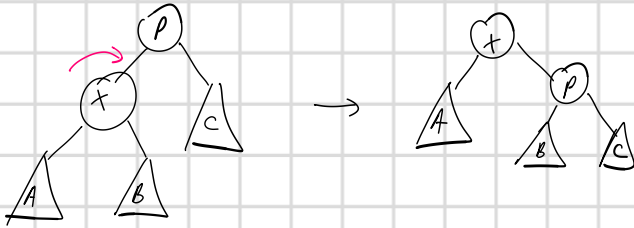


Splay-tree

$$\tilde{T} = O(\log n)$$

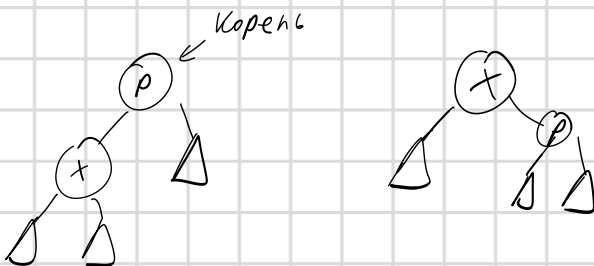


Углубление дерева поиска

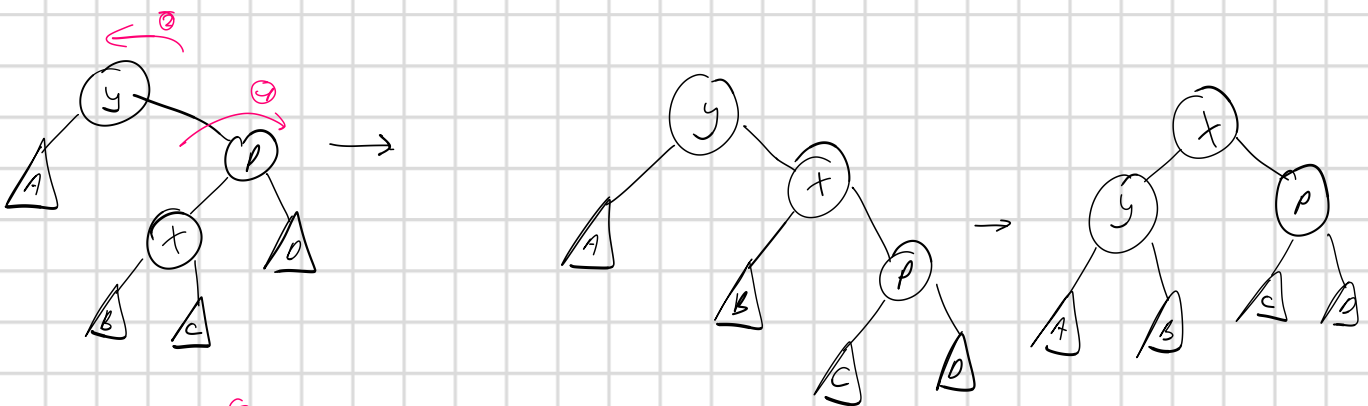
find:



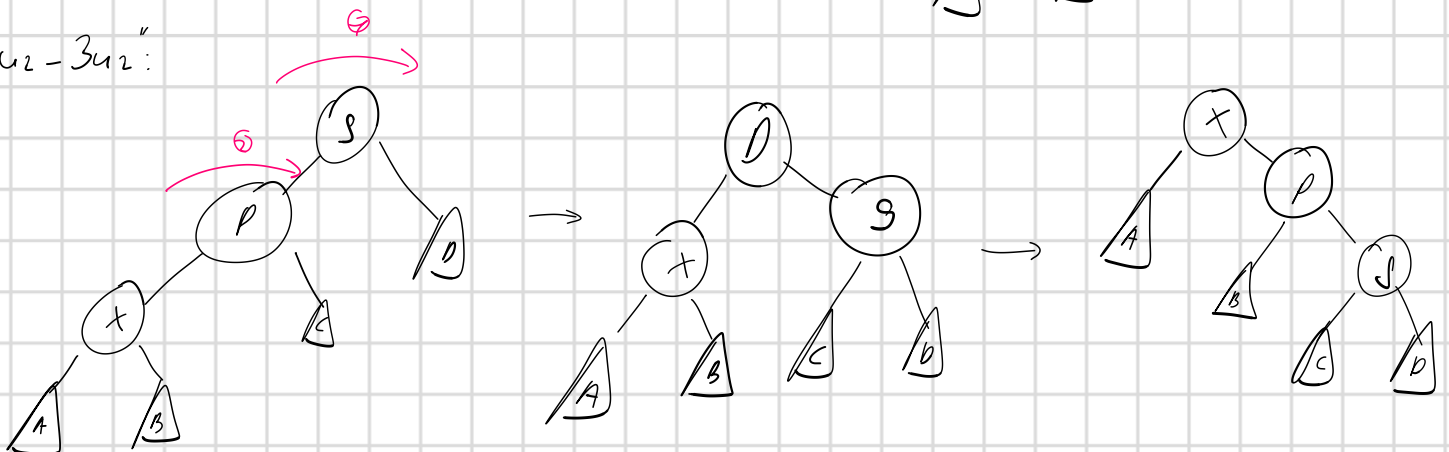
"Зул"



