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Exam01 Solution

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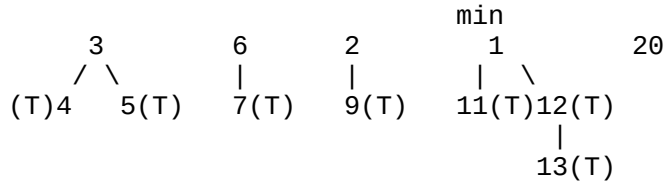
1.

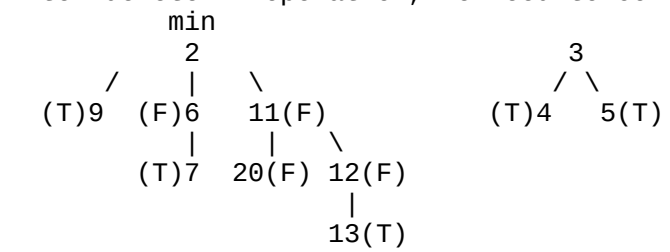
F-heap (ChildCut: T(true), F(false))

(a)



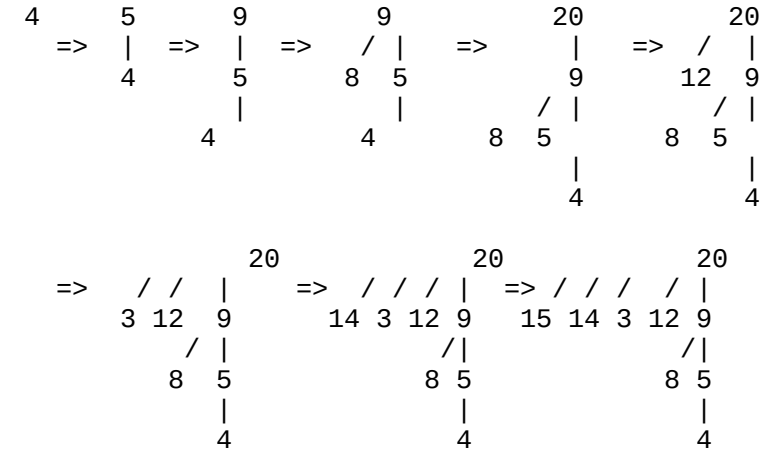
(b)

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

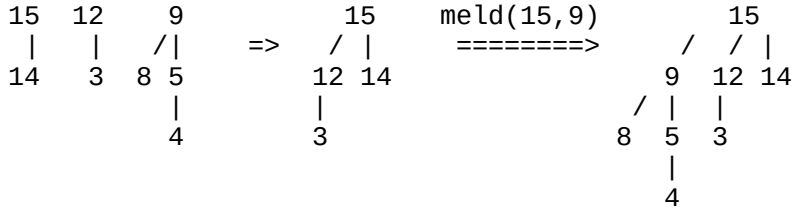


2.

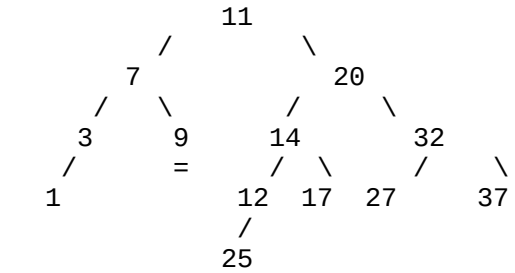
(a)



(b)

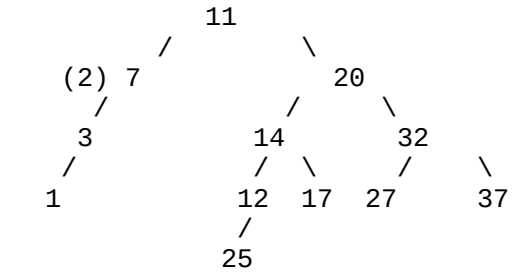


3.

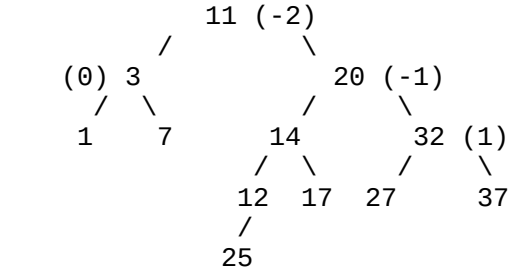


Part a:

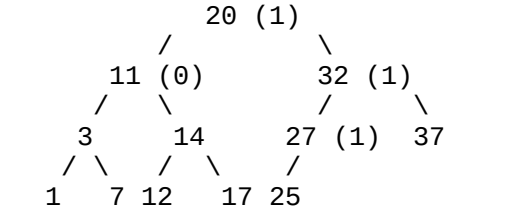
delete 9.



R1 Rotation

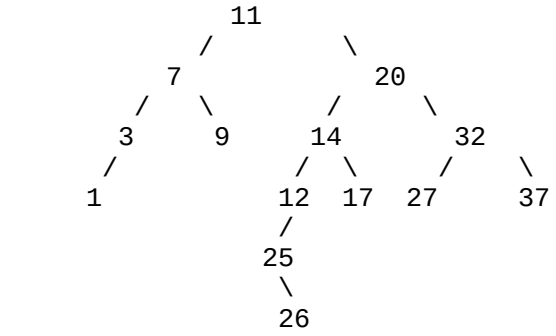


L0 Rotation

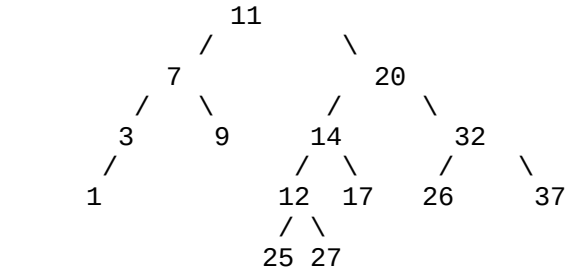


Part b:

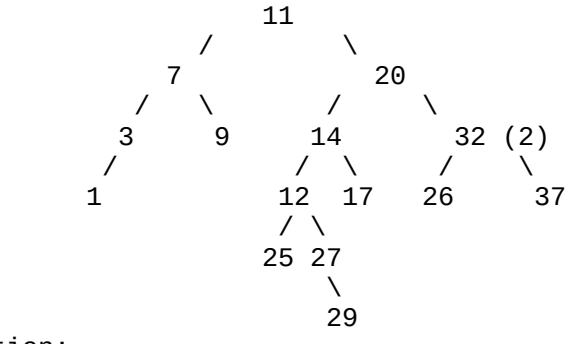
Insert 26



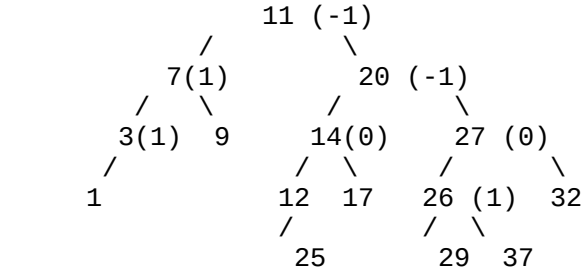
LR Rotation



Insert 29

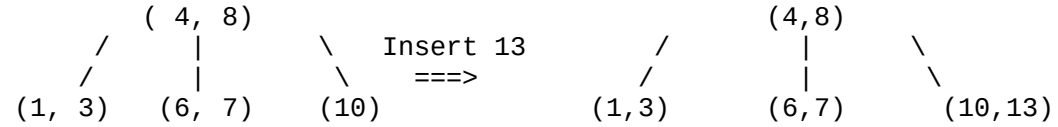


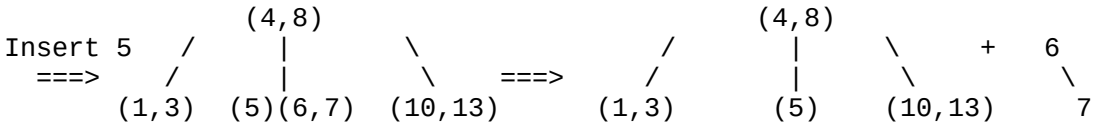
LR Rotation:

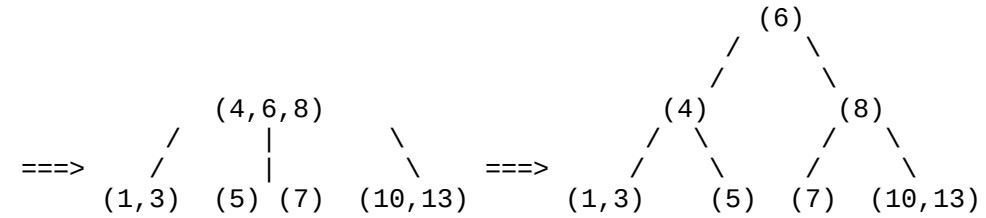


4.

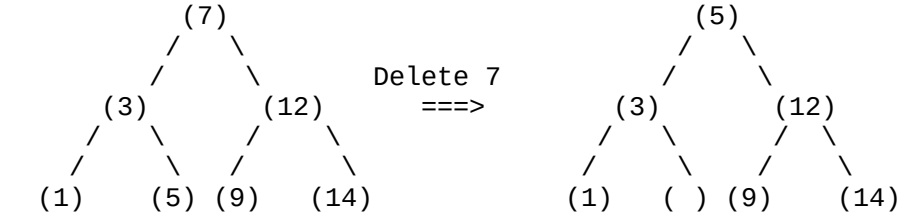
(a)

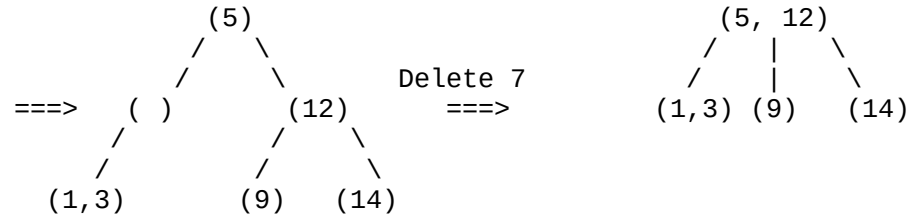

(4, 8)
(1, 3)
(6, 7)
(10)
Insert 13
===>
(4,8)
(1,3)
(6,7)
(10,13)

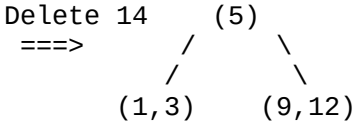

Insert 5
===>
(4,8)
(1,3)
(5)(6,7)
(10,13)
(4,8)
(1,3)
(5)
(10,13)
+
6
7


(4,6,8)
===>
(1,3)
(5) (7)
(10,13)
(6)
(4)
(8)
(1,3)
(5)
(7)
(10,13)

(b)

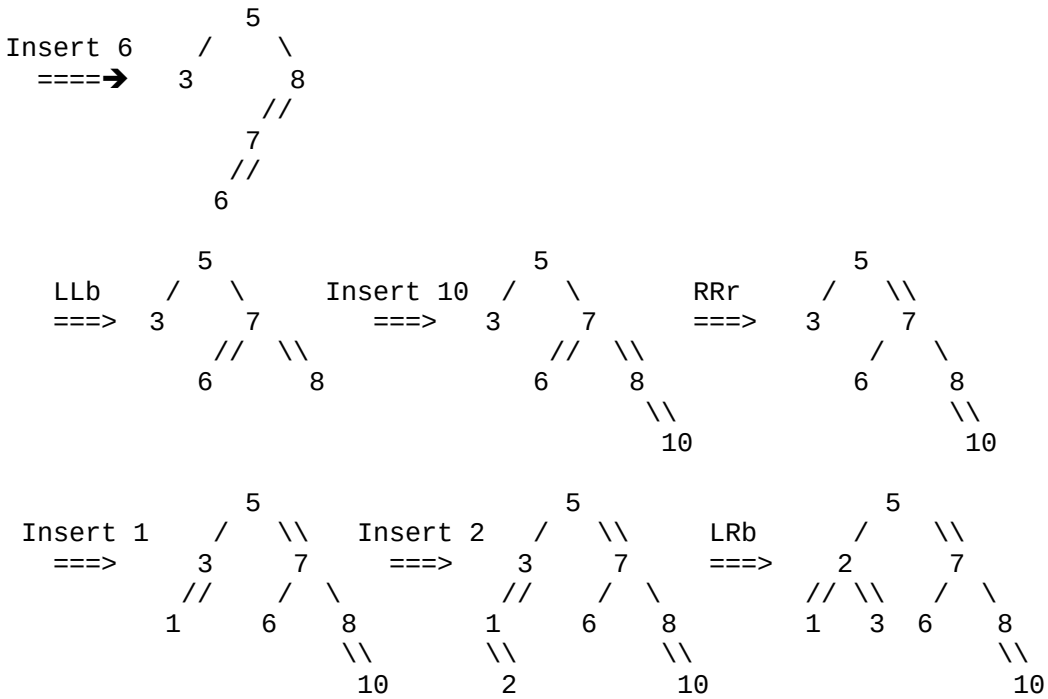

(7)
(3)
(12)
(1)
(5)
(9)
(14)
Delete 7
===>
(5)
(3)
(12)
(1)
( )
(9)
(14)


(5)
===>
( )
(12)
(1,3)
(9)
(14)
Delete 7
===>
(5, 12)
(1,3)
(9)
(14)


Delete 14
===>
(5)
(1,3)
(9,12)

5. Red-Black Trees

(a)

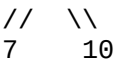


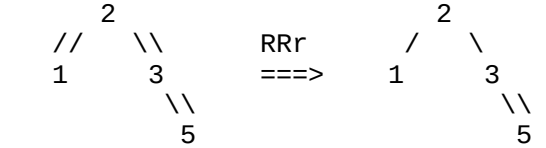
(b)

Step 1: Search 6 and copy it to x.
Initialize S and B to NULL. (S=NULL, B=NULL)

Step 2: S=NULL B=join(B, 7, 8)

B:



Step 3: S=(2,5,S) B= same as above

S: