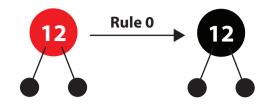
Red Black Tree Insertion:

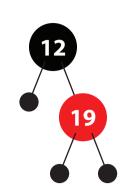
Data Set: {12, 19, 17, 21, 16, 15}

Step 1: Insert {12, 19, 17, 21, 16, 15}



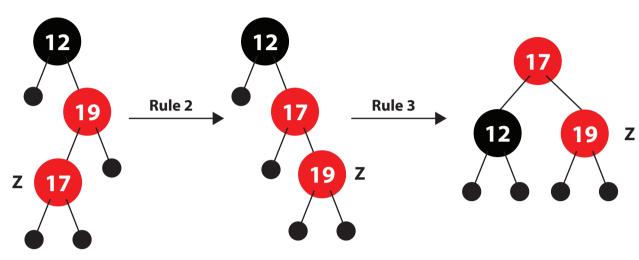
First node is root node Rule 0 is applied

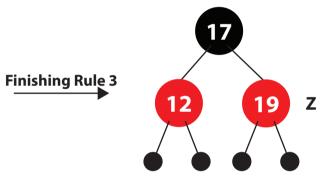
Step 2: Insert {12, 19, 17, 21, 16, 15}



Node is inserted and no damage has occured.

Step 3: Insert {12, 19, 17, 21, 16, 15}

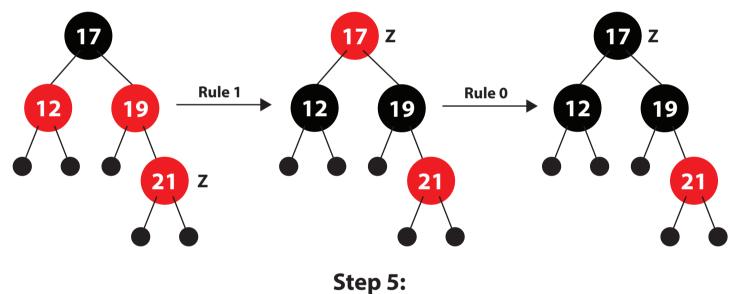




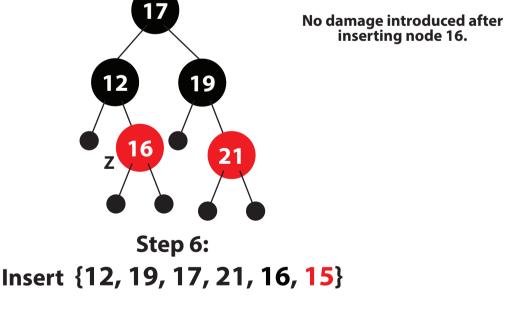
Introducing the new node also damaged the tree. Rule 1 does not apply because Z's uncle is not also red. Next we notice the zig zag node path so Rule 2 is applied and Z is rotated with is parent node. Z is assigned its old parent node. Next Rule 3 is applied because Rule 2 was applied so first we perform a rotation bringing Z parent up and Z grandparent down. Then we swap the color of Z's old parent and grandparent.

Insert {12, 19, 17, 21, 16, 15}

Step 4:



Insert {12, 19, 17, 21, 16, 15}



parent up and Z's old grandparent down. Finally we swap the color of Z's old parent and grandparent.

