

23/9/13

7

אנליזה של אלגוריתם

delete - insert של ענפי בנות
מה עולה לנו

$O(n)$ זמן

delete זמן זמן

$O(\log n)$ זמן זמן

Amort $O(1)$
זמן זמן

הערה

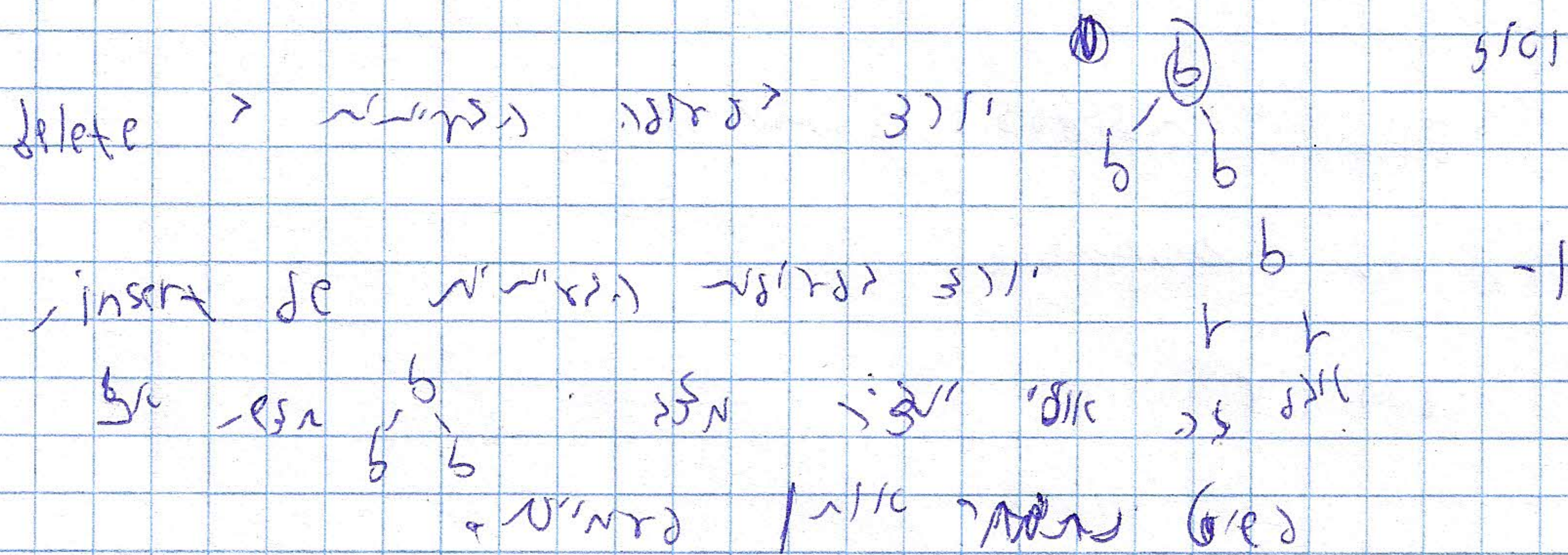
הערה # זמן זמן זמן זמן



הערה

$$\Phi = \# \left(\begin{array}{c} b \\ / \quad \backslash \\ b \quad b \end{array} \right) + 2 \# \left(\begin{array}{c} b \\ / \quad \backslash \\ r \quad r \end{array} \right)$$

הערה
הערה
הערה



1/14 10/10 10/10 10/10 10/10

T_1 ? T_2 ? x \rightarrow Join (T_1, x, T_2)

