



Tutorial N° 03 : Conditionnal Instructions

Exercise 01 :

1) In algorithmics, what will be the condition: **Either** $-1 \leq n \leq 2$, **either** $n=5$

- if $n \geq -1$ OR $n \leq 2$ AND $n = 5$ then
- if $(n \geq -1$ OR $n \leq 2)$ AND $n = 5$ then
- if $n \geq -1$ AND $n \leq 2$ OR $n = 5$ then
- if $n \geq -1$ OR $n \leq 2$ OR $n = 5$ then

2) Give the conditional expression in algorithmics and in C language for each of the following expressions:

- a) $5 < x < 10$: **Algo:** if $((x > 5)$ and $(x < 10))$ then, **C:** if $((x > 5) \&\& (x < 10))$ {
- b) Either $x > 0$ or $x < -4$, **Algo** if $((x > 0)$ or $(x < -4))$ then, **C:** if $((x > 0) || (x < -4))$
- c) $18 < \text{temperature} \leq 26$ **Algo:** if $((\text{temperature} > 18)$ and $(\text{temperature} \leq 26))$ then
- d) Either $m=10$ or $20 > n \geq 15$ **ALGO:** if $((m=10)$ or $((n \geq 15)$ and $(n < 20)))$ then

3) What is the result of the expression written in C program:

$(a \leq b/2) || (a == 2) \&\& (b > 3)$

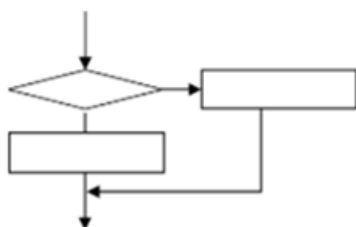
In the case where « $a=3$ and $b = 8$ » and in the case where « $a=2$ and $b = 8$ »

- Case 1: True, Case 2 : True
- Case 1: False, Case 2 : True
- Case 1: True, Case 2 : False

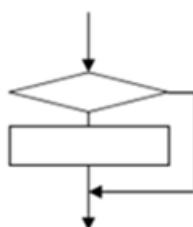
Exercise 02 :

What is the most appropriate flowchart for this conditional statement? **1**

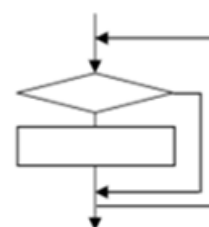
if $(n \geq 0)$ then write ("positive"); else write ("negative");



(1)



(2)



(3)

Exercise 03 :

Write an algorithm that displays the maximum of two entered numbers.

Algorithme Exo3

Var N, M : entier ;

Begin

write ("this program display the mawimum between two numberes entered by the user\n");

write ("enter the first value\n");

read (N) ;

write ("enter the second value\n");

read (M) ;

```

if (N > M) then
write ("the maximum is : ", N) ;
else
if (M > N) then
write ("the maximum is : ", M) ;
Sinon
else (" both numbers are equal\n") ;
end if ;
endif ;
end.

```

Exercise 04:

Draw a flowchart and write an algorithm that ask the user for two numbers m and n and inform him whether their product is zero or positive or negative.

Solution :

Algorithm product

Var m, n : integer;

Begin

Write ("give two numbers \n");

Read(m,n);

If((n>0) and (m>0)) or ((n<0) and (m<0)) **then**

Write ("the product is positive\n");

Else

If(((n>0) and (m<0)) or ((n<0) and (m>0))) **then**

Write("the product is negative\n");

Else

Write ("the product is zero\n");

endif

endif

End

#include <stdio.h>

int main()

{ int m,n;

printf("give two integer numbers \n");

scanf("%d%d",&m,&n);

if ((n==0)||(m==0))

printf (" the product is zero\n");

else

{

if (((n>0)&&(m>0))|| ((m<0)&&(n<0)))

printf (" the product is positive \n");

else

printf ("the product is negative \n");

}

return 0;

}

Exercise 05 :

Write a program that checks whether a number is divisible by 2 and 5 or not, using if-else instruction. After that, you transform it into a program C.

Algorithm ex05

Var x: integer ;

Begin

```

#include<stdio.h>
int main()
{ int x ;
printf("give a number \n");
scanf("%d",&x);
printf("le nombre est %i \n",x%5);
if ((x%2==0)&&(x%5==0))
{ printf(" the number %d is divisible by 2 and 5\n",x);
}else
{printf(" the number %dis not divisible by 2 and
5\n",x);
}
return 0;
}

```

```

Write' »give a number \n ») ;
Read (x);
If ((x mod 2 =0 )and (x mod 5 =0)) then
Write("the number ",x,"is divisible by two
and five \n");
Else
Write ("the number",x ,"is not divisible by
2 and 5 \n");
Endif
end

```

Exercise 06 :

Write an algorithm that requests a real number from the user and displays its absolute value (without using the predefined function).

