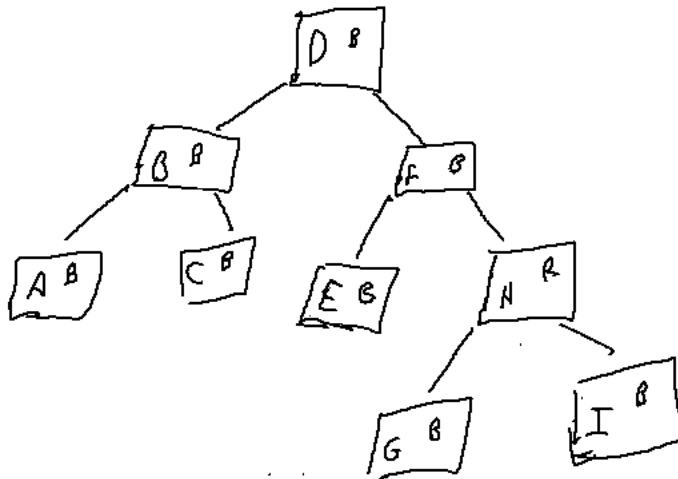


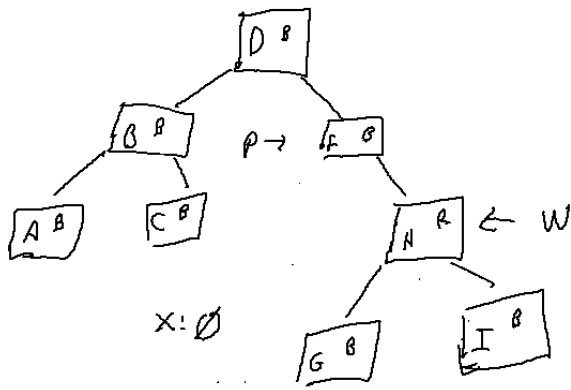
Delete E from the following red-black tree.



DELETE

1. Let d be the node you are physically deleting. Let p be d 's parent, and x be d 's child. (x is NULL if d has no children. If d has two children, then you wouldn't be physically deleting it.)
2. Physically delete d .
3. If d was red, DONE!
4. If x is red, color x black, DONE!
5. If x is now the root, (i.e. if p is NULL), DONE!
6. Let w be x 's current sibling. (The child of p that is not x .)
7. If w is red, rotate w up once, RESTART.
8. If w 's children are both black, color w red, reassign x to p and p to p 's parent, RESTART.
9. If w 's direct child is red, color this child black, rotate w up once, DONE!
10. Rotate w 's zigzag child up twice, recolor w black, DONE!

Northern Michigan University (Marquette Co, MI)
 CS222-61-21W Data Structures (Andrew A. Poe)
 Practice Quiz 11
 Thursday 22 April 2021 10:00 A.M. EDT
 Time: 10 minutes



Rule 7
 rotate
 W up once \Rightarrow

