DAA
ASSIGNMENT 1

Done By

Harikrishnan V

CS6A

Roll No : 27

QUESTION

Create a red-black tree with numbers from 1 to 10. Delete all odd values starting from 1.
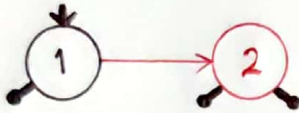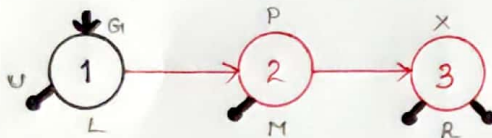
ANSWER
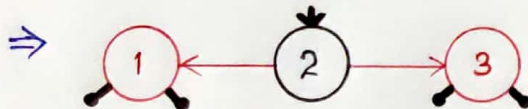
Insert 1:-

(1)   Root should be black ⇒   (1)

Insert 2:-

(1) → (2)

Insert 3:-

G (1) → P (2) → X (3)
U   L   M   R

Uncle is failure node, which is black in colour. So we have to do rebalancing.

⇒   (1) ← (2) → (3)

Insert 4:-

U (1) ← G (2) → P (3) → X (4)

Uncle is red in colour. So we have to do colour flip.

⇒

(2)
↙ ↘
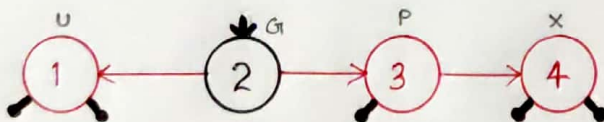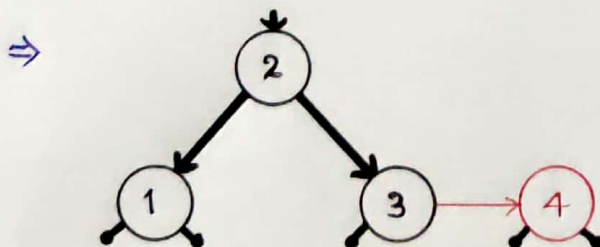(1)   (3) → (4)

Root should be black

Insert 5:-
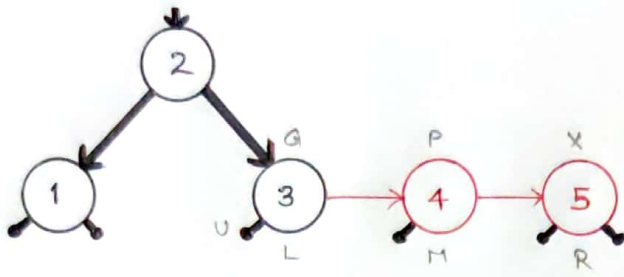
Uncle is failure node, which is black in color. So we have to do rebalancing.

