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Homework-7:-

1. Given array: 15, 20, 24, 10, 18, 7, 30, 36, 25

1] Insert 15.

15 (B)
Black

2] Insert 20

15 (Black)
20 (Red)

3] Insert 24

15 (Black)
20 (Red)
24 (Red)

Before Restructure

15 (Black)
20 (Red)
24 (Red)

After restructure

20 (Black)
15 (Red)
24 (Red)

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Date
Page

Homework-7:-

1. Given array: 15, 20, 24, 10, 18, 7, 30, 36, 25

1.] Insert 15.

15 (B)
(Black)

2) Insert 20

15 (Black)
20 (Red)

3] Insert 24

15 (Black)
20 (Red)
24 (Red)

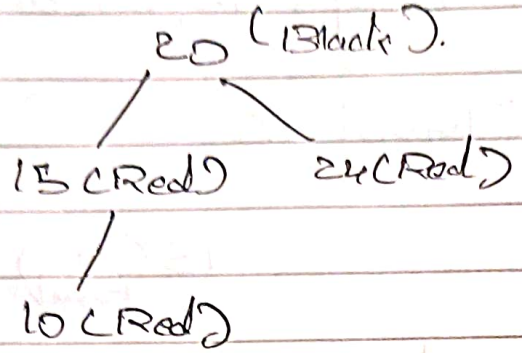
Before Restructure

15 (Black)
20 (Red)
24 (Red)

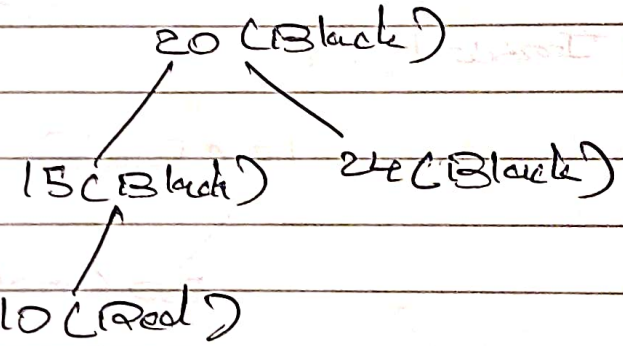
After restructure

20 (Black)
15 (Red)
24 (Red)

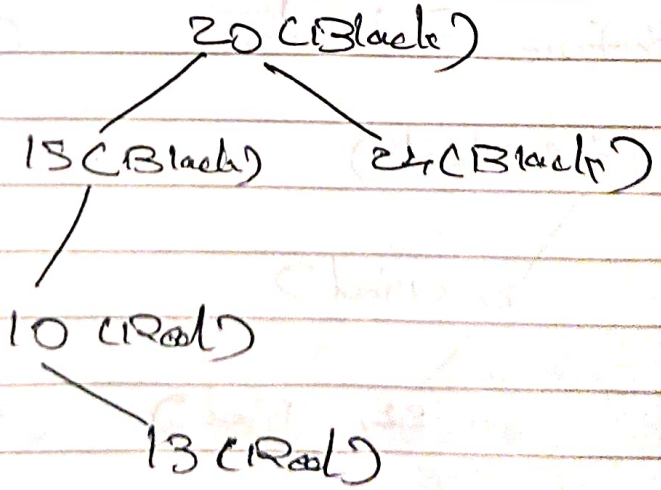
4] Insert 10



→ Red-red violation is there in step 4 and the uncle node of 10 is also red.

