

# 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"]

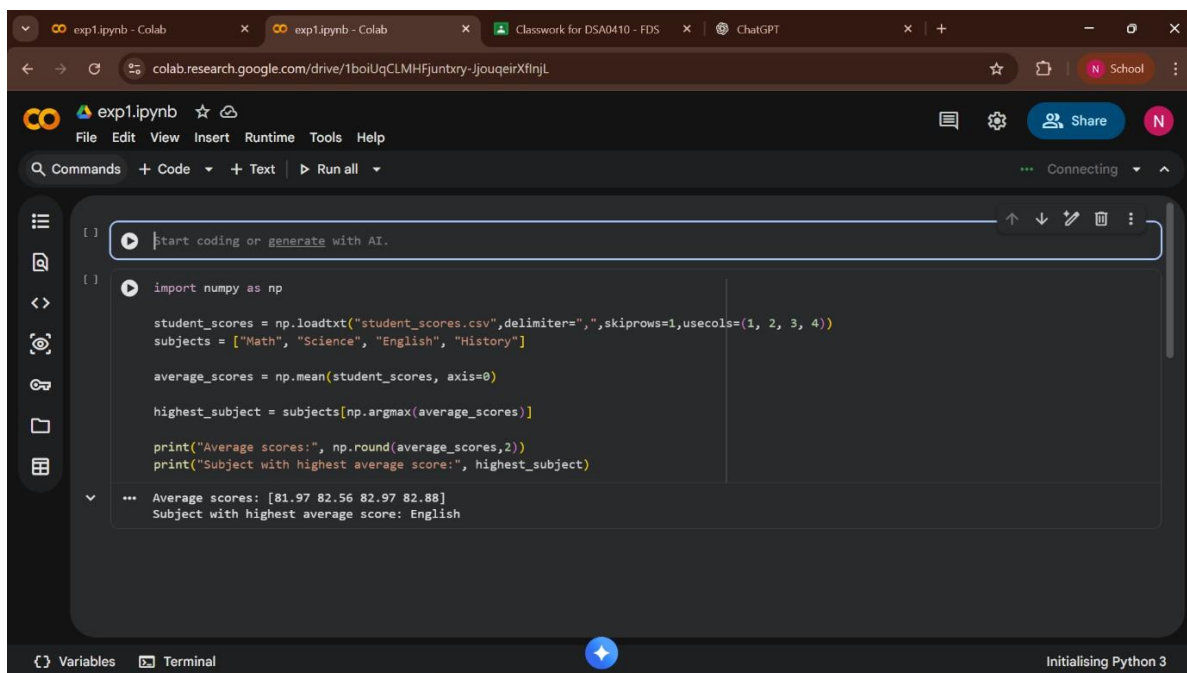
average_scores = np.mean(student_scores, axis=0)

highest_subject = subjects[np.argmax(average_scores)]

print("Average scores:", np.round(average_scores,2))

print("Subject with highest average score:", highest_subject)
```

OUTPUT :



```
exp1.ipynb - Colab
exp1.ipynb - Colab
Classwork for DSA0410 - FDS
ChatGPT

colab.research.google.com/drive/1boIUqCLMHfjuntxy-jjouqeirXflnJL

exp1.ipynb
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

Variables Terminal Initialising Python 3
```

## EXP 2 :

### PROGRAM:

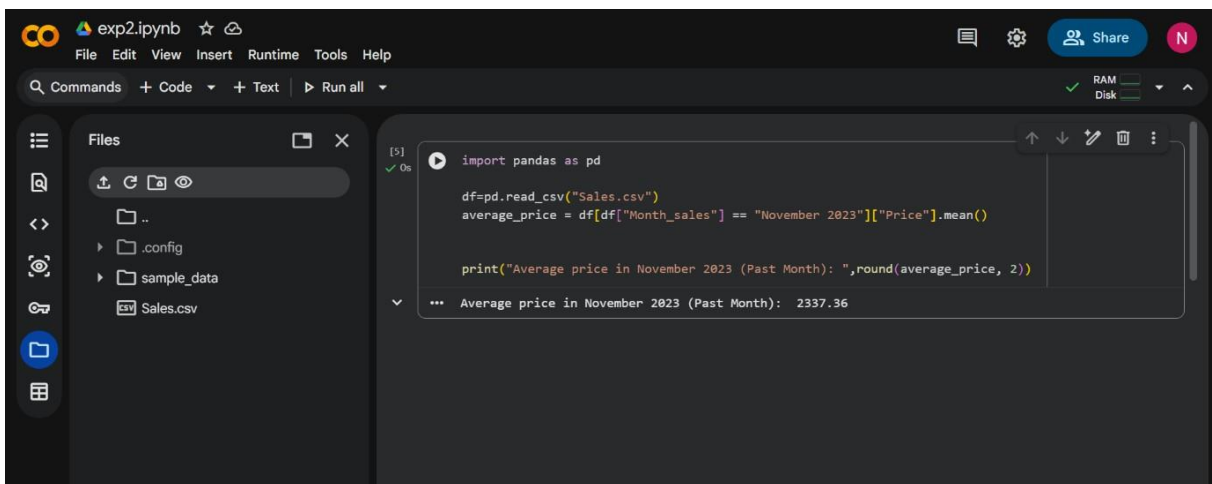
```
import pandas as pd
```

