Rayat Shikshan Sanstha's
KARMAVEER BHAURAO PATIL COLLEGE,VASHI
(Empowered Autonomous)

Reaccredited NAAC with Grade 'A++' (CGPA3.51)|ISO 9001:2015 Certified Institute 'Best College' Award by University of Mumbai

[DEPARTMENT OF INFORMATION TECHNOLOGY]

CERTIFICATE

This is to certify that **Mr./Miss:** SHUBHAM VIKAS NAVALE student of Class M S C I T from **Karmaveer Bhaurao Patil College, Vashi, Navi Mumbai** has satisfactorily completed the practical course in subject **Data Science.** As per the syllabus laid by the college during the Academic. Year **2024-25.**

ROLL NO.:240609

EXAM NO.:240609

Date:__/__/2025

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Course Coordinator

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Head, Department of IT

External Examiner

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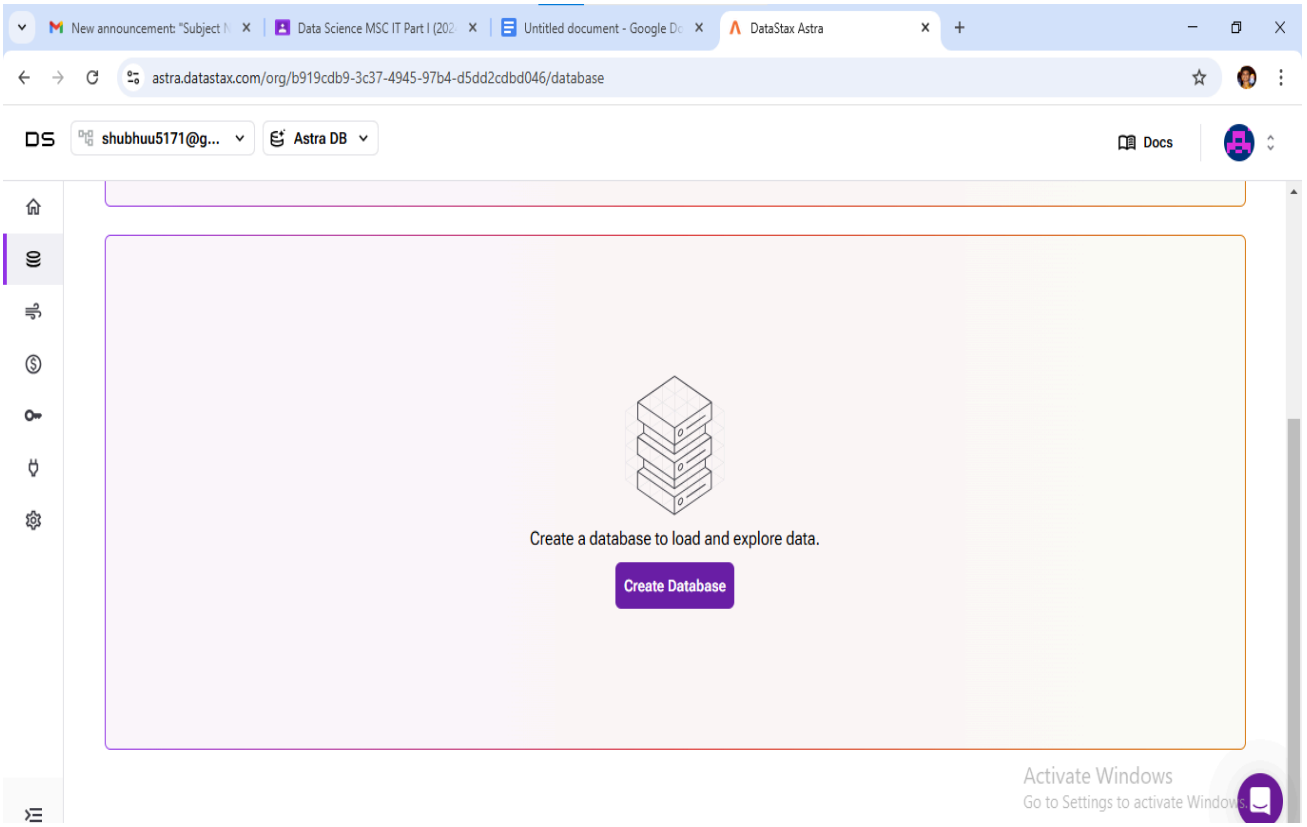
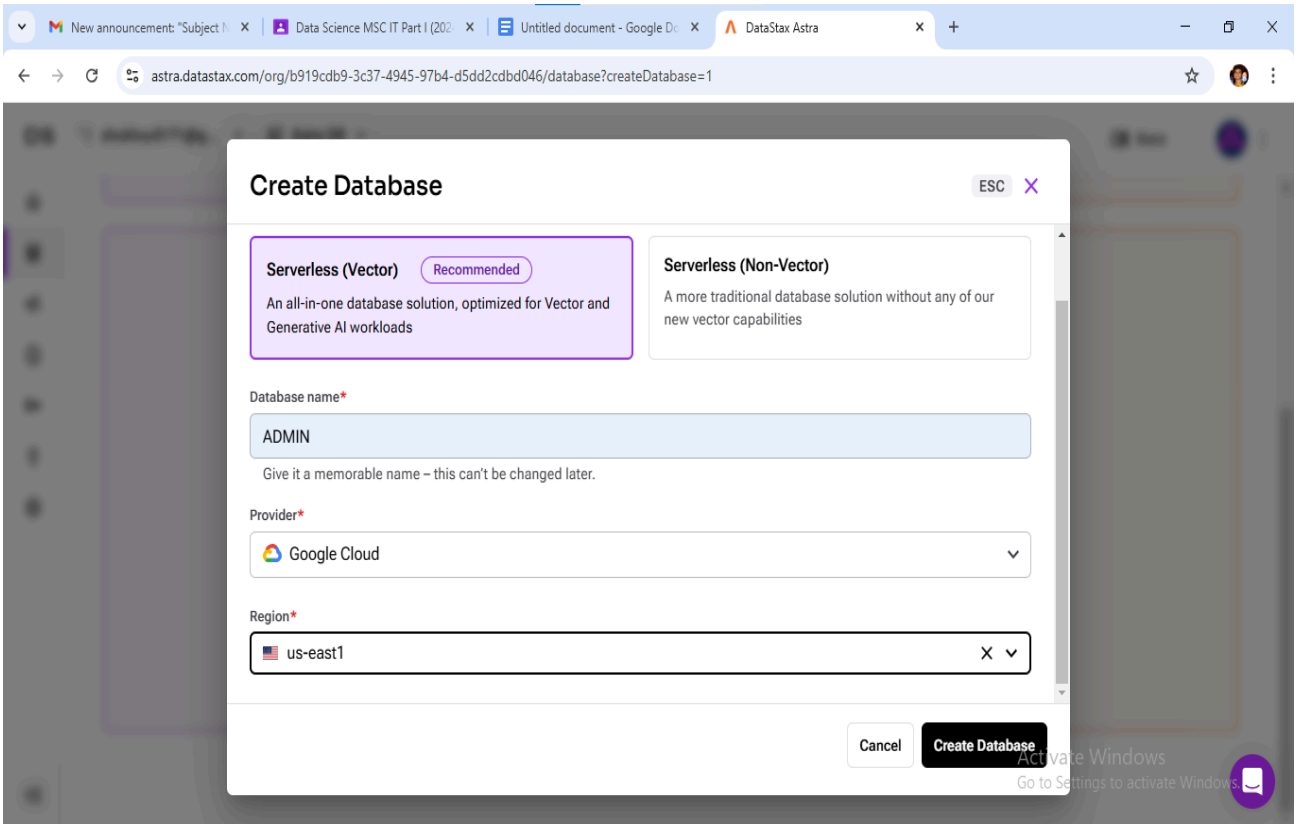
Practical No. 1

