

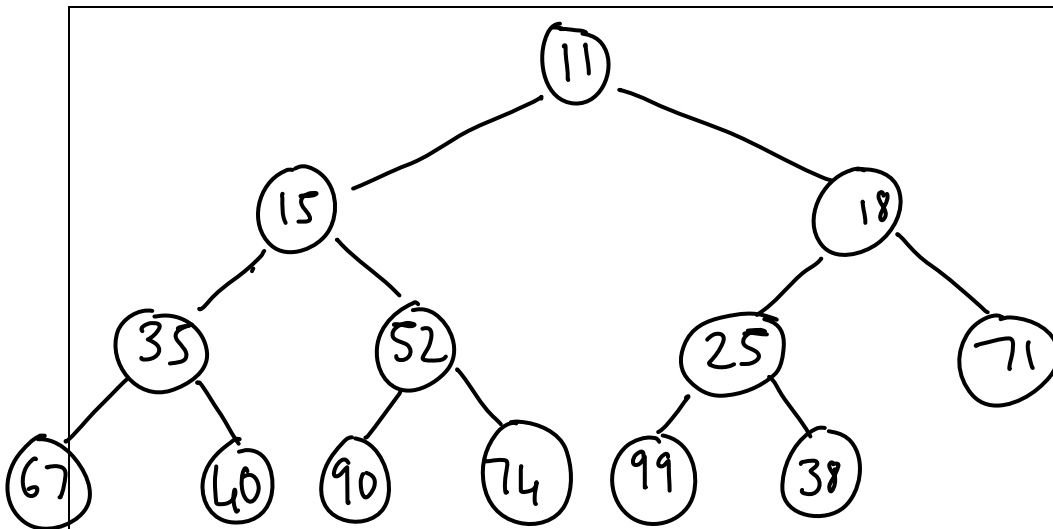
PA 7 Part 1: Heap Worksheet

DSC 30 Spring 2020 - Marina Langlois

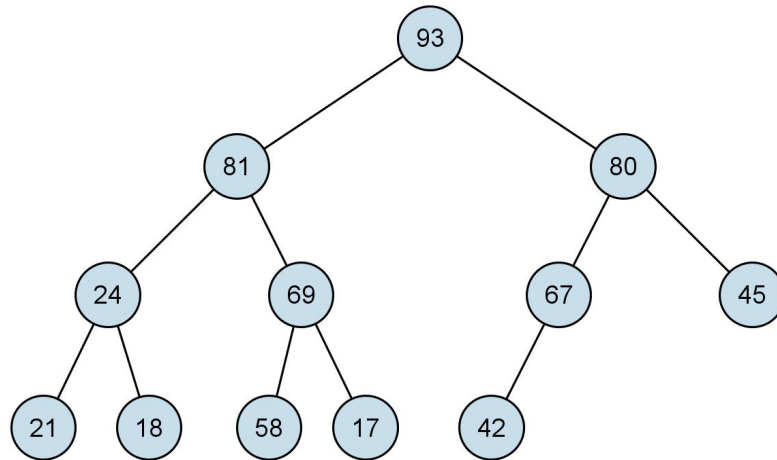
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PID	A15600068

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.

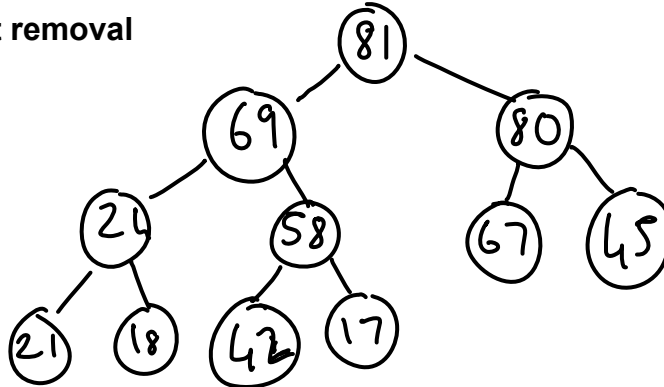
Elements to insert: ~~67~~, 52, ~~71~~, ~~40~~, ~~35~~, 99, ~~38~~, ~~15~~, ~~11~~, ~~90~~, ~~74~~, ~~18~~, ~~25~~



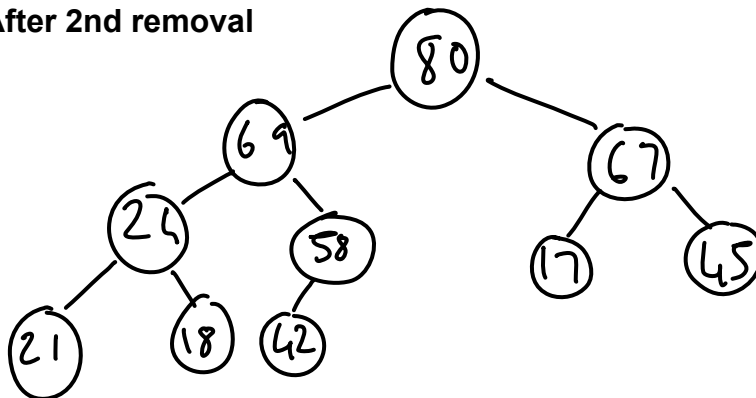
2. Remove the top element 5 times from the given heap and draw the tree representations of the heap after **each** removal.



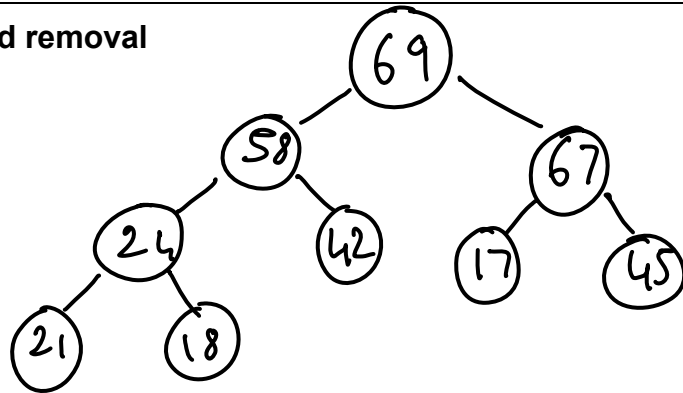
After 1st removal



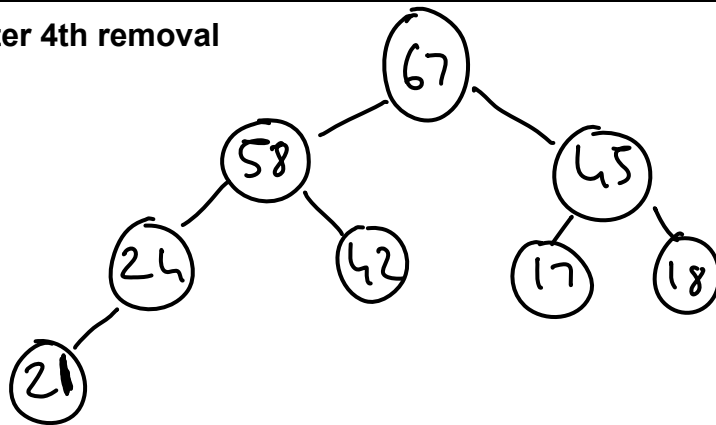
After 2nd removal



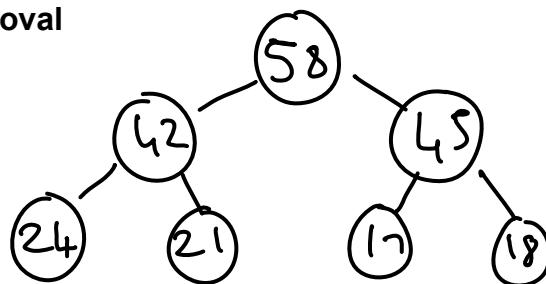
After 3rd removal



After 4th removal



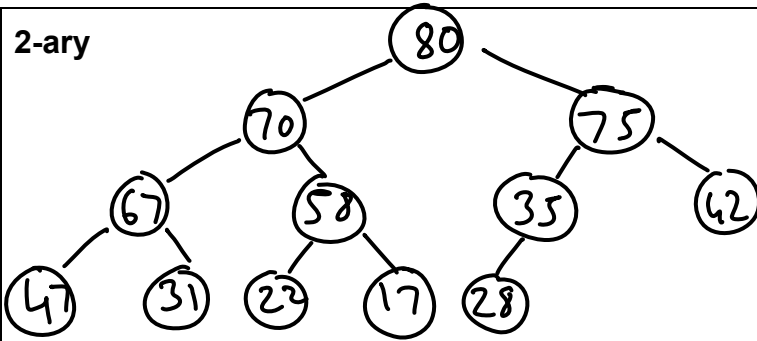
After 5th removal



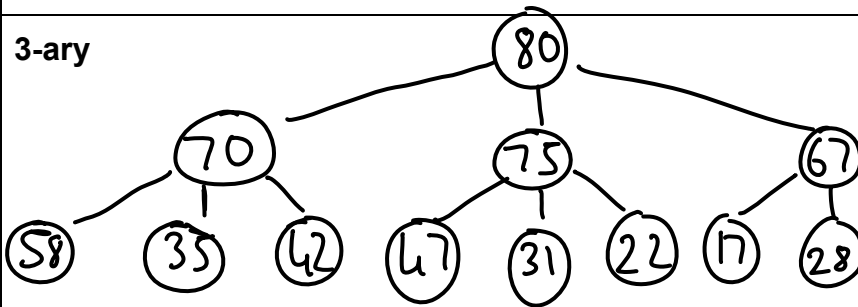
3. Draw the tree representations of the d-ary max-heaps from the following array representation. Choose $d = 2, 3, 4$.

