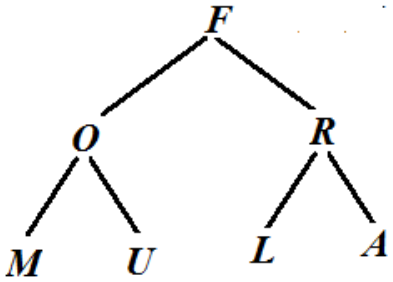
KEY TO Q U I Z #7 [9 points]

1. [4 points] Given a sequence of characters: <F, O, R, M, U, L, A>, build a heap using each of the following approaches:

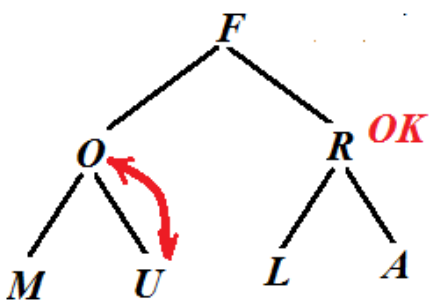
(a) Bottom-up approach.

Solution.

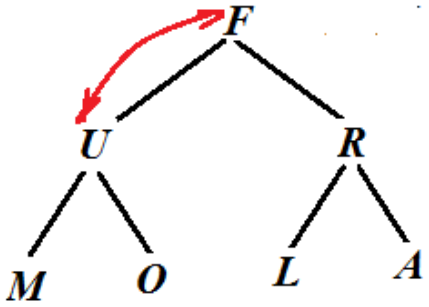
First, we build a nearly complete binary tree from incoming characters:



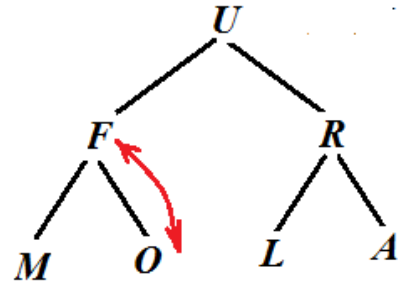
Now, we fix violations of parental-dominance requirement when going through all parental nodes, starting from the last one, from right to left, bottom – up:



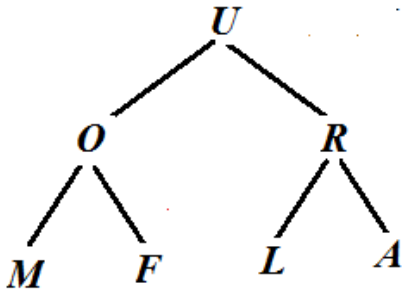
⇒



⇒

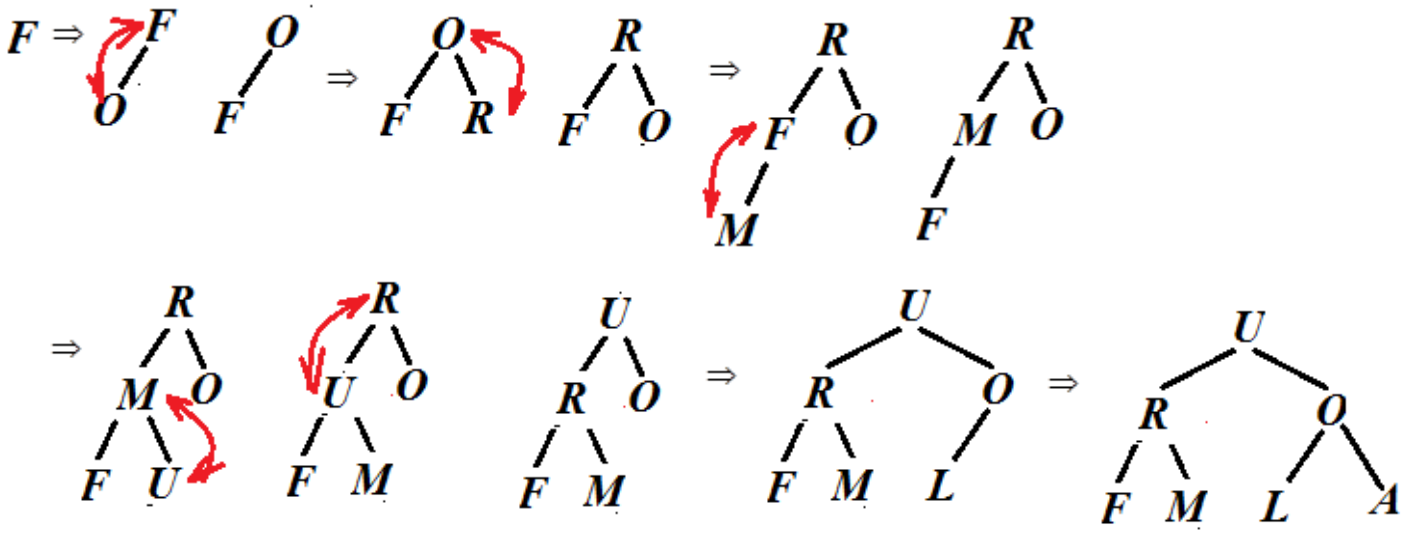


⇒



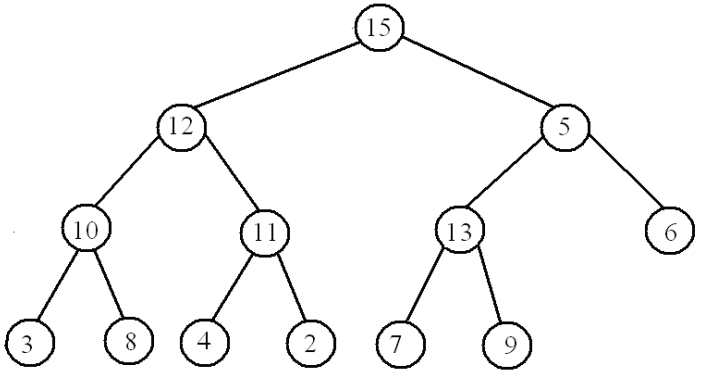
(b) Top-down approach.

