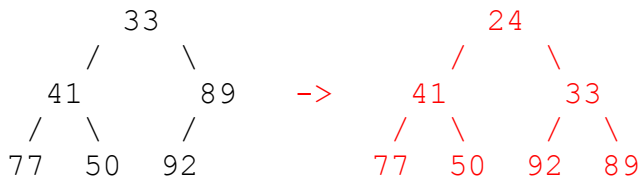
2) (10 pts) ALG (Minheaps)

a) Show the result of inserting the value 24 into the following minheap.



Grading (4 pts for part a):

4/4 if correct

2/4 if not correct, but they satisfy at least one of the following: (1) 24 ends up at the root, (2) the structure of the tree is the same as above (despite where the values ended up).

0/4 otherwise

b) Show the result of deleting the root of the following minheap.

Grading (4 pts for part b):

4/4 if correct

2/4 if not correct, but they satisfy at least one of the following: (1) 41 ends up at the root, (2) the structure of the tree is the same as above (despite where the values ended up).

0/4 otherwise

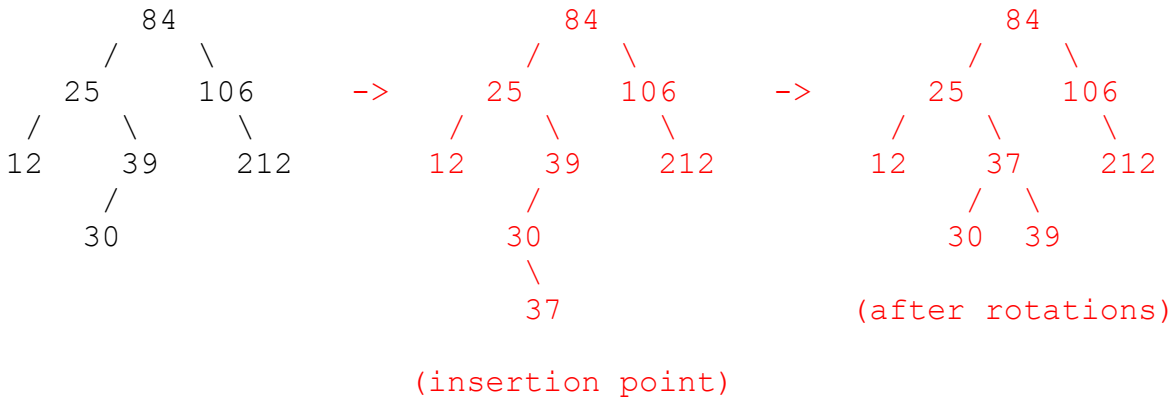
c) Using big-oh notation, what is the **worst-case** runtime for deleting the minimum element from a minheap that has *n* nodes?

Solution: O(log n)

Grading: 2 pts, all or nothing.

3) (10 pts) ALG (AVL Trees)

a) Show the result of inserting 37 into the following AVL tree:



Grading (6 points for part a):

6/6 for correct answer.

3/6 for something reasonably close. (Use your judgment. However, 84 must be the root in order for them to earn these points.)

0/6 otherwise.

b) Using big-oh notation, give the **best-case** runtime for inserting a new element into an AVL tree with *n* nodes:

Solution: O(log n) **Grading:** 1 point if correct, 0 otherwise

c) Using big-oh notation, give the **worst-case** runtime for inserting a new element into an AVL tree with *n* nodes:

Solution: O(log n) **Grading:** 1 point if correct, 0 otherwise

d) Using big-oh notation, give the **best-case** runtime for inserting a new element into a binary search tree with *n* nodes:

Solution: O(1) **Grading:** 1 point if correct, 0 otherwise

e) Using big-oh notation, give the **worst-case** runtime for inserting a new element into a binary search tree with *n* nodes:

Solution: O(n) **Grading:** 1 point if correct, 0 otherwise