ITM 200 Midterm Project

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April 13, 2023

Report

Part one

```python
import csv
import matplotlib.pyplot as plt

with open('Data.csv', mode='r') as file:
    data = csv.reader(file)
    next(data)  # Skip the header column
    years = []
    sales = []

    for row in data:
        year = row.pop(0)  # Remove the year from the sales
        years.append(year)  # create a list containing the years

        total_sales = 0  # Initialize the total_sales as 0
        for item in row:
            total_sales += int(item)  # add all the sales by converting them
to integers
        sales.append(total_sales)  # create a list containing the total sales
per year

        with open('stats.txt', mode='a') as stats:  # Write the year and
total using append
            stats.write(f"{year}: {total_sales}\n")  # add newline after each

# Plotting values for each year
x = years
y = sales

plt.figure(1)
plt.bar(x, y)

plt.title("Car sales from 2012 to 2022")  # Writing plot title
plt.xlabel("Years")       # Writing x-axis label
plt.ylabel("Total Sales")  # Writing y-axis label

plt.show()
```

This Python code reads data from the data CSV file that contains information about car sales for different years. It then calculates the total sales for each year and stores them in two lists, years and sales. The data is also written to a text file named 'stats.txt'.

After processing the data, a bar graph is created using the years and sales lists. The graph shows the total sales for each year and is given a title ('Car sales from 2012 to 2022') and labels for the x and y axis ('Years' and 'Total Sales' respectively). Finally, the graph is displayed using the plt.show() function.

In summary, this code reads car sales data from a CSV file, calculates the total sales for each year, writes the data to a text file, and creates a bar graph to visualise the total sales for each year as shown below:
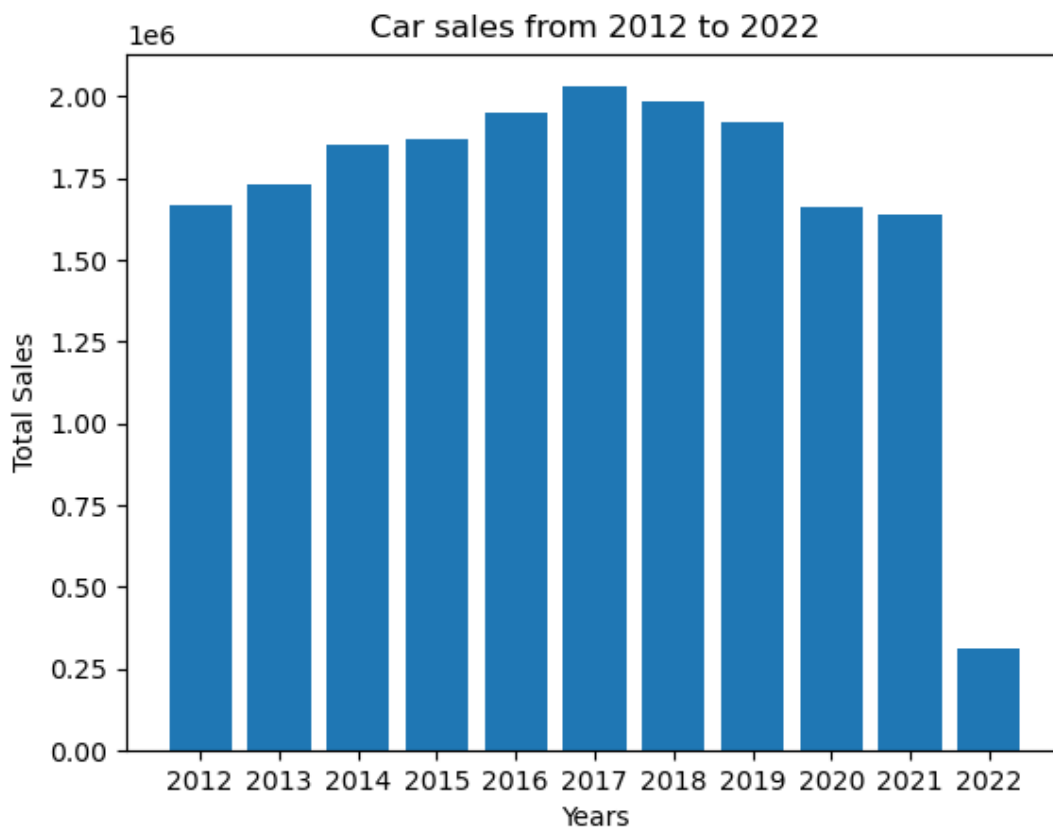
Part two

```python
import csv
import matplotlib.pyplot as plt

# Read the file
with open('Data.csv', mode='r') as file:
    data = csv.reader(file)
    data_2021 = []
    for row in data:
        if row[0] == "Month":
            last_months = row[-6:]  # Get the last 6-month names
        elif row[0] == "2021":
            data_2021 = row  # Add the data values for 2021 in a list
            sales_2021 = sum([int(x) for x in row[1:7]])  # Calculate the sum
of the first 6 months 2021
        elif row[0] == "2022":
            sales_2022 = sum([int(x) for x in row[1:7]])  # Calculate the sum
of the first 6 months 2022

    sales_growth_rate = (sales_2022 - sales_2021) / sales_2022

    estimated_values = []  # Initialize a list for the estimated values

    i = 0  # Counter for months
    # Loop through values in the 2021 list for the last 6 months
    for month_value_2021 in [int(x) for x in data_2021[-6:]]:
        month_value_2022 = month_value_2021 + month_value_2021 *
sales_growth_rate  # Get the 2022 estimated values
        estimated_values.append(month_value_2022)

        with open('stats.txt', mode='a') as stats:
            stats.write(f"{last_months[i]}: {month_value_2022}\n")  # Append
the values in the existing stats file
        i += 1

# Horizontal Bar Plot
x = last_months  # x values to be months
y = estimated_values  # y values to be the estimated values

plt.figure(1)
plt.barh(x, y)

plt.title("Estimated sales for 2022")
plt.xlabel("Month")
plt.ylabel("Estimated sales")
plt.grid()                      # Showing grids on the plot

plt.show()
```

