

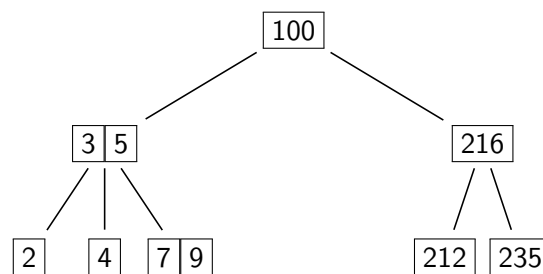
hw28: 2-3 tree deletion practice

You may do this homework on paper instead of in \LaTeX . Scan to PDF and submit, as usual. Make sure your scan is legible.

Read the notes and play with the visualization linked from the calendar if needed. But try not to rely solely on the visualization to complete this homework.

(Do enough extra practice such that you are confident you can do any 2-3 tree operation on paper if asked on an exam without aid of notes or visualization.)

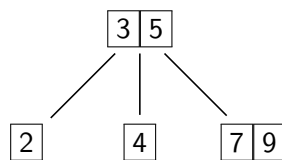
Let T be the following 2-3 tree.



For each part below, start with a fresh copy of T again. Delete the item specified. Draw all intermediate steps (each time tree changed).

For consistency and ease of grading, please always replace a non-leaf item to delete with its inorder predecessor (not inorder successor).

Since most of the parts won't touch any of the 3-digit numbers, to save you some writing, you are **strongly encouraged** to omit them until such a time as relevant (if you need to change them). In other words, I recommend that you only draw the left subtree:



and work on that locally for as long as changes only affect that subtree. The 3-digit numbers will become relevant at the very end of the last problem.

Ex 1. Delete 7.

Ex 2. Delete 4; there are two ways to go, one by interaction with the “2” left sibling, and one with the “7 9” right sibling. Do both.

Ex 3. Delete 3, 5, 2, and 9, in that order. Box the tree at the end of deleting each item. For example, after deleting 3, box that tree, and then show steps to delete 5, box the result, and then continue. You will box a total of four trees, one after each item is fully deleted. Include in the last boxed tree the entire tree, including 3-digit numbers.