OPTIONAL ASSIGNMENT

QUESTIONS FROM MICROSOFT JOB INTERVIEWS

See yourselves why I keep pestering you with problem solving

1. Given an array of real numbers A[*1..n*], find a contiguous sub-array A[*i..j*], $1 \le i \le j \le n$, with the largest sum. Note that the array might contain both positive and negative numbers. [Hint: Dynamic Programming (or similar)]

2. An array of integers (positive and negative) is given, each having at most *K* bits (plus the sign bit), and it is known that the sum of all the integers in the array also has at most *K* bits (plus the sign bit). Design an algorithm that computes the sum of integers in the array, with all intermediate sums also having at most *K* bits (plus the sign bit). [Hint: find in what order you should add positive and negative numbers].

3. Given two arrays of integers, how can you efficiently find out if the two arrays have an element in common?

4. Given a singly linked list, determine whether it contains a loop or not, without making any modifications to the list, and without using any additional storage space. [Hint: advance pointers, one faster than the other…] .

5. **(Microsoft)** Given an array *A*[*1..100*] which contains all natural numbers between *1* and *99*, design an algorithm that runs in *O(n)* and returns the duplicated value.