**Name:** Saira Irshad  
**Section:** BSAI-3B  
**Subject:** Artificial Intelligence (Lab)  
**Submitted To:** Sir Rasik Ali

**1. LUHN Algorithm**

The Luhn Algorithm is a simple mathematical formula used to validate credit card numbers and other identification numbers.

* Steps:

1. Process the digits from right to left.
2. Double every second digit.
3. If the result is greater than 9, add the digits of the result (e.g., 12 → 1 + 2 = 3).
4. Add all the digits together.
5. If the total is divisible by 10, the number is valid.

**2. Remove Punctuations from String**

The purpose of this program is to clean text by removing unwanted characters called punctuations.

When we write natural text, it often includes commas, full stops, question marks, and other special symbols. Computers may face difficulties in processing text if these symbols are present. Therefore, they are removed first to prepare the text for analysis.

Common punctuations include: ! , . ? ; : ' " - ( ) [ ] { } etc.

Example:

Input: "my!!! name, is: saira; irshad???"

Output: "my name is saira irshad"

This technique is widely used in Natural Language Processing (NLP), Machine Learning Models, and Search Engines to prepare clean data.

**3. Sort a Sentence Alphabetically**

This program is used to sort the words of a sentence in alphabetical (dictionary) order.

* Process:

1. Break the sentence into words using split().
2. Compare each word and arrange them alphabetically.
3. Join the words back into a sorted sentence.

* **Applications:**

1. Creating dictionaries
2. Indexing words
3. Search engines and text organization

**Example 1:**

Input: "Artificial Intelligence is powerful"

Words: [Artificial, Intelligence, is, powerful]

Sorted: "Artificial Intelligence is powerful" (already sorted)

**Example 2:**

Input: "my name is Saira"

Words: [my, name, is, Saira]

Sorted: "Saira is name my"

This makes text more organized, structured, and easier to process for both humans and computers.

## ****3. Sort the Letters of a Sentence Alphabetically****

This program is used to **sort all the letters of a sentence in alphabetical (dictionary) order**.

### ****Process:****

Take the sentence as input.

Remove spaces (so only letters are sorted).

Arrange all the letters in alphabetical order.

Join them back to form the sorted string.

### ****Example 2:****

Input: "my name is Saira"

Letters: [m, y, n, a, m, e, i, s, S, a, i, r, a]

Sorted: "Saaaeeiimmnry"