Aim: - Creating data models using Cassandra [datastax Astra].

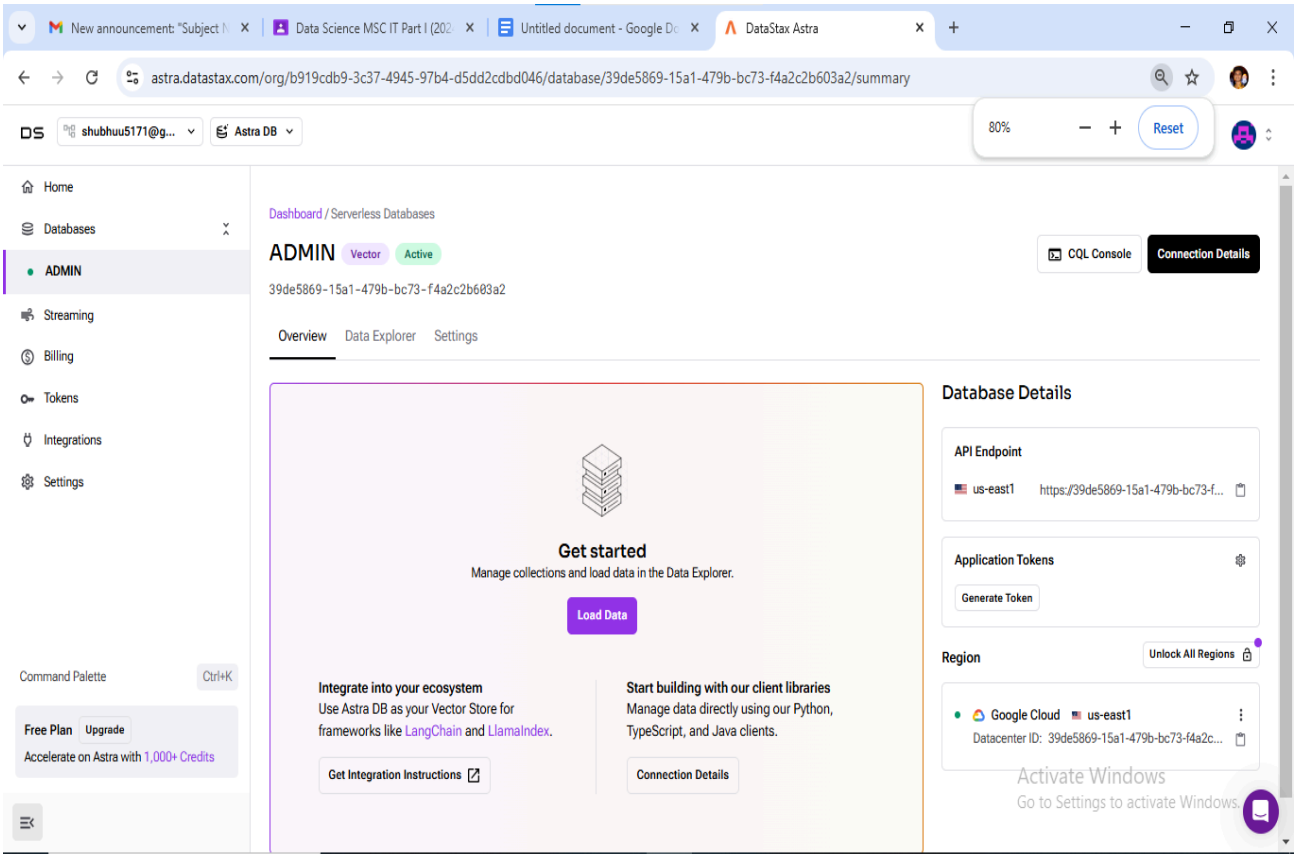
- Create Database .



