**Artificial Intelligence**

**Lab Manual**

**BIT 360**

**Lab Assignment - 1 [10 pts]**

Due: 17th Jan, submission at Google Classroom

1. Write a python program (menu driven) that asks for an operation to be performed on two input numbers. Operations are add, subtract, divide, multiply. The program should keep asking for options on new numbers until the user specifies explicitly to exit. Also handle the scenario of divide by zero through exception handling in python. [1 pt]
2. Write a python program that takes a sentence as input from the user and reverses the words in the sentence. Eg. If the sentence is 'Welcome to AI lab', then the output should be 'lab AI to Welcome'. (Use list and string data structures) [1 pt]
3. Write a python program that reads text from an input file (use your own input text file, it should contain at least 5-6 small sentences) and counts the number of times each alphabet is appearing in it, and displays the frequency of the occurrence of each alphabet. (Use dictionary data-structure to solve it) [2 pts]
4. Write a python program to find the square root of a given number (n) within a given precision (p). Do not use any predefined library. (Take a guess, compute error at each successive step, until error is less than given precision) Example values of n are 10,15, 45, etc. Example values of p are 0.1, 0.05, 0.01, etc. [2 pts]
5. Find the minimum value of a function y = (x+3)2. Write a python program to find the minimum value, use the numerical method described in [this](https://www.datasciencecentral.com/profiles/blogs/optimization-techniques-finding-maxima-and-minima) link. [2 pts]
6. Create a suitable class in python to represent the mathematical concept of '1-D vector' (use list data structure to represent 1-D vector). Create appropriate member variables and member functions of this class to perform operations: Length of vector, Cosine similarity between two vectors, Euclidean distance between two vectors. [2 pts]

**Answer all the above questions in a single jupyter notebook.**

**Rename your solution notebook file in the format: <assignment-number>\_<first-name>\_<first three digits of enroll number>.ipynb file**

**eg. 1\_Aarushi\_040.ipynb**