CSSE 230 Day 14

AVL insert/Delete Review
Exam

After today, you should be able to…
…determine where a tree is imbalanced after insertion.
… do single and double rotations on paper

Agenda

- EditorTrees:
  - Work together
  - Commit often
  - Switch drivers often and commit who drove.
    - If each uses own laptop, then SVN records username
    - If you all share a laptop, then identify yourself in the commit log.

- AVL insertion review and deletion intro

- Exam

- For those who finish early:
  - Practice with AVL rotation, finish after class, due tomorrow at start of class.

After insertion into AVL or EditorTree, go up tree, updating balance codes and checking for imbalance

▸ p = parent of inserted node
▸ while p != null
  ◦ // 3 cases (=, tipped towards, tipped away)
  ◦ if p.balanceCode is '='
    • set code to '/' or '\' (towards insertion point)
    • p = p.getParent()
  ◦ else if p.balanceCode indicates "insertion was in shorter subtree"
    • change code to '='
    • Break (STOP)
  ◦ else //insertion was into taller side.
   • do the appropriate rotation
    • Break (STOP)

This is for Milestone 1; You will design a similar procedure for deletion (milestone 2)

Which kind of rotation to do after an insertion?

Depends on the first two links in the path from the lowest node that has the imbalance (A) down to the newly-inserted node.

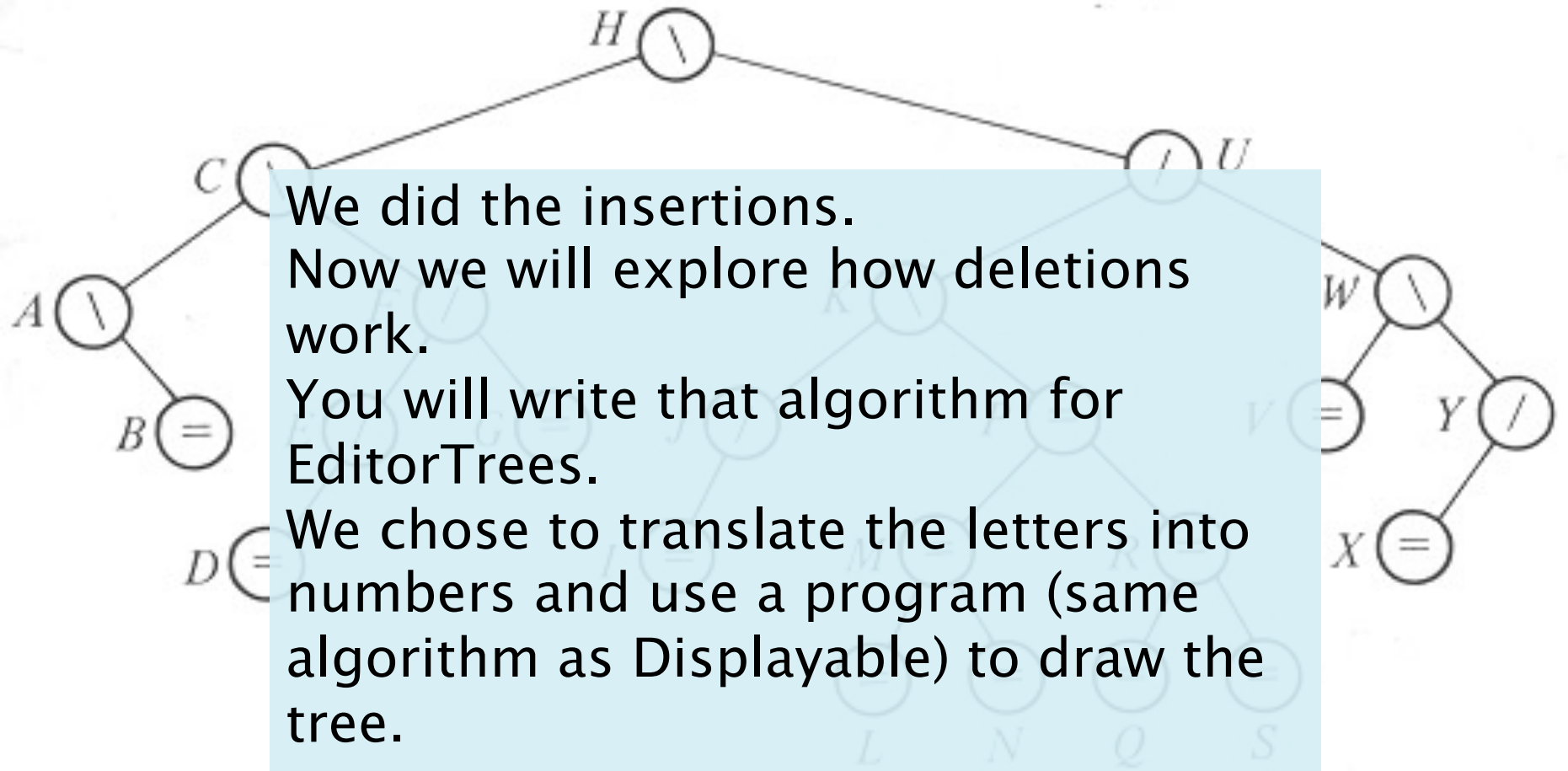| First link (down from A)	Second link (down from A's child)	Rotation type (rotate "around A's position")
Left	Left	Single right
Left	Right	Double right
Right	Right	Single left
Right	Left	Double left