Algorithme absv

Var a: real;

Begin

Write("give a realnumber \n");

Read(a);

If (a>0) then

Write ("the absolute value of ", a , " is ",a);

Else

Write ("the absolute value of ", a , " is ",a*(-1));

Endif

End.

```

#include <stdio.h>
int main()
{ float a;
  printf("give a real number \n");
  scanf("%f",&a);
  if (a >0)
    printf (" the absolute value of %f is %f
\n",a,a);
  else
    printf (" the absolute value of %f is %f
\n",a,a*(-1));
  return 0;
}

```

Exercise 07 :

Write an algorithm that tests the parity of an integer, that's to say, it displays whether an integer entered on the keyboard is even or odd.

```
#include<stdio.h>
```

```
int main()
```

```
{ int m ;
```

```
  printf("give a numbers \n");
```

```
  scanf("%d",&m);
```

```
if(m %2==0)
```

```
  printf("%d :this number is even \n",m);
```

```
else
```

```
  printf("%d :this number is odd \n",m);
```

```
return 0;
```

```
}
```

Exercise 08 :

Write an algorithm that displays whether a student is admitted or failed, given that its average grade must be between 0 and 20. You have to display that the average grade is incorrect if it is less than 0 or greater than 20.

Algorithme exo08

Var av : real;

Begin

Write (" enter a real value between 0 and 20 \n");

Read (av);

If(av >20)or (av<0) then

Write ("it is incorrect value \n");

```

#include <stdio.h>
int main()
{ float average;
  printf("give a real number \n");
  scanf("%f",&average);
  if ((average >20)||average <0))
    printf (" it is incorrect value \n");
  else
  {
    if ((average >=10)&&(average
<=20 ))
      printf (" you are admitted \n");
    else
      printf (" you are failed \n");
  }
  return 0;
}

```

```

Else
  If (av<=20) and (av >=10)) then
    Write (" the student is admitted \n");
  Else
Write ("the student is failed \n");
End if
Endif
End.

```

Exercise 09 :

A reprography store charges 5 Algerian Dinar for the first 10 photocopies, 4 AD for the next 20 and 3 AD beyond that. Write an algorithm that asks the user the number of photocopies made and displays the corresponding invoice.

```

#include<stdio.h>
int main()
{ int price , nbr ;
printf("give the number of photocopies \n");
scanf("%d",&nbr);
if ((nbr <=10)&&(nbr >=1))
  price = nbr*5;
else
  {
    if ((nbr <=30)&&(nbr > 10))
      price = 50+(nbr-10)*4;
    else
      price = 50+80+(nbr-30)*3;
  }
  printf("the price is %d \n",price);
return 0;
}

```

Exercise 10 :

Write an algorithm that asks you for the current time and displays the time after one second later. For example, if the user types 21, then 32, then 8, second it will be 21 hour(s), 32 minute(s), and 9 second(s). Obviously, the user must enter a valid date.

```

#include <stdio.h>
main()
{ int h, m,s;
printf("give the current time please enter
hour then minutes then secondes \n");
scanf("%d%d%d",&h,&m,&s);
if
(((h<0)|| (h>=24))||((m<0)|| (m>=60))||((s<0)
)|| (s>=60)))
  printf("it is incorrect value \n");
else
  { s=s+1;
  if (s > 59)
    {
      s=0;
      m=m+1;
      if (m > 59)
        {
          m=0;
          h=h+1;
          if (h>23)
            h=0;
        }
    }
  printf("the time will be in one second %d
hour %d minutes and %d second \n",h,m,s);
}
}

```

Exercise 11 :

Give the algorithm which allows you to enter a number and display the day of the week, for example 7 represents Friday.

Exercise 12 :

Same as exercise 11. The same goes for months, for example 1 represents January.

Exercise 13 :

Consider the following C program. Give its equivalent C program using if-else instruction.

```
#include <stdio.h>
main() {
char c; printf("give your marital status"); scanf("%c",&c);
switch (c) {
case 's':
case 'S':
    printf("single"); break;
case 'm':
case 'M':
    printf("married"); break;
case 'd':
case 'D':
    printf("divorced"); break;
case 'w':
case 'W':
    printf("widowed"); break;
default:
    printf("This marital status does not exist"); }
}
```

```
#include <stdio.h>
main(){
char c; printf("give your marital status \n"); scanf("%c",&c);
if ((c=='m') || (c=='M'))
    printf("married\n");
else
    if ((c=='s') || (c=='S'))
        printf("single \n");
    else
        if ((c=='d') || (c=='D'))
            printf("divorced\n");
        else
            if ((c=='w') || (c=='W'))
                printf("widowed\n");
            else
                printf("This marital status does not exist");
}
```

Exercise 14. Write an algorithm that requests a date in the form of 2 integers (day number and month number) and displays the season (eg: 02/12; winter). It will be assumed that the first day of the season is always the 21st.

- Winter will take place from December 21 to March 20
- Spring will take place from March 21 to June 20
- Summer will take place from June 21 to September 20
- Fall will take place from September 21 to December 20.

Note the date number and the month number must be tested if they are correct or no.

Exercise 15. Write an algorithm that checks if a year is a leap year. Remember that there are leap years every 4 years, but the first year of a century is not (1800, 1900 were not leap years) except every 400 years (2000 was a leap year) .

Leap years are years that are:

- Either divisible by 4 but not divisible by 100;
- Be divisible by 400.

Solution :

Algorithm ex15

Var y : integer ;

b : boolean ;

begin

write ("this program test if the year is leap or not \n");

write ("enter a year number ");

read (y) ;

b ← ((a mod 400 = 0) or ((a mod 4 = 0) and (a mod 100 <> 0))) ;

if (b = 1) **then**

write (y, "is a leap year.");

else

write (y, "is not a leap year.");

endif ;

end.