- 1 List all the steps used by Algorithm 1 to find the maximum of the list 1, 8, 12, 9, 11, 2, 14, 5, 10, 4.

  max :=1,*i* := 2,*max* := 8,*i* := 3,*max* := 12,*i* := 4, *i* := 5, *i* := 6, *i* := 7,
  max := 14, *i* := 8, *i* := 9, *i* := 10, *i* := 11

- 2 Devise an algorithm that finds the sum of all the integers in a list.

```
procedure AddUp(a1, ... , an: integers) sum := a1
for i : = 2 to n
        sum := sum + ai
return sum
```

- 3 Describe an algorithm that takes as input a list of n integers in nondecreasing order and produces the list of all values that occur more than once. (Recall that a list of integers is **nondecreasing** if each integer in the list is at least as large as the previous integer in the list.)

```
procedure duplicates(a1, a2, ... , an: integers in
        nondecreasing order)
k := 0 {this counts the duplicates}
j := 2
while j ≤ n
        if aj = aj-1 then
                k := k + 1
                ck := aj
                while j≤n and aj =ck
                        j := j + 1
        j := j + 1

{c1,c2,...,ck is the desired list}
```

- 4 Describe an algorithm that interchanges the values of the variables x and y, using only assignments. What is the minimum number of assignment statements needed to do this?

procedure *interchange*(*x, y*: real numbers)
z := *x*
x := *y*
y := *z*
The minimum number of assignments needed is three.

- 5 List all the steps used to search for 9 in the sequence 1, 3, 4, 5, 6, 8, 9, 11 using

a) a linear search. **b)** a binary search.

Linearsearch:
i:=1, *i*:=2, *i*:=3, *i*:=4, *i*:=5, *i*:=6, *i* := 7, *location* := 7;

binarysearch:
i := 1, *j* := 8, *m* := 4,
i := 5, *m* := 6,
i := 7, *m* := 7, *j* := 7,
location := 7