CST2\_4

LONG QUIZ

NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**PROGRAMMING PROBLEMS:**

**Problem 1**

**Objective:** Write a MATLAB script that reads data from an Excel file and writes specific information to a

text file.

**Instructions:**

1. **Read Data from Excel File:**
   * Create an Excel file named data.xlsx with the following columns: ID, Name, Score.
   * Populate the file with at least 10 rows of data.
2. **Process the Data:**
   * Read the data from the Excel file into MATLAB.
   * Calculate the average score of all entries.
   * Identify the entry with the highest score.
3. **Write Data to Text File:**
   * Create a text file named output.txt.
   * Write the following information to the text file:
     + The average score.
     + The ID and Name of the entry with the highest score.

**Example Data in**data.xlsx**:**

| **ID** | **Name** | **Score** |
| --- | --- | --- |
| 1 | Alice | 85 |
| 2 | Bob | 90 |
| 3 | Charlie | 78 |
| … | … | … |

**Expected Output in**output.txt**:**

Average Score: 82.5

Highest Score: 90

ID: 2

Name: Bob

**Hints:**

* Use the readtable function to read data from the Excel file.
* Use MATLAB functions to calculate the average and find the maximum score.
* Use the fopen, fprintf, and fclose functions to write data to the text file.

**Problem 2: Analyzing Sales Data**

**Objective: w**rite a MATLAB script that reads sales data from an Excel file, processes the data, and writes the results to a text file.

**Details:**

1. **Input Excel File**:
   * The Excel file is named sales\_data.xlsx.
   * It contains a sheet named Sales with the following columns:
     + Date (in dd-mm-yyyy format)
     + ProductID
     + QuantitySold
     + UnitPrice
2. **Processing Requirements**:
   * Calculate the total sales for each product (i.e., TotalSales = QuantitySold \* UnitPrice).
   * Determine the total quantity sold for each product.
   * Identify the product with the highest total sales.
3. **Output Text File**:
   * The output should be written to a text file named sales\_summary.txt.
   * The text file should contain the following information:
     + Total sales for each product.
     + Total quantity sold for each product.
     + The product ID with the highest total sales and the corresponding sales amount.

**Example:**

If the Excel file contains the following data:

| **Date** | **ProductID** | **QuantitySold** | **UnitPrice** |
| --- | --- | --- | --- |
| 01-01-2024 | P001 | 10 | 15.00 |
| 02-01-2024 | P002 | 5 | 20.00 |
| 03-01-2024 | P001 | 7 | 15.00 |
| 04-01-2024 | P003 | 8 | 25.00 |

The output text file should look like this:

ProductID: P001, Total Sales: 255.00, Total Quantity Sold: 17

ProductID: P002, Total Sales: 100.00, Total Quantity Sold: 5

ProductID: P003, Total Sales: 200.00, Total Quantity Sold: 8

Product with Highest Sales: P001, Sales Amount: 255.00

**Problem 3:** Data Visualization

**Problem Statement.** You were given an Excel file named CS PEC 3 data.xlsx that contains a dataset with multiple columns. Your task is to write a MATLAB script that performs the following operations:

**port Data**: Read the data from the Excel file into a MATLAB table.

**Data Processing:** Perform basic data processing tasks such as:

Calculate the mean of each numeric column.

Identify and count the number of missing values in each column.

**Data Visualization:** Create a plot to visualize one of the columns.

Requirements

Import Data: Use the readtable function to import the data from data.xlsx.

Data Processing: Calculate the mean of each numeric column using the mean function.

Identify missing values using the ismissing function and count them using the sum function.

Data Visualization:

Create a bar plot of one of the numeric columns using the bar function.

Your script should:

Import this data into a MATLAB table.

Calculate the mean of Value1 and Value2.

Count the number of missing values in Value1 and Value2.

Create a bar plot of Value1.

**ESSAY: you can expand the space for your answers.**

Watch this youtube video: **Visualizing Data | Data Science Tutorial in MATLAB, Part 4**

* + 1. Describe the different types of plots demonstrated in the video. How can each type of plot be used to visualize different kinds of data effectively?
    2. Explain the process of creating a line plot in MATLAB as shown in the video. What are the key steps and functions used, and how can you customize the plot to enhance its readability?
    3. Discuss the importance of data visualization in data science. How does the video illustrate the use of MATLAB for visualizing complex datasets, and what are the benefits of using MATLAB for this purpose?
    4. How can geo bubble plots be used to represent geographical data? Provide an example from the video and explain the steps involved in creating such a plot in MATLAB.
    5. What are some best practices for data visualization mentioned in the video? How can these practices improve the clarity and impact of your visualizations?
    6. Reflect on the use of bar plots in the video. How are bar plots created in MATLAB, and what types of data are they best suited for visualizing?

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