

# Deterministic Selection

SELECT(**A**,**i**,**n**)

```
1  if ( $n = 1$ )
2      then return  $A$ 

3   $p = \text{MEDIAN}(A)$ 
4
5

6   $L = \{x \in A : x \leq p\}$ 
    $H = \{x \in A : x > p\}$ 

7  if  $i \leq |L|$ 
8      then SELECT( $L, i, |L|$ )
9      else SELECT( $H, i - |L|, |H|$ )
```

## Deterministic Selection (2)

SELECT(**A**,**i**,**n**)

- 1 **if** ( $n = 1$ )
- 2     **then return**  $A$
  
- 3 **Split the items into**  $\lfloor n/5 \rfloor$  **groups** 5 **(and one more group).**  
    **Call these groups**  $G_1, G_2, \dots, G_{\lfloor n/5 \rfloor}$
- 4 **Find the median**  $m_i$  **of each**  $G_i$
- 5 **Recursively compute the median of medians,**  
    SELECT( $\{m_1, \dots, m_{\lfloor n/5 \rfloor}\}$ ,  $\lfloor n/10 \rfloor$ ,  $\lfloor n/5 \rfloor$ )
  
- 6  $L = \{x \in A : x \leq p\}$   
    $H = \{x \in A : x > p\}$
  
- 7 **if**  $i \leq |L|$
- 8     **then** SELECT( $L$ ,  $i$ ,  $|L|$ )
- 9     **else** SELECT( $H$ ,  $i - |L|$ ,  $|H|$ )

# Proof

