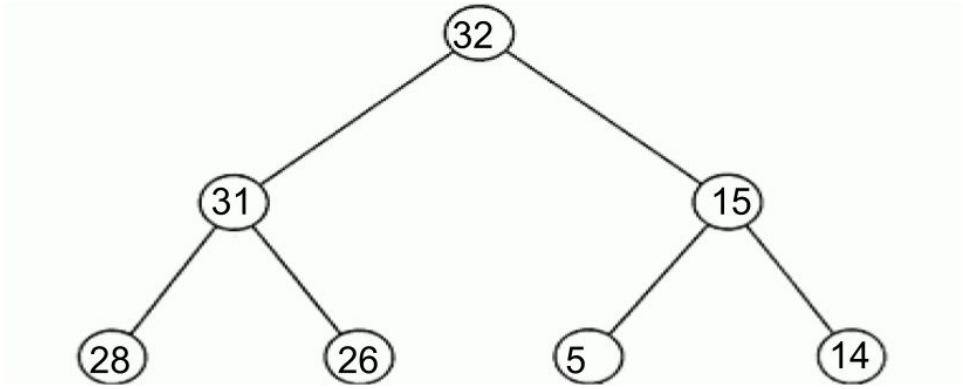
After 3rd removal



After 4th removal



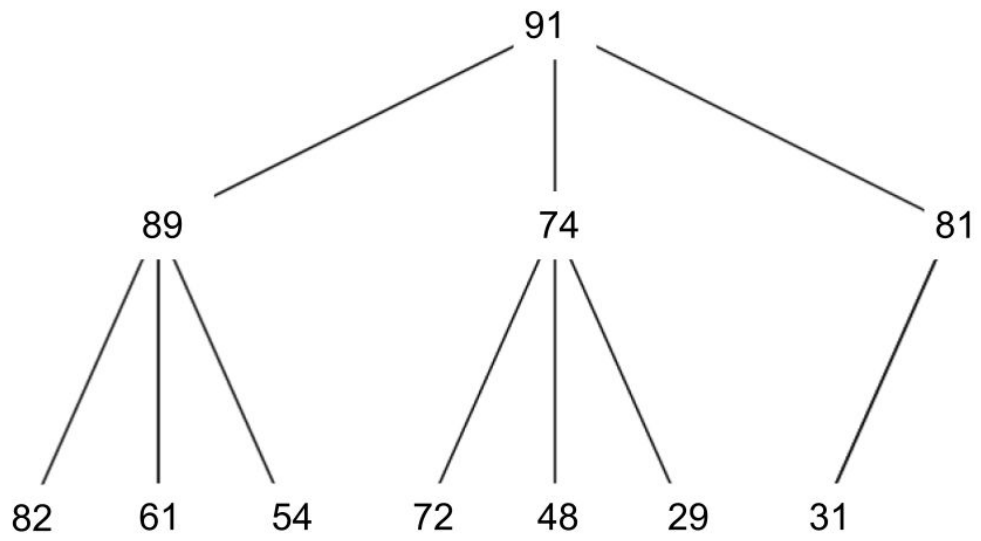
After 5th removal



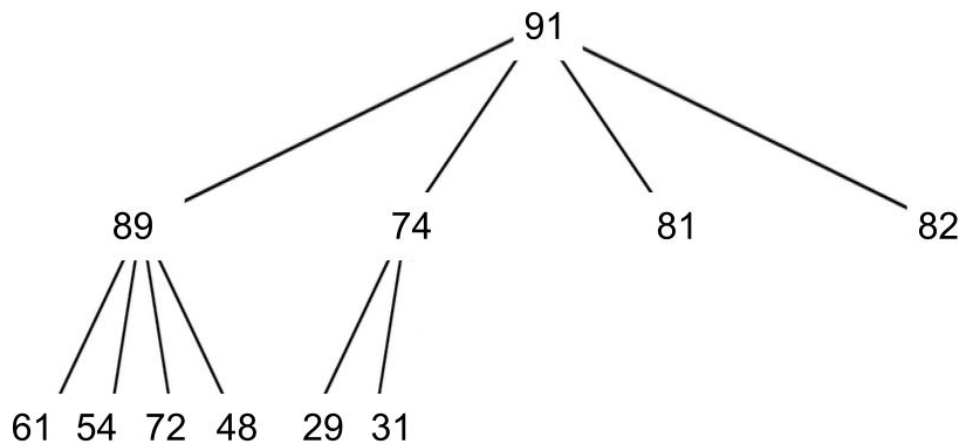
3. Draw the tree representations of the d-ary max-heaps from the following array representation. Choose d = {3, 4}.

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

3-ary



4-ary



4. Write down the array representations of the given **3-ary min-heap** after each specified operation.

Original											
11	23	19	42	31	48	58	55	30	26	45	
After **removing the minimum once**											
19	23	26	42	31	48	58	55	30	45	45	
After **removing the minimum twice**											
26	31	30	42	45	48	58	55	30	45	45	
After **inserting 32 and 18**											
18	31	26	42	45	48	58	55	32	30	45	
After **inserting 15 and 12**											
12	31	26	15	45	48	58	55	32	30	42	18
After **removing the minimum 10 times**											
55	58	58	48	55	48	58	55	32	30	42	18