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BH

## Insertion of Red Black Tree.

Pseudocode :-

\* if ( $x$  = new node)  
    Perform Binary search insertion.  
    Make the colour of newly inserted node  
    as RED.

if ( $x$  = root)  
    { colour( $x$ ) = Black  
    }

~~else~~ if ( $(\text{colour}[x.\text{parent}] \neq \text{black}) \wedge (x \neq \text{root})$ )

{

    if ( $(x.\text{uncle} \neq \text{red})$ )  
        change colour of parent & uncle as black.

    change colour of grandparent as RED

    change  $x$  =  $x$ 's grandparent, repeat the  
    above steps.

    }

if ( $(x.\text{uncle} = \text{black})$ )

    Four cases are there for this step.

① left left case ( $p$  is left child of  $g$   
    and  $x$  is left child of  $p$ ).

② Left Right Case ( $p$  is left child of  $g$   
&  $a$  is right child  
of  $p$ )

③ Right Right Case (mirror of case a)

④ Right Left Case (mirror of case c)

Now change  $a = a$ 's parent, and  
repeat the above steps.