

# Algorithm Assignment Answer Key

Main comment: Read the instruction carefully and list all the values you are asked for!

① Algorithm 1 to find the maximum of 14, 5, 17, 17, 8, 27, 3

LIST ALL VALUES OF  $i$  AND MAX

```
MAX := 14
i := 2
i := 3
MAX := 17
i := 4
i := 5
i := 6
MAX := 27
i := 7
```

The MAX is 27

② Linear Search to search for 7 in 1, 3, 4, 5, 6, 8, 9, 11

LIST ALL VALUES OF  $i$  AND LOCATION

$i := 1, i := 2, i := 3, i := 4, i := 5, i := 6, i := 7, i := 8, i := 9, \text{location} := 0$

Binary Search to search for 7 in 1, 3, 4, 5, 6, 8, 9, 11

LIST ALL VALUES OF  $i, j, m, \text{location}$

```
i := 1
j := 8
m := 4
i := 5
m := 6
j := 6
m := 5
i := 6
location := 0
```

③ Bubble sort to sort d, f, k, m, a, b

SHOW THE LISTS OBTAINED AT EACH PASS

There are  $N=6$  elements in the list, so we have  $N-1=5$  passes.

```
PASS 1  d f k a b m
PASS 2  d f a b k m
PASS 3  d a b f k m
PASS 4  a b d f k m
PASS 5  a b d f k m sorted list
```

④ Insertion sort to sort d, f, k, m, a, b

SHOW THE LISTS OBTAINED AT EACH STEP

There are  $N=6$  elements in the list, so we have  $N-1=5$  steps.

STEP 1 

d	f
---	---

 k m a b

STEP 2 

d	f	k
---	---	---

 m a b

STEP 3 

d	f	k	m
---	---	---	---

 a b

STEP 4 

a	d	f	k	m
---	---	---	---	---

 b

STEP 5 a b d f k m sorted list.

⑤ Let's modify Algorithm 1 p. 193 accordingly. We need to write a PSEUDOCODE

PROCEDURE min ( $a_1, a_2, \dots, a_n$ ; natural numbers)

min :=  $a_1$

FOR  $i := 2$  TO  $n$

IF  $MIN > a_i$ , THEN  $MIN := a_i$

return min {min is the smallest element}