# TP 5: Conditional structures

## 1. the conditional structure If:

The conditional structure **If** is written in C++ language as follows:

**if (**condition**)**

<instructions block>

Or

**if (**condition**)**

<instructions block 1>

**else**

<instructions block 2>

The <instructions block> can be a single statement ending with a semicolon "**;**" or a set of instructions enclosed in braces "**{ }**".

Examples:

| | |
|---|---|
| **if**(Nbr < 0)<br>Nbr = - Nbr; | **If** (A!=B)<br>**{**<br>A=A+2;<br>B=B+1<br>**}** |
| **if**((Nbr%2) == 0)<br>cout << "The number is even";<br>**else**<br>cout<< "The number is odd"; | **if**(A==B)<br>**{**<br>A=A+1;<br>B=B+2;<br>**}**<br>**else**<br>**{**<br>A=A+2;<br>B=B+1;<br>**}** |

We can also nest if-else as follows:

| Nesting in the **if** part | Nest in **else** part |
|---|---|
| **if** (condition1)<br>**if**(condition2)<br><Instruction block 1><br>**else**<br><Instruction block 2><br>**else**<br><instruction block 3> | **if** (condition1)<br><Instruction block 1><br>**else**<br>**if** (condition2)<br><Instruction block 2><br>**else**<br><Instruction block 3> |

**Noticed :**

We can nest as many **if** that we want in the **if part** or in the **else** part.

**Examples:**

| | |
|---|---|
| Example 1 | **if**(X != 0)<br>**if**(X < 0)<br>cout <<"X is negative";<br>**else**<br>cout<<"X is positive";<br>**else**<br>cout<<"X is null"; |
| Example 2 | **if**(X == 0)<br>cout<<"X is null";<br>**else**<br>**if**(X < 0)<br>cout<<"X is negative";<br>**else**<br>cout<<"X is positive"; |

**Question :**

What is the difference between the two examples?

Practically there is no difference, it is just a change in possible test priority.

**Noticed :**

We can have ambiguity because of such nesting, here is an example:

| Program | Interpretation 1 | Interpretation 2 |
|---|---|---|
| **if**(A!=B)<br>**if**(A>B)<br>x=x+1;<br>**else**<br>x=x+2; | **if**(A!=B)<br>  **if**(A>B)<br>  x=x+1;<br>**else**<br>x=x+2; | **if**(A!=B)<br>  **if**(A>B)<br>  x=x+1;<br>  **else**<br>  x=x+2; |

In C++ language, the "else" corresponds to the closest if which does not have an **else**.

So our example program corresponds to interpretation 2.

If we want the "else" to correspond to the first "if" we must use the braces "{ }" as follows:

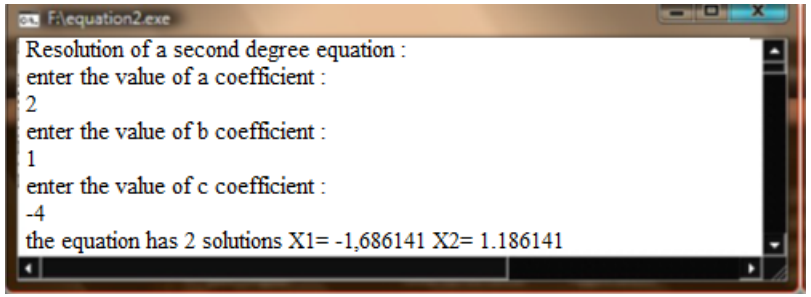
```
if(A!=B)
{
  if(A>B)
   x=x+1;
}
else
x=x+2;
```

## Exercise 1 :

Write a C++ program that reads three variables A, B and C then displays these three variables (values) in ascending order.

## Exercise 2:

1) Write a C++ program which asks the user for the coefficients a,b,c of a second degree equation $aX^2+bX+c=0$, then calculates and displays the solutions of this equation, the execution should be as follows :




2) modify the previous program so that it even accepts the first degree equation.