Red and Black Tree Balancing

INSERTION & BALANCING:
Step1. Insert New Node
Step2. Perform appropriate transformations (Cases 1, 2, 3 one or more times)
Step3. If root is red, change to black

- Treat null children as Black nodes for the purposes of transformations.
- Inside Child(Node) is the child of a parent node, that is horizontally closer to the root, whereas the Outside Child(Node) is horizontally further away from the root
- Grandparent nodes is the parent's parent node
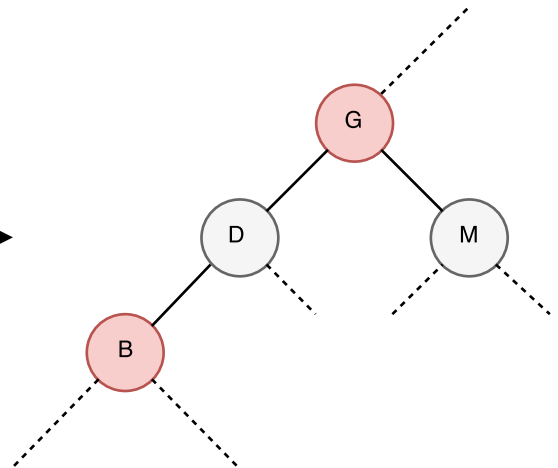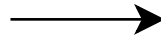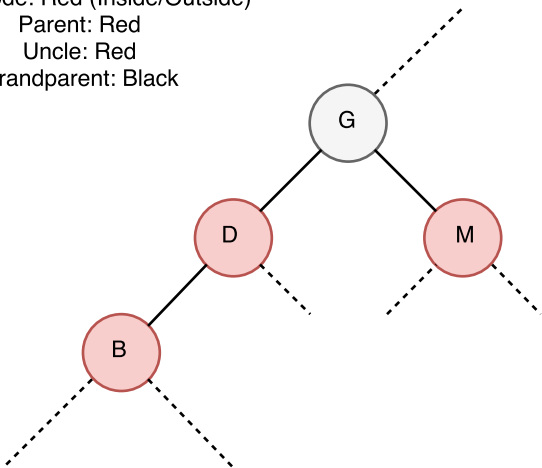- Unlce (or Aunt) node is the Granparent's other child, (not the inserted node's parent

CASE 1
Insert Node: Red (Inside/Outside)
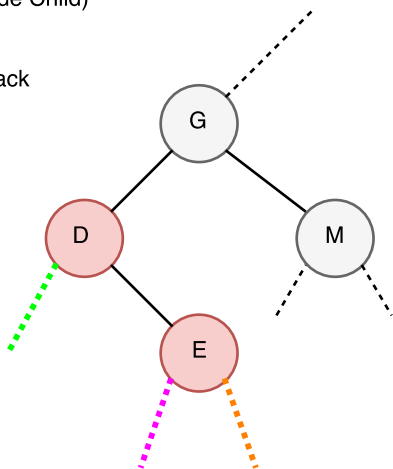Parent: Red
Uncle: Red
Grandparent: Black

CASE 2
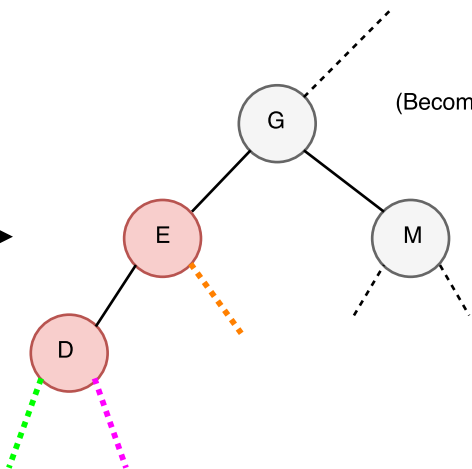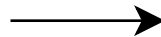Insert Node: Red (Inside Child)
Parent: Red
Uncle: Black
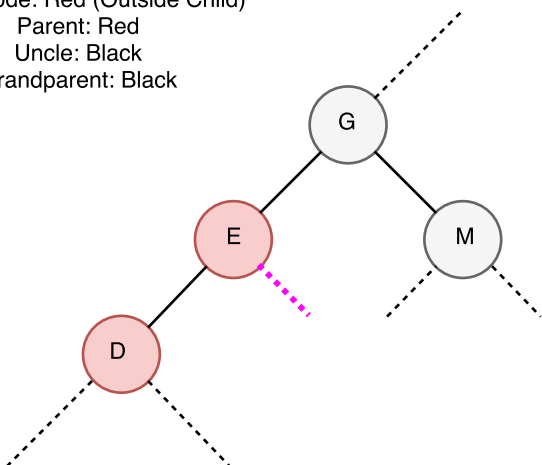Grandparent: Black

'Rotate'

(Becomes CASE 3)

CASE 3
Insert Node: Red (Outside Child)
Parent: Red
Uncle: Black
Grandparent: Black

Parent: Swap Colour
Grandparent: Swap Colour
'Rotate'