Solutions

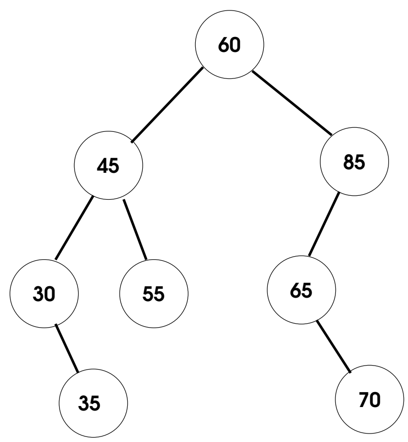
1. An AVL tree contains 30 nodes. What is the maximum height that it could be?

   You need to compute the S(h) function until you find an h for which $S(h) \leq 30 < S(h+1)$.Then it is this value of h. A simple table works best, as I showed in class:

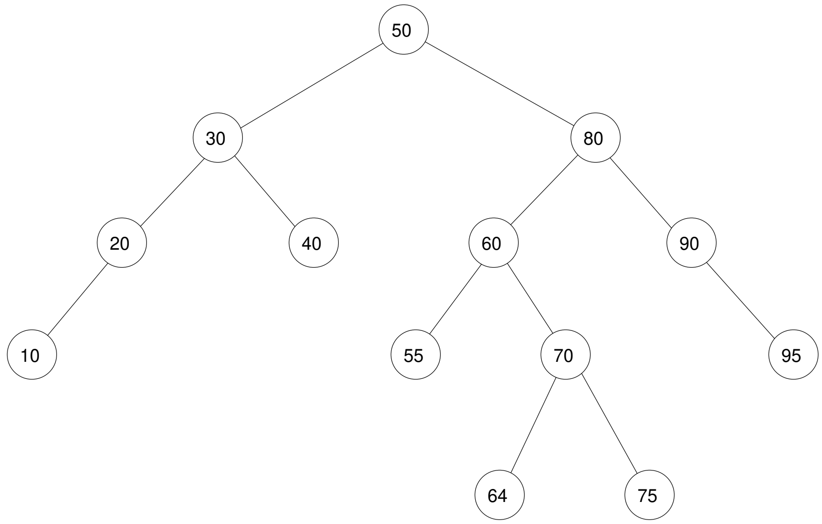
h	0	1	2	3	4	5	6
S(h)	1	2	4	7	12	20	33

   This shows that a tree of height 6 must have at least 33 nodes, so a tree with 30 nodes is at most height 5.

2. The values 60, 45, 85, 65, 55, 30, 35, 70 are inserted into an initially empty, unbalanced binary search tree. Draw the final tree in the space below. This is straightforward:



3. The initial tree:



The tree after the deletion of node 30 is below. There were two rotations, one at 40 after deleting 30, then one at the root.