A sample AVL tree
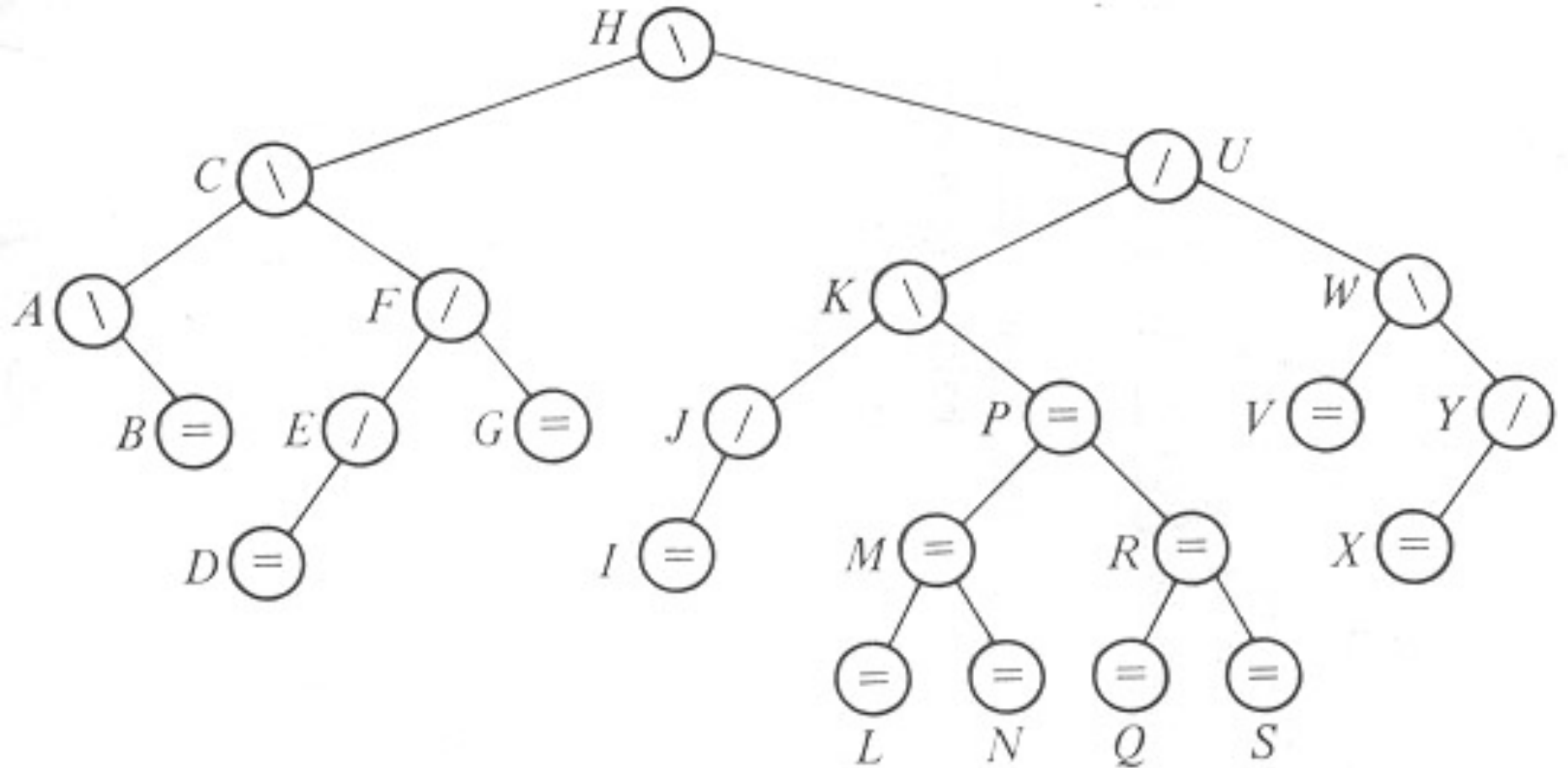
Insert **HA** into the tree, then **DA**, then **O**.
Delete **G** from the original tree, then **I, J**, **V**.