```
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 displays a Jupyter Notebook interface with a dark theme. The top bar shows the notebook name 'exp2.ipynb' and various menu options like File, Edit, View, Insert, Runtime, Tools, and Help. On the left, a file explorer pane shows the directory structure with files like '.config', 'sample\_data', and 'Sales.csv'. The main area contains 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 as a text box showing the result of the print statement:

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

The interface also includes a status bar at the top right showing RAM and Disk usage, and a 'Share' button.

### EXP 3:

#### PROGRAM :

```
import numpy as np

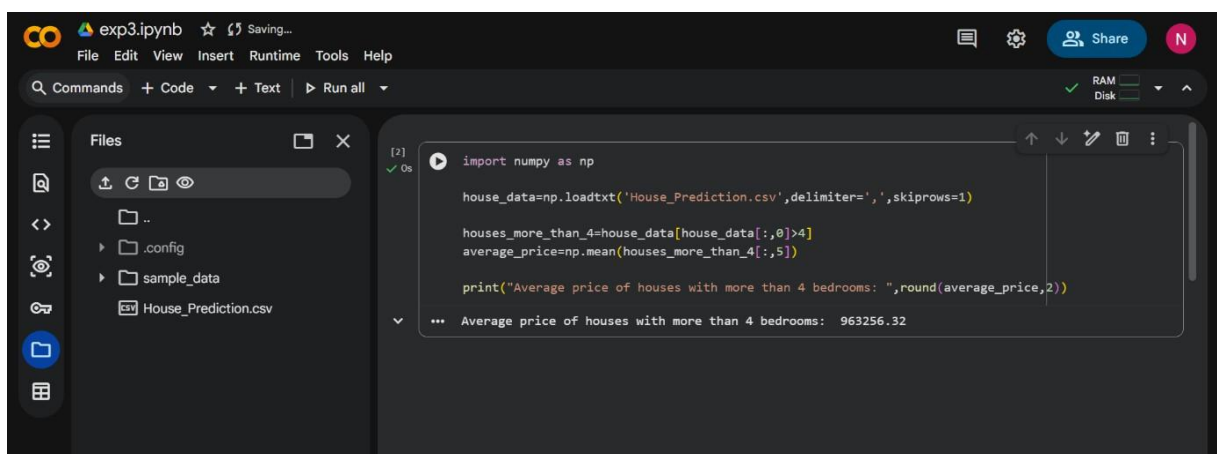
house_data=np.loadtxt('House_data.csv',delimiter=',',skiprows=1)

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 with a dark theme. The top bar includes the Colab logo, the filename 'exp3.ipynb', and a 'Saving...' status. Below the top bar is a menu bar with 'File', 'Edit', 'View', 'Insert', 'Runtime', 'Tools', and 'Help'. A search bar labeled 'Commands' is on the left, and a 'Run all' button is on the right. The left sidebar shows a file explorer with a tree view containing '..' (selected), '.config', 'sample\_data', and 'House\_Prediction.csv'. The main area displays a code cell with the following Python code:

```
[2]
✓ Os
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, the output is shown as a text message:

```
... 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]
```

