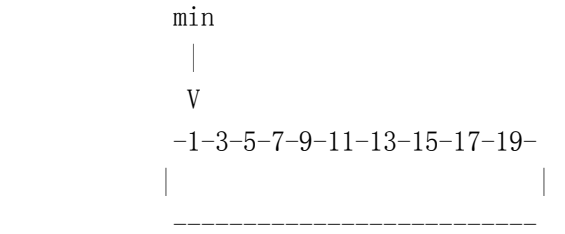
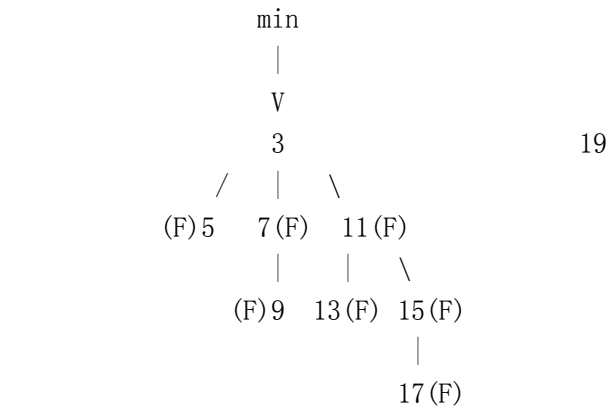
COP 5536/AD 711R Advanced Data Structures
Spring, 2001

Sample Solutions - Exam 2

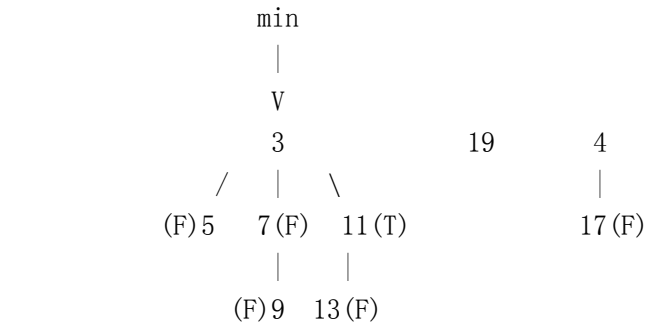
1. (a)



(b) RemoveMin



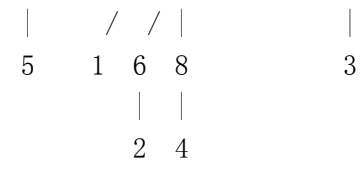
(c) decrease 17 to 4



2.

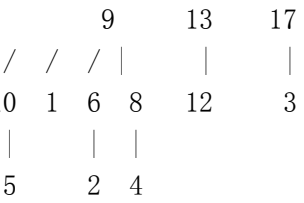
After RemoveMax

10 9 13 12 17

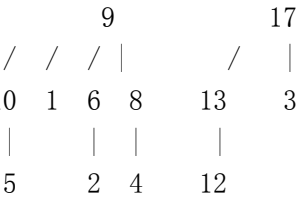


Two passing combine

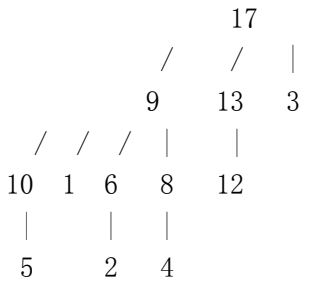
Step 1:



Step 2:



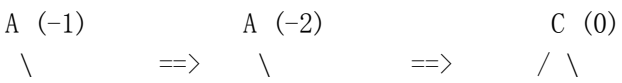
Step 3:

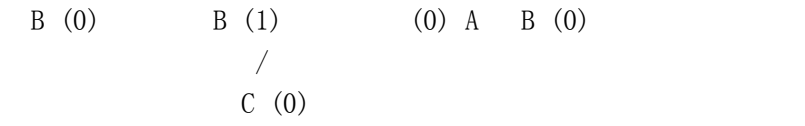


(b)

3. RL rotations
   Numbers in parentheses represents balance factors.

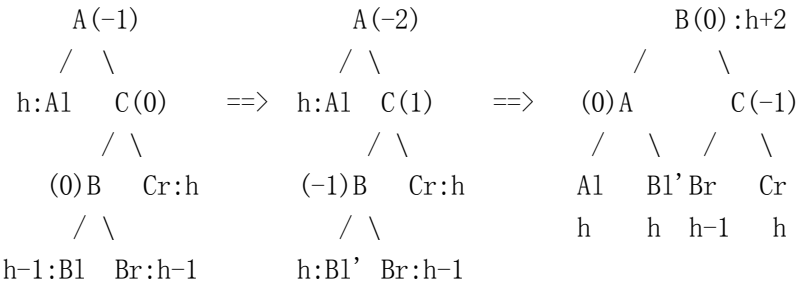
   (1) case 1:





