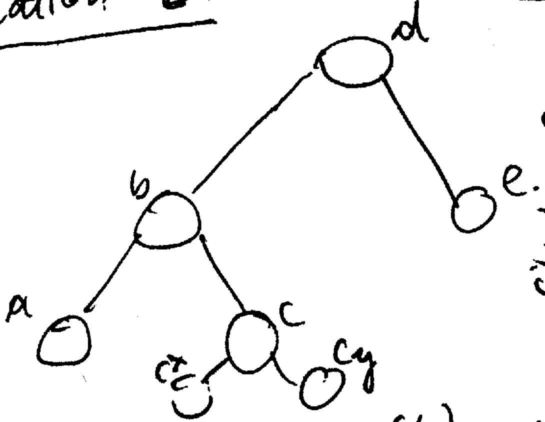
Situation 2 DOUBLE-ROTATION

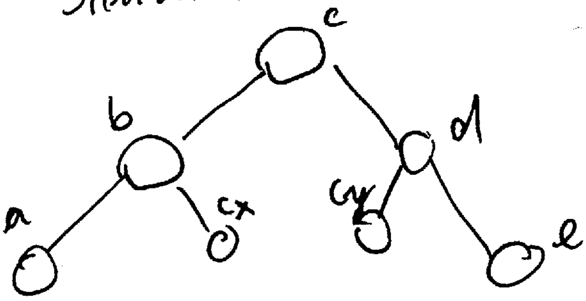


Situation 2

$$h(d) = 1 + \max(h(b), h(e))$$
$$h(b) = h(e) + 2$$
$$h(d) = 1 + h(b)$$
$$\boxed{h(c) = h(a) + 1}$$
$$h(b) = 1 + h(c) = h(a) + 2$$

Need left rotate(b) followed by right rotate(d).

Situation then:



$$h'(a) = h(a) \qquad h'(c_x) = h(c_x)$$
$$h'(e) = h(e) \qquad h'(c_y) = h(c_y)$$
$$h'(b) = 1 + \max(h'(a), h'(c_x)) = 1 + h'(a) = 1 + h(a) = h(b) - 1$$
$$h'(d) = 1 + \max(h'(c_y), h'(e)) = 1 + \max(h(c_y), h(e)) = 1 + h(e)$$

since $h(c_y) \le h(b) - 2 = h(e) + 2 - 2 = h(e)$

$$= h(b) - 1 = h(d) - 2$$

$$h'(c) = 1 + \max(h'(b), h'(d)) = 1 + h'(b) = h(b) = h(c) + 1$$

since $h'(d) = h(d) - 2 = h(b) - 1 = h'(b)$

Summary

$$\boxed{\begin{aligned} h'(b) &= h(b) - 1 \\ h'(c) &= h(c) + 1 \\ h'(d) &= h(d) - 2 \end{aligned}}$$

$$\boxed{\begin{aligned} h'(t) = h'(c) = h(c) + 1 &= h(d) - 1 \\ &= h(t) - 1 \end{aligned}}$$

where t is "the top"