

# Algorithms - Assignment 1

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## Πρόβλημα 1

- Ερώτημα 1

```
1 function MajorityFinder(A[1...n])
2   majority_person = []
3   maxcount = 0
4   count
5   temp
6   for (i = 1 to n)
7     count = 0
8     temp = A[i]
9     for (j = 1 to n)
10      if (temp == A[j])
11        count++
12      if (count > maxcount)
13        maxcount = count
14        majority_person[1] = temp
15        majority_person[2] = null
16      else if (count == maxcount)
17        majority_person[2] = temp
18  if (maxcount ≥ ⌈ $\frac{n}{2}$ ⌉)
19    return majority_person
20  else
21    return "no person has the majority"
```

- Ερώτημα 2

### Merge Sort

```
1 function mergesort(a[1...n])
2   if (n > 1)
3     return merge(mergesort(a[1...⌊ $\frac{n}{2}$ ⌋]), mergesort(a[⌊ $\frac{n}{2}$ ⌋ + 1 ... n]))
4   else
5     return a

1 function merge(x[1...k], y[1...l])
2   if (k = 0)
3     return y[1...l]
4   if (l = 0)
5     return x[1...k]
6   if (x[1] ≥ y[1])
7     return x[1] ◦ merge(x[2...k], y[1...l])
8   else
9     return y[1] ◦ merge(x[1...k], y[2...l])
```

```
1 function MajorityFinder2(A[1...n])
2   mergesort(A)
3   for (i = 1 to n)
4     if (A[i] == A[
```