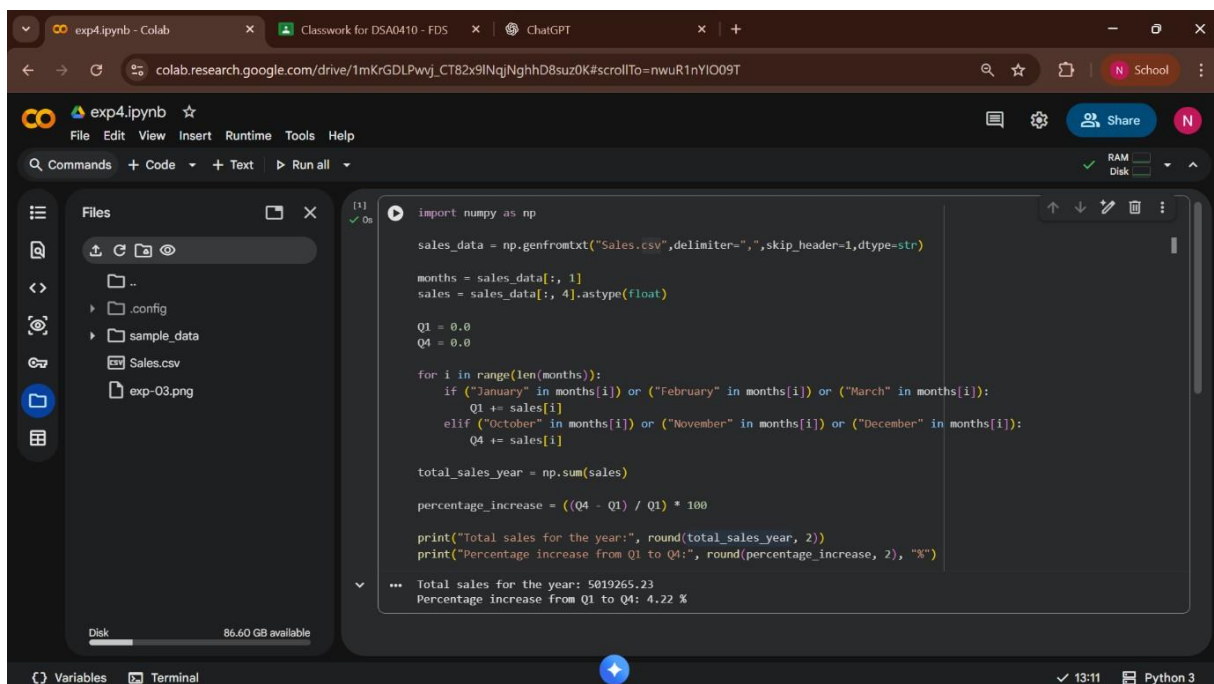
```
total_sales_year = np.sum(sales)
```

```
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:



```
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), "%")
```

... Total sales for the year: 5019265.23  
Percentage increase from Q1 to Q4: 4.22 %

## 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

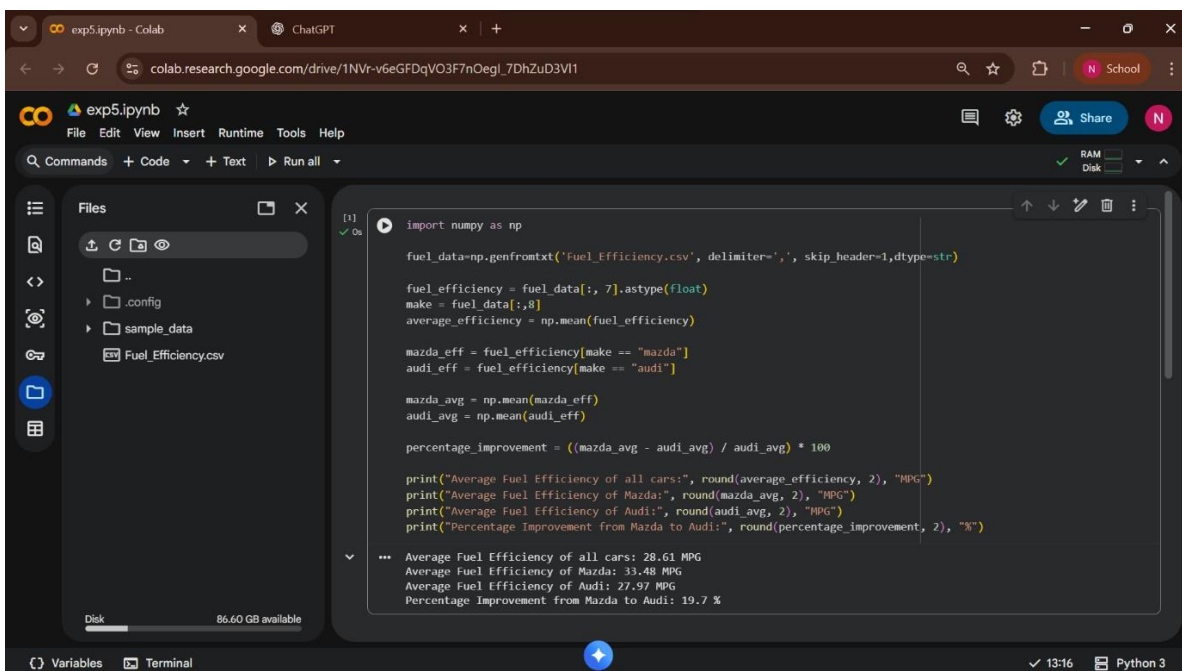
print("Average Fuel Efficiency of all cars:", round(average_efficiency, 2), "MPG")

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



```
exp5.ipynb - Colab
ChatGPT
colab.research.google.com/drive/1NVr-v6eGFDqVO3F7nOegl_7DhZuD3VI1

exp5.ipynb
File Edit View Insert Runtime Tools Help
Commands + Code + Text Run all
Files
..
.config
sample_data
Fuel_Efficiency.csv
Disk 86.60 GB available

[1] 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 %

Variables Terminal 13:16 Python 3
```

