TD N°01
First year engineering

Exercise 01

1. What does this program do ?

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

int main()
{
   int x, y;  // deux variables de type entier.
   double z;  // une variable de type réel.
   printf("Donner la valeur de x\n"); // ........
   scanf("%d", &x);  // ..........................
   printf("Donner la valeur de y\n"); // ........
   scanf("%d", &y); // ..........................
   z = x/y; // ..................................
   printf("La valeur de z est : %lf", z\n"); // .
   return 0;
}
```

2. Completed in front of each comment.

Exercice 02

1. Write a program that asks the user for the size of a screen in inches and converts it to centimeters (cm). Knowing that 1 inch = 2.54 cm.
2. Write a program that asks the user for the duration of his journey in hours and converts it first into minutes and then into seconds.
3. Write a program that requests a temperature Tc, expressed in degrees Celsius, and converts it into degrees Farenheit Tf , knowing that: Tf = Tc ∗ 1.8 + 32.
4. Write a program that requests an amount in Algerian Dinar and the exchange rate in Euro, then calculates the equivalent amount in Euro.

Exercise 03

Based on the program from the previous exercise, propose a program that swaps and displays the values of two variables X and Y entered by the user.

For example, if the user enters

X ← 3 and Y ← 5,

the program will display X = 5 and Y = 3.

Exercise 04

Write a program that asks the user for his year of birth and then calculates his age.

Write a program that calculates the final grade for the IT subject, knowing that the final grade is calculated by the following formula

Note_Finale = (T P +CC+Examen∗2)/4.

Exercise 05

1. To calculate my ideal weight, I have chosen the formula of

Monnerot-Dumaine

formula: Poids_ideal = (Taille-100+4∗Circonference_poignet)/2.

Compared with other formulas used to calculate ideal weight, this one gives a result closer to reality, since it takes into account bone and muscle mass by introducing the circumference of the wrist.

Write a program to calculate ideal weight. Note that height and wrist circumference are expressed in (cm) and weight is calculated in (Kg).

2. In 1997, the World Health Organization defined the Body Mass Index (BMI) as the standard for assessing the risks associated with being overweight in adults.

BMI is used to estimate a person's corpulence, and is calculated as a function of height and mass using the following formula:

BMI = Weight/Height^2

IMC = Poids/Taille^2

Write a program to calculate the Body Mass Index (BMI).

Travaille à domicile et à rendre.

1. Write a program that calculates and displays the distance D between two points A and B in the plane whose coordinates (XA, YA) and (XB, YB) are supplied by the user.
2. Write a program that asks the user for the radius R of a cylinder's base and its height H, and calculates :
its area, knowing that the area of a cylinder is equal to 2π multiplied by the radius of the base and by the height.
its volume, knowing that the volume of a cylinder is equal to π multiplied by the radius of the base squared and by the height.

3. The energy of an n-level atom of a hydrogenoid (i.e. an atom with a single electron) is given by the formula :

$$E_n = -\frac{Z^2}{n^2} \cdot E_0.$$

- Write a program that asks the user for the atomic number of the atom (Z) and the level concerned (n), and buys the energy of the level. E0 is a constant, so its value is not requested from the user (take E0 = 13.6 eV).

Note: Take care with inputs and outputs (messages when requested, relevant display of results, with units).