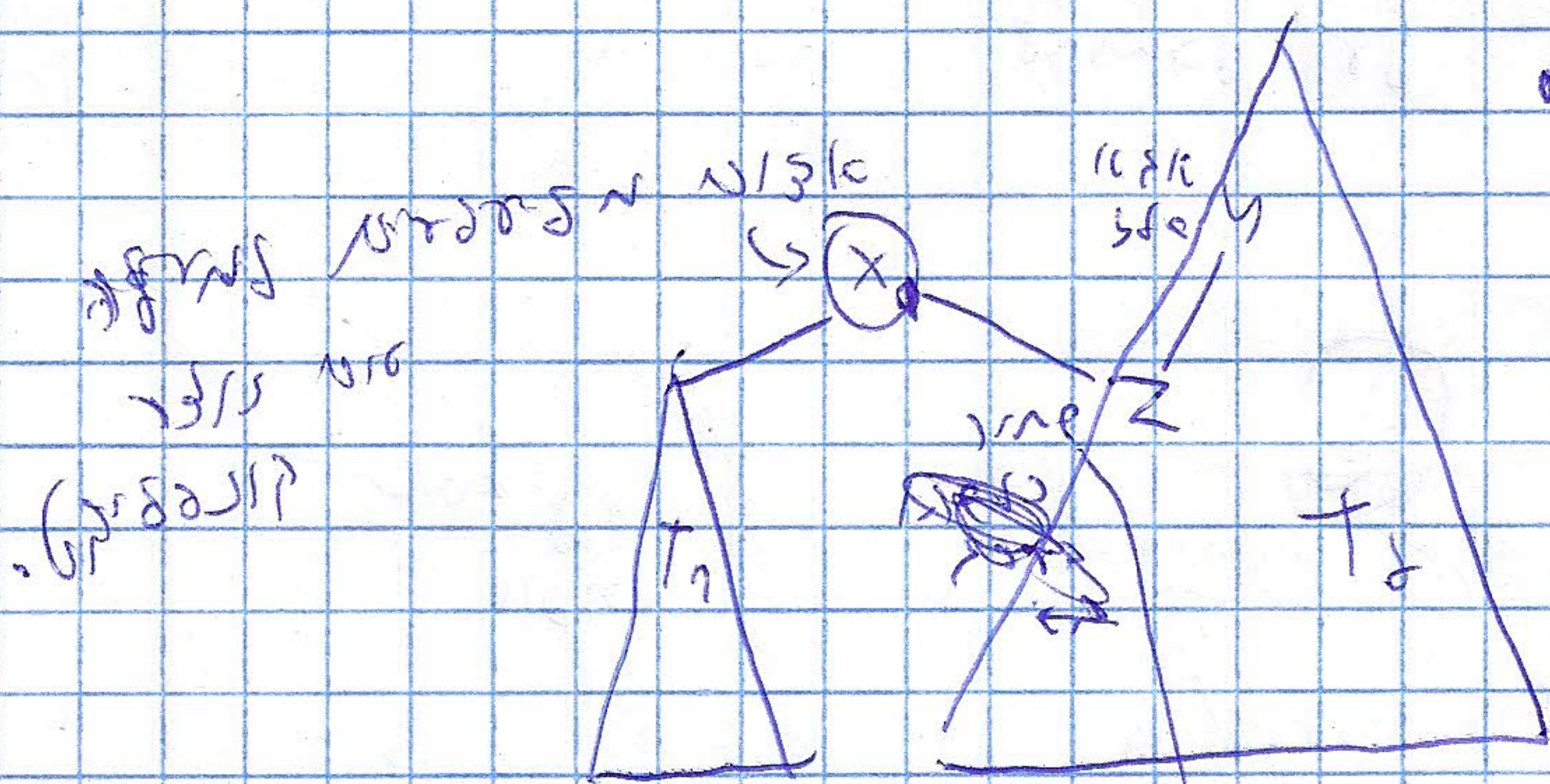
T_2 ? T_1 ? x ?