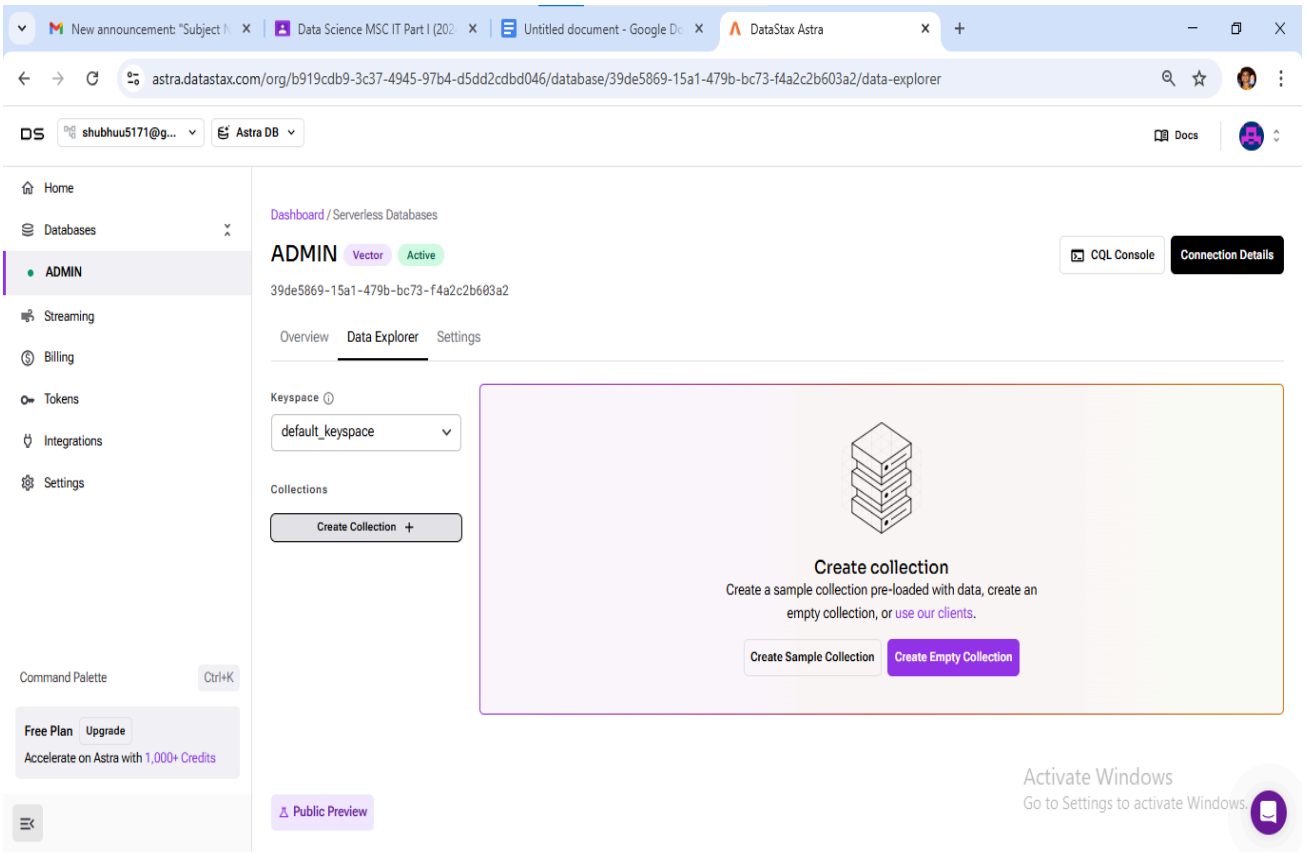
- Database name-> Provider Google Cloud -> Region-> us-east1.



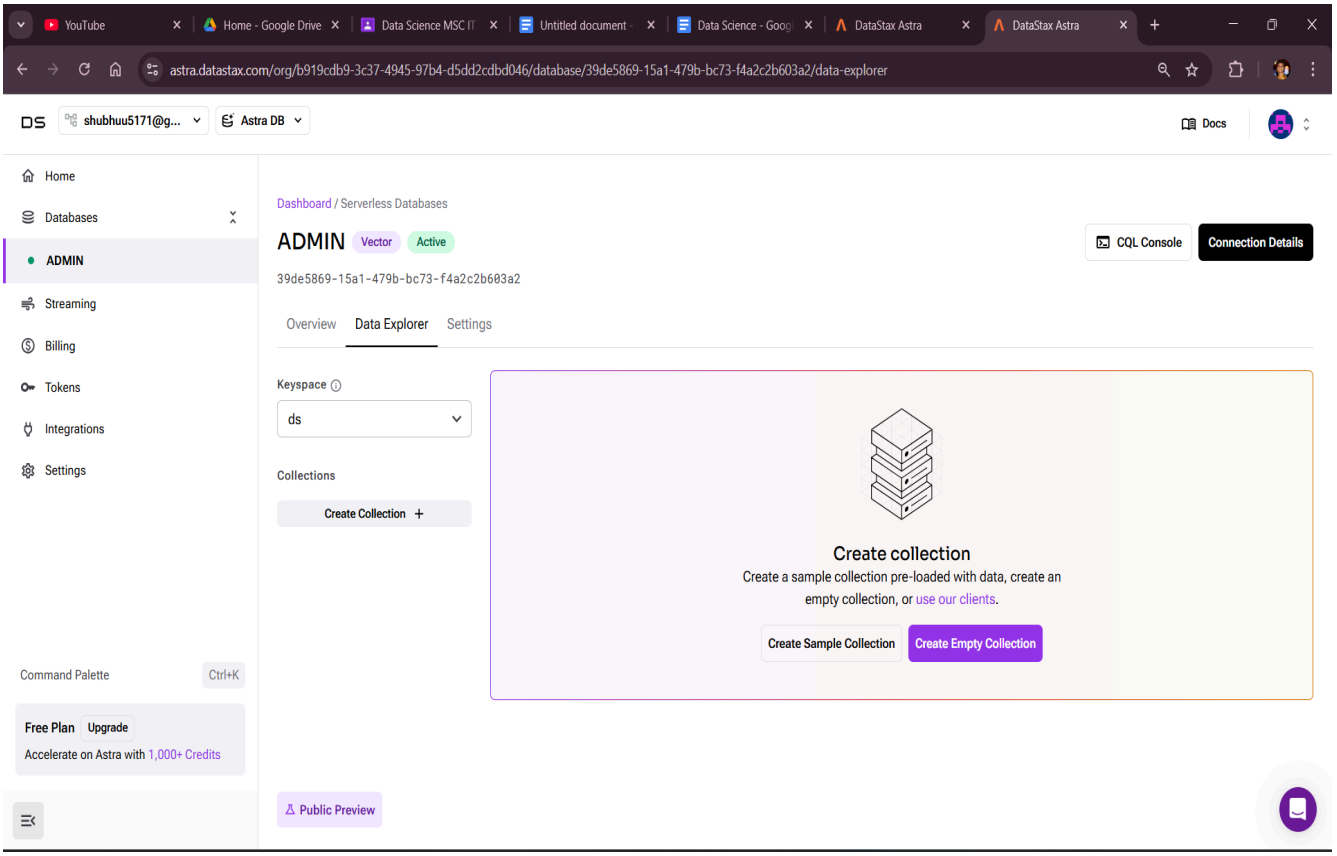
- From Dashboard Select -> ADMIN.



- From ADMIN -> Data Explorer -> Keyspace.



