## Computational Physics Assignment 4: Inverse Matrix

**(1)** Generate a square matrix $A$ with 20 rows and columns. Choose the values of the elements randomly in range $[0, 1]$ using the function `random` from library `random` using a given random number generator seed. (A code that performs this is enclosed. Additional instructions will be provided during the next lecture and lab sessions). The value of the seed used in your calculations has to be provided in your report.

**(2)** Find the inverse matrix $A^{-1}$ using the $LU$ decomposition method with pivoting.

**(3)** Check the accuracy of your calculation by assessing the value of $A \cdot A^{-1}$.

**(4)** Calculate the condition number of matrix $A$. Asses weather your system is well-conditioned.

**(5)** Asses weather the accuracy of your calculation of $A^{-1}$ is consistent with the value of the condition number of matrix $A$.

**(6)** Calculate $A^{-1}$ again with function `inv` from library `numpy.linalg`. Compare the computational efficiency of your implementation and that of the function `inv`. Which method is faster? Explain the difference.