


```

function SELECT(A,i)
    // find i-th element in array A
    p:=choose_pivot(A);
    //--- partition A into LESS, EQUAL, MORE
    create new arrays LESS, EQUAL, MORE;
    for i:=1 to size(A) do
        if A[i]<p then add A[i] to LESS;
        if A[i]=p then add A[i] to EQUAL;
        if A[i]>p then add A[i] to MORE;
    //--- decide, what case to pursue
    if size(LESS)>=i then
        return SELECT(LESS,i);
    else if size(LESS)+size(EQUAL)>=i then
        return p;
    else
        return SELECT(MORE,i-size(LESS)-size(EQUAL));

```

Running time of a deterministic algorithm

Running time of algorithm A is a **function of the input size**, where $T_A(n)$ is the largest amount of time needed to solve an input of size n .

$$T_A(n) = \max\{T_A(x) \mid |x| = n\}$$

($T_A(x)$ is time that algorithm A needs to solve input x .)

Running time of a randomized algorithm

Running time of algorithm A is a **function of the input size**, where $T_A(n)$ is the **expected** largest amount of time needed to solve an input of size n .

$$T_A(n) = E_R[\max\{T_A(x, R) \mid |x| = n\}]$$

($T_A(x, R)$ is time that algorithm A needs to solve input x when using a sequence R of randomly generated bits.)