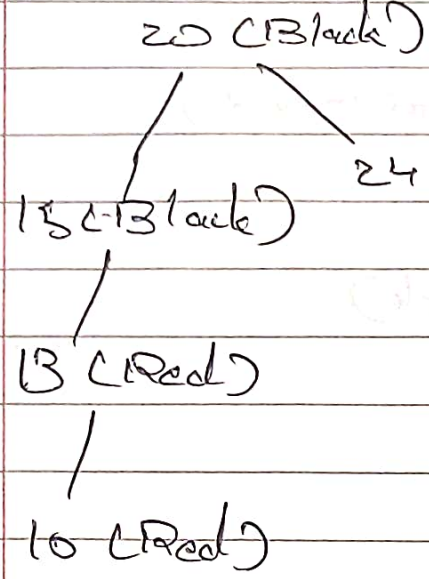


5] Insert 13

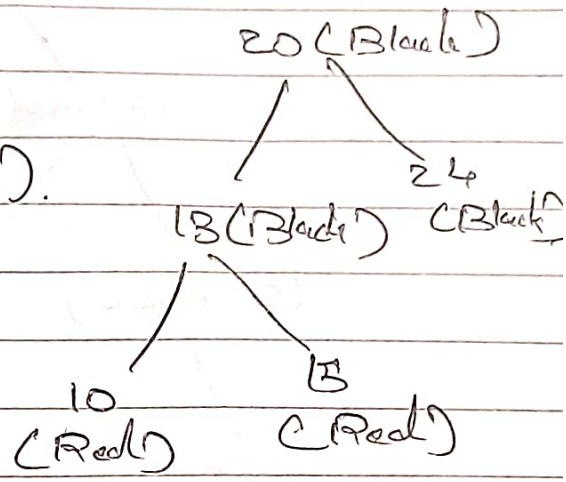


→ Again red-red violation, apply LR rotation and perform recoloring restructuring