$\Rightarrow$

Insert 6:-

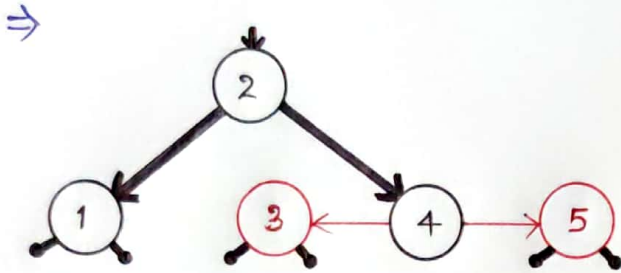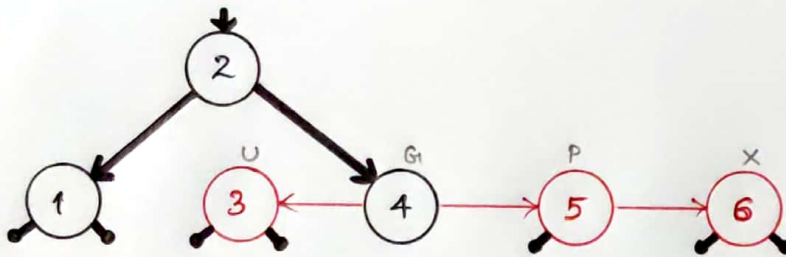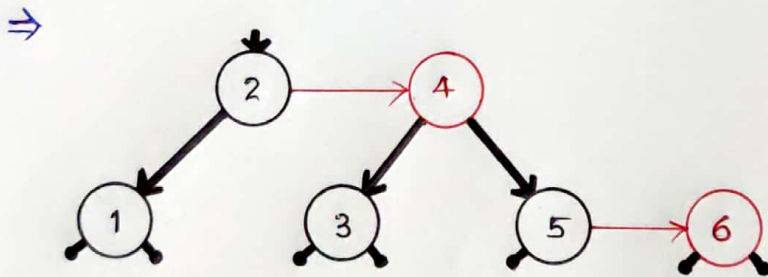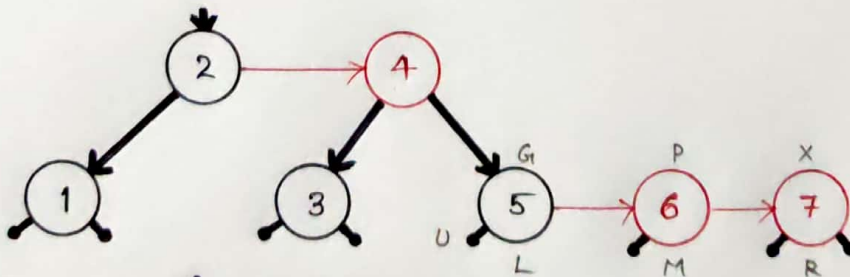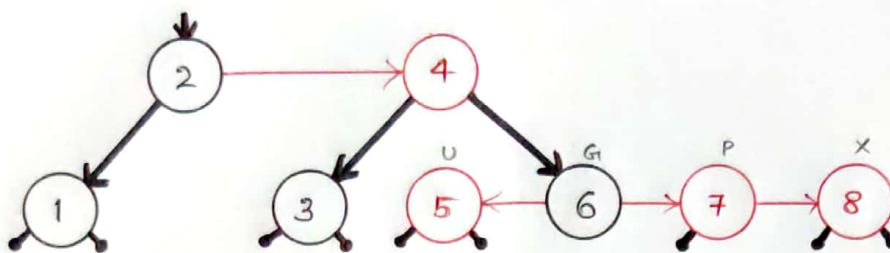Uncle is red in color. So we have to do color flip.
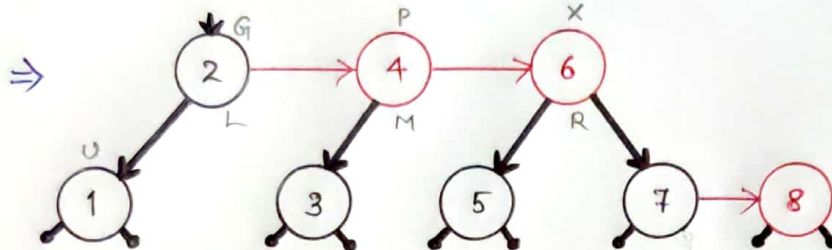
$\Rightarrow$

Insert 7:-

Uncle is failure node, which is black in color. So we have to do rebalancing

$\Rightarrow$
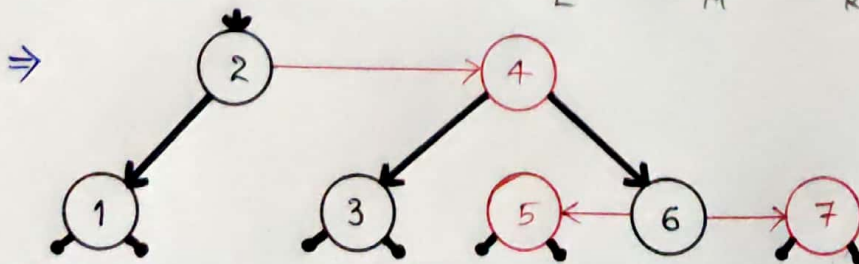
Insert 8:-

Uncle is red in colour. So we have to do colour flip

$\Rightarrow$

Uncle is black in colour. So we have to do rebalancing.