black height

black height

$bh(T_1) \leq bh(T_2)$

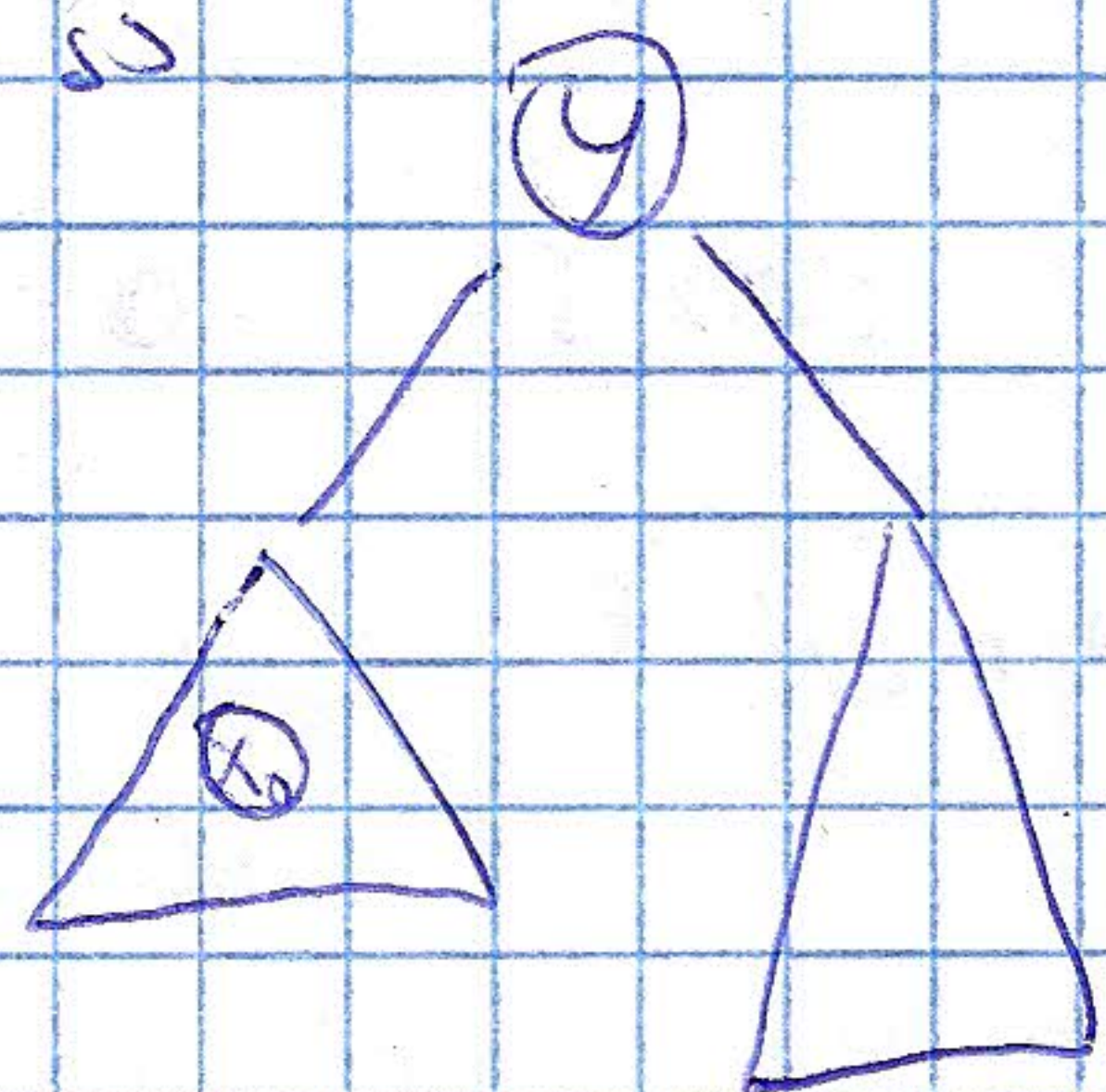
black height



$O(|T_2 - T_1|)$

$bh(T_1)$

split (y, x):



$\langle T_1, T_2 \rangle \leftarrow \text{split}(y, \text{left}, x)$

return ($T_1, \text{Join}(T_2, y, \text{right})$)

