Solutions to Exercise Series N°: 04

Exercise 1.

Write an algorithm which solves a first degree equation $ax+b=0$ (a,b entered by the user)

```
Algorithm equation
 Var
        a,b,x : real
Begin
        Write ("This algorithm solves  a first degree equation ax+b=0 ")
        Write (" Enter a and b  : ");
         Read(a,b)
         x  ← -b/a;
        write (" the solution x = ", x);
End
```

Exercise 2.

Write an algorithm that asks the user to enter the two limits a and b of an interval [a; b]. Check the entered values. Then ask it to enter a value x, tell it if x ∈ [a; b]

```
Algorithm interval
var
      inf , sup , val :real
      write ( " enter an interval ( [ xx , xx ]) [ " ) ;
       read(inf , sup ) ;
      if ( inf > sup )then
      Ecrire  ( " This interval is poorly formed " ) ;
      else
        ecrire ( " Enter a value : " ) ;
            lire ( val ) ;
            if ( inf <= val  and  val <= sup )then
              printf ( " belongs" ) ;
           else
              printf ( n, " does not belong to the interval  [",inf, "," sup, "] " ) ;
            endif
      endif
End
```

Exercise 3.

Write an algorithm that reads a time measured in hours, minutes and returns the time to the next minute. *Example* : *Time entered 17:59 → time after one minute 18:00*

```
Algorithm Next_minute
Var
    H , M , Hn,Hn : integer ;
Begin
      write ( "enter Time (hh :mm) ? " ) ;
      read ( H , M ) ;
      Mn←M+1
      Hn←H
      If (Mn=60) then
      Mn←0
           Hn←H+1
      endIf
      If (Hn=24) then
           H←0
      enfIF
      write ("time next minute : ",Hn, ":"Mn)
      End
```

```
Algorithm Next_minute
Var
      H , M , Hn,Hn : integer ;
Begin
       write ( "enter Time (hh :mm) ? " ) ;
       read ( H , M ) ;
      Hn←H+(M+1)div 60
      Mn←(M+1)mod 60
      write ("time next minute : ",Hn, ":"Mn)
End
```

Exercise 4.

Write an algorithm that asks the user to enter a start time (hours + minutes) and an end time (hours + minutes too). This program must then calculate in hours + minutes the time elapsed between the start time and the end time.

```
Algorithm Gap
Var
    hStart , hEnd , mStart , mEnd ,hGap , mGap : integer ;
begin
        write ( " start time(hh :mm) ? " ) ;
        read ( hStart , miStart ) ;
        write ( "End time (hh :mm) ? " ) ;
        read ( hEnd , mEnd ) ;
        hGap ←hEnd - hStart ;
        mGap ←mEnd - mStart ;
        if ( minuteEcart < 0) then
            hGap← hGap-1 ;
            mGap  ← mGap+60 ;
        EndIf
        Write  ( "interval duration  :" ,hGap , ": " ,mGap) ;
End
```

Exercise 5.

Write an algorithm which allows you to enter the number of a day of the week and which displays "*Workday*" or "*Weekend*" depending on the day. Days are numbered 1 to 7 from *Monday* to *Sunday*.

Example: *Number of day entered 4 → the algorithm displays "Workday"*
Number of day entered 6 → the algorithm displays "Weekend"

```
Algorithm week
Var
    Day : integer
Begin
    Write ("enter a number of  day ")
    Read (Day)
    Case day of
        1: 2:  3:  4: 7: write ("Workday")
        5: 6:write ("Weekend ")
    Else
       Write ("this day doesn't exist")
    End Case
End
```

```
#include<stdio.h>
int main ( )
{
      int Day ;
      printf ( " enter a number of  day:  " ) ;
      scanf ( "%d" , &Dau) ;
      Case (day )
      {
          1: 2:  3:  4: 7:
                  printf ("Workday");
                  break ;
          5: 6:
                  printf ("Weekend ");
          default:
                  printf  ("this day doesn't exist");
      }
return 0 ;
}
```

Practical Work

Exercise 1.

Write an algorithm that allows you to read a positive integer made up of 4 digits and tell if it is palindrome.

Example: *1221, 9559 are palindromes, on the other hand, 1591 and 1225 are not.*

```
#include<stdio.h>
int main ( )
{
      int n, u, d,c,m ;
      printf ( "enter an integer :  " ) ;
      scanf ( "%d" , &n) ;
      u=n%10 ;                          //u :unit numbe
      d= n/10%10;                       // Tens number
```

```
    c= n/100%10;                    // Hundreds number
    m= n/1000;          // Thousands number

 if ( (a ==m)&&(c==d))
          printf ( "%d is palindrome  ",n ) ;
     else
          printf ( "%d is not  palindrome  ",n ) ;
     return 0 ;
}
```

Exercise 2. Write a program that reads two positive integers and informs us if one of them is divisible by the other. *Example: Values entered 4 and 17 → none is divisible by the other*
Values entered 24 and 120 → 120 is divisible by 24

```
#include<stdio.h>
int main ( )
{
     int a, b,;
     printf ( "enter 2 integers :  " ) ;
     scanf ( "%d%d" , &a,&b) ;
     if (a%b==0 )
          printf ( "%d is divisible by %d  ",a,b ) ;
     else
          if (b%a==0 )
               printf ( "%d is divisible by %d  ",b,a ) ;
          else
               printf ("none is divisible by the other");
      return 0 ;
}
```

Exercise 3. Write a program asks the user to enter a character then it informs them if it is a letter or a digit or another character. (try to look up the ASCII code)

Example: *Entered character: '9' →is a digit*
Entered character: 'F' →is a letter
Entered character: ' #' →is another character

```
#include<stdio.h>
int main ( )
{
     char c;
     printf ( "enter a character :  " ) ;
     scanf ( "%c" , &c,) ;
     if (c>=48 && c<=57 )
          printf ( "%c is a digit  ",c ) ;
     else
          if ((c>=65  &&c<= 90)   ||(c>=97 &&c<= 122))
               printf ( "%c is a lettre",c ) ;
          else
               printf ("%c is another charcter ",c);
      return 0 ;
}
```