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Exam02 Solution

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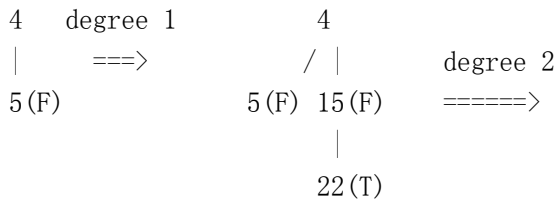
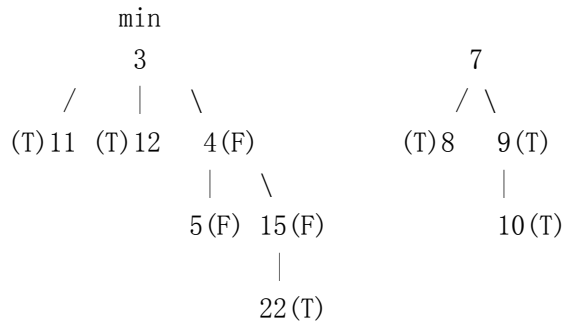
1.

F-heap (ChildCut: T(true), F(false))

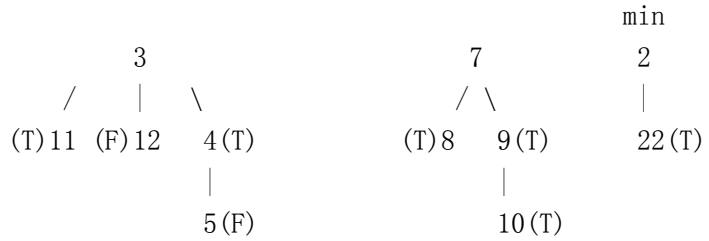
(a)The solution can be represented in more than one way.

After deleteMin operation, we need to combine steps like below:



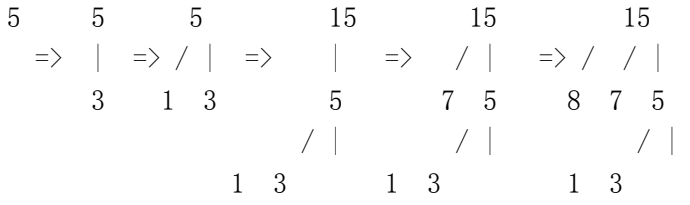


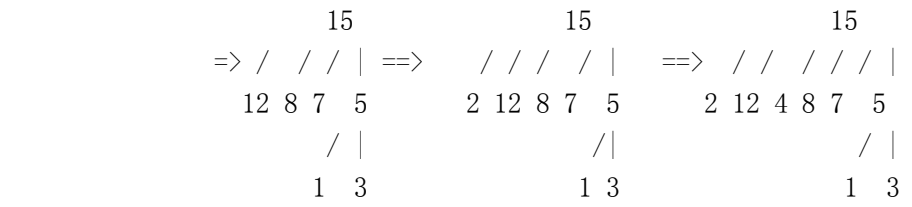
(b)



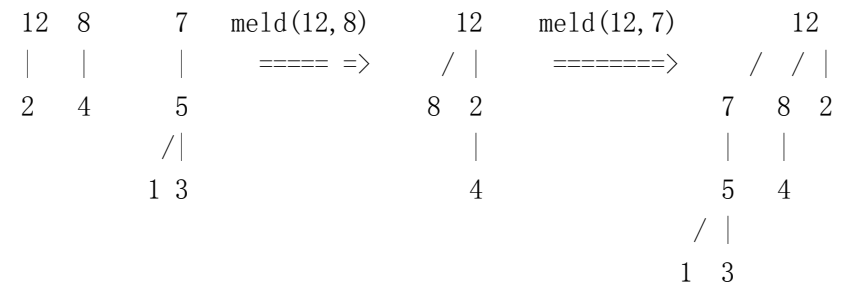
2.

(a)



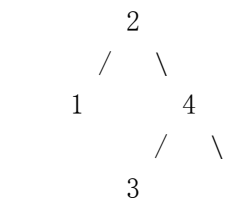


(b) two pass method

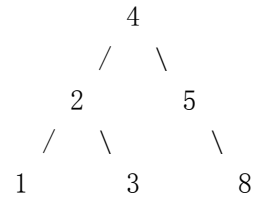


3.

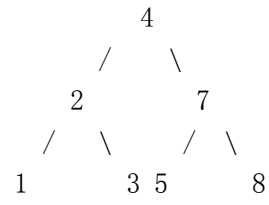
a) 2, 1, 3, and 5 are inserted normally.
Then a single rotation inserts 4, yielding



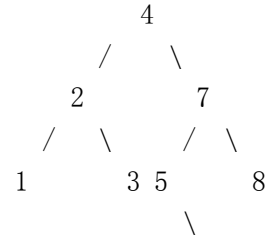
The insertion of 8 requires a single rotation at the root, resulting in



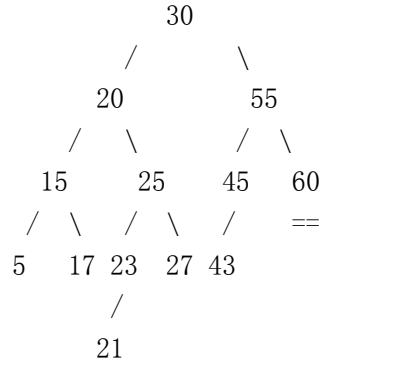
Next 7 is inserted, which requires a double rotation

