PW Sheet N° 3

Part 1: The Conditional Statement

Comparing Two Numbers

The following program prompts the user to enter two numbers, compares them, and then displays them in ascending order using a simple conditional statement.


```
#include <stdio.h>
int main()
{
float x, y;
printf("Please enter a real number on the keyboard\n");
scanf("%f", &x);
printf("Please enter another real number on the keyboard\n");
scanf("%f", &y);
if (x<y)
printf("%f, ‘ ‘,%f" , x,y);
if (x>=y)
printf("%f, ‘  ‘,%f" , y,x);
return 0;
}
```

a. Create a new project.
b. Type this code, then compile and run.
c. Improve this program to display the two integers in order, using only one comparison.

Concluding remarks

1. The conditional statement in the C programming language is implemented using the ***if*** statement, which is written as follows:

```
if (condition)
    {
        /* Instruction_Block */
    }
```

2. The instruction block will be executed only if the condition is met.
3. In the case of the alternating conditional instruction, if the condition is false, another block of instructions is executed. It is written as follows:

```
if (condition)
      {
          /* Instruction_Block 1*/
       } ;
else
      {
          /* Instruction_Block 2*/
        }
```

Part 2: The multiple-choice conditional instruction

A menu in a restaurant

A restaurant requests that you program the following menu to be offered to customers upon arrival:

```
Welcome to our restaurant
Press 1 to choose the Fish menu
Press 2 to choose the Meat menu
Press 3 to choose the Vegetarian menu
Type 4 to Exit
```

If the user types 2, your program should display the following

```
You have chosen the Meat menu
Enjoy your meal
```

However, if the user types 4, your program should display the following

```
Goodbye !
```

a. Create a new project.
b. Write the corresponding code, then compile and run.

Concluding remarks

1. To avoid nested if statements, C has a switch statement that can be used to explore multiple cases at once. The syntax of the switch statement is as follows:

```
 switch ( expression ) {
case constante1 :
          /* Instruction_Block1*/ ;
           break ;
case constante2 :
          /* Instruction_Block 2*/ ;
```

```
            break ;
...
case constant_i :
            /* Instruction_Block i*/ ;
            break ;
...
[default :
            /* Instruction_Block */;]
}
```

2. ***expression*** is generally an evaluable variable or expression.
3. Cette instruction exécute le bloc d'instructions correspondant à la valeur de l'expression. Le cas échéant, elle exécute le bloc d'instructions correspondant à default, s'il existe.

Comparison operators in C language

Relational Operators		Suppose X and Y are two variables
Operator	**Expression**	**Description**
<	X < Y	X is less than Y
<=	X <= Y	X is less than or equal to Y
>	X > Y	X is greater than Y
>=	X >= Y	X is greater than or equal to Y
==	X == Y	X is equal to Y
!=	X != Y	X is not equal to Y

Part 3 : Application Exercises

1. Write and code in C an algorithm that reads three positive non-zero numbers and prints the minimum.
2. Write a C program that reads the three components of a time (hour, minute, second) from the keyboard, displays the time read in the format hour:minute:second, and then displays the time that it will be one second later, in the same format. (Algorithm done in Class Session)
3. Write a program in C language that solves a quadratic equation.

4. Write a C program that reads the coordinates of the two endpoints of a line segment, then reads the coordinates of a point in the plane and determines whether the point lies on the segment.
5. Write a C program that allows the user to enter three digits, A, B, and C, where each digit is a number between 0 and 9. The program should then calculate and display the largest number that can be formed using the three digits, in base 10.
6. A library charges 5 DA for the first 10 photocopies, 3.5 DA for the next 20, and 1.50 DA for all photocopies beyond that. Write a C program that asks the user for the number of photocopies and displays the corresponding amount (price).

7. Write a C program that prompts the user to enter a number representing a sum of money in DA less than 100 DA. The program should calculate and display the minimum number of coins of 50 DA, 20 DA, 10 DA, and 1 DA that make up the sum.
8. The body mass index (BMI) is an index used to assess the health risks associated with being overweight or underweight. BMI is used to estimate a person's corpulence, and is calculated on the basis of height and mass using the following formula:

   BMI = Weight/Height^2

BMI	Interpretation (according to the WHO)
less than 16,5	Severely Underweigh
16,5 to 18,5	Underweigh
18,5 to 25	Normal weight
25 to 30	Overweight
More than 30	Obesity

   BMI is interpreted according to the criteria defined by the World Health Organisation.

   Write a program in C language to calculate and display a person's BMI, and its interpretation.
9. Write a C program that performs addition (+), subtraction (-), multiplication (*), or division (/) on two numeric values, depending on the user's choice.

   Instructions: The user must enter the two numbers and the operator.
10. Write a C program that reads a date in the format 15/09/2012 and displays it in the following format: 15-September-2012.