If you have time after the test

▸ Do today's in-class quiz silently while others finish the test
  ◦ Check your work using the demo website at the given URL
  ◦ It is due **tomorrow at the start of class.**
    • Try to finish before then, but you may ask questions during class if you got stuck.

  ◦ If you finish the worksheet early, you may leave. But please don't discuss the exam with anyone until 5:00 pm.
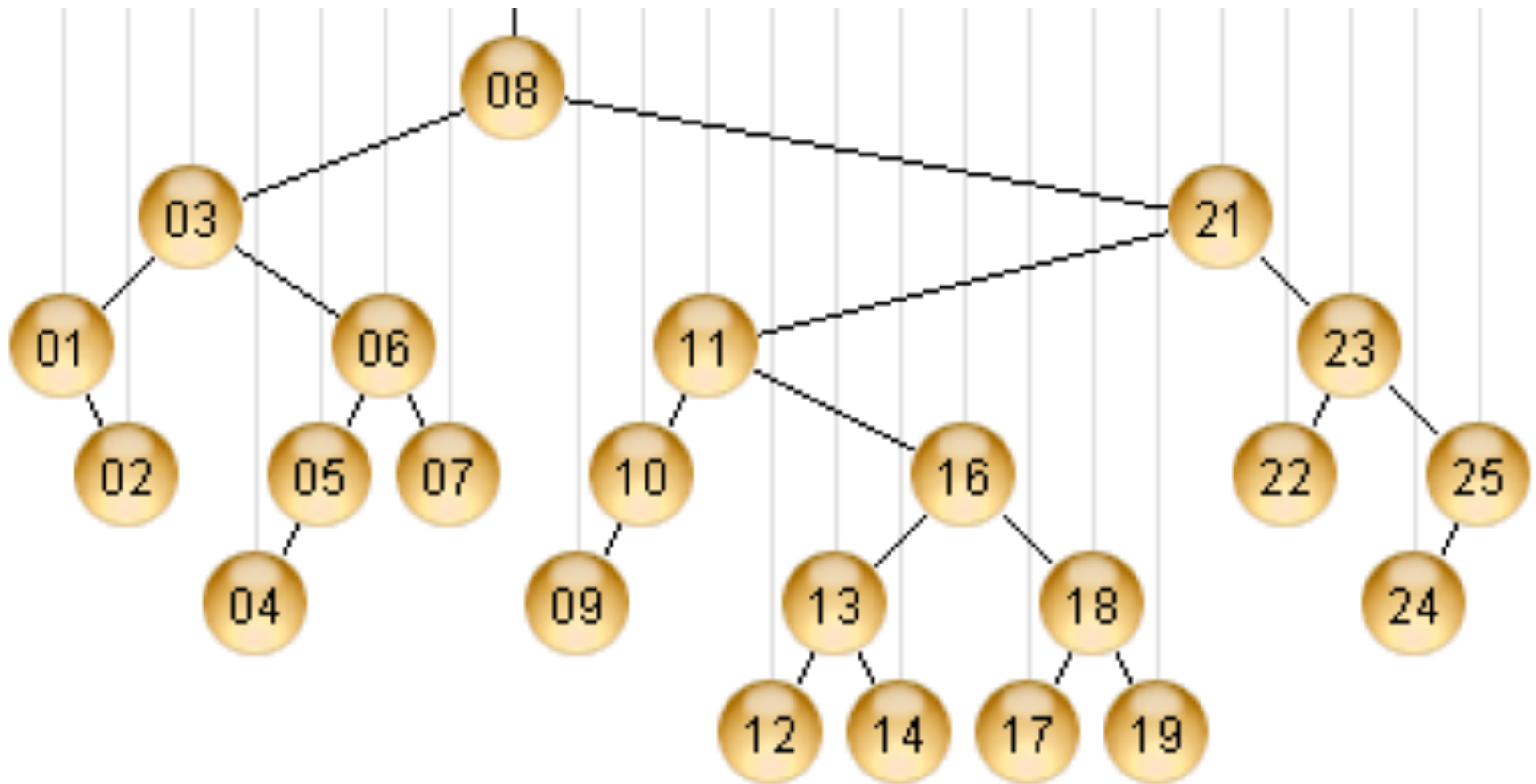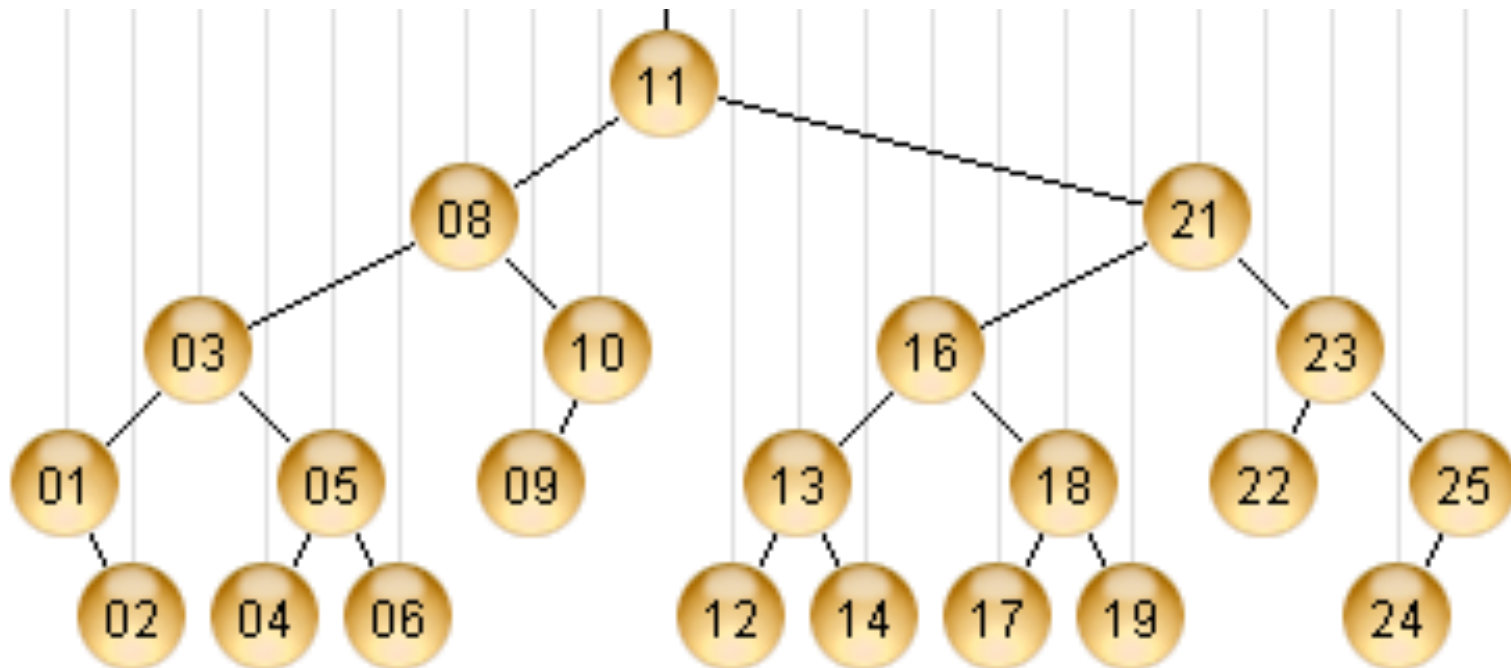
A sample AVL tree

