Lab 6 : Pointers

Exercise 1:

Write a program that compares the difference between the addresses of two pointers p and q = p+1 for different types of objects being pointed to: char, int, float, double. Compare with the result of the sizeof(type) function (which returns an unsigned long).

Exercise 2:

Declare a double array and a pointer to its first element. Iterate through the array elements using this pointer. Display the values of the array and their addresses, using both the array and the pointer.
The address display is done by %p.

Exercise 3:

1. Write a C function that calculates the sum and product of two real numbers passed as parameters.
2. Use your function to calculate the sum and product of two real numbers entered by the user.
3. Modify your function to calculate the sum and product of the real elements of a vector passed as a parameter.

Exercise 4:

The Fibonacci sequence is defined as follows:

$u_0 = 0$; $u_1 = 1$; $u_n = u_{n-1} + u_{n-2}$ for $n > 1$

1. Write a function *fibonacci()* that calculates the term u_n of the Fibonacci sequence for n given as parameter.
2. Use the *fibonacci()* function to calculate and store the terms from 0 to `N` of the sequence in an array. `N` is given by the user. The array must be created dynamically based on `N` using the *malloc()* function.
3. Display the created array. The display should be as follows:

```
u0      0
u1      1
u2      1
u3      2
u4      3
...
```

Exercise 5: (Manipulating vectors using pointers)

Write a C function (replace) that takes as input a vector of real numbers V and returns a second vector containing just the elements of V that are less than its mean.

Use this function in a main program to find the vector corresponding to the vector T of size N entered by the user. N is given by the user.