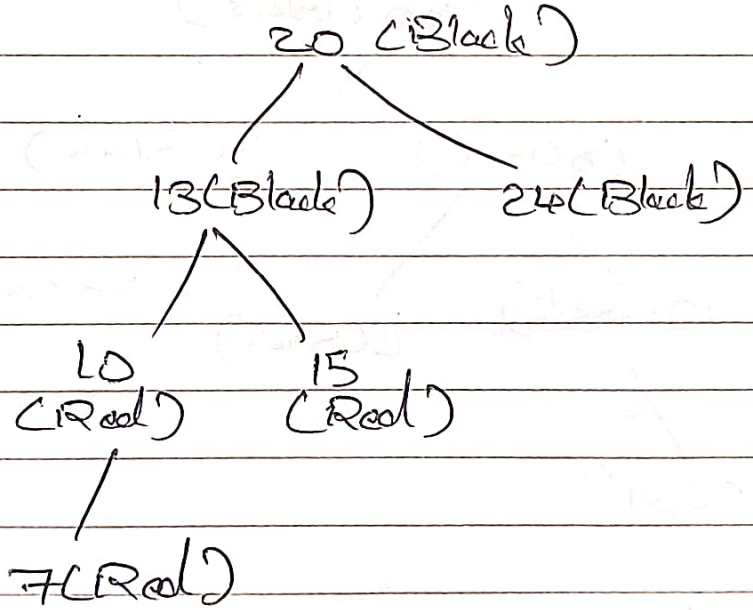
Rotation: 1



Rotation: 2

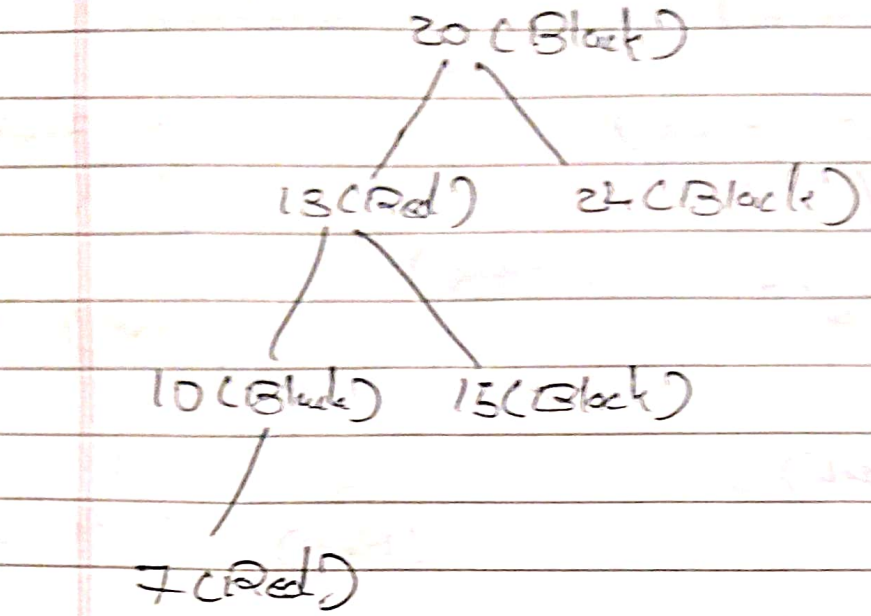


6] Insert 7

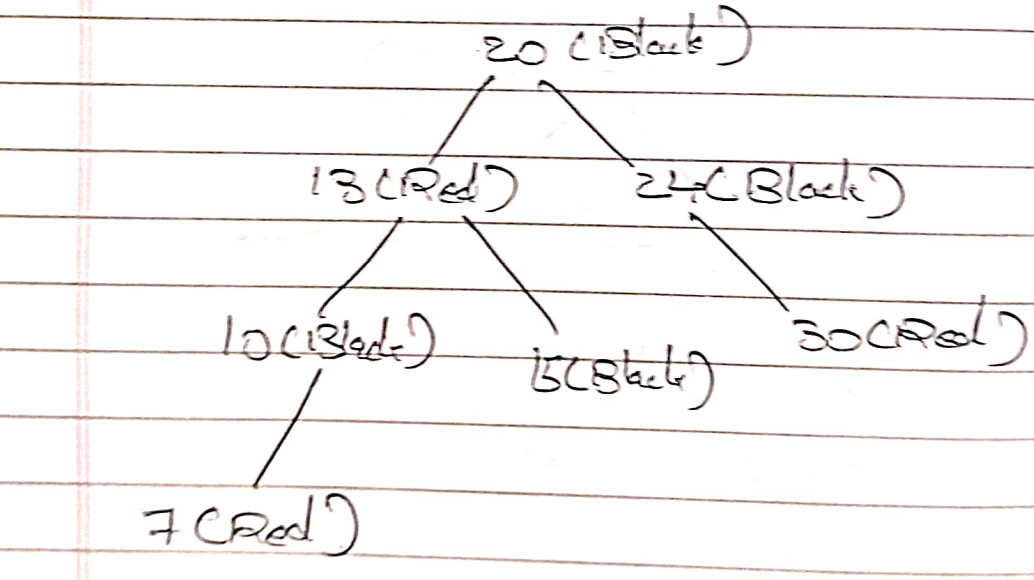


→ red-red violation and uncle node of 7 is red.

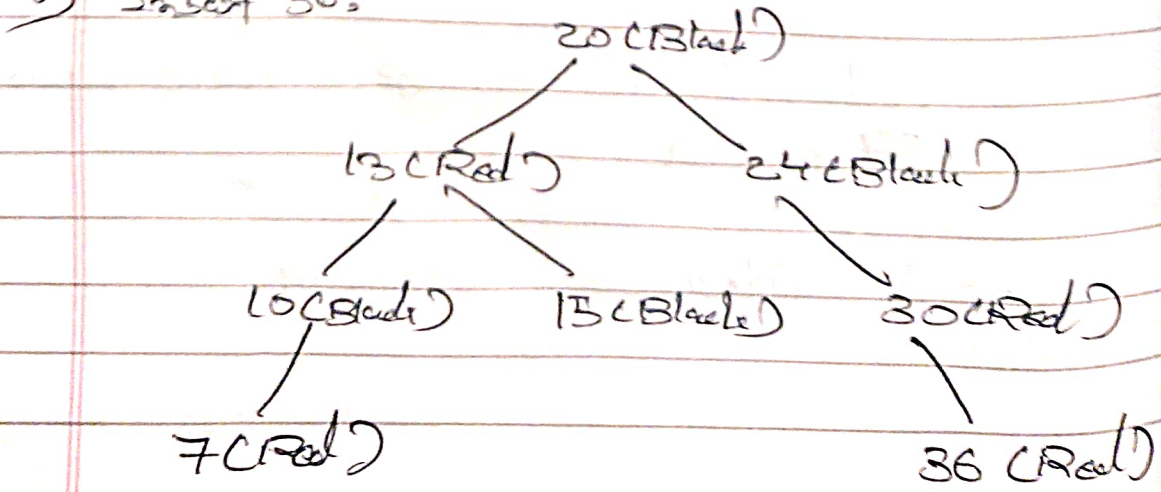
→ So, after restructuring.