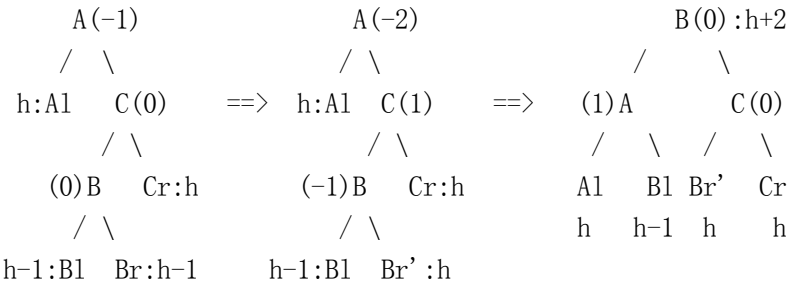
Before Insert C After

(2) case 2:



Before Insert to Bl After

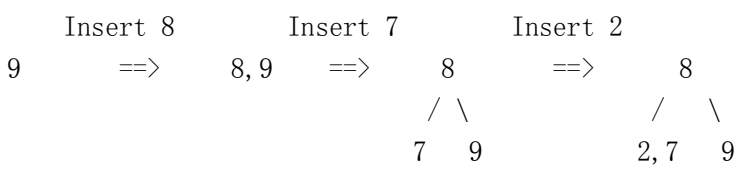
(3) case 3:

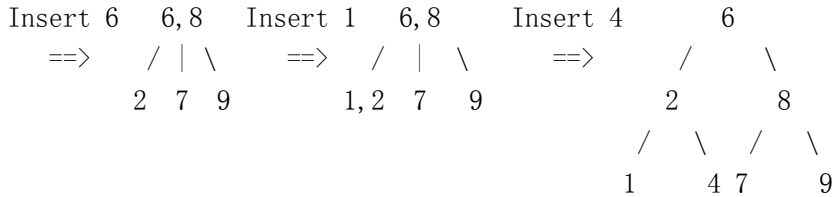


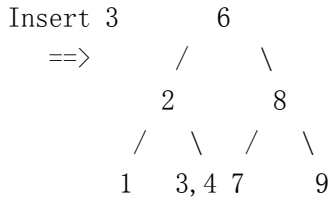
Before Insert to Br After

4.

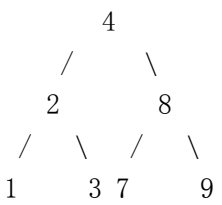
(a)





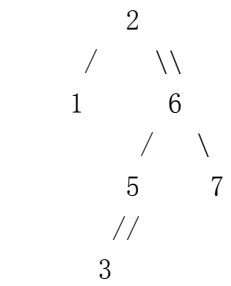


(b) Delete 6



5.

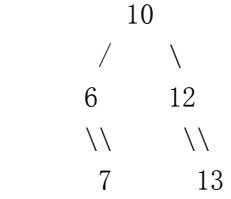
(a) Lb1 rotation



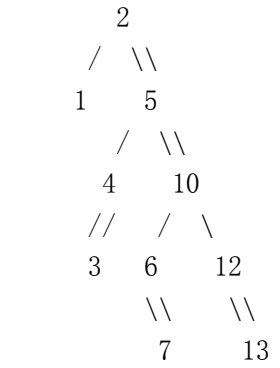
(b) Numbers in parentheses represent ranks.

i: Follow the right child pointer until rank(B) = rank(x), where rank(B) =1, x is a node pointer of tree S.

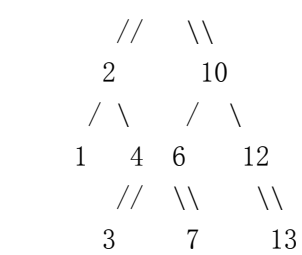
ii: Combine subtree x, 10, and B



iii: Combine the result of ii to node 5 through a red pointer



iv: Perform a RR rotation



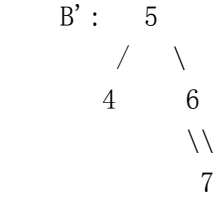
(c)

i: Search node 3

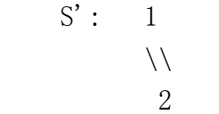
ii: Perform Join(B', 4, null)

B': 4

iii: Join (B', 5, right-subtree of node 5)



iv: Join (left-subtree of node 2, 2, S')



Result: