

Today: Priority queues and binary heaps; §§ 21.*.

Next class: Quiz 2.

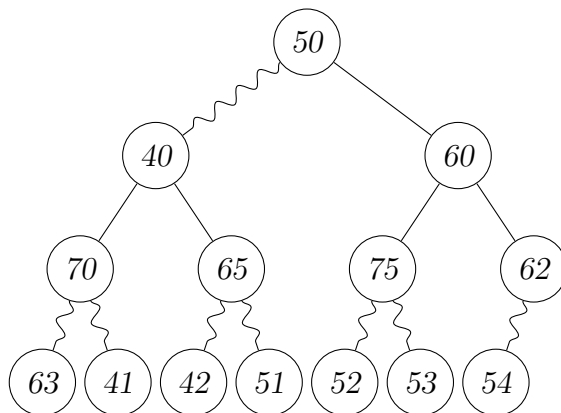
1. Write your group members' names below. Underline your name.

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2. Using conventional graphical notation, depict the complete binary tree encoded by the following array, based on the textbook's method.¹

i:	1	2	3	4	5	6	7	8	9	10	11	12	13	14
a[i]:	50	40	60	70	65	75	62	63	41	42	51	52	53	54

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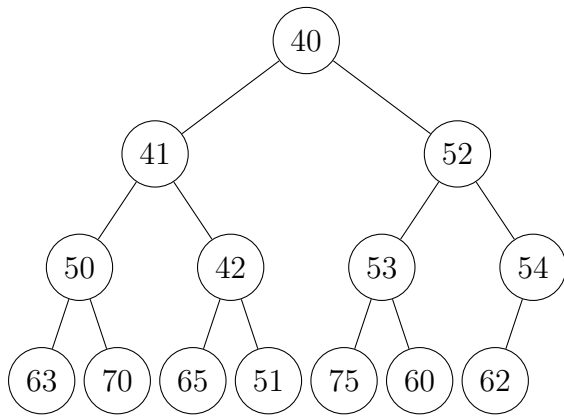


3. Mark all violations of the *(min-)heap order property* in the tree of Question 2 by annotating the corresponding edge with a *V*.

Ⓐ *The violations are marked using wavy edges in the earlier figure.*

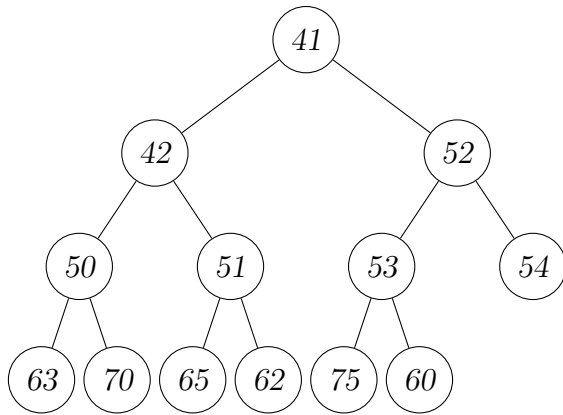
4. Depict the state of the following binary min-heap after all actions triggered by a *deleteMin* operation have completed. Repeat for three additional *deleteMin* operations.

¹Mark Allen Weiss, *Data Structures and Problem Solving Using Java*, 4th edition (Addison-Wesley, 2010), §21.1.1.

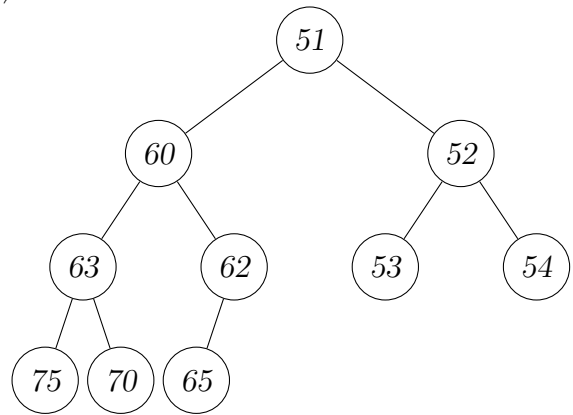
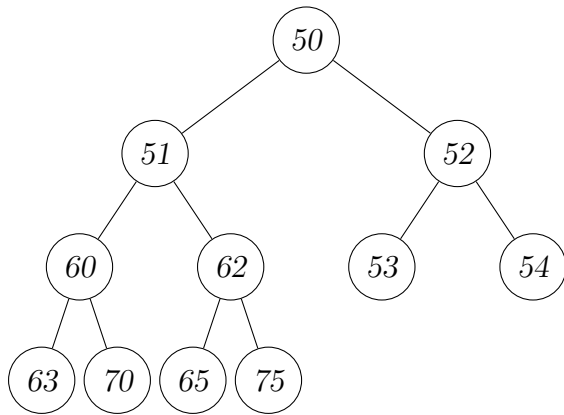
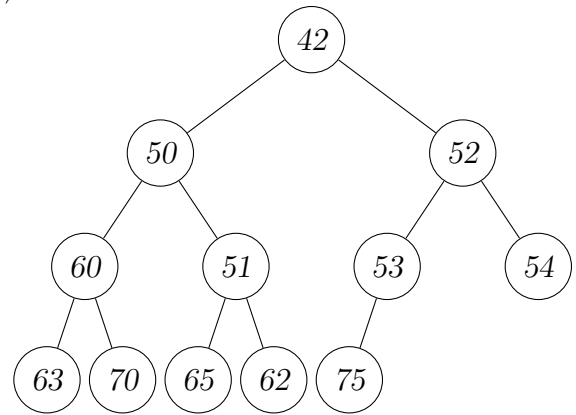


a)