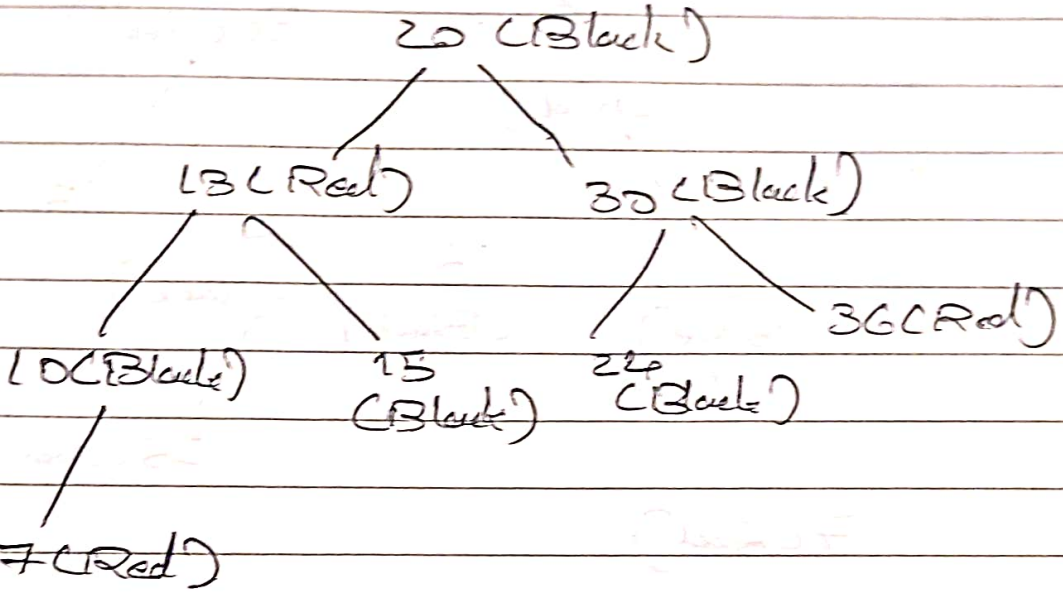
7] Insert 30:



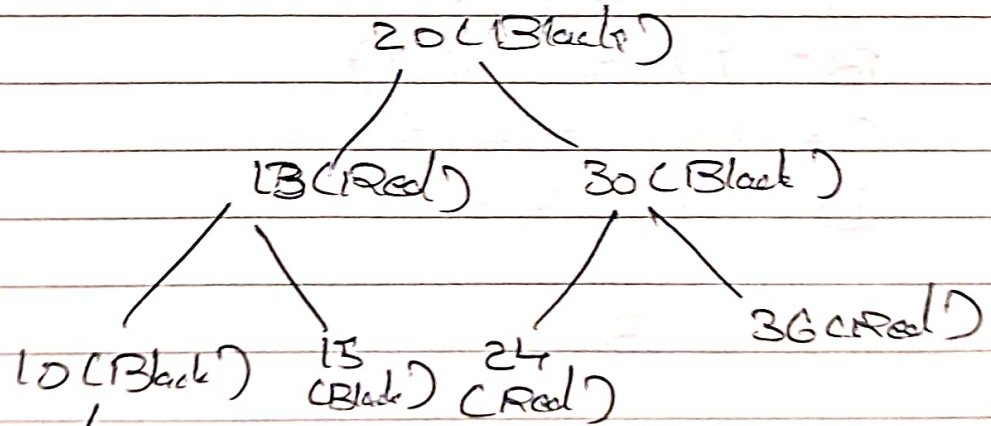
8] Insert 36:



