# Intensive Computation

## 8th march 2016

**Exercise 1**

Write a script *MyScript* that:

- Create a matrix A 10x10 of random values
- Visualize the matrix A with command `imagesc` in the first subwindow of a grid 2x3
- Apply command `sort` to A and visualize the resulting matrix A1 with command `imagesc` in the next subwindow
- Apply command `reshape` to A1 to obtain a matrix with 2 rows, and visualize the resulting matrix AA with command `imagesc` in the next subwindow
- Repeat these 3 steps on B obtained as the transpose matrix of A
- Finally, **in a new window**, plot with different colours the 4 graphs obtained by using matrix AA and BB divided into two halves, and considering values in the first row of AA and BB as abscissas (reordered by command `sort`) and values in the second row as ordinates. Include the legend, the name of the axis and the name of the figure.

**Exercise 2**

- Write a script that create a matrix M nxn, with n>10, consisiting of random integer values in the interval [100,199]
- Write the **function ExtractRows** that extracts k rows from M starting from a given index i and return the k rows in a matrix K
- Write a **function** that swap k rows selected by calling the function **ExtractRows** with the last k rows
- **remark** avoid superimposition of the sets of rows that are swapped by imposing limitations to the values of k and the index i

**Exercise 3**

- Write a script that create a matrix M nxn, with n=10, consisiting of random in the interval [-10,10]
- Consider the 5 submatrix 2x2 in the first 2 rows and swap these submatrices with submatrices 2x2 along the diagonal.

**Exercise 4**

Use `meshgrid` to obtain the 3-D representation of the function $f(x,y) = x^6 + (ky)^6 * e^{(-x^2-(ky)^2)}$ where (x,y)∈[-2,2]x[-2,2] and the scale grid is equal to 0,1.

Visualise the graph in different sub-windows for different values of `k` by using the statements `mesh`, `surf`, `surfl` and `contour`.
For example create a grid of 4 rows, each for a different plot command, and 5 columns, for k=1:1:5.

Try the command `getframe` and `movie` to create an animated sequence when the value of k varies.