PA 7 Part 1: Heap Worksheet

DSC 30 Spring 2020 - Marina Langlois

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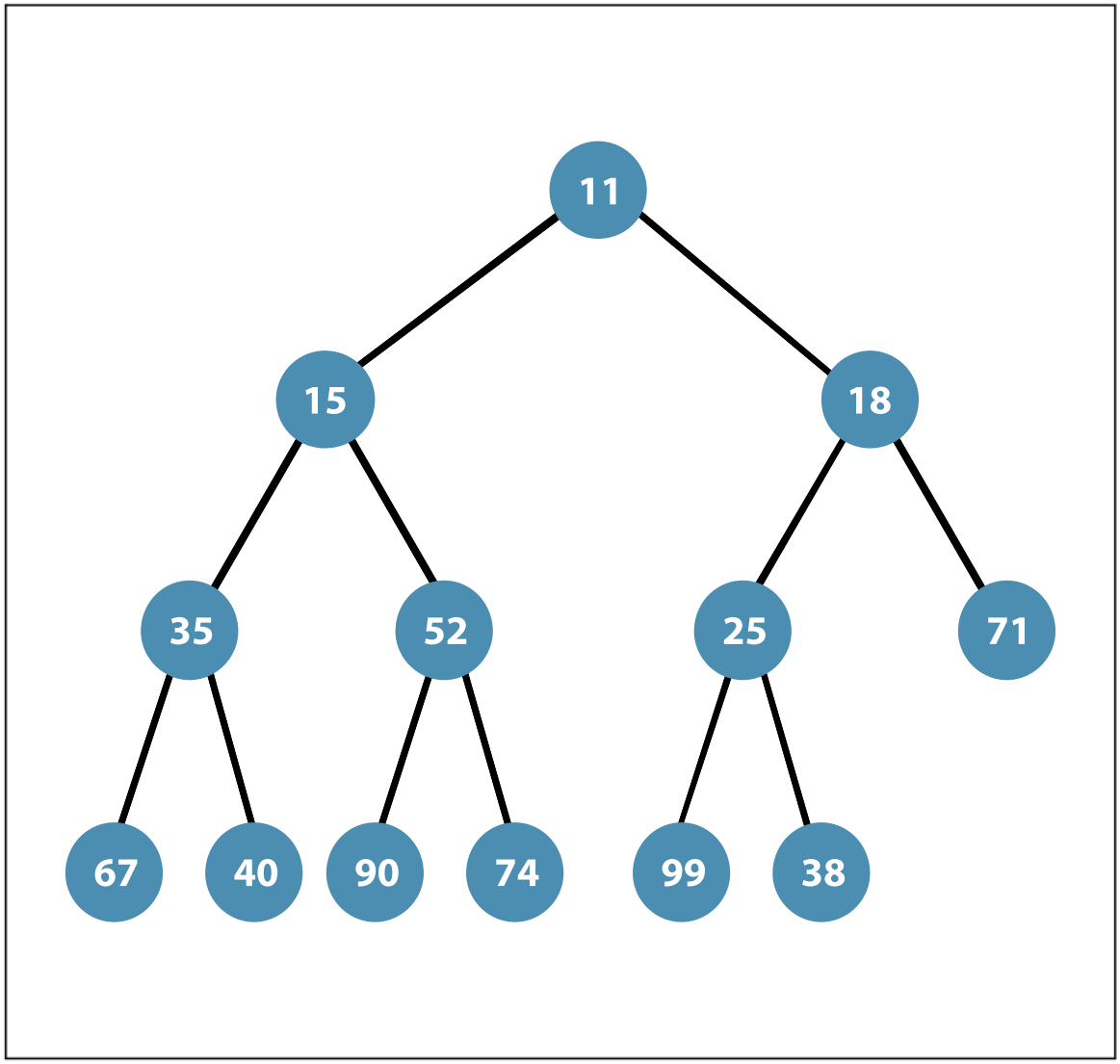
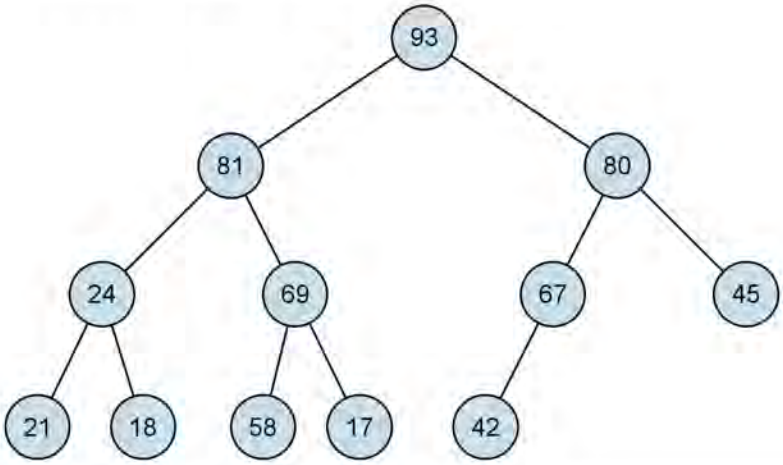
1. Insert the following elements in the given order to an empty binary (d = 2) min-heap. Draw the tree representation of the heap after all insertions.