"Зул-Зул"



"Зул-Зул":



▷ $\int(v)$ - кон-ло беруну б нощере

$$r(v) = \log_2(\int(v))$$

$$\tilde{T} = T + \Delta \varphi$$

$$\Delta \varphi_0 = 0 \quad \varphi_i \geq 0$$

$$\sum \tilde{T} = \sum T + \varphi_n$$

$$\int \varphi = \sum r(v)$$

$$\tilde{T} = T + \underbrace{\left(\overset{\text{сгано}}{E r'(v)} - \overset{\text{дано}}{\sum r(v)} \right)}_{\Delta \varphi}$$

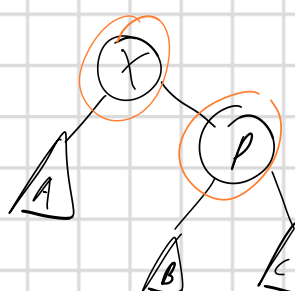
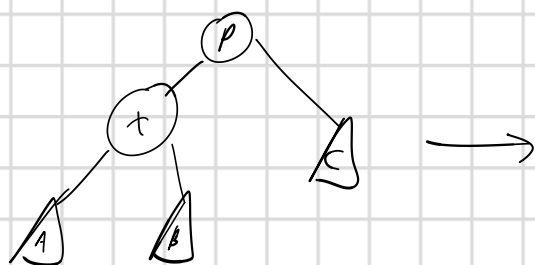
$$1 + 3(r'(t) - r(t)) = \tilde{T}$$

$$\tilde{T}(3u_i) = 1 + 3(r'(x) - r(t))$$

$$\tilde{T}(3u_2 - 3u_1) = 3(r'(t) - r(t))$$

$$\tilde{T}(3u_1 - 3u_2) = 3(r'(1) - r(1))$$

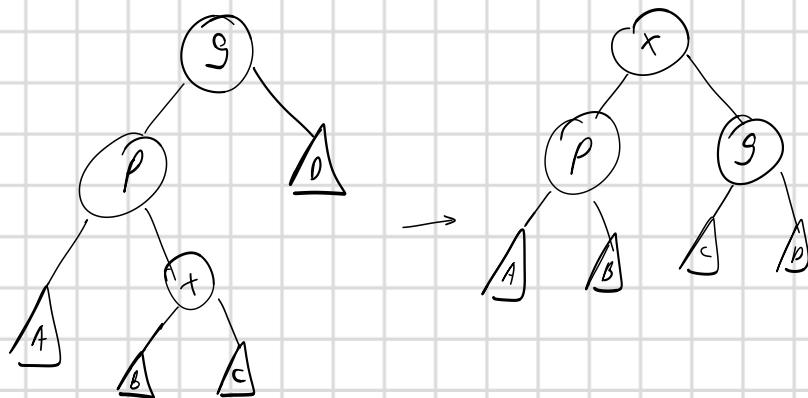
$$3(\underline{r'(t)} - r(t)) + 3(r''(t) - \underline{r'(t)}) + \dots = 1 + 3(r(t) - r(t))$$



■ - узелки помер

$$1 + \cancel{r'(x) - r(x)} + \cancel{r'(p) - r(p)} = 1 + r'(p) - r(x) \leq 1 + r'(x) - r(x) = 1 + 3(r'(x) - r(x))$$

т.к. эти гуранили сгано



$$\tilde{T} = 2 + (\underbrace{r'(x) - r(x)}_{< r(x)}) + (\underbrace{r'(g) - r(g)}_{< r(x)}) + (\underbrace{r'(p) - r(p)}_{< r(x)})$$

$$2 + r'(g) + \cancel{r'(p)} - 2r(x) < 2(r'(x) - \cancel{r(x)}) \leq 3(r'(x) - r(x))$$

$$2 + r'(g) + r'(p) - 2r'(x) \leq 0$$

$$r'(g) + r'(p) - 2r'(x) \leq -2$$

$$\log_2 \frac{s'(g)}{\underbrace{s'(x)}_a} \cdot \frac{s'(p)}{\underbrace{s'(x)}_b} \leq -2$$

$$a \cdot b \leq \frac{1}{4} ?$$

$$a + b \leq 1$$

$$\frac{a+b}{2} \geq \sqrt{ab}$$

$$\left(\frac{a+b}{2}\right)^2 \geq ab$$