

```

1: procedure IS( $A$ )
2:    $n = \text{length}(A)$ 
3:   for  $i = 2$  to  $n$  do
4:      $x = A[i]$ 
5:      $j = i$ 
6:     while  $j > 1$  and  $A[j - 1] > x$  do
7:        $A[j] = A[j - 1]$ 
8:        $j = j - 1$ 
9:      $A[j] = x$ 

```

```

1: procedure QS( $A$ )
2:    $n = \text{length}(A)$ 
3:   QUICKSORT( $A, 1, n$ )

```

```

1: procedure QUICKSORT( $A, i, j$ )
2:   if  $i < j$  then
3:      $p = \text{PARTITION}(A, i, j, A[j])$ 
4:     QUICKSORT( $A, i, p - 1$ )
5:     QUICKSORT( $A, p + 1, j$ )

```

```

1: procedure PARTITION( $A, i, j, x$ )
2:    $b = i - 1$ 
3:   for  $k = i$  to  $j$  do
4:     swap( $A[k], A[b + 1]$ )
5:     if  $A[b + 1] \leq x$  then
6:        $b = b + 1$ 
   return  $b$ 

```