This code uses two Python modules to read data from the data CSV file and create a graph. It starts by opening the CSV file and reading its contents using the csv.reader() function. The code then extracts the sales data for 2021 and calculates the sales growth rate between 2021 and 2022.

The estimated sales data for the last 6 months of 2022 is then calculated using the sales growth rate and the sales data for the same period in 2021. These estimated sales data are

stored in a list called estimated_values, and are also written to a text file named 'stats.txt' for later use.

Finally, the code uses the matplotlib.pyplot module to create a horizontal bar graph showing the estimated sales data. The x-axis shows the last 6 months' names, while the y-axis shows the estimated sales data. The graph is given a title and axis labels before being displayed.

Overall, this code reads data, performs calculations and visualizes the results in a graph as shown below.
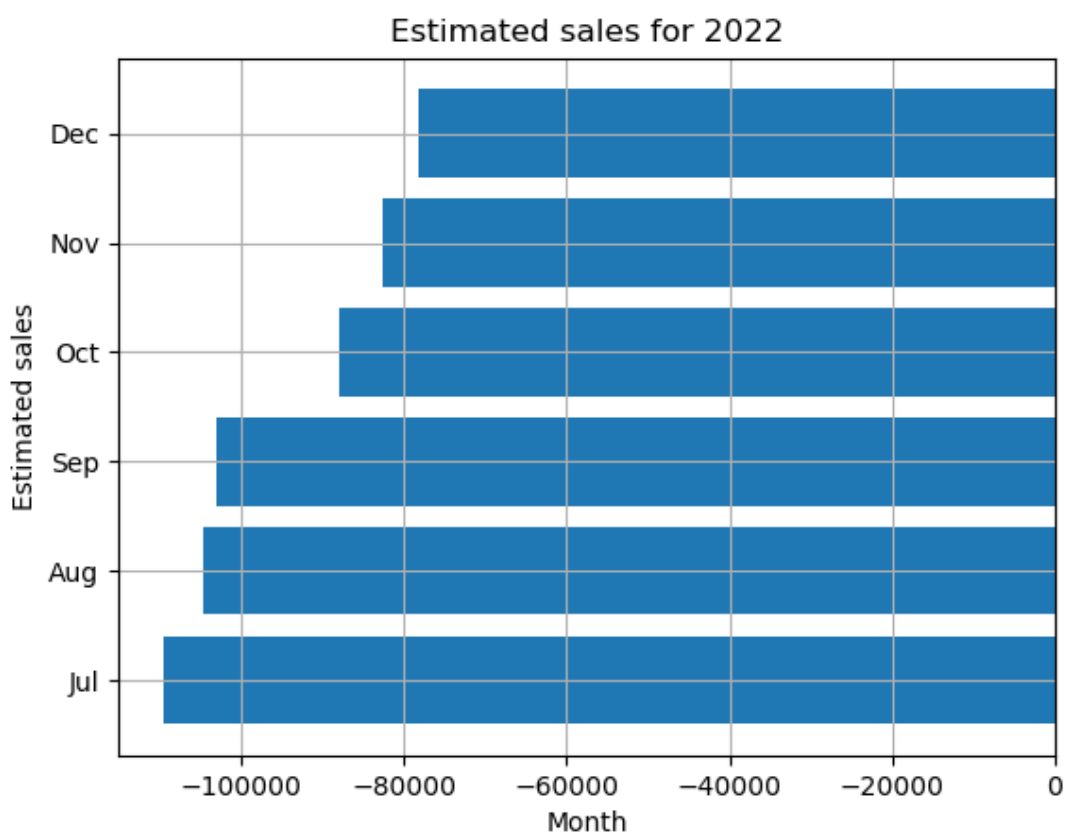
Stats.txt

```
2012: 1665063
2013: 1728140
2014: 1851645
2015: 1867498
2016: 1948375
2017: 2029668
2018: 1987373
2019: 1921449
2020: 1661560
2021: 1638340
2022: 312230
```

```
Jul: -109563.49828651955
Aug: -104612.8465554239
Sep: -103008.19697018224
Oct: -87980.17407039684
Nov: -82480.56327066588
Dec: -78068.85049482755
```

The first part of this text file is writing down the calculated sales of total vehicles sold in each year starting from 2012 to 2021.

The second part of the text is writing down the estimated sales for the last six months in month M of 2022.

GitHub repository link :

https://github.com/Codeman44guy/CarSales.git