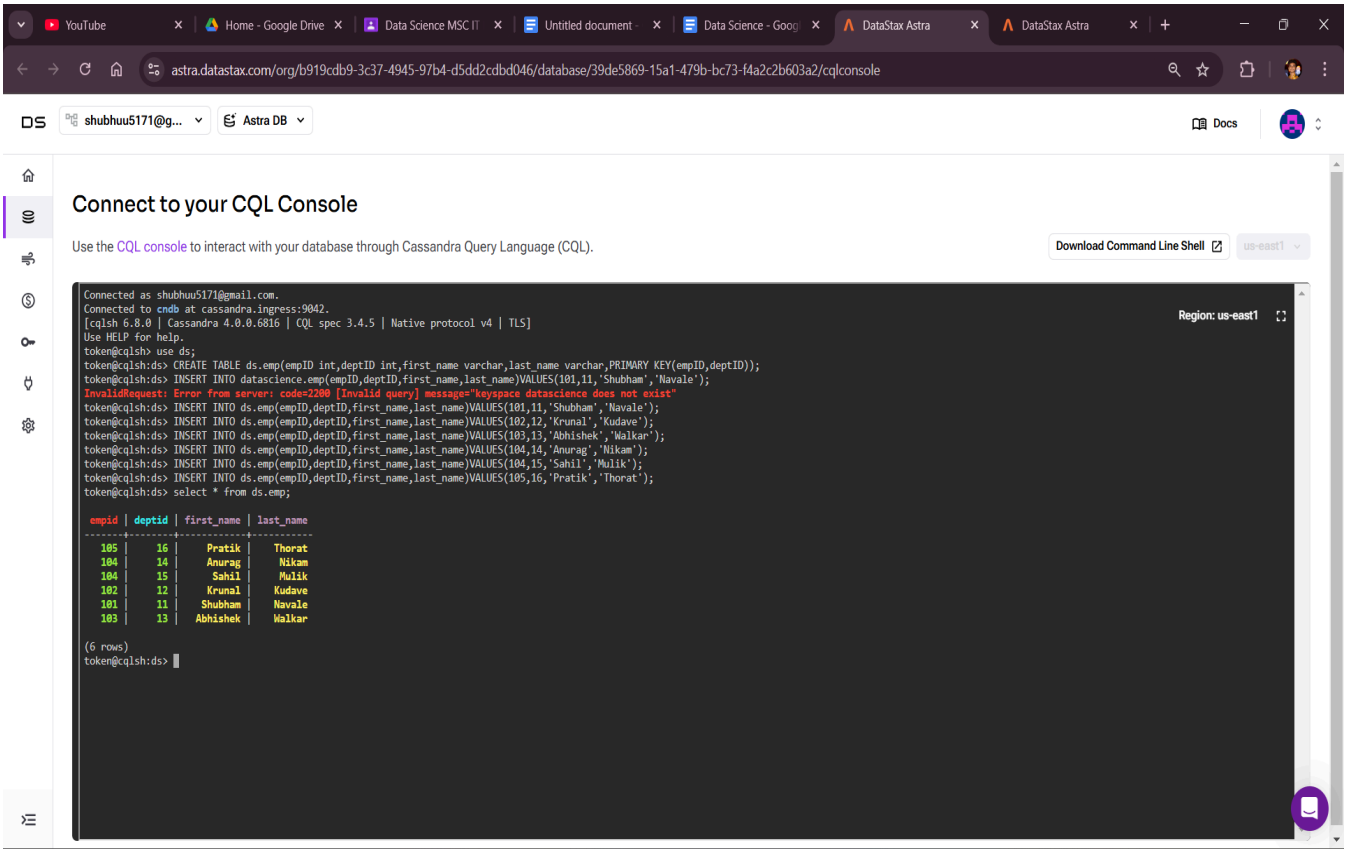
- Select Keyspace -> ds



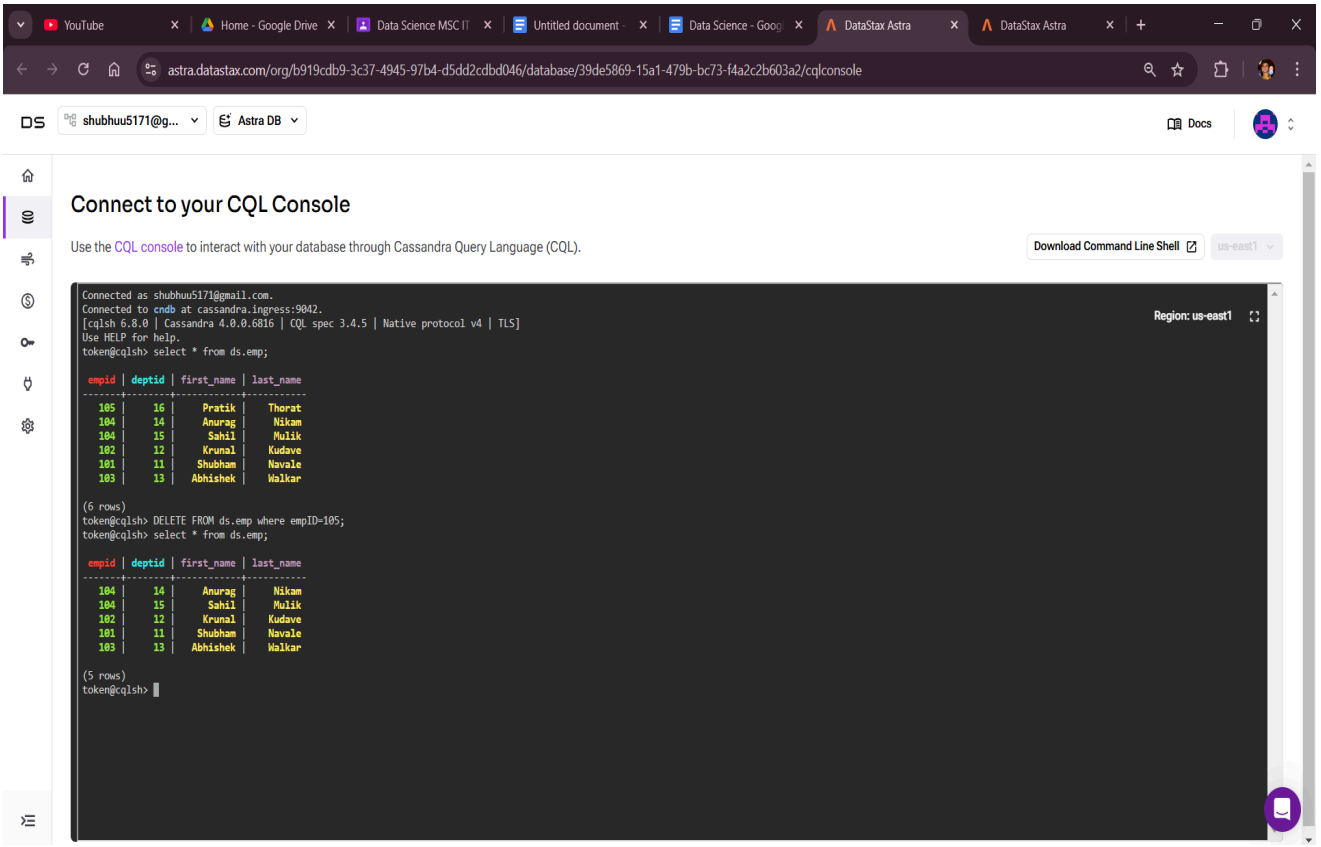
- Select -> CQL (Cassandra Query Language) after creating a keyspace.