$\Rightarrow$
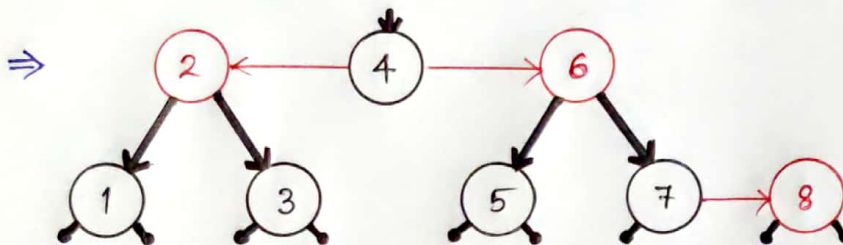
Insert 9:-
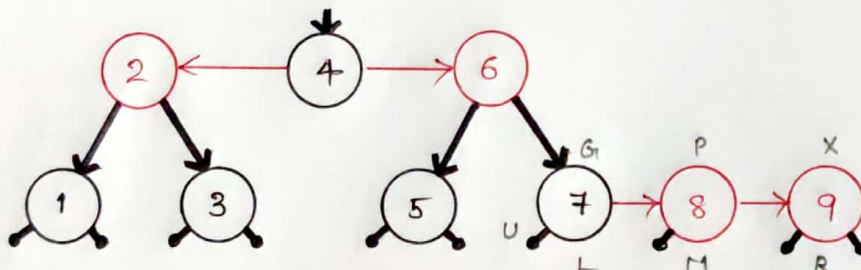
Uncle is failure node, which is black in colour. So we have to do rebalancing.

$\Rightarrow$
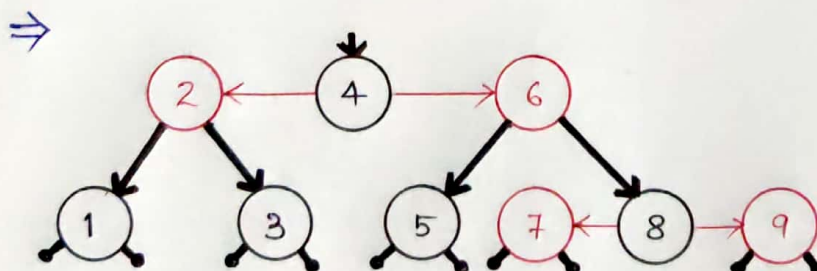
Insert 10:-

Uncle is red in colour. So we have to do colour flip.

⇒

U
②

G
4

P
6

X
8

① ③ ⑤ ⑦ ⑨ → 10

Uncle is
red in colour.
So we have
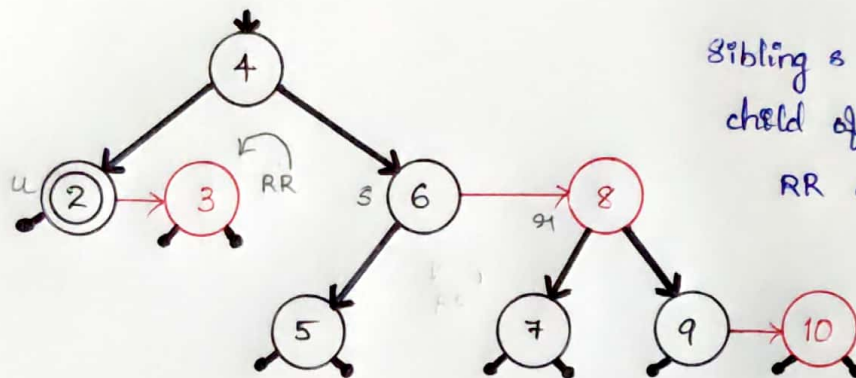to do colour
flip.

