Exercise 1: (4 marks)

Without using a table, write a function or procedure that receives a positive integer and returns or displays the mirror image respectively. For example if we pass the number 352498167 as parameter, then the number 761894253 will be returned or displayed respectively by the function or procedure.

Exercise 2: (5 marks)

Let U_0 and U_1 be the first two terms in the progression $U_{n+2} = U_{n+1} + U_n$. Write an algorithm to calculate the sum of the first p terms of the progression (U_n) with $n \geq 0$

Exercise 3: Egyptian Multiplication(5 marks)

The technique of ancien Egytian multiplication lies on the decomposition of one of the numbers (generally the smallest) in to a sum and the creation of a power table for the other number. Given x and y, two integers, the algorithm has to calculate the product of the two using only addition, subtraction and division by 2. We notice that:

If x is even then $x*y = (x/2)*(2*y)$
If x is odd then $x*y=(x-1)*y + y$
For example

$$15 * 53 = 14*53 + 53$$
$$= 7*106 + 53$$
$$= 6*106 + 106 + 53$$
$$= 3*212 + 159$$
$$= 2*212 + 212 + 159$$
$$= 2*212 + 371$$
$$= 1*424 + 371$$
$$= 795$$

Write an algorithm which reads two nombers x and y then multiplies them using the Egyptian multiplication. The algorithm will behave the same way if x is greater than y.

Exercise 4: (6 marks)

Let V be a Vector with $V(i) \in \{0,1\}$. Write an algorithm that returns the position i in the vector such that V [i] is the beginning of the longest consecutive series of zeros.