1A) Create a TABLE EMPLOYEE and perform operations on it.

- CREATE TABLE datascience.emp(empID int,deptID int,first_name varchar,last_name varchar,PRIMARY KEY(empID,deptID));
- INSERT INTO ds.emp(empID,deptID,first_name,last_name) VALUES(101,11,'Shubham','Navale');
- INSERT INTO ds.emp(empID,deptID,first_name,last_name) VALUES(102,12,'Krunal','Kudave');
- INSERT INTO ds.emp(empID,deptID,first_name,last_name) VALUES(103,13,'Abhishek','Walkar');
- INSERT INTO ds.emp(empID,deptID,first_name,last_name) VALUES(104,14,'Anurag','Nikam');
- INSERT INTO ds.emp(empID,deptID,first_name,last_name) VALUES(104,15,'Sahil','Mulik');
- INSERT INTO ds.emp(empID,deptID,first_name,last_name) VALUES(105,16,'Pratik','Thorat');
- select * from ds.emp;



- **Query For DELETING one ROW: -**
- DELETE FROM ds.emp where empID=105;
- Select * From ds.emp;



1B) Create a TABLE STUDENT and perform operations on it.

- **Query for CREATING TABLE student: -**

  CREATE TABLE ds.stud(studID int, deptID int, first_name varchar, last_name varchar, year_of_joining int, PRIMARY KEY(studID, deptID));

- **Query for INSERTING VALUES into student table: -**

  INSERT INTO ds1.stud(studID, deptID, first_name, last_name, year_of_joining) VALUES (101,1,'Abhishek','Walkar', 2025);

  INSERT INTO ds1.stud(studID, deptID, first_name, last_name, year_of_joining) VALUES (101,2,'Shubham','Navale', 2025);

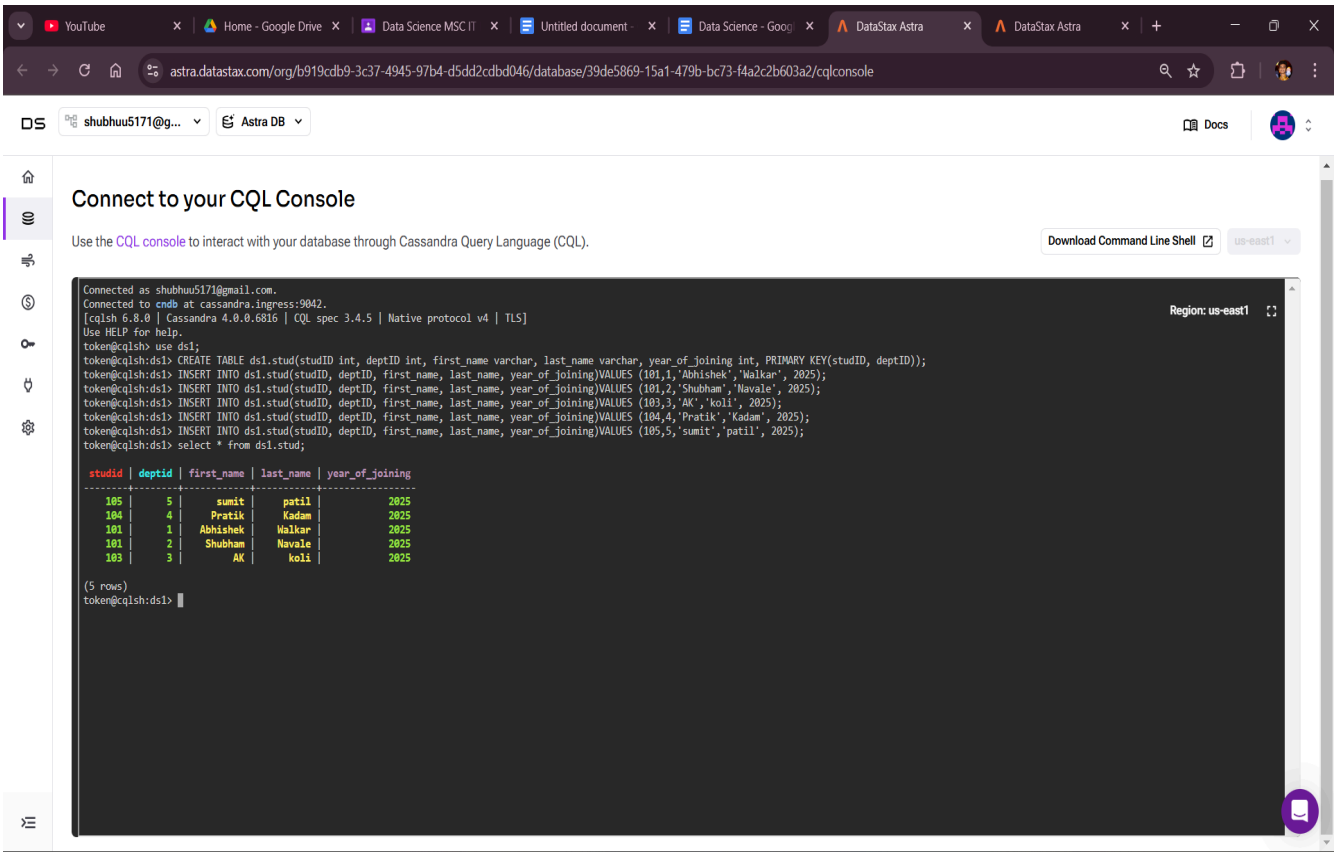
  INSERT INTO ds1.stud(studID, deptID, first_name, last_name, year_of_joining) VALUES (103,3,'AK','koli', 2025);