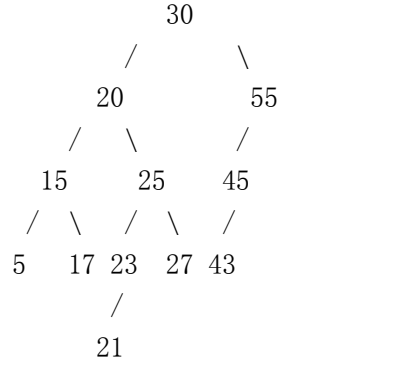


Finally, 6 is inserted yielding the result:

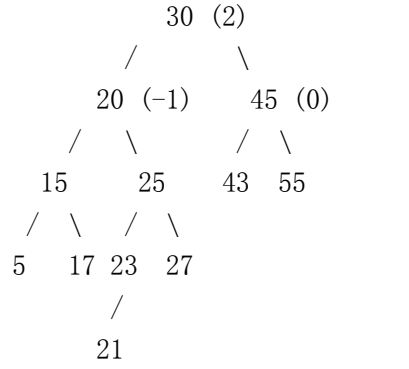


part b:

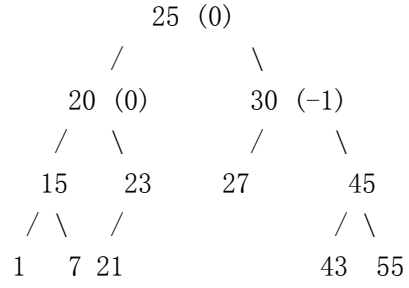




R1 Rotation



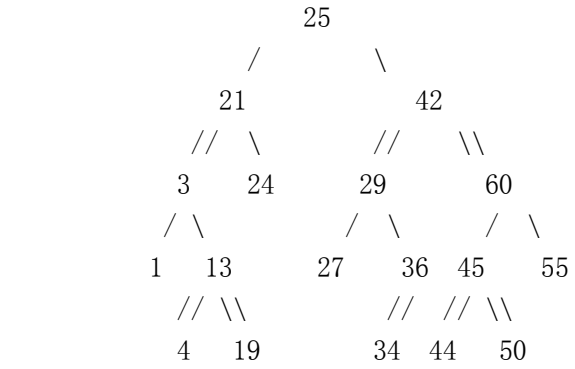
R-1 Rotation



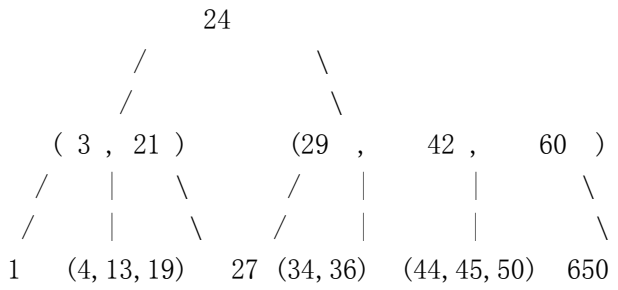
4.

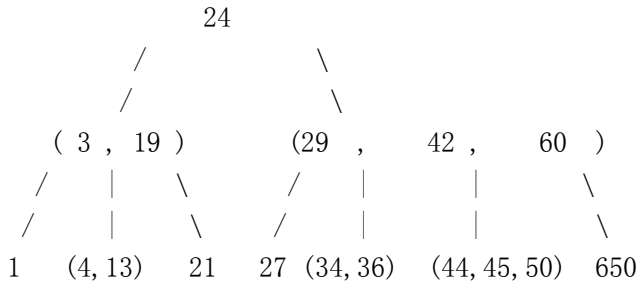
(a)

The solution can be represented in more than one way.



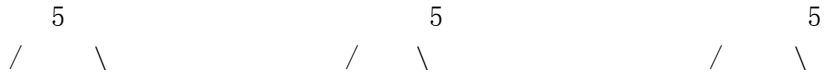
(b)

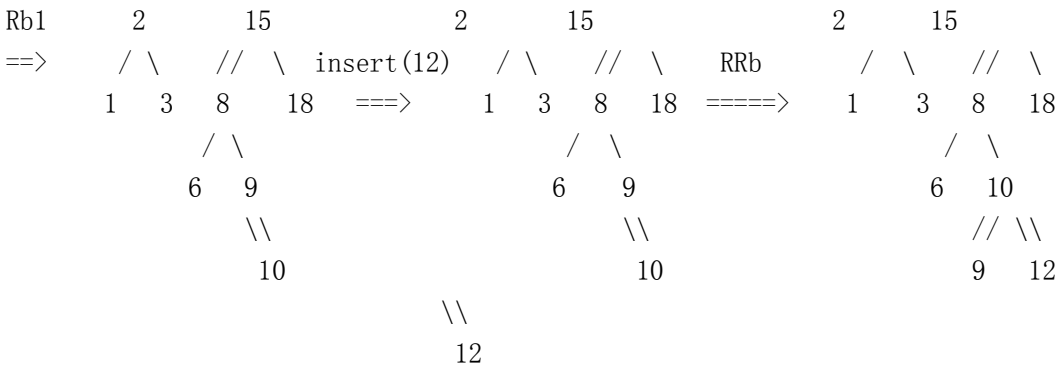




5. Red-Black Trees

(a)



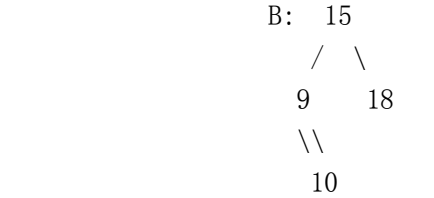


(b)

Step 1: Search 8 and copy it to x.
Initialize S and B to NULL. (S=NULL, B=NULL)

Step 2: S= 6 B= 9

Step 3: S= 6 B=join(B, 15, 18)



Step 4: S= join(3, 5, S) B= same as above