# 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 a random matrix $A$ of size $N \times N$ (user input), numerically show that $(A + A^T)$ is symmetric.

2. 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 $N = 64, 128, 256$ and $512$.

## Linux basics

- `vi, vim, gedit, emacs, xemacs, vscode, gedit` – Editors to write and navigate code.
- LaTeX – To typeset 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.