  INSERT INTO ds1.stud(studID, deptID, first_name, last_name, year_of_joining) VALUES (104,4,'Pratik','Kadam', 2025);

  INSERT INTO ds1.stud(studID, deptID, first_name, last_name, year_of_joining) VALUES (105,5,'sumit','patil', 2025);

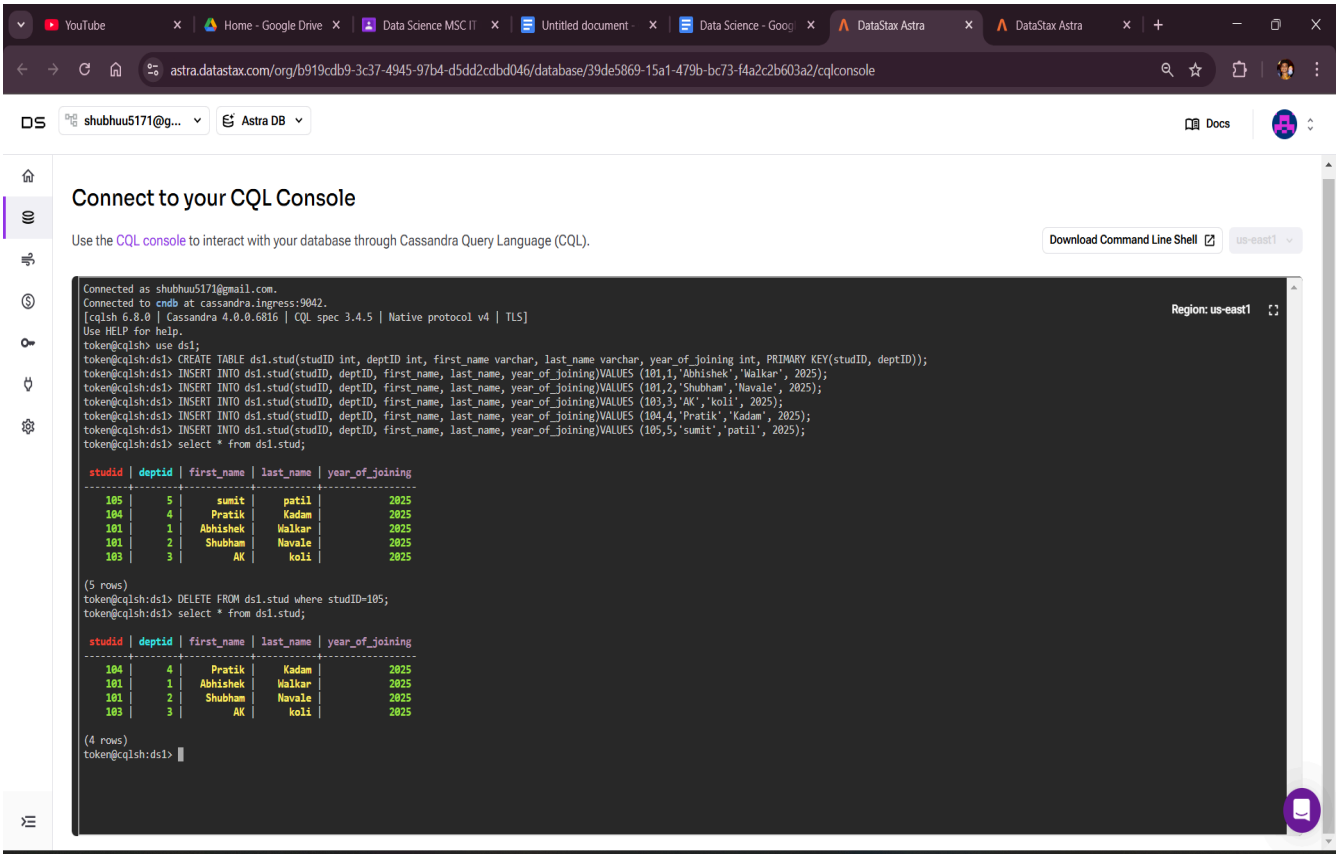
- **Query For displaying the TABLE STUDENT: -**

  SELECT * FROM ds1.stud;



- **Query For displaying the TABLE STUDENT: -**

  SELECT * FROM ds1.stud;



Practical No. 2

Aim: Conversion from different formats to HORUS format.CSV

A. CSV to HORUS

```
import pandas as pd
```

```
from datetime import datetime
```

```
df=pd.read_csv("Country_code.csv", encoding="UTF-8")
```

```
print(df)
```

```
                      Country ISO-2-CODE ISO-3-Code  ISO-M49
0                 Afghanistan         AF        AFG        4
1               Aland Islands         AX        ALA      248
2                     Albania         AL        ALB        8
3                     Algeria         DZ        DZA       12
4              American Samoa         AS        ASM       16
..                        ...        ...        ...      ...
242  Wallis and Futuna Islands         WF        WLF      876
243             Western Sahara         EH        ESH      732
244                      Yemen         YE        YEM      887
245                     Zambia         ZM        ZMB      894
246                   Zimbabwe         ZW        ZWE      716

[247 rows x 4 columns]
```

```
processdata=df
```

```
processdata.drop("ISO-2-CODE", axis=1)
```

	Country	ISO-3-Code	ISO-M49
0	Afghanistan	AFG	4
1	Aland Islands	ALA	248
2	Albania	ALB	8
3	Algeria	DZA	12
4	American Samoa	ASM	16
...	...	...	...
242	Wallis and Futuna Islands	WLF	876
243	Western Sahara	ESH	732
244	Yemen	YEM	887
245	Zambia	ZMB	894
246	Zimbabwe	ZWE	716

247 rows × 3 columns

```
processdata.drop("ISO-2-CODE", axis=1, inplace=True)
```

```
processdata.drop("ISO-3-Code", axis=1, inplace=True)
```

```
processdata
```

	Country	ISO-M49
0	Afghanistan	4
1	Aland Islands	248
2	Albania	8
3	Algeria	12
4	American Samoa	16
...	...	...
242	Wallis and Futuna Islands	876
243	Western Sahara	732
244	Yemen	887
245	Zambia	894
246	Zimbabwe	716