⇒

4

2

6 → 8

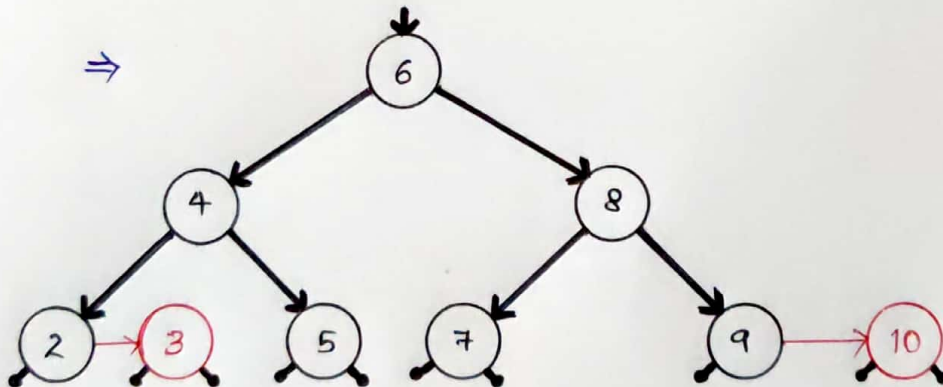① ③ ⑤ ⑦ ⑨ → 10
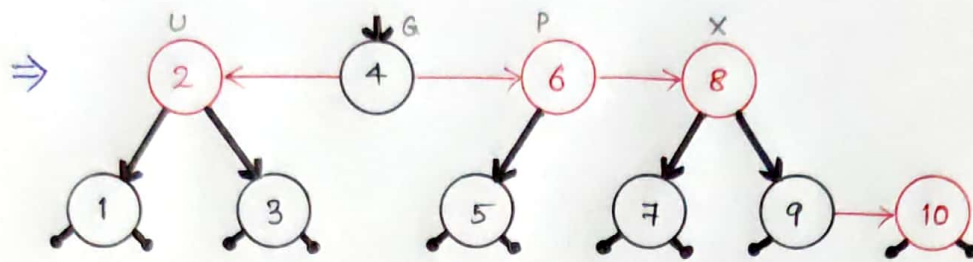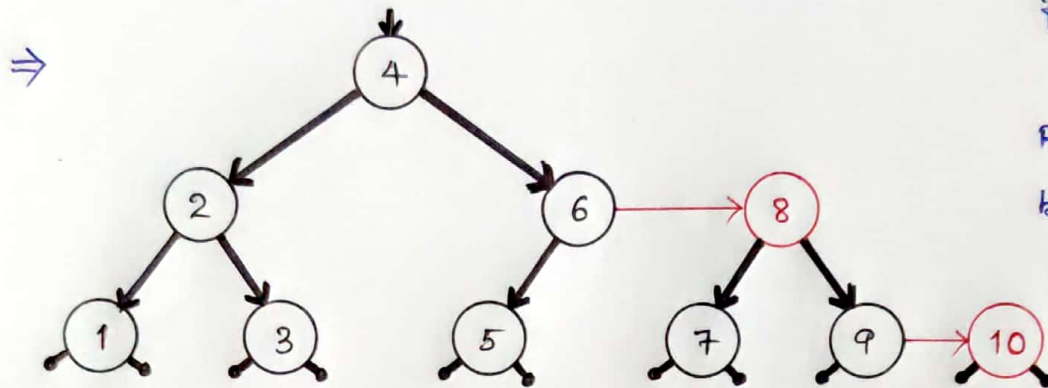
Root should
be black.