Join

return

$O(\log h)$

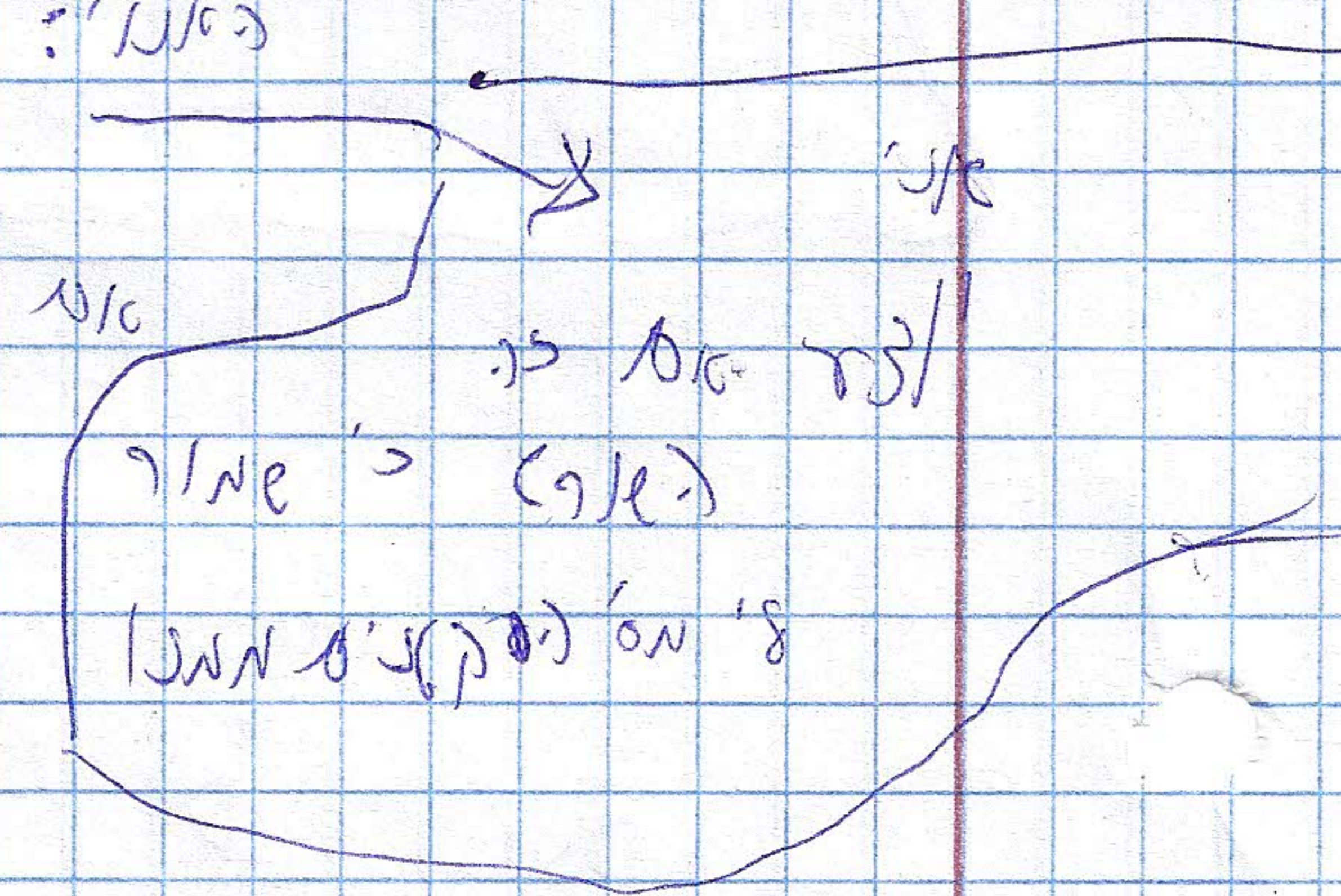
1) $\text{select}(i)$ \rightarrow $\text{rank}(x)$

$\text{Rank}(x)$

with the size of the array



Select



... $\text{rank}(x)$... $\text{select}(i)$...

Index

... $\text{rank}(x)$... $\text{select}(i)$...

Finger Search trees

... $\text{rank}(x)$... $\text{select}(i)$...