247 rows × 2 columns

```
new=datetime.now()
```

```
new
```

```
datetime.datetime(2025, 3, 4, 16, 21, 2, 589485)
```

```
dt_string=new.strftime("%d-%m-%y %H:%M:%S")
print("Date and Time: ", dt_string)
```

```
Date and Time:  04-03-25 16:21:02
```

```
f=open("CountryCode.txt", "a")
f.write("Deleting cloumn activity recorded ")
f.write(dt_string)
f.close()
```

```
processdata.rename(columns={"Country":"CountryName"}, inplace=True)
```

```
processdata
```

	CountryName	ISO-M49
0	Afghanistan	4
1	Aland Islands	248
2	Albania	8
3	Algeria	12
4	American Samoa	16
...	...	...
242	Wallis and Futuna Islands	876
243	Western Sahara	732
244	Yemen	887
245	Zambia	894
246	Zimbabwe	716

247 rows × 2 columns

```
processdata.rename(columns={"ISO-M49":"Code"}, inplace=True)
processdata
```

	CountryName	Code
0	Afghanistan	4
1	Aland Islands	248
2	Albania	8
3	Algeria	12
4	American Samoa	16
...	...	...
242	Wallis and Futuna Islands	876
243	Western Sahara	732
244	Yemen	887
245	Zambia	894
246	Zimbabwe	716

247 rows × 2 columns

```
processdata.set_index("Code", inplace=True)
```

```
processdata
```

Code	CountryName
4	Afghanistan
248	Aland Islands
8	Albania
12	Algeria
16	American Samoa
...	...
876	Wallis and Futuna Islands
732	Western Sahara
887	Yemen
894	Zambia
716	Zimbabwe

247 rows × 1 columns

```
processdata.sort_values("CountryName", axis=0, ascending=False, inplace=True)
```

```
processdata
```

Code	CountryName
716	Zimbabwe
894	Zambia
887	Yemen
732	Western Sahara
876	Wallis and Futuna Islands
...	...
16	American Samoa
12	Algeria
8	Albania
248	Aland Islands
4	Afghanistan

247 rows × 1 columns

Start coding or generate with AI.

```
OutputFileName="Hours_Country_Code.csv"
processdata.to_csv(OutputFileName, index=False)
```

Practical No. 2

Aim: Conversion from different formats to HORUS format.CSV

B. CSV to AUDIO

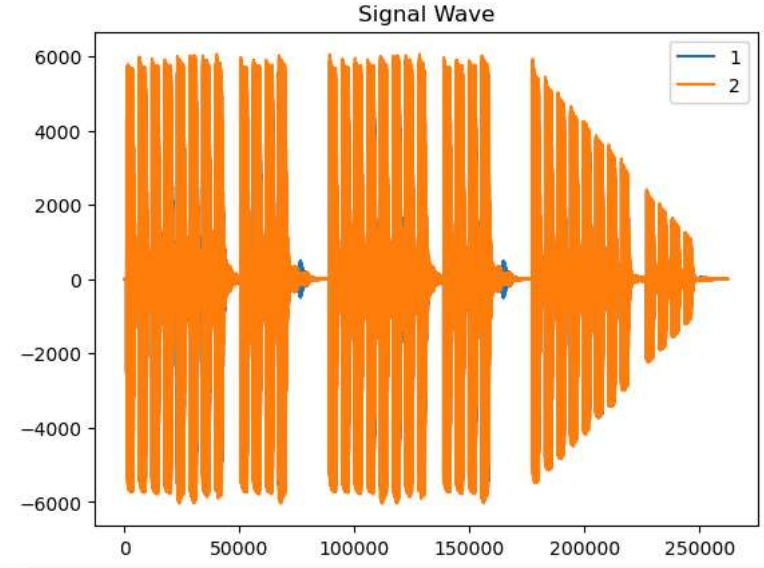
```
from scipy.io import wavfile
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np

def show_info(aname, a, r):
    print("audio", aname)
    print("rate:", r)
    print("shape:", a.shape)
    print("dtype:", a.dtype)
    print("min,max:", a.min(), a.max())

def plot_info(aname, a, r):
    stitle = 'Signal Wave-' + aname + "at" + str(r) + "hz"
    plt.title("Signal Wave")
    slegend = []
    # Iterate through the channels of the audio data
    for i in range(a.shape[1]):
        slabel = "CH" + str(i + 1)
        slegend = slegend + [str(i + 1)]
        plt.plot(a[:, i], label=slabel)
    plt.legend(slegend)
    plt.show()

wavfile1 = "C:/Users/KBP/Desktop/ds/sample.wav"
print("Processing:", wavfile1)
inputRate, inputData = wavfile.read(wavfile1)
show_info("2 Channel", inputData, inputRate)
plot_info("2 Channel", inputData, inputRate) # Call plot_info with inputData
processdata = pd.DataFrame(inputData)
scolumns = ["Ch1", "Ch2"]
```

```
Processing: C:/Users/KBP/Desktop/ds/sample.wav
audio 2 Channel
rate: 44100
shape: (262094, 2)
dtype: int16
min,max: -6038 6056
C:\Users\KBP\AppData\Local\Temp\ipykernel_6764\3627020737.py:27: WavFileWarning: Chunk (non-data) not understood, skipping it.
  inputRate, inputData = wavfile.read(wavfile1)
```



```
processdata.columns=scolumns
outputData=processdata
outputData
```

	Ch1	Ch2
0	0	0
1	0	0
2	0	0
3	0	0
4	1	-1
...	...	...
262089	-3	-1
262090	3	2
262091	-2	-2
262092	0	2
262093	2	-2

262094 rows × 2 columns

```
outputfiledata="Horus-Audio.csv"
outputData.to_csv(outputfiledata,index=False)
print("Audio to Horus done")
```

```
Audio to Horus done
```

Practical No. 3

Aim: Bad Data: Removing leading or lagging spaces from string

```
import string
import datetime as dt
print('#1 Removing leading or lagging spaces from a data entry');
baddata = " Data Science with too many spaces is bad!!! "
baddata
```

```
#1 Removing leading or lagging spaces from a data entry
' Data Science with too many spaces is bad!!! '
```

```
baddata.lstrip()
```

```
'Data Science with too many spaces is bad!!! '
```

```
baddata.rstrip()
```

```
' Data Science with too many spaces is bad!!!'
```

```
baddata
```

```
' Data Science with too many spaces is bad!!! '
```

```
baddata.strip()
```

```
'Data Science with too many spaces is bad!!!'
```

