

# LAB EXPERIMENTATIONS

## DSA 0410 – FUNDAMENTALS OF DATA SCIENCE

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EXP 1 :

PROGRAM :

```
import numpy as np
student_scores = np.loadtxt("Students_data.csv", delimiter=",", skiprows=1, usecols=(1, 2, 3, 4))
subjects = ["Math", "Science", "English", "History"]
average_scores = np.mean(student_scores, axis=0)
highest_subject = subjects[np.argmax(average_scores)]
print("Average scores:", np.round(average_scores, 2))
print("Subject with highest average score:", highest_subject)
```

OUTPUT :

```
File Edit View Insert Runtime Tools Help
Commands + Code + Text ▶ Run all ... Connecting ...
```

```
[ ] Start coding or generate with AI.
[ ] import numpy as np
      student_scores = np.loadtxt("student_scores.csv", delimiter=",", skiprows=1, usecols=(1, 2, 3, 4))
      subjects = ["Math", "Science", "English", "History"]
      average_scores = np.mean(student_scores, axis=0)
      highest_subject = subjects[np.argmax(average_scores)]
      print("Average scores:", np.round(average_scores, 2))
      print("Subject with highest average score:", highest_subject)

... Average scores: [81.97 82.56 82.97 82.88]
Subject with highest average score: English
```

## EXP 2 :

### PROGRAM:

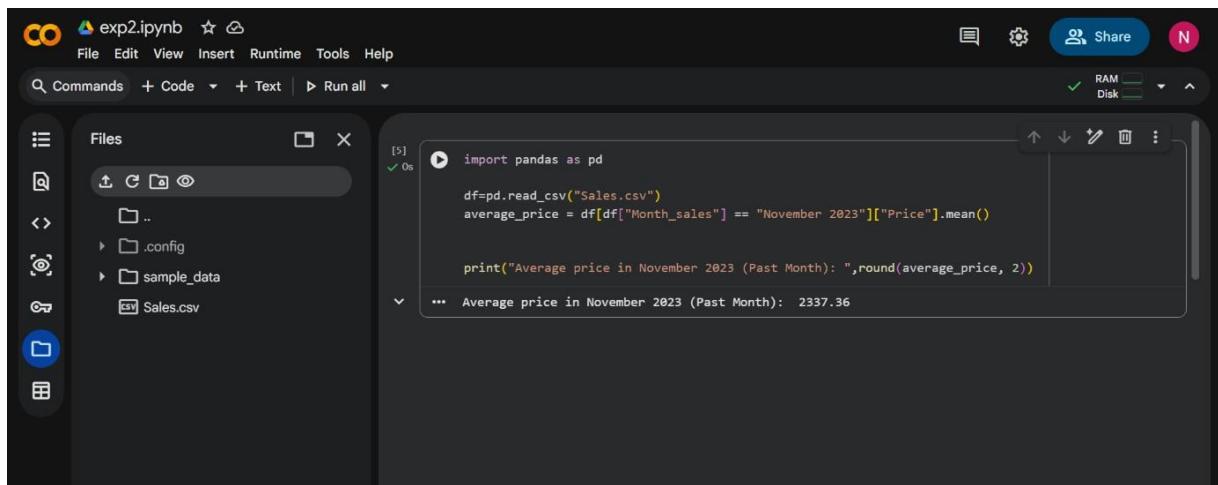
```
import pandas as pd

df=pd.read_csv("Sales_data.csv")

average_price = df[df["Month_sales"]==" November 2023"]["Price"].mean()

print("Average price in November 2023 (Past Month): ",round(average_price, 2))
```

### Output



The screenshot shows a Jupyter Notebook interface with a dark theme. On the left, there's a sidebar labeled 'Files' containing a folder structure with '..', '.config', 'sample\_data', and 'Sales.csv'. The main area has a code cell with the following Python code:

```
import pandas as pd

df=pd.read_csv("Sales.csv")
average_price = df[df["Month_sales"] == " November 2023"]["Price"].mean()

print("Average price in November 2023 (Past Month): ",round(average_price, 2))
```

Below the code cell, the output is displayed in a monospaced font:

