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checkAVL.txt

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boolean checkAVL(AVLTree<T> t)
    <b, h, min, max> <-- checkAVL(t.root)
    return b

<boolean, int, T, T> checkAVL(AVLEntry<T> t)
// Bottom-up procedure to check validity of an AVL tree
// @return: boolean: is it an AVL tree?  int: height of tree
//         T: min value in tree, T: max value in tree
    if t.element = null then
        return <false, -1, null, null>

    if t.left = null and t.right = null then // leaf node
        if t.height = 0 then
            return <true, 0, t.element, t.element>
        else
            return <false, -1, null, null>

    else if t.right = null then // only left child
        <lb, lh, lmin, lmax> <-- checkAVL(t.left)
        if !lb or lh!=0 or t.height != 1 or t.element <= lmax then
            return <false, -1, null, null>
        else
            return <true, 1, lmin, t.element>

    else if t.left = null then // only right child
        <rb, rh, rmin, rmax> <-- checkAVL(t.right)
        if !rb or rh!=0 or t.height != 1 or t.element >= rmin then
            return <false, -1, null, null>
        else
            return <true, 1, t.element, rmax>

    else // Two child case
        <lb, lh, lmin, lmax> <-- checkAVL(t.left)
        <rb, rh, rmin, rmax> <-- checkAVL(t.right)
        h <-- max(lh, rh) + 1
        if !lb or !rb or |lh-rh|>1 or t.height != h or t.element <= lmax or t.element >= rmin then
            return <false, -1, null, null>
        else
            return <true, h, lmin, rmax>

```