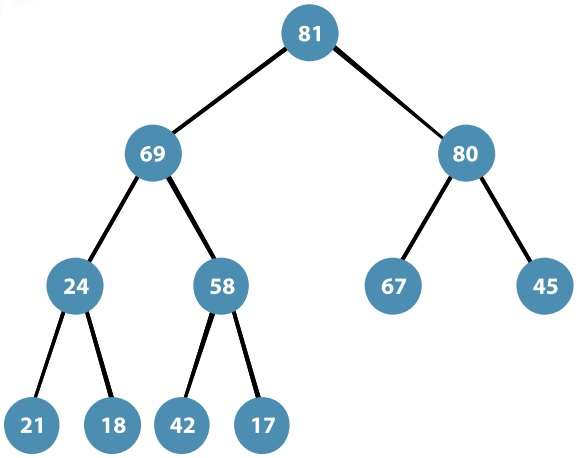
   Elements to insert: [67, 52, 71, 40, 35, 99, 38, 15, 11, 90, 74, 18, 25]



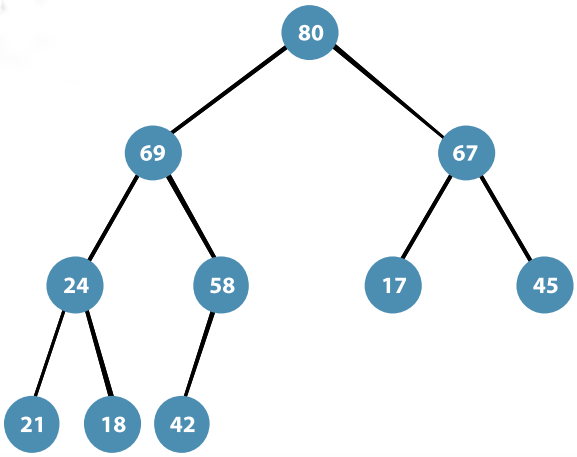
2. Remove the top element 5 times from the given heap and draw the tree representations of the heap after **each** removal.



