Week 1: Lab 1 A Quick Refresher on Python

In this lab session, we will work on python programming. We will first install python environment and then we will work on a number of programming tasks.

1. Part A: Installation

Please skip this part in case if a python has already been installed on your machines.

Windows Installation

Here are the steps to install Python on Windows machine.

- Open a Web browser and go to https://www.python.org/downloads/.
- Follow the link for the Windows installer *python-XYZ.msi* file where XYZ is the version you need to install.
- To use this installer *python-XYZ.msi*, the Windows system must support Microsoft Installer 2.0. Save the installer file to your local machine and then run it to find out if your machine supports MSI.
- Run the downloaded file. This brings up the Python install wizard, which is really easy to use. Just accept the default settings, wait until the install is finished, and you are done.

2. Part B: Programming Exercises

There is a list of 20 programming tasks which you need to implement using Python.

1. Write a python program to add two numbers with user input.
2. If a=10, b=120, and c=160 are three sides of a triangle then write a python program to estimate the area of a Triangle using.

$$\mathbf{s} = \frac{\mathbf{a} + \mathbf{b} + \mathbf{c}}{\mathbf{2}} \quad \textbf{and} \quad \textbf{Area} = \sqrt{\mathbf{s}(\mathbf{s} - \mathbf{a}) \times (\mathbf{s} - \mathbf{b}) \times (\mathbf{s} - \mathbf{c})}$$

3. Write a python program to solve the quadratic equation, with a=2, b=5, and c=40. You may need complex math module libraries (cmath).

$\mathbf{ax^2+bx+c=0}$, where a, b, and c are real numbers and $\mathbf{a \neq 0}$

4. Write a python program to find the factorial of a number 10.
5. Write a python program to display the multiplication table of number 10.
6. Write a python program to print the Fibonacci sequence.
7. Write a python program to find the HCF or GCD.
8. Write a python function to find the LCM
9. Write a python functions for different set operation e.g., union, intersection, difference, and symmetric.
10. Write a python program to find the resolution id JPEG image.
11. Write a python program to find the transpose of a matrix.
12. Write a python program to compute the pairwise Euclidean distance between two numbers. The function takes two numbers in pairs (for example, (100,120)) and returns the Euclidean distance between them.
13. Write a python program to create an object e.g., Enum and display a member name and value.
14. Given a list of numbers, write a python function to return True if first and last number of a list is same.
15. Write a python function that takes three input variables and returns the largest of the three. Please do not use max() function.
16. Write a python code to find the cube of a number *n*. The function takes a number *n* returns the cube of this number.
17. Write a python program to compute the dot product of two sparse vectors.
18. Write a python program to show the list of those numbers or elements which are added at the even positions.
19. Given two strings (e.g., S1=``America" and S2=``Japan"), write a python program that returns a new string made of the first, middle, and last char each input string
20. Write a python program that arranges string characters such that lowercase letters comes first

3. Part C: Read AI and Its Role in Near Future Paper