We did the insertions.
Now we will explore how deletions work.
You will write that algorithm for EditorTrees.
We chose to translate the letters into numbers and use a program (same algorithm as Displayable) to draw the tree.

Insert **HA** into the tree, then **DA**, then **O**.
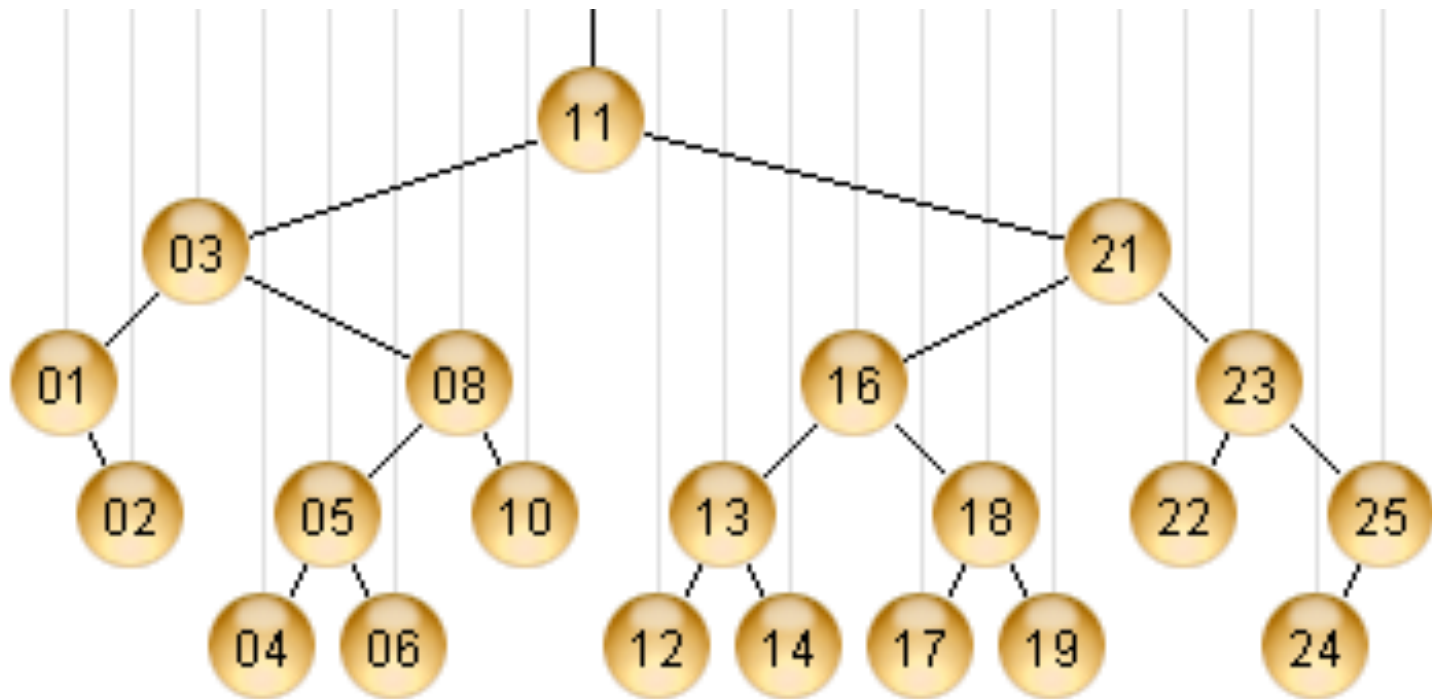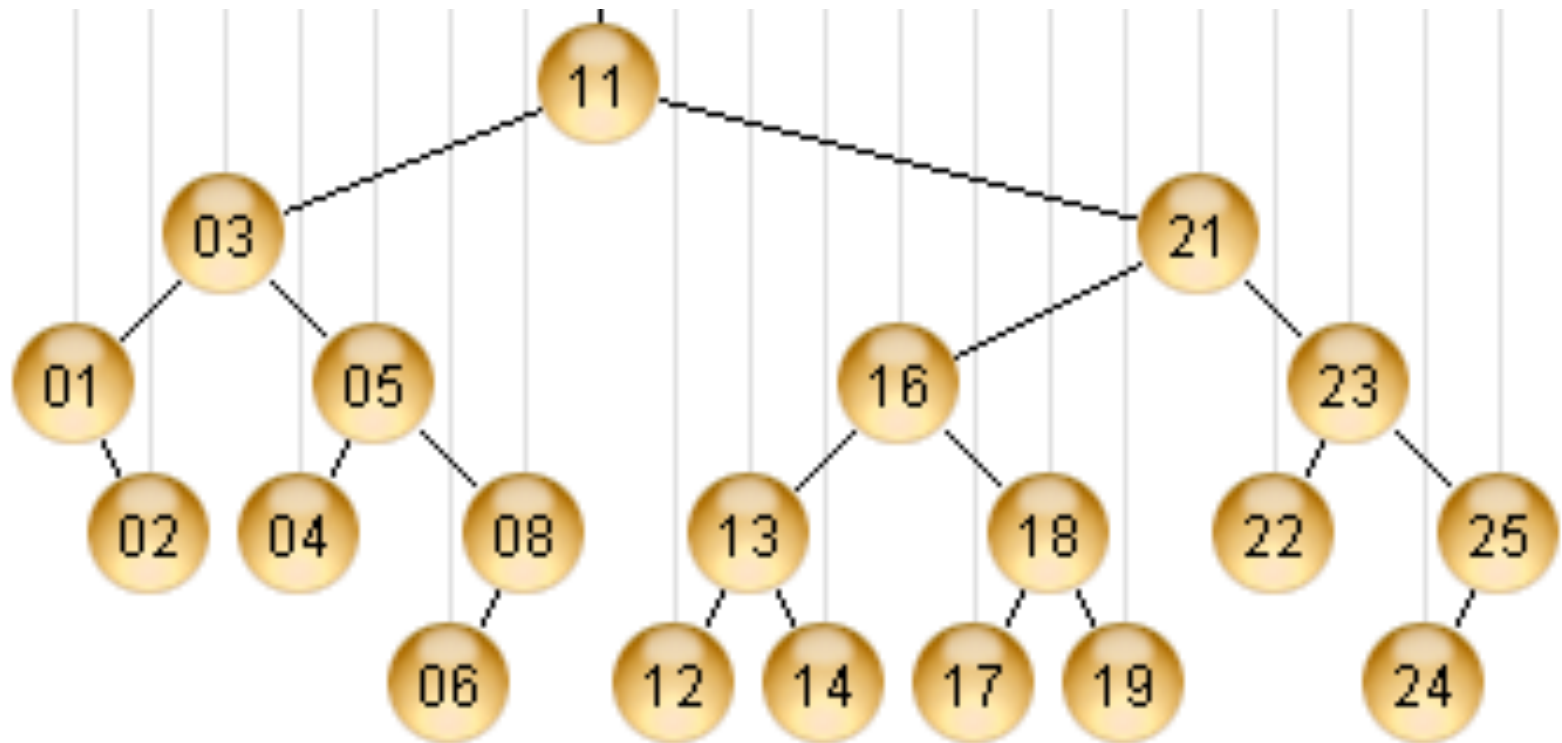Delete **G** from the original tree, then **I, J**, **V**.