Delete 1:-
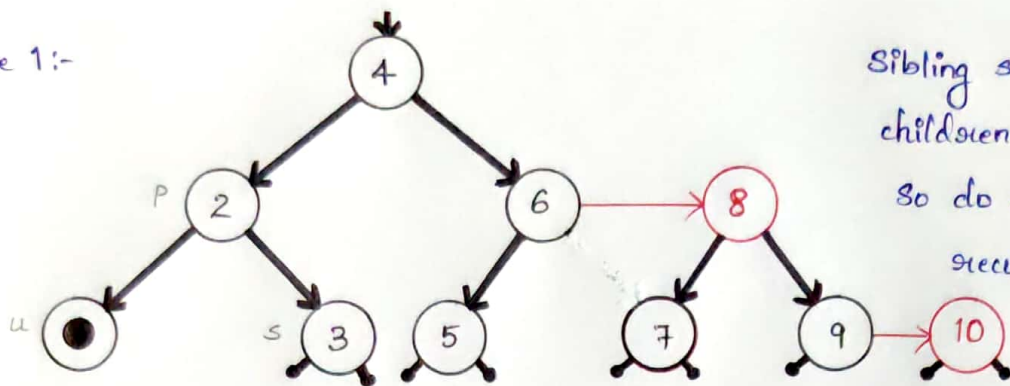
Sibling s is black & both children of s are black. So do recoloring & recur for parent
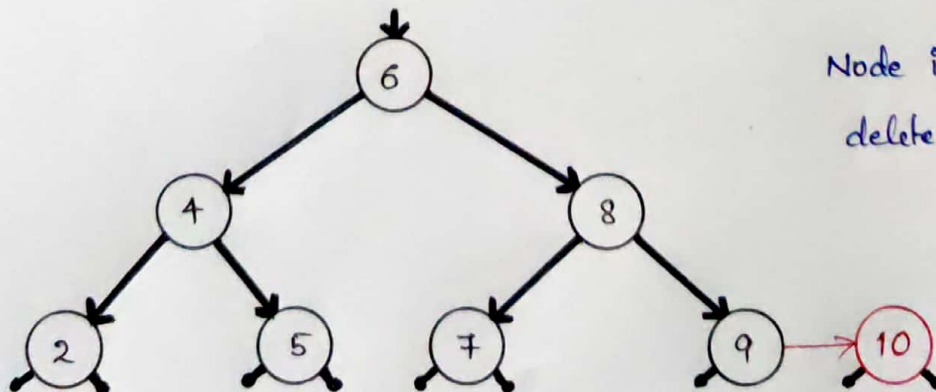
⇒

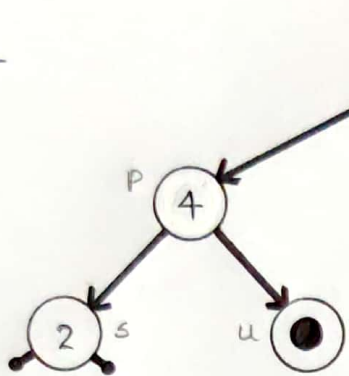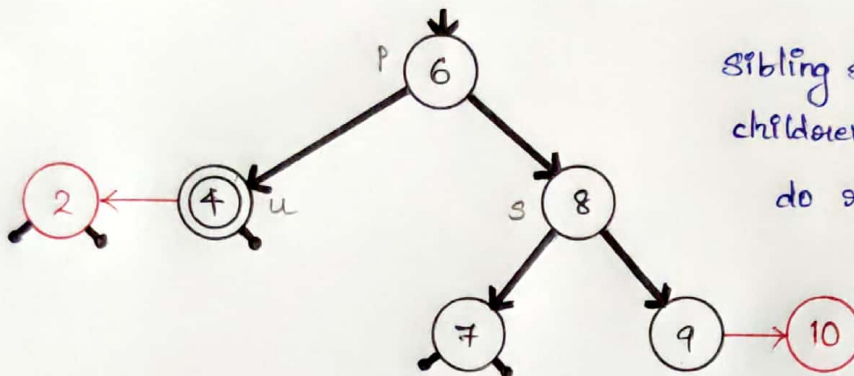Sibling s is black & right child of s is red. So RR case.

