

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

$a,b,x : \text{real}$

Begin

Write ("This algorithm solves a first degree equation $ax+b=0$ ")

Write (" Enter a and b : ");

Read(a,b)

$x \leftarrow -b/a$;

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 $x \in [a; b]$

Algorithm interval

var

$inf, sup, val : \text{real}$

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 ($inf \leq val$ and $val \leq sup$)**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 $\rightarrow$ time after one minute 18:00

Algorithm Next_minute

Var

$H, M, Hn, Mn : \text{integer}$;

Begin

write ("enter Time (hh :mm) ? ");

read (H, M);

$Mn \leftarrow M+1$

$Hn \leftarrow H$

If ($Mn=60$) **then**

$Mn \leftarrow 0$

$Hn \leftarrow H+1$

endIf

If ($Hn=24$) **then**

$H \leftarrow 0$

enfiF

write ("time next minute : ", Hn , " : " Mn)

End

Algorithm Next_minute

Var

$H, M, Hn, Mn : \text{integer}$;

Begin

write ("enter Time (hh :mm) ? ");

read (H, M);

$Hn \leftarrow H+(M+1)\text{div } 60$

$Mn \leftarrow (M+1)\text{mod } 60$

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" , &Day ) ;
    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 a 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 number
    d = n / 10 % 10 ;      // d : 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 ;
}

```