

Write-up

Red-black tree (insertion)

Let $x \leftarrow$ newly inserted node

- 1) Perform standard BST insertion and make ^{colour of} newly inserted node as RED.
- 2) If x is root, change the colour to BLACK.
- 3) If colour of x 's parent is not BLACK and x is not the root :-
 - a) If x 's uncle is RED,
 - i) change colour of parent and uncle to BLACK
 - ii) colour of grandparent is RED
 - iii) change $x = x$'s grandparent, repeat 2 and 3 steps for new x
 - b) if x 's uncle is BLACK,
 - i) left-left case (p is left child of g and x is left child of p).
 - ii) left-right case (p is left child of g and x is the right child of p).
 - iii) right-right case (mirror of case i)
 - iv) right-left case (mirror of case ii)