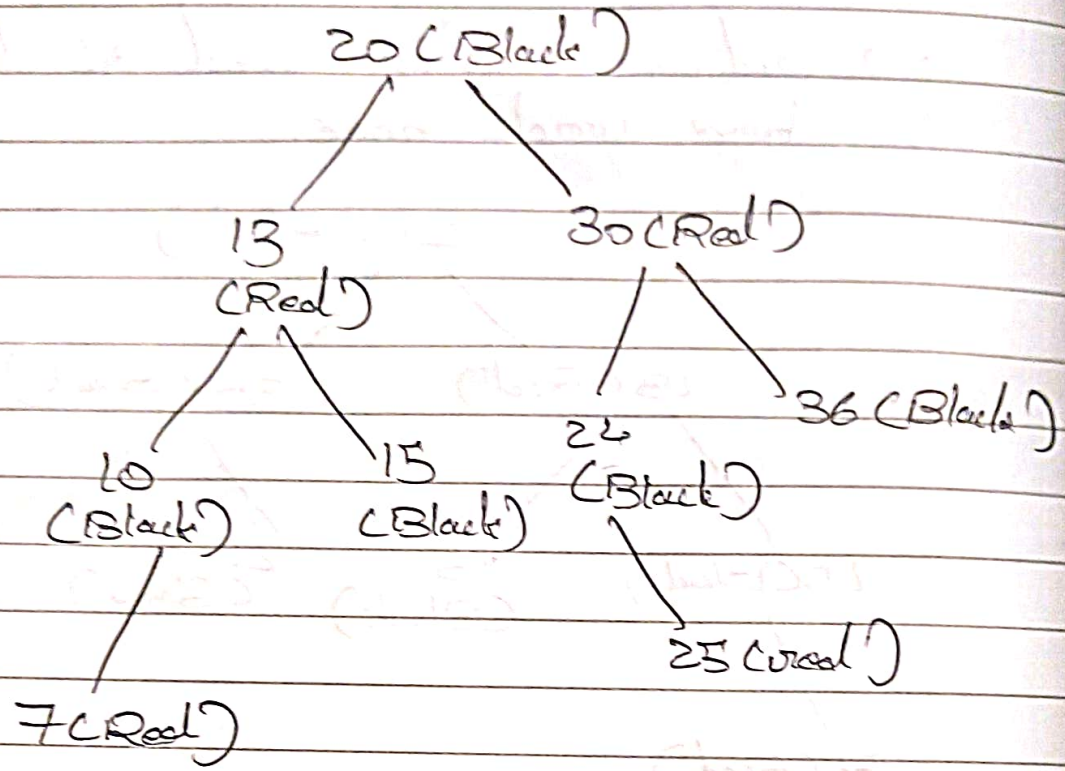
→ red-red violation and 36 does not have uncle node.



9] Insert 25:



→ red-red violation and uncle node of (36) is red, so we restructuring nodes.



2. $A = \{2, 4, 6, 8, 10\}$
$B = \{1, 3, 5, 7, 9\}$
$C = \{1, 2, 3, 4, 5\}$
$D = \{5, 6, 7, 8, 9\}$

(a) $A \cup B$

$A \cup B = \{2, 4, 6, 8, 10\} \cup \{1, 3, 5, 7, 9\}$

$P = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$

(b) $A \cap C$

$A \cap C = \{2, 4, 6, 8, 10\} \cap \{1, 2, 3, 4, 5\}$
$= \{2, 4\}$

(c) $(C \cap D) \Delta (A \cap B)$

$C \cap D = \{1,2,3,4,5\} \cap \{5,6,7,8,9\}$
$= \{5\}$

$A \cap B = \{2,4,6,8,10\} \cap \{1,3,5,7,9\}$
$= \phi$

$((C \cap D) \Delta (A \cap B)) = \{5\} \Delta \phi$
$= \{5\}$