**1. Solve System of Linear Equations**

1.1. Solve for x, y & z where:

Eq1 : x - y + z = 4 | Eq2 : 2x + y - 3z = 0 | Eq3: x + y + z = 2

**2. Create & Update Dictionary**

2.1. Create a Dictionary 'car\_dict' with following Information:

|  |  |  |
| --- | --- | --- |
| **Car** | **Drive\_Type** | **Car\_Size** |
| ABC | Manual | Medium |
| DEF | Automatic | Small |
| GHI | Automatic | Medium |
| JKL | Manual | Large |
| MNO | Manual | Small |
| PQR | Automatic | Small |
| STU | Manual | Medium |

2.2. Update the Dictionary 'car\_dict' with following Information:

|  |
| --- |
| **Horsepower** |
| 180 |
| 150 |
| 250 |
| 300 |
| 220 |
| 200 |
| 180 |

**3. Create Update & Subset Dataframe**

3.1. Create a Dataframe 'car\_df' from the Dictionary 'car\_dict'

3.2. Update the Dataframe 'car\_df' with the following Information:

|  |  |
| --- | --- |
| **Mileage** | **Engine\_Displacement** |
| 18 | 1500 |
| 20 | 800 |
| 14 | 1000 |
| 12 | 2000 |
| 24 | 1000 |
| 22 | 800 |
| 16 | 1200 |

3.3. Create a Subset ‘car\_df\_engine\_mileage’ from ‘car\_df’ with the following Variables: {Car, Engine\_Displacement, Mileage}

**4. Sort Dataframes**

4.1. Create a Copy of 'car\_df' Named as 'car\_df\_sorted\_mileage' and Sort {Highest to Lowest} by 'Mileage'

4.2. Create a Copy of 'car\_df' Named as 'car\_df\_sorted\_hp\_mileage' and Sort: First by 'Horsepower' {Highest to Lowest}, Second by 'Mileage' {Lowest to Highest}

**5. Filter Dataframe**

5.1. Create a Dataframe ‘car\_df\_filter’ to Filter ‘car\_df’ using the following Information: 'Mileage' <= 20 & 'Car\_Size' = 'Small'

5.2. Create 2 Subsets: ‘car\_df\_manual’ & ‘car\_df\_automatic’ from ‘car\_df’ such that ‘car\_df\_manual’ & ‘car\_df\_automatic’ will contain all Information related Cars having ‘Drive\_Type’ = ‘Manual’ & ‘Drive\_Type’ = ‘Automatic’, respectively

**6. Merge Dataframe**

6.1. Create a Dataframe ‘car\_df\_merge’ to Inner Merge ‘car\_df\_manual’ having only following Variables {Car, Car\_Size, Horsepower} with ‘car\_df\_automatic’ having only following Variables {Car, Car\_Size, Mileage} on ‘Car\_Size’

**7. Group Dataframe**

7.1. Group ‘car\_df’ by ‘Drive\_Type’ with Average of Variables {Horsepower & Mileage}

**8. Create Panel Dataframe from Cross-Sectional Dataframe**

8.1. From the following Cross-Sectional Dataframe 'df\_cross\_section':

|  |  |  |
| --- | --- | --- |
| **Company** | **2021** | **2022** |
| ZYX | 123 | 321 |
| WVU | 456 | 654 |
| TSR | 789 | 987 |

Create the following Panel Dataframe 'df\_panel':

|  |  |  |
| --- | --- | --- |
| **Company** | **Year** | **Profit** |
| ZYX | 2021 | 123 |
| ZYX | 2022 | 321 |
| WVU | 2021 | 456 |
| WVU | 2022 | 654 |
| TSR | 2021 | 789 |
| TSR | 2022 | 987 |