Delete 7 and Rebalance
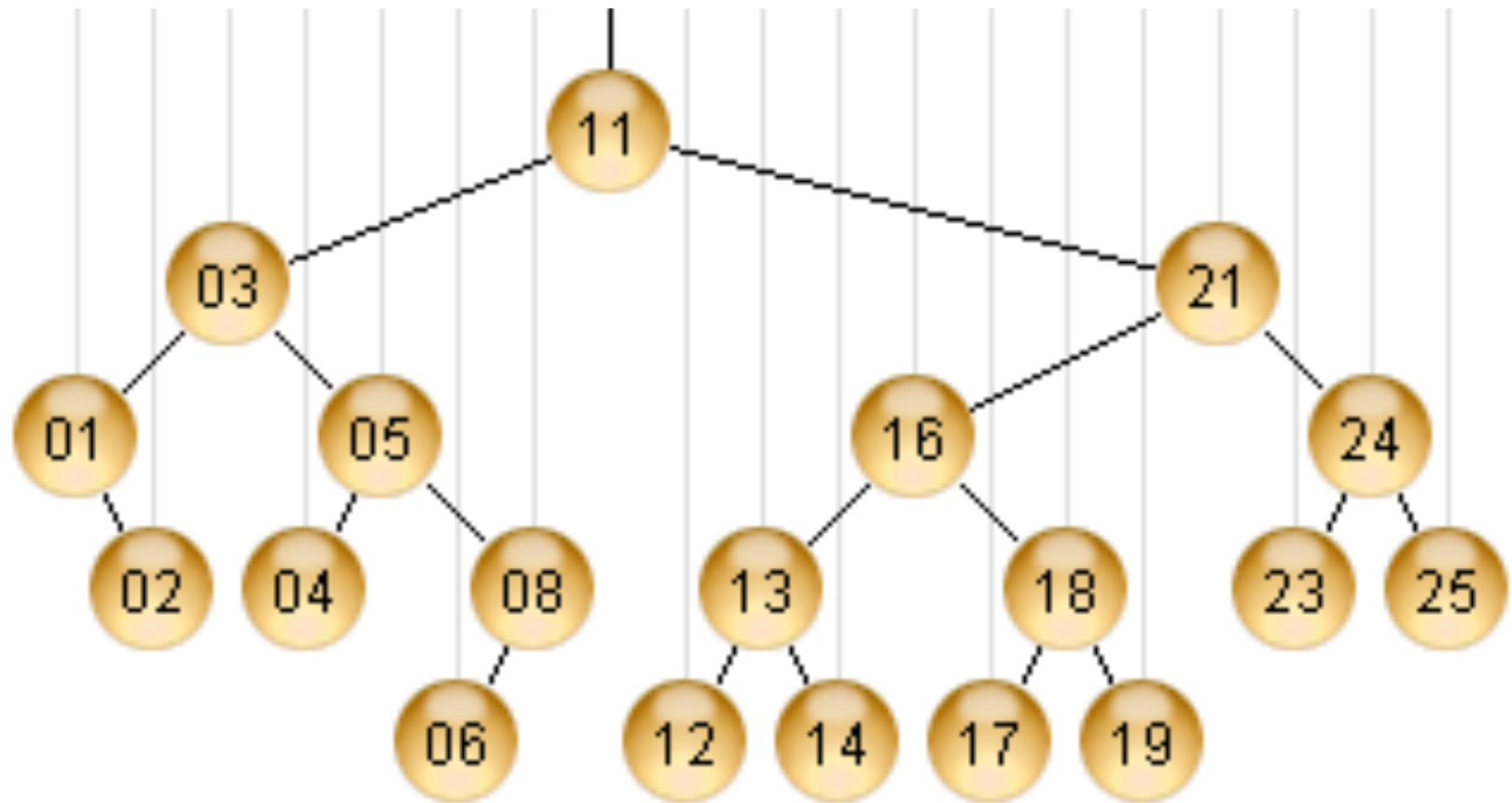
Delete 9 and Rebalance

Delete 10 and Rebalance

Delete 22 and Rebalance

Final result

If you have time after the test

▸ Do today's in-class quiz silently while others finish the test

  ◦ Check your work using the demo website at the given URL

  ◦ It is due tomorrow.

    • Try to finish before then, but you may ask questions during class if needed.

  ◦ If you finish the worksheet early, you may leave.

Your turn (with a partner or two)

▸ Do today's quiz

▸ Check your work as you go with your partner

▸ The demo website at the given URL is very nice!

Work with your EditorTrees team.
When you finish, work on EditorTrees.
Or write the rotateDoubleRight code from yesterday's slide.