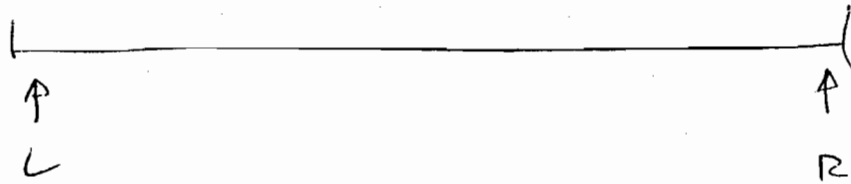


② DSA

2000

p3q5
MR

①



$$S(k, L, R) =$$

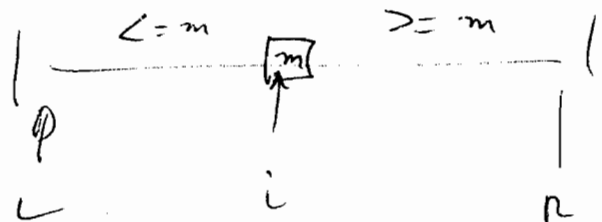
$m \leftarrow$ choose a median eg of B elements

$i \leftarrow \text{partition}(m, L, R)$

if $k = i$ return m

if $k < i$
return $S(k, L, i-1)$

else return $S(k-i+1, i+1, R)$



expected time $O(n)$

because $Cn \approx n + C\left(\frac{n}{2}\right)$

$$n + \frac{1}{2}n + \frac{1}{4}n + \dots$$

$$\approx 2n$$

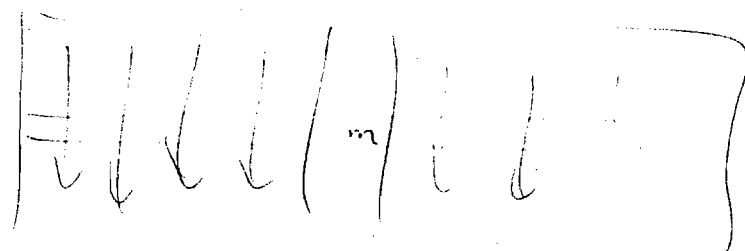
quintuplets



① sort the quintuplets

② select the $\frac{n}{5}$ medians

③ recursively select $(\frac{n}{10}, \dots) \rightarrow m$



④ count number $\begin{matrix} < m & a & > \frac{3}{10}n \text{ elem} \\ = m & b & \\ > m & c & > \frac{3}{10}n \text{ elem} \end{matrix}$

$$b \leq a$$

$$a < n \leq a+b$$

$$a+b < b$$

$$S(b, \text{set} < m)$$

return m

$$S(b-a-b, \text{set} > m)$$

~~Can~~

$$C_n = n + C(\frac{n}{5}) + C(\frac{7n}{10})$$

$$= O(n)$$

QS mlt

Casper's

$$n = 100$$

$$k = 50$$

3

100

3

50

3

25

3

13

3

7

3

3

$$21 + 200$$

221

221

Q00WT

$C(100)$

$$7 \times 20$$

140

$C(20)$

50

100

100

3

3

293

$C(50)$

$$7 \times 10$$

70

$C(10)$

10

50

50

3

3

133

$C(25)$

$$7 \times 5$$

35

$C(5)$

7

25

25

3

3

396

known to be
between 25 & 75