

Birla Institute of Technology and Science, Pilani, Hyderabad

Campus

MACHINE LEARNING FOR ELECTRONICS ENGINEERS LAB

Experiment 1

Introduction to Python using Google Colab

In today's lab, you are going to learn the following

- Getting started with the basics of Python using Google Colab
- Creating and displaying the variables of different data types and performing arithmetic operations
- Create an array and perform array operations using the numpy library.
- Data visualization using different types of plots with the matplotlib library

Q1. Write a Python code to print the following

- a) “Hello, Machine Learning world”
- b) “Welcome to Python”
- c) Try to run the command “print (5+3)” and observe the result, similarly run “print (10+2)”, “print (20*3)”, “print (40/2)”, and observe the results.

Q2. Consider the following different data types assigned to variables given on the left-hand side (type them as they are given below in the Colab cell).

i) Using “print” and “type” Python commands, display the data types of the following variables.

- a) text_data= “Machine Learning”
- b) x= 42

- c) `y= 3.14159`
- d) `true_false = False`

ii) Declare a variable 'age = ' and 'name = ' like you did above. Take any number in the age variable and any string in the name variable. Print the following: "Hello, my name is ____, and my age is ____". In the blanks, whatever name and age you have given should be displayed.

Q3. Write a Python code to perform the following

- a) Add the numbers 15 and 25 and save it in a variable x. Print the result saved in variable x as "Addition = 40".
- b) Subtract 20 from 50 and save it in a variable y. Print the result saved in the variable y as "Subtraction is: 30".
- c) Multiply 4 and 7 and save it in a variable z. Print the result saved in the variable z as "Multiplied value is: 28".
- d) Divide 20 by 4 and save it in a variable v. Print the result saved in the variable v as "Result of the Division is= 5".

Q4. Array operations in Python using numpy

Note: You need to import the numpy library. For example, you can import it as follows "import numpy as np" and use it for the following problems

- a) Create a 1D data array `x = [1 2 3 4 5]`. Compute the mean and standard deviation of the 1D array x using the numpy library in-built Python commands.
- b) Create a 2D data array matrix as shown below

$$Matrix = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \end{bmatrix}$$

Find the mean and standard deviation of (i) all the elements of the 2D array, and (ii) for all the elements of the first row.

c) Create a 1D column and row array separately containing 6 elements with all the values as 1, and a 2D array of size (3×4) with all the values as 1. *Note: Use the numpy library in-built Python command.*

d) Create two different matrices of size (3×3) of your choice. Perform matrix multiplication and element-wise multiplication separately and display the results.

Q5. Data visualization by plotting

Note: You need to import the matplotlib library and use it for the following problems (for example, import matplotlib.pyplot as plt)

Generate the following array $x = [2, 4, 6, 8, 10]$, $y = [8, 16, 24, 32, 40]$.

a) Create a scatter plot between x and y, choose figure size (8,5), plot the elements of the array as filled/solid circles, and show the grid lines.

Give the figure title as 'Scatter plot', x-axis label as 'x-axis', and y-axis label as 'y-axis'.

b) Create a straight-line plot between x and y, choose figure size (8,5), plot the elements of the array as a star symbol, and show the grid lines. Give the figure title as 'Simple line plot', x-axis label as 'x-axis', and y-axis label as 'y-axis'.