... $\text{rank}(x)$... $\text{select}(i)$...

... $\text{rank}(x)$... $\text{select}(i)$...

... $\text{rank}(x)$... $\text{select}(i)$...

... $\text{rank}(x)$... $\text{select}(i)$...

... $\text{rank}(x)$... $\text{select}(i)$...

... $\text{rank}(x)$... $\text{select}(i)$...

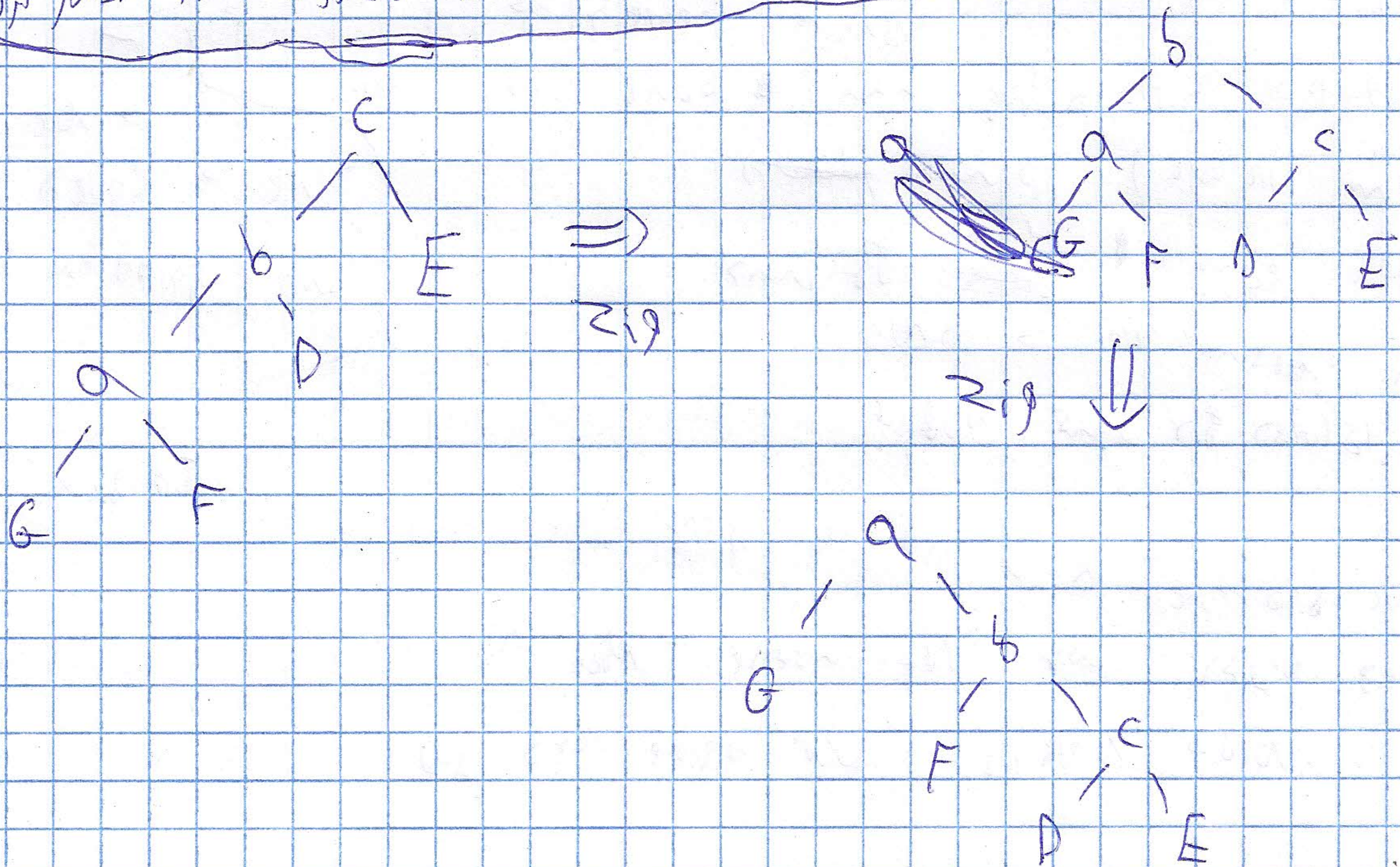
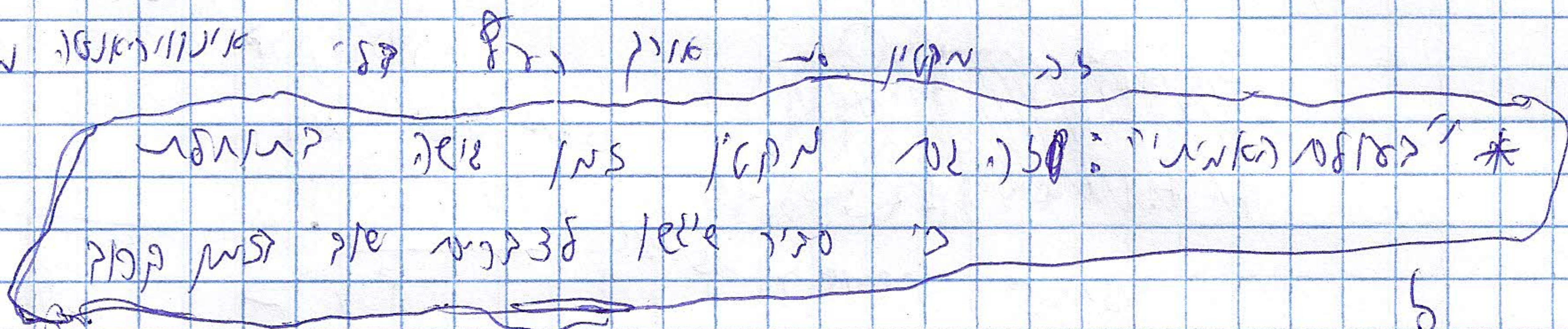
... $\text{rank}(x)$... $\text{select}(i)$...