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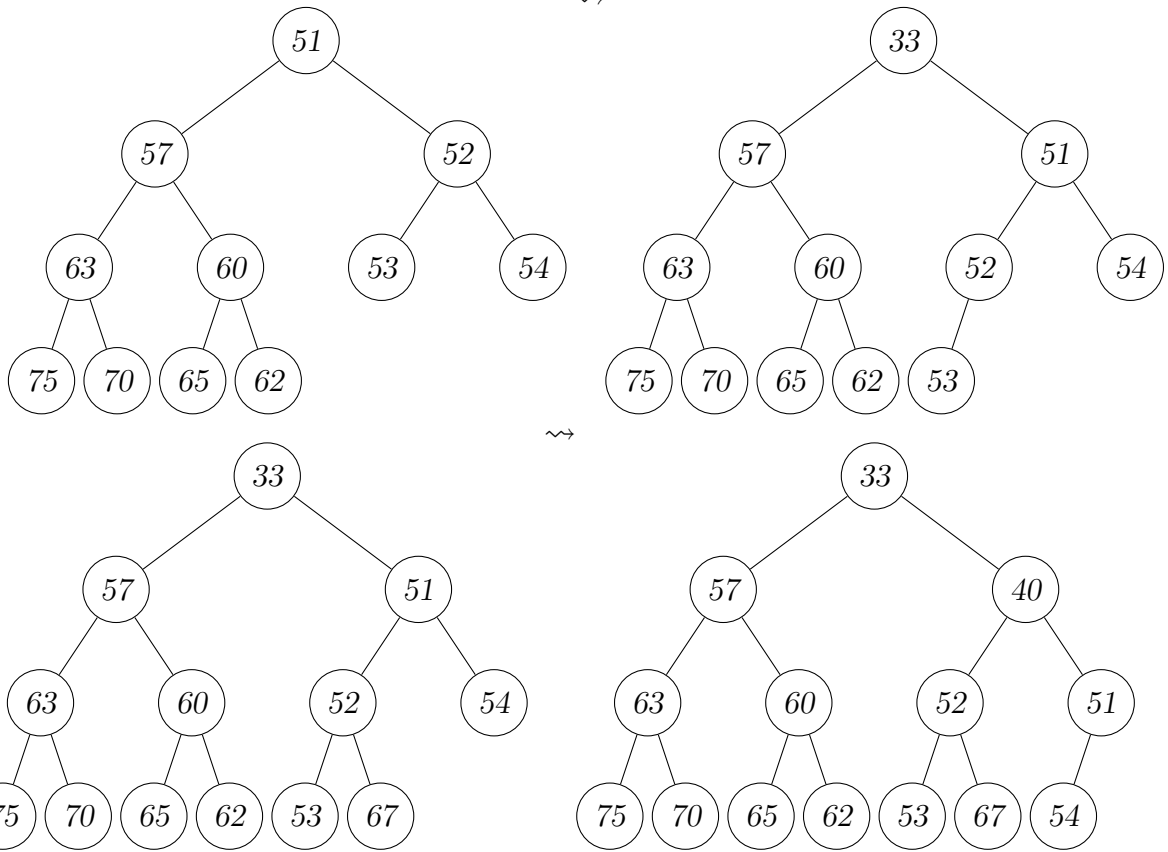


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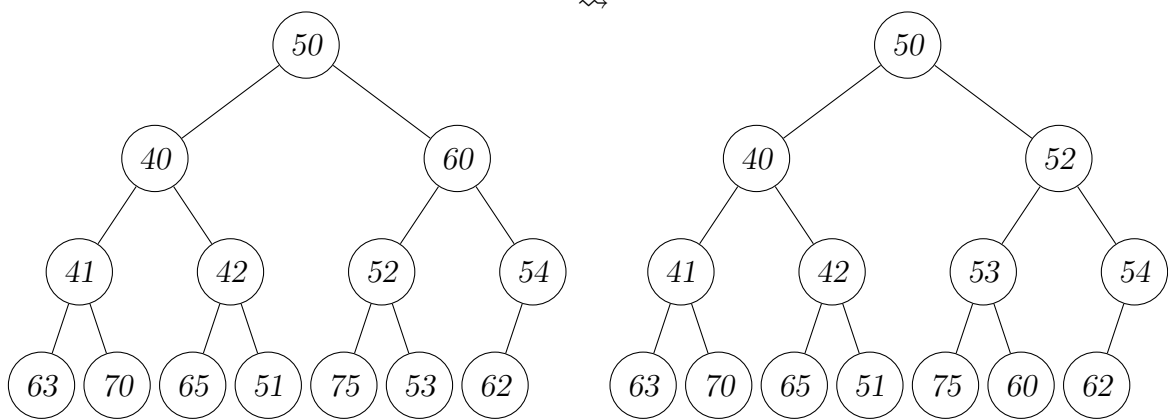
5. Starting with the final heap of Question 4, depict the state of the heap after all actions triggered by a $insert(57)$ operation have completed. Repeat for operations $insert(33)$, $insert(67)$, and $insert(40)$.

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6. *Heapify* the tree of Question 2 using the *buildHeap* operation from the textbook.² Depict intermediate states of the tree, including at least the states after *buildHeap* completes each level of the tree.

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² *Idem*, §21.3.

