Pre-screening qualification test (AI & ML Fundamental)

- In your own words, explain what machine learning is and how it differs from traditional programming.

- Consider a situation in your everyday life where machine learning could offer valuable assistance. Describe a practical use case for applying ML and elaborate the benefits that such an application might bring.

(The purpose of questions 1 and 2 is not to evaluate the students directly but to give them a chance to read and conduct some research about the ML concept in general and why it is useful. It provides the interviewer an opportunity to find out if the candidate has basic knowledge and enough motivation for the course.)

- Create a Python function that encodes a list of characters into positional integers based on a given reference list. The function should take two parameters: **reference** (a list of characters serving as a reference) and **input_list** (the list of characters to be encoded). The function should return a dictionary where each character from the input list is mapped to its corresponding positional integer in the reference. Apply all the necessary sanity checks to avoid getting any runtime error. Explain your solution.

  reference= ['A','B', 'C', 'D', 'E', 'F]

  input_list = ['B','E']

  return => {'B':1, 'E':4}

(covered concepts: function, list, indexing, mapping, error handling,)

- Load the provided dataset ('dataset.csv') into a Python DataFrame using a library such as Pandas. Answer the following questions based on the loaded dataset.

  - ❖ Explorer the dataset. Find the datatype, minimum & maximum values of each column.
  - ❖ For each column, what is the percentage of non-zero values
  - ❖ Create a new column 'Sum' representing the sum of values across all columns for each row.
  - ❖ Plot a bar chart showing the percentage of non-zero values for each column.
  - ❖ Optionally, apply an analysis of your choice to discover and highlight the characteristics of the dataset.

(covered concepts: Pandas, row specific question, sparsity, visualization, manipulation)