Today: priority queues, binary heaps; §§ 21.{1,2,3}.
Next class: binary heaps, heapsort, external sorting; §§21.4–21.end. Reynolds's paper.[1]
Reminders: Newsgroup is required reading (and writing); use to advantage.

1. List the members of your group below. Underline your name.

2. Using conventional graphical notation, depict the complete binary tree encoded by the following array, based on the textbook's method.[2]
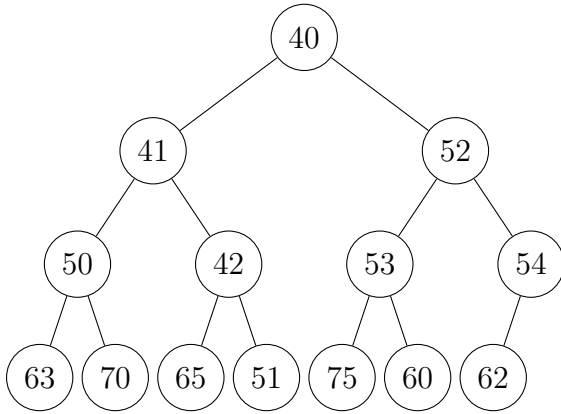
```
   i:   1   2   3   4   5   6   7   8   9  10  11  12  13  14
a[i]:  50  40  60  70  65  75  62  63  41  42  51  52  53  54
```

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

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[1]Samuel W. Reynolds, "A Generalized Polyphase Merge Algorithm," *Communications of the ACM* 4/8 (1961).

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

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.

```
                    40
           _____/  _____
          41                   52
        /    \               /    \
      50      42           53      54
     /  \    /  \         /  \     /
    63  70  65  51       75  60   62
```

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)*.

6. *Heapify* the tree of Question 2 using the *buildHeap* operation from the textbook.[3] Depict intermediate states of the tree, including at least the states after buildHeap completes each level of the tree.

[3] *Idem*, §21.3.