⇒

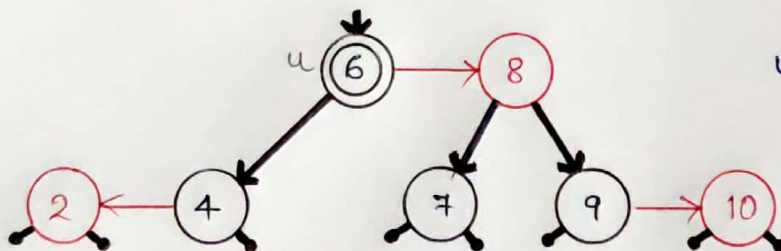Delete 3:-

Node is red. So just delete it.

Delete 5:-

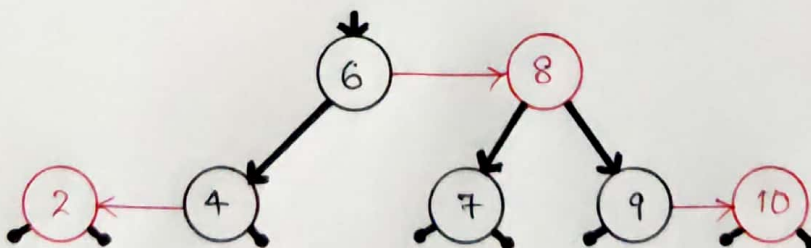Sibling s is black & both children of s are black. So do recoloring & recur for parent.

⇒

Sibling s is black & both children of s are black. So do recoloring & recur for parent.
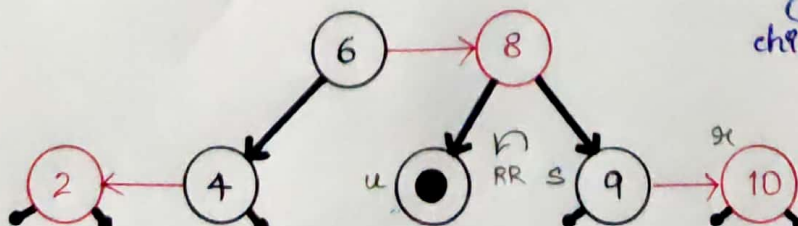
⇒

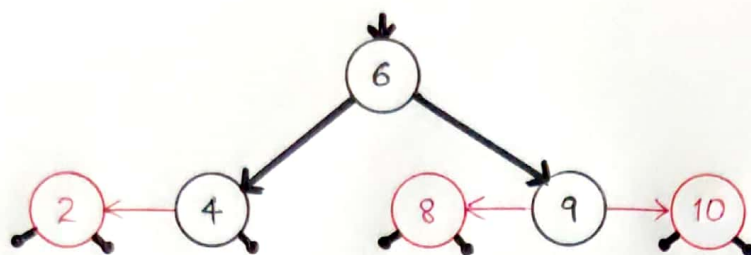
u is root. So make it single black.

Delete 7:-
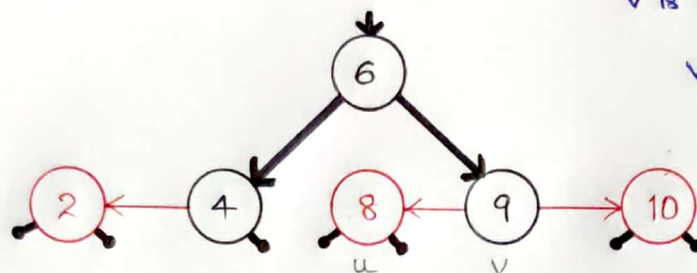

Sibling s is black & right child of s is red. So RR case.

⇒

Delete 9:-

v is black. u is red. Delete
v & replace u as black.

u   v

⇒