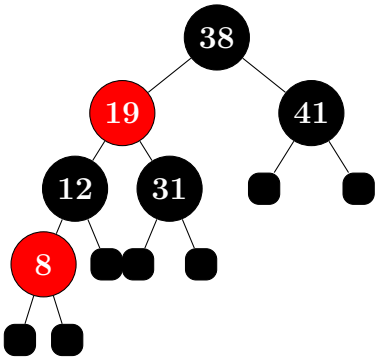
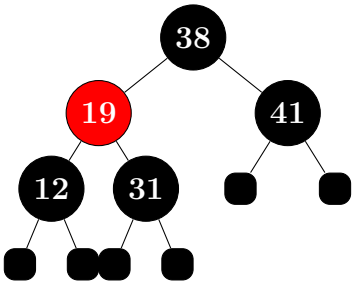
CLRS Problem 13.4-3: delete nodes from the red-black tree created in problem 13.3-2.

Note: NIL nodes shown as black rounded-corner rectangles.

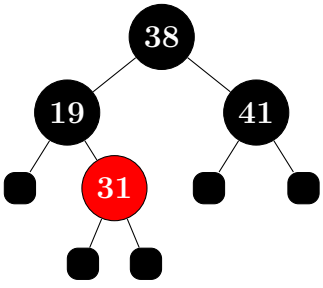
Delete: 8
Start with the red-black tree from the insert exercise.



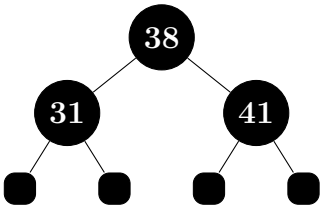
Now, deleting a red node is easy, just remove it, replace it with a nil node.



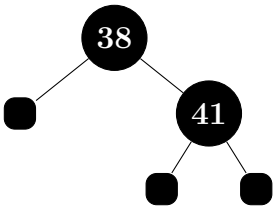
Delete: 12
Recolor parent and silbing of deleted node (now a nil node).



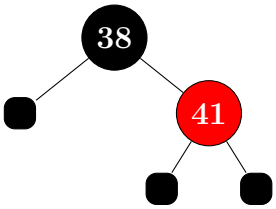
Delete: 19
Connect single child to grandparent, and recolor this node to preserve the black height.



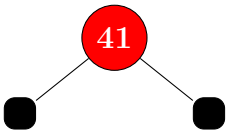
Delete: 31
Deleting node with key 31 gives



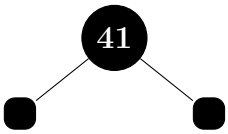
Now, recolor sibling to restore black height.



Delete: 38
Deleting the root with key 38 gives



Of course, the root must be black, recolor the root.



Delete: 41
Deleting the root gives an empty tree.

Done!