Tutorial - 1

In this tutorial, you will use one of the programming languages that you are familiar with such as C or FORTRAN and try to run the given codes for the following:

1. Consider random matrices A and B of size $N \times N$ (user input), computationally prove that $(AB)^T = B^T A^T$.
2. Consider a random matrix A of size $N \times N$ (user input), numerically show that $(A + A^T)$ is symmetric.
3. Adapt the function to *multiply two matrices* to perform a *matrix* $(N \times N)$ *vector* $(N \times 1)$ *product*. Plot the time taken as a function of N for $N = 256$, $N = 512$, $N = 1024$ and $N = 2048$.

Linux basics

- `vi, vim, gedit, emacs, xemacs` – Editors to write and navigate code.
- LaTeX – Compile tex documents
- `Libre office` – Document writer, spread sheets and presentations.

Simple programs in `C/C++/Fortran`

1. Basics
   - Your first program
2. Array operations
   - Create and retrieve elements
   - Array addition
   - Dot product
3. Matrix operations
   - Create and retrieve elements
   - Matrix Addition
   - Matrix Multiplication

Plotting tool – `gnuplot`

- Line plot
- `Document viewer` – viewer for images, pdf files etc.