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**Subject / Course : “Python for Data Science”**

This document is part of the submittals for “Lab Exercise No – 3 (Question No 25)”

**A short note on : Numpy**

Numerical python shortly called as “Numpy”, is a library supported by python that uses multi-dimensional arrays (ndarrays) as means to do numerical computations. Multi-dimensional “ndarrays” are an efficient means of providing fast array oriented arithmetic operations also called “vectorized operations” (similar to MATLAB / Octave).

The key reason “Numpy” is so popular and important is because it is designed for efficiently handling large arrays of data in numerical computations. The operations by Numpy array, perform complicated and intricate operations / computations on entire arrays obviating the need for less efficient “for-loops”. Numpy internally stores data in continuous blocks of memories that adds to its efficiency. Numpy library of algorithms is written in ‘C’ – language that can operate on these continuous memory with out any need for type checking. Also, Numpy arrays use far lower memory than other python data types.

The efficient multidimension ndarrays provide flexible broadcasting capabilities which prove to be very useful in efficient manipulation of large subsets of data. Numpy supports several mathematical domains including linear algebra, statistics, random numbers, fourier series, etc.,. Numpy can also be interfaced with C, C++, Fortran libraries using a C-API that provides access to huge gamut of mathematical functions, thus resulting in harnessing the efficiencies / speeds that match those languages (C/C++/Fortran, etc.,).