Splay Trees

self adjusting trees

rotates

... (faint handwritten notes)



I/O ... (faint handwritten notes)

... (faint handwritten notes)

Binary Trees ... (faint handwritten notes)

... (faint handwritten notes)

$$\sum_{l=0}^m \binom{h+l}{l} = \binom{h+m+1}{m}$$

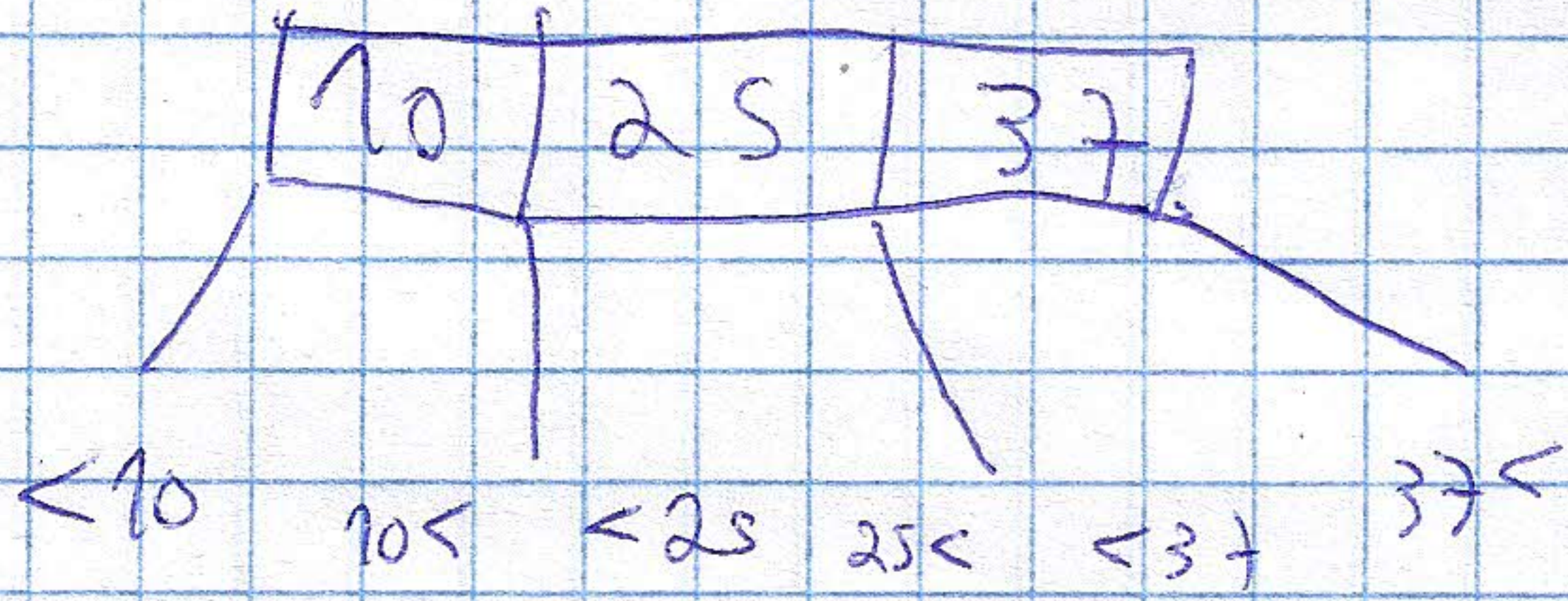
$$\sum_{l=0}^{m-1} \binom{h+l}{l} + \binom{h+m}{m} = \binom{h+m+1}{m}$$

