

**Exercise 1 : (Course)**

1) Translate the following “for” loop in “while” and “do ...while” loop, and give the display.

```
for (i=50, x=0; i>=x; i-=10)
    printf("%d\n", i);
```

2) What can you say if x was initialized by 60?

3) Translate the following “for” loops in “while” loop, and give the display.

```
for (i=0; i<3; i++)
    for (j=0; j<2; j++)
        printf("i=%d j=%d\n", i, j);
```

**Exercise 2 : (Course)**

Write a C treatment allowing to :

- 1- Display the sum of integer numbers that are between 1 and 100.
- 2- Display the even integers that are between 1 and 80.
- 3- Display the odd integers that are between 1 and 80.
- 4- Display all natural numbers multiple of 5 that are between 1 and 100.
- 5- Display the sum of 10 integer numbers as well as their average.
- 6- Display the sum of n integer numbers (n>0) as well as their average.
- 7- Read an integer x>0, then double it as many times until it exceeds 60.
- 8- Display the minimum between 10 integer numbers.
- 9- Display the minimum between n integer numbers (n>0).
- 10- Calculate the sum of several given integer numbers and stop as soon as the sum exceeds 500, then display their average.
- 11- Calculate the sum of several given integers, and stop when entering -1, display their average.

**Exercise 3 : (Course)**

Write a program that reads two positive integers A, B and calculates their product using only additions.

**Exercise 4 : (Course)**

Write programs that calculate the values of the following expressions :

$$1) S1 = 1 + \frac{1-x}{1+x} + \frac{2-x}{2+x} + \frac{3-x}{3+x} + \dots + \frac{n-x}{n+x^n} \quad (\text{with } x > 0)$$

$$2) S2 = -\frac{2}{1+(N-1)} + \frac{4}{2^N+(N-2)} - \frac{8}{3^N+(N-3)} + \dots - \frac{2^{N-1}}{(N-1)^{N+1}} - \frac{N}{N^N}$$

$$3) S3 = -\frac{x.2!}{N!} + \frac{x^2.3!}{N!} - \frac{x^3.4!}{N!} \dots \pm x^{N-1} \quad (\text{with a normal and optimal method})$$

**Exercise 5 : (DW)**

Consider the following program :

```
#include <stdio.h>
int main() {      int A, i, count ;
printf("Give the value of A :"); scanf("%d", &A) ;
count=1 ;    i=1 ;
while (i <= A / 2) {
    if (A % i==0)
        count++ ;
    i++ ;
}
printf("count=%d ", count);
return 0; }
```

- 1) Unroll this program and give the display for A=6 then A=9.
- 2) Indicate what this program does.

**Exercise 6 : (DW)**

Write a program that reads an integer n (n>0) then displays:

- 1) All its divisors
- 2) Its first 15 multiples starting with 0.
- 3) Its multiples which are between 1 and 100.

**Exercise 7 : (DW)**

Write a program that determines whether an integer M>0 is prime or not. A number is said to be prime if it has exactly two different divisors.

**Exercise 8 : (DW)**

Based on the MOD and DIV operators, write a program which:

- 1) Reads an integer x (x>0).
- 2) Calculates and displays the number of digits of x and constructs its inverse.

**Example:** if x=187 then: the number of digits of x is 3, and its inverse is: 781.

**Reminder:** 187 mod 10 = 7, and 187 div 10 = 18

**Exercise 9 : (DW)**

Write a program that reads two positive integers A, B and calculates the quotient and remainder of A by B without using division operators.

**Exercise 10 : (DW)**

Write programs that determine the n<sup>th</sup> term of sequences defined by:

- a)  $U_1=1, U_2=2, U_n=U_{n-1}+U_{n-2}$
- b)  $S_1=2, S_2=3, S_3=-2, S_n=S_{n-3}+(-1)^n * S_{n-1}$  with  $n \geq 4$