STRUTTURA DI CLARKE
PER LA SELEZIONE

$t = \#$uni

I° LIVELLO

Memorizzo $P[0], P[1], \dots, P\left[\frac{t}{\log n \log\log n}\right]$ le posizioni multiple di 7 (?) $\log n \log\log n$

$$P[i] \triangleq select_b(i \log n \log\log n)$$

MEMORIA

$$\frac{t}{\log n \log\log n} \log n = \frac{t}{\log\log n} \leq \frac{n}{\log\log n} = o(n)$$

II LIVELLO

$$r_i = P[i+1] - P[i]$$

$$r_i \geq \log n \log\log n$$

$$r_i \overset{?}{\geq} (\log n \log\log n)^2$$

II - CASO A: SPARSO $r_i \geq (\log n \log\log n)^2$

$S[i, j]$ con le posizioni di tutti gli uni

$j = 0, \dots, \log n \log\log n - 1$

MEMORIA

$$(\log n \log\log n) \log r_i =$$

$$= \underline{(\log n \log\log n)^2} \log r_i \leq$$

$$\log n \log\log n$$

$$\le \frac{r_i \log r_i}{\log n \log\log n} \le \frac{r_i \cancel{\log n}}{\cancel{\log n} \log\log n} =$$

$$= \frac{r_i}{\log\log n}$$

$\boxed{\text{II CASO B: DENSO} \quad r_i < (\log n \log\log n)^2}$

Memorizzo esplicitamente solo (come offset rispetto a $P[i]$) le pos. multiple di

$$\log r_i \log\log n$$

$$S[i,j] = select_{\underline{b}}(i \log n \log\log n + j \log r_i \log\log n) - P[i]$$

numero di j

$\boxed{\text{MEMORIA}}$

$r_i \ge \log n \log\log n$

$$\frac{\log n \log\log n}{\cancel{\log r_i} \log\log n} \cancel{\log r_i} \le$$

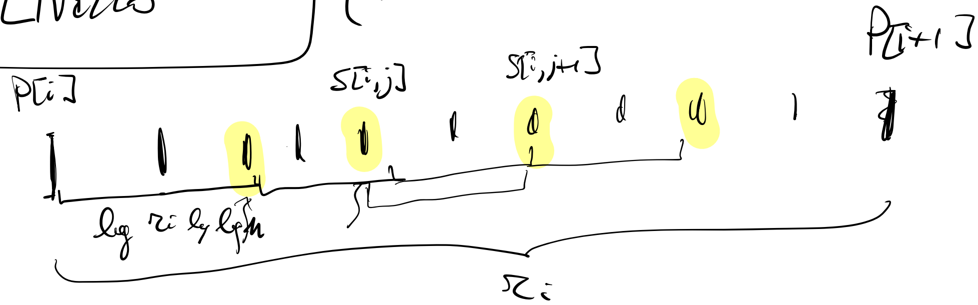
$$\le \frac{r_i}{\log\log n}$$

$\boxed{\text{MEMORIA COMPLESSIVA PER IL LIVELLO II}}$

$$\leq \sum_{i=0}^{\frac{t}{\log n \log\log n}-1} \frac{P[i+1]-P[i]}{\log\log n} = \frac{P\left[\frac{t}{\log n \log\log n}\right] - P[0]}{\log\log n} \leq$$

$$\leq \frac{n}{\log\log n} = o(n)$$

$\boxed{\text{III LIVELLO}}$ (PER IL CASO II B)



$$s_{ij} = S[i,j+1] - S[i,j]$$

$$s_{ij} \geq \log r_i \log\log n$$

III CASO A : SPARSO $\quad s_{ij} \geq \log s_{ij} \log r_i (\log\log n)^2$

Memorizzo esplicitamente tutte le posiz. intermedie.

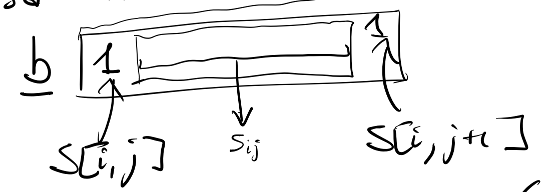
$\boxed{\text{MEMORIA}}$

$$(\log r_i \log\log n) \log s_{ij} =$$

$$= \frac{\log r_i (\log\log n)^2 \log s_{ij}}{\log\log n} \leq \frac{s_{ij}}{\log\log n}$$

III CASO B: DENSO $\quad s_{ij} < \log s_{ij} \log r_i (\log \log n)$

Si usa il Four-Russians Trick



$\boxed{\text{OSS. 1}}$: $\log s_{ij} \le \log r_i \underset{\text{CASO II B}}{\le} \log\left(\left(\log n \log\log n\right)^2\right) =$

$= 2\log\log n + 2\log\log\log n \le$

$\le 4 \log\log n$

$\Rightarrow s_{ij} < \underbrace{\log s_{ij}}_{\substack{\text{OSS1} \\ \le 4\log\log n}} \underbrace{\log r_i}_{\substack{\text{OSS1} \\ \le 4\log\log n}} (\log\log n)^2 \le$

$\le 16 (\log\log n)^4$

\# TIPI DI "BLOCCHI"

$2^{s_{ij}} \le 2^{16(\log\log n)^4}$

\# RIGHE TABELLA

s_{ij}

VALORI NELLA TAB. $\Rightarrow \log s_{ij}$ bit

$\le 2^{16(\log\log n)^4} \cdot s_{ij} \cdot \log s_{ij} \le$

$\le 2^{16(\log\log n)^4} \cdot 16(\log\log n)^4 \log\left(16(\log\log n)^4\right) =$

$= o(n)$

Il caso III A occupa in tutto

$$\leq \sum_j \frac{s_{ij}}{\lg \lg n} = \sum_j \frac{S[i,j+1]-S[i,j]}{\lg \lg n} =$$

$$= \frac{S[i,-1]-S[i,0]}{\lg \lg n} \leq \frac{n_i}{\lg \lg n} \leq \frac{n}{\lg \lg n} =$$

$$= o(n)$$