$$\binom{h+l}{h} = \binom{h+l}{l}$$

$$\sum_{l=0}^{m-1} \binom{h+l}{h} = \binom{h+m}{m-1}$$

B Trees

$de \leq p \leq p-1$ for $n \geq 1$ **node** $>$ $n \leq p-1$ for $n \geq 1$
 $n \leq p-1$
 $n \geq 1$
 $n \leq p-1$

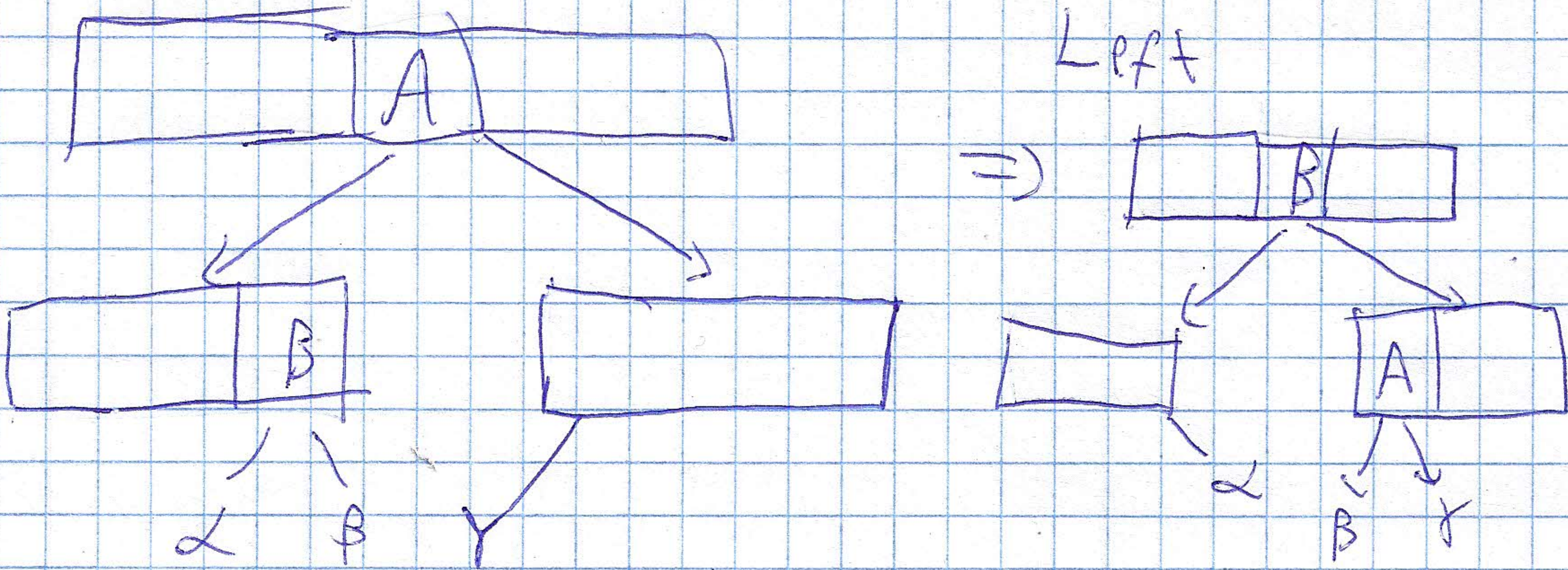


$n \leq p-1$ for $n \geq 1$ **B Tree**

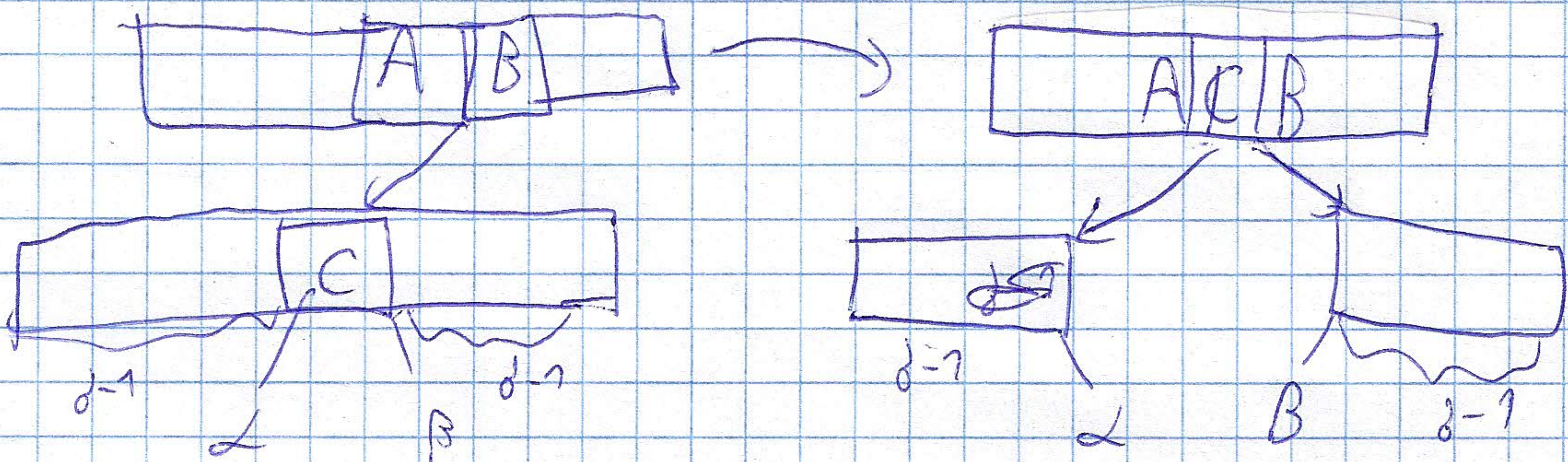
$n \leq p-1$ for $n \geq 1$ $n \leq p-1$ for $n \geq 1$ $n \leq p-1$ for $n \geq 1$

$n \leq p-1$ for $n \geq 1$

Rotate:



$n \leq p-1$ for $n \geq 1$



Insert top-down

1/10/2019 1/10/2019 1/10/2019 1/10/2019 1/10/2019 1/10/2019 1/10/2019

1/10/2019 1/10/2019 1/10/2019 1/10/2019 1/10/2019

I/O 1/10/2019 1/10/2019 1/10/2019 1/10/2019 1/10/2019