Exercise no. 1:
The „Simpson‘s 3/8“ rule belongs to the family of the Newton-Cotes formulas. It is applied on three consecutive strips and its formula looks like:

$$\int_{x_0}^{x_3} f(x)dx \cong \frac{3}{8}h(f(x_0)+3f(x_1)+3f(x_2)+f(x_3))$$

where $h = x_1 - x_0$

Write a program which implements iteratively the Simpson‘s 3/8 rule (subdividing more and more the strips) to evaluate the value of the integral

$$\int_{-1}^{1} \log(1+x^2)\sqrt{(\cos(x))}dx$$

with a precision of 10^{-6}

$$\left(\quad |I(iteration\_n) - I(iteration\_n+1)| < 10^{-6} \quad \right)$$

Exercise no. 2:
Stickers are being sold in packs of 5 for 1 sFr. Each sticker has a number on it which ranges between 1 and 200. In each pack, there are five random but non-identical stickers.

You want to collect these stickers and fill an album which has places for all the 200 stickers. How much money are you going to spend in order to fill your album in such a way that each sticker appears at least once.

Use the “rand” random number generator to simulate the filling of the album. For each packet you have to extract 5 non-identical integer numbers from a uniform distribution in the range [1,200]. You buy more and more packs until you fill the album (this means, all the numbers from 1 to 200 are extracted at least once). Count the total number of money spent.
Repeat the simulation 1000 times to calculate average, maximum and minimum amount of money spent.