Solution.

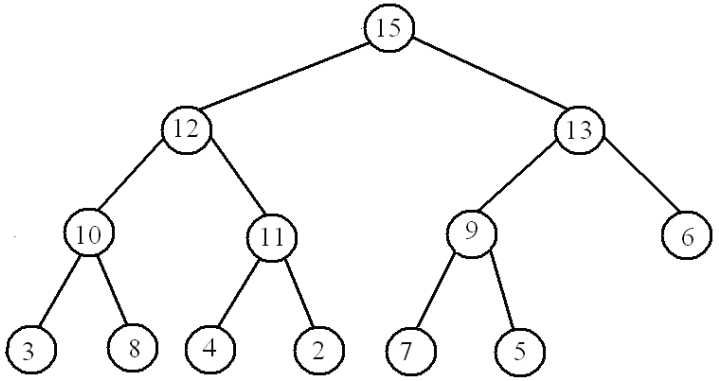


2. [2 points] (a) Build an essentially complete binary tree from the items:

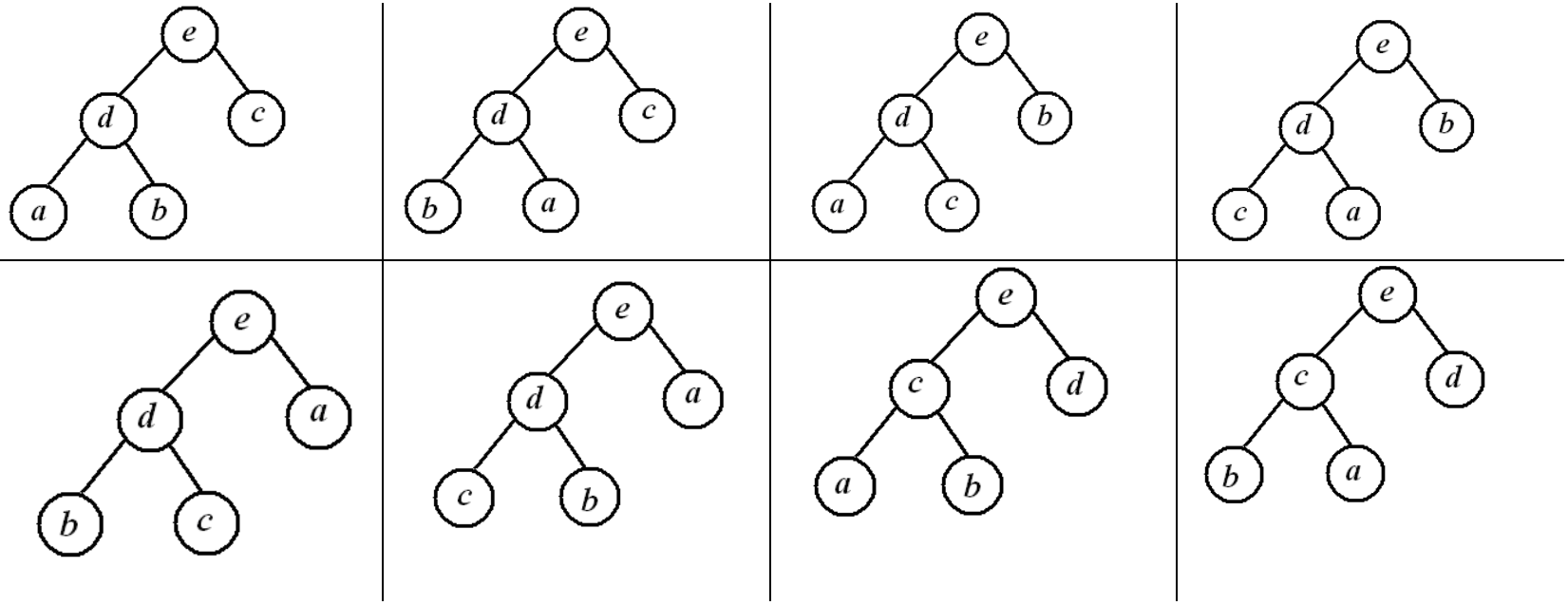
A=<15, 12, 5, 10, 11, 13, 6, 3, 8, 4, 2, 7, 9>



(b) Show the heap that is a result of a function call MAX-HEAPIFY(A, 3), where the array A comes from part (a) of this problem.



3. [3 points] Show all the heaps that may be built from the items: ***a***, ***b***, ***c***, ***d***, ***e*** that may come in an arbitrary order.


e
d
c
a
b
e
d
c
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a
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d
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a
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b
a