PW1
Repeating structures and control structures

Exercise 1:

You deposited € 1000 in your favorite bank, and you want to know how this money will evolve over five years. Each year it brings 4.5% interest.

FOR (initialization; condition; transition) { instructions }

Exercise 2:

We slightly modify our problem. You deposited € 1000 in your favorite bank, and you want to know how many years it will wait for the obtained capital exceeds € 1,500.

You will use a WHILE loop to indicate that as the capital does not exceed € 1,500 we must wait one more year. The structure of such a loop is:

WHILE (condition) { instructions }

Exercise 3: (upload from AREL the file exo3.java)

The CAC 40 index is determined continuously from the curves of the 40 pricing stock (action) on the first market (Paris Bourse). The CAC 40 index is updated every 30 seconds during the day. So it gives you continuously, an idea of the evolution of the market. For memory, the CAC 40 was defined with the value 1,000 on the 31/12/87, and for guidance, the CAC 40 has evolved since its creation as follows.

year	1990	1992	1994	1996	1998	2000	2002	2004	2006	2008
value	1517,93	1757,78	1981,1	2215,73	2942,66	3558,32	4063,91	4521,16	5101,76	?

1- Show the data table from 1990 to 2008 as it was given above
2- Calculate the coefficient of correlation of the data between 1990 and 2006
3- Calculate the correlation coefficient between 1990 and 1996 and between 1998-2006 (what can we conclude?)
4- Give the linear regression for the period 1998-2006
5- In taking into account this period, estimate the value for 2008

Remarque: the regression linear expression has the form $y = ax + b$
a = the slope oh the line
b = the constant term (ordinate at the origin)

calculating the average x and y

$$\bar{x} = \frac{x_1 + x_2 + .. + x_n}{N} = \frac{1}{N}\sum_{i=1}^{N} x_i$$

calculating the regression oefficient *a*

$$a = \frac{\sum_{i=1}^{N}(x_i - \bar{x}) \cdot (y_i - \bar{y})}{\sqrt{\sum_{i=1}^{N}(x_i - \bar{x})^2}}$$

then the offset b is determined

$$b = \overline{y} - a\overline{x}$$

the correlation coefficient is given by

$$r_p = \frac{\sum_{i=1}^{N}(x_i - \bar{x}) \cdot (y_i - \bar{y})}{\sqrt{\sum_{i=1}^{N}(x_i - \bar{x})^2} \cdot \sqrt{\sum_{i=1}^{N}(y_i - \bar{y})^2}}$$