Institute for Advancing Intelligence, TCG CREST
(TCG Centres for Research and Education in Science and Technology)

Introduction to Programming and Data Structures, 2023-24, Semester-II
Assignment 04

Maximum Marks: 150
Topic: using Linked list

Submission Deadline: **2023-Oct-01**
Clarification Deadline: **2023-Sep-29**

[**AP0401**:] *Large large number operations:*

- **Problem:** Create a C program that implements large number (integer) operations using linked lists in C. The operations should include:
  1. Addition:
  2. Subtraction
  3. Multiplication
  4. Division
  5. Factorial

  The first four functions, given two large number, returns another large number which is the result of the corresponding operations. The fifth function takes only one input.
- **Input:** From a file "`input_0401.txt`".
  - The first line contains number of test cases, say n
  - second line onward, each of the n lines contains three things– $num1$ op and $num2$, separated by spaces.
  - Here, $num1$ and $num2$ are integers having up to 100 digits. $op \in \{+, -, *, /, !\}$
  - Note that, when op is !, $num2$ will not be present
  - Though inputs have maximum lengths, the functions should be able to handle numbers of any size.
- **Output:** Just display the outputs in the terminals.
- **Suggestions:** (It is not mandatory to follow)
  - To represent a large integers, a structure called `LargeInt` can be made that stores information like sign, storage, etc.
  - Write a function to print a large number in the terminal.
  - Read the numbers from the input file as strings, then convert them to large number. The function can be like `LargeInt` ← `string_to_large_number(char` *inpStr*`)`

[150]

Note: For bad indentation or inappropriate name of files, variables, etc., 10% marks will be automatically deducted.