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

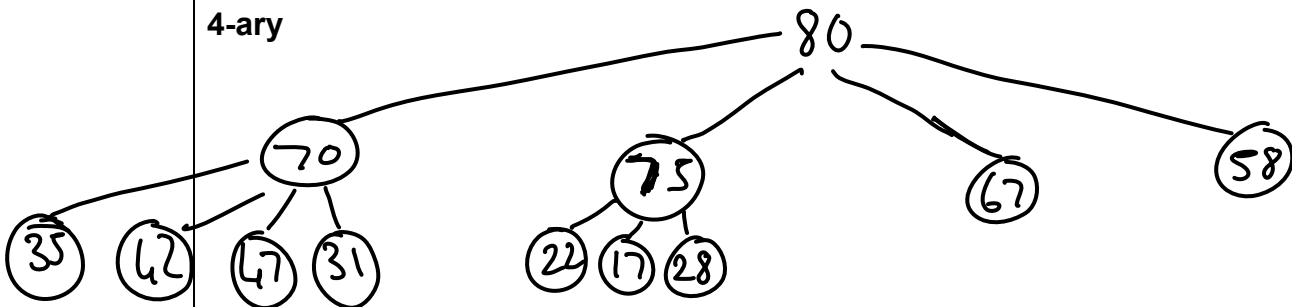
2-ary



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 <i>L₁ M₂ K₃ L₁₁ M₁₁ K₁₁ L₂₂ M₂₂ K₂₂ L₃₃</i>											
17	25	52	49	50	46	27	56	82	67		
After removing the minimum twice											
27	46	52	49	50	82	67	56				
After inserting 35 and 53											
27	46	35	49	50	82	67	56	52	53		
After inserting 20 and 50											
20	46	35	27	50	82	67	56	52	53	49	50
After removing the minimum 10 times											
67	82										