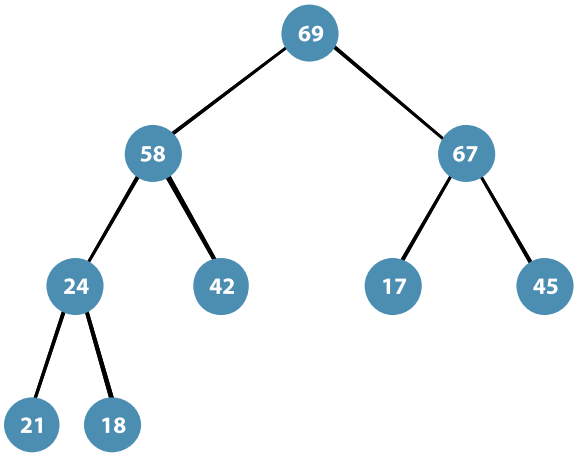
After 1st removal



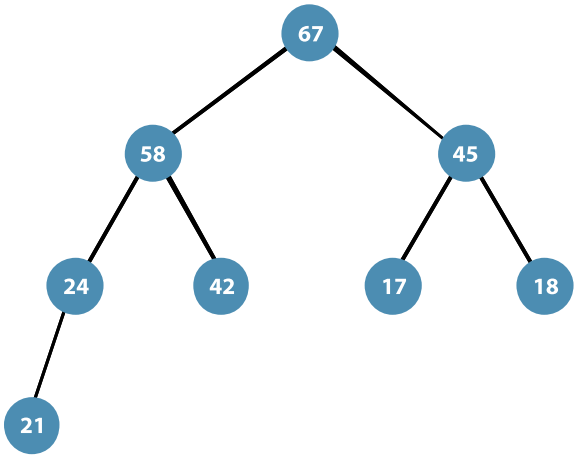
After 2nd removal



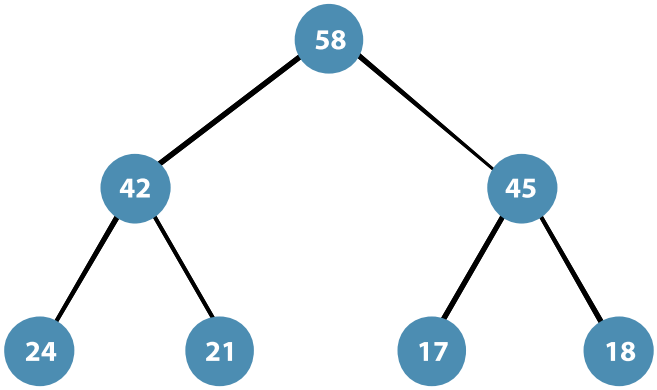
After 3rd removal



After 4th removal



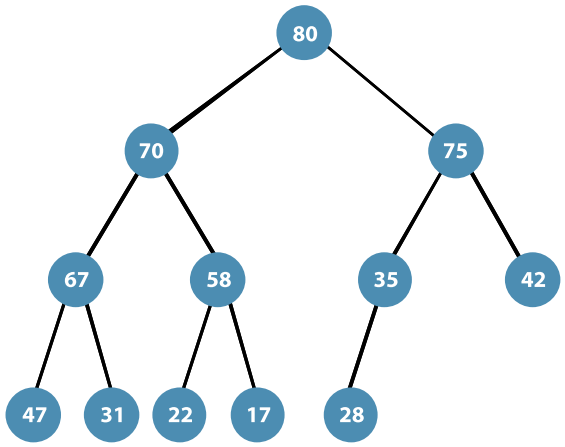
After 5th removal



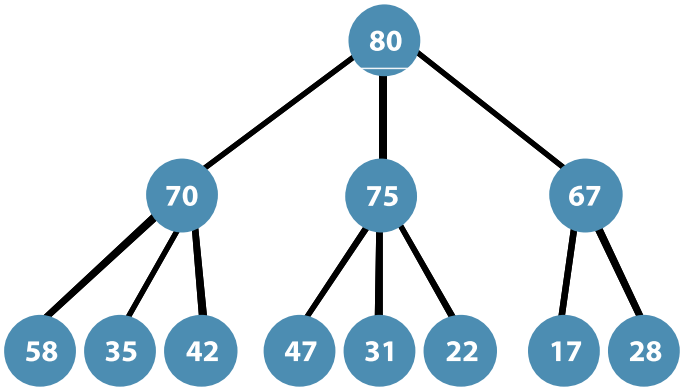
3. Draw the tree representations of the d-ary max-heaps from the following array representation. Choose d = 2, 3, 4.

   Array representation: [80, 70, 75, 67, 58, 35, 42, 47, 31, 22, 17, 28]

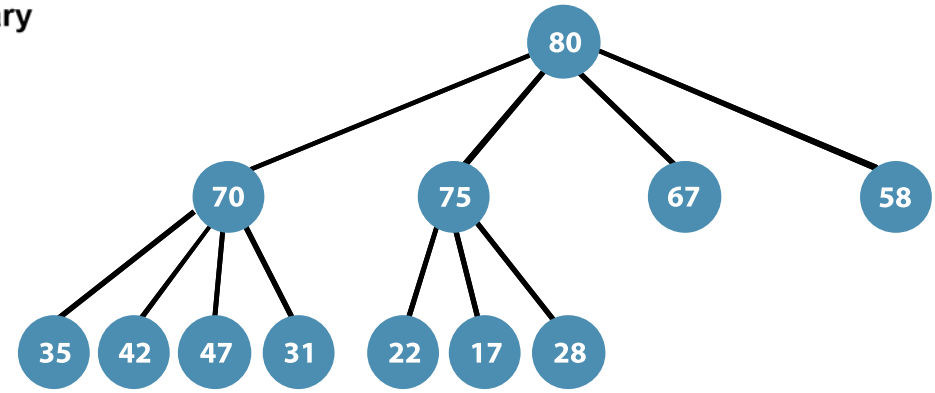
2-ary



3-ary



4-ary



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

Original											
10	17	52	49	25	46	27	56	82	67	50	
After **removing the minimum once**											
17	25	52	49	50	46	27	56	82	67		
After **removing the minimum twice**											
27	46	52	49	50	82	77	56				
After **inserting 35 and 53**											
27	46	35	49	50	82	77	56	52	53		
After **inserting 20 and 50**											
20	46	35	27	50	82	77	56	52	53	49	50
After **removing the minimum 10 times**											
77	82										