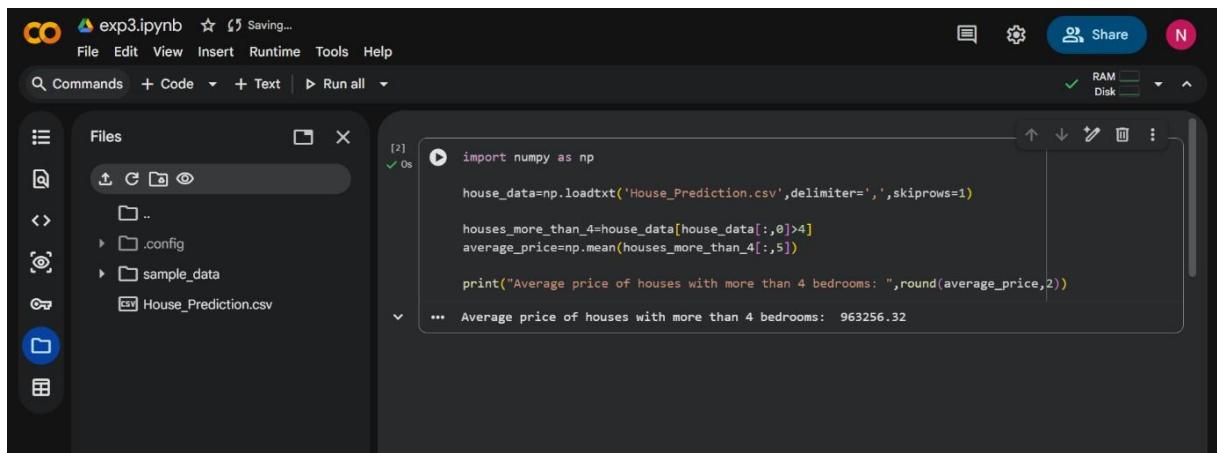
```
... Average price in November 2023 (Past Month):  2337.36
```

## EXP 3:

### PROGRAM :

```
import numpy as np  
house_data=np.loadtxt('House_data.csv',delimiter=',',skiprows=1)  
houses_more_than_4=house_data[house_data[:,0]>4]  
average_price=np.mean(houses_more_than_4[:,5])  
print("Average price of houses with more than 4 bedrooms: ",round(average_price,2))
```

### OUTPUT:



The screenshot shows a Jupyter Notebook interface. On the left, there's a sidebar with a 'Files' section containing a folder named 'sample\_data' which contains 'House\_Prediction.csv'. The main area has a code cell with the following Python code:

```
import numpy as np  
house_data=np.loadtxt('House_Prediction.csv',delimiter=',',skiprows=1)  
houses_more_than_4=house_data[house_data[:,0]>4]  
average_price=np.mean(houses_more_than_4[:,5])  
print("Average price of houses with more than 4 bedrooms: ",round(average_price,2))
```

Below the code cell, the output is displayed as:

```
... Average price of houses with more than 4 bedrooms: 963256.32
```

## EXP 4:

### PROGRAM :

```
import numpy as np

sales_data = np.genfromtxt("Sales_data.csv", delimiter=",", skip_header=1, dtype=str)

months = sales_data[:, 1]

sales = sales_data[:, 4].astype(float)

Q1 = 0.0

Q4 = 0.0

for i in range(len(months)):

    if ("January" in months[i]) or ("February" in months[i]) or ("March" in months[i]):

        Q1 += sales[i]

    elif ("October" in months[i]) or ("November" in months[i]) or ("December" in months[i]):

        Q4 += sales[i]

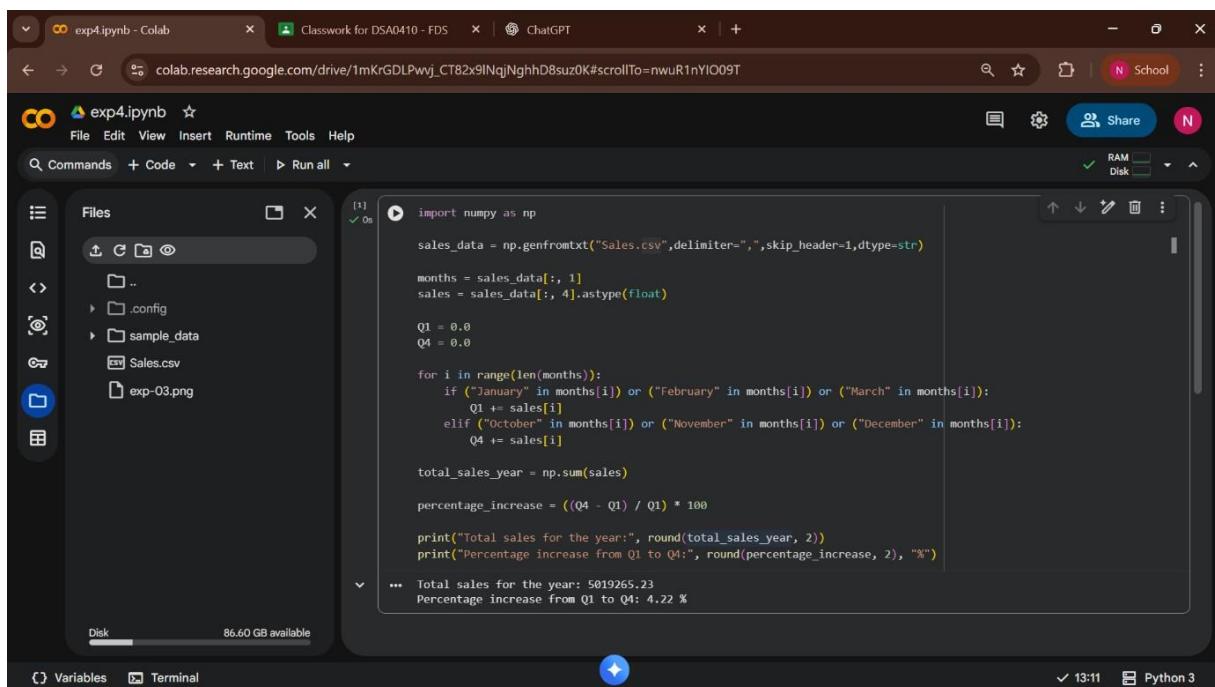
total_sales_year = np.sum(sales)

percentage_increase = ((Q4 - Q1) / Q1) * 100

print("Total sales for the year:", round(total_sales_year, 2))

print("Percentage increase from Q1 to Q4:", round(percentage_increase, 2), "%")
```

### OUTPUT:



The screenshot shows a Google Colab notebook titled "exp4.ipynb". The code cell contains the provided Python script. The output pane shows the execution results: "Total sales for the year: 5019265.23" and "Percentage increase from Q1 to Q4: 4.22 %". The bottom status bar indicates "13:11" and "Python 3".

## EXP 5:

### PROGRAM :

```
import numpy as np

fuel_data=np.genfromtxt('Fuel_data.csv', delimiter=',', skip_header=1,dtype=str)

fuel_efficiency = fuel_data[:, 7].astype(float)

make = fuel_data[:,8]

average_efficiency = np.mean(fuel_efficiency)

mazda_eff = fuel_efficiency[make == "mazda"]

audi_eff = fuel_efficiency[make == "audi"]

mazda_avg = np.mean(mazda_eff)

audi_avg = np.mean(audi_eff)

percentage_improvement = ((mazda_avg - audi_avg) / audi_avg) * 100

print("Average Fuel Efficiency of all cars:", round(average_efficiency, 2), "MPG")

print("Average Fuel Efficiency of Mazda:", round(mazda_avg, 2), "MPG")

print("Average Fuel Efficiency of Audi:", round(audi_avg, 2), "MPG")

print("Percentage Improvement from Mazda to Audi:", round(percentage_improvement, 2), "%")
```

### OUT

The screenshot shows the Google Colab interface with a dark theme. On the left, there's a sidebar titled 'Files' containing a folder named 'Fuel\_Efficiency' which includes a file named 'Fuel\_Efficiency.csv'. The main workspace shows the Python code for calculating average fuel efficiency and the percentage improvement between Mazda and Audi. The output cell at the bottom displays the results of the calculations.

```
import numpy as np

fuel_data=np.genfromtxt('Fuel_Efficiency.csv', delimiter=',', skip_header=1,dtype=str)

fuel_efficiency = fuel_data[:, 7].astype(float)
make = fuel_data[:,8]
average_efficiency = np.mean(fuel_efficiency)

mazda_eff = fuel_efficiency[make == "mazda"]
audi_eff = fuel_efficiency[make == "audi"]

mazda_avg = np.mean(mazda_eff)
audi_avg = np.mean(audi_eff)

percentage_improvement = ((mazda_avg - audi_avg) / audi_avg) * 100

print("Average Fuel Efficiency of all cars:", round(average_efficiency, 2), "MPG")
print("Average Fuel Efficiency of Mazda:", round(mazda_avg, 2), "MPG")
print("Average Fuel Efficiency of Audi:", round(audi_avg, 2), "MPG")
print("Percentage Improvement from Mazda to Audi:", round(percentage_improvement, 2), "%")
```

...  
Average Fuel Efficiency of all cars: 28.61 MPG  
Average Fuel Efficiency of Mazda: 33.48 MPG  
Average Fuel Efficiency of Audi: 27.97 MPG  
Percentage Improvement from Mazda to Audi: 19.7 %