2 Removing nonprintable characters from a data entry

```
print('#2 Removing nonprintable characters from a data entry')
printable = set(string.printable)
baddata = "Data\x00Science with\x02 funny"
baddata
#2 Removing nonprintable characters from a data entry 'Data\x00Science with\x02 funny'
cleandata=".join(filter(lambda x:x in string.printable,baddata))"
print('Bad Data:',baddata);
```

```
#2 Removing nonprintable characters from a data entry
Bad Data: Data Science with funny
```

3 Reformatting data entry to match specific formatting criteria.

```
# Convert YYYY/MM/DD to DD Month YYYY
print('# 3 Reformatting data entry to match specific formatting criteria.')
baddate= dt.date(2019, 10, 31)
baddata= format(baddate,'%Y-%m-%d')
baddata
```

```
# 3 Reformatting data entry to match specific formatting criteria.
'2019-10-31'
```

```
gooddate= dt.datetime.strptime(baddata, '%Y-%m-%d')
gooddata= format(gooddate,'%d %B %Y')
print('Bad Data:',baddata)
print('Good Data:',gooddata)
```

```
Bad Data: 2019-10-31
Good Data: 31 October 2019
```

Practical No. 4

Aim: Assessing the Data.

```
import pandas as pd
```

A) Create a Data frame using Python.

```
data = {"Name":["SHUBHAM","SAHIL","KRUNAL"],"Age":[21,21,20],"std":("MSc","MSc","TY")}
df = pd.DataFrame(data)
df
```

	Name	Age	std
0	SHUBHAM	21	MSc
1	SAHIL	21	MSc
2	KRUNAL	20	TY

Next steps: Generate code with df | View recommended plots | New interactive sheet

B) INSERT COLUMN NAME, AGE, ROLL NO USING PANDAS

```
df.insert(3,"Roll no",["Ghansoli","Vashi","Sanpada"])#insert row and columns
df
```

	Name	Age	std	Roll no
0	SHUBHAM	21	MSc	Ghansoli
1	SAHIL	21	MSc	Vashi
2	KRUNAL	20	TY	Sanpada

Next steps: Generate code with df | View recommended plots | New interactive sheet

C) Rename the column name

```
df = df.rename(columns={"Roll no":"Address"})#rename the column name

df
```

	Name	Age	std
0	SHUBHAM	21	MSc
1	SAHIL	21	MSc
2	KRUNAL	20	TY

Next steps: Generate code with df | View recommended plots | New interactive sheet

D) Delete the column

```
df = df.drop(columns=["std"])#To delete the column
df
```

	Name	Age	Address
0	SHUBHAM	21	Ghansoli
1	SAHIL	21	Vashi
2	KRUNAL	20	Sanpada

Next steps: Generate code with df | View recommended plots | New interactive sheet

E) Update any value using index.

```
df.loc[1,"Address"]="UP"#update any value using index
df
```

	Name	Age	Address
0	SHUBHAM	21	Ghansoli
1	SAHIL	21	UP
2	KRUNAL	20	Sanpada

Next steps: Generate code with df | View recommended plots | New interactive sheet

```
df.loc[2,"Age"]=19#update any value using index
df
```

	Name	Age	Address
0	SHUBHAM	21	Ghansoli
1	SAHIL	21	UP
2	KRUNAL	19	Sanpada

Next steps: Generate code with df | View recommended plots | New interactive sheet

F) To delete the row

```
df = df.drop(index=2)#To delete the row
df
```

	Name	Age	Address
0	SHUBHAM	21	Ghansoli
1	SAHIL	21	UP

Next steps: Generate code with df | View recommended plots | New interactive sheet

G) To get particular values of any columns

```
df.get("Name")#To get particular values of any columns
```

	Name
0	SHUBHAM
1	SAHIL

dtype: object

Practical No. 5

Aim: Conversion from different formats to HORUS format.CSV

```
import matplotlib.pyplot as plt
from PIL import Image
import numpy as np


img='/content/FERRARI.jpg'
imageIn=Image.open(img)


fig1=plt.figure(figsize=(10,5))
fig1.suptitle('Ferrari', fontsize=25, color="green")
imgplot=plt.imshow(imageIn)
plt.show()
```


```
imagewidth,imageheight = imageIn.size
imageMatrix=np.asarray(imageIn)
pixelscnt=(imagewidth * imageheight)
print('Pixel:', pixelscnt)
print('Size:', imagewidth, 'X', imageheight)
print(imageMatrix)
```

```
Pixel: 16942801
Size: 5041 X 3361
[[[126 123 118]
  [130 127 122]
  [136 133 128]
  ...
  [116 108  97]
  [117 109  98]
  [120 112 101]]

 [[122 119 114]
  [138 135 130]
  [140 137 132]
  ...
  [122 114 103]
  [120 112 101]
  [118 110  99]]

 [[138 135 130]
  [134 131 126]
  [134 131 126]
  ...
  [117 109  98]
  [124 116 105]
  [123 115 104]]

 ...
```

```
[[106  98  87]
 [106  98  87]
 [110 102  91]
 ...
 [127 119 108]
 [127 119 108]
 [131 123 112]]

[[103  95  84]
 [111 103  92]
 [119 111 100]
 ...
 [128 120 109]
 [130 122 111]
 [136 128 117]]

[[110 102  91]
 [112 104  93]
 [120 112 101]
 ...
 [142 132 122]
 [135 125 115]
 [129 121 110]]]
```

Practical No:6

Aim: Perform to deal with Missing Values in Pandas

```
import pandas as pd
df=pd.read_csv('/content/Book1.csv')
df
```

	Name	AI	DS	MA	Total
0	Sahil	56.0	NaN	76.0	44.000000
1	Krunal	69.0	53.0	NaN	40.666667
2	Vivek	56.0	55.0	56.0	55.666667
3	NaN	45.0	NaN	NaN	15.000000
4	Sandesh	63.0	55.0	23.0	47.000000
5	NaN	61.0	45.0	NaN	35.333333
6	Megha	56.0	NaN	53.0	36.333333
7	Pallavi	NaN	45.0	47.0	30.666667

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 8 entries, 0 to 7
Data columns (total 5 columns):
 #   Column  Non-Null Count  Dtype  
---  ------  --------------  -----  
 0   Name    6 non-null      object 
 1   AI      7 non-null      float64
 2   DS      5 non-null      float64
 3   MA      5 non-null      float64
 4   Total   8 non-null      float64
dtypes: float64(4), object(1)
memory usage: 448.0+ bytes
```

1. Drop the column where any of the element is missing values.

```
df.dropna(how='any',axis=0)
```

	Name	AI	DS	MA	Total
2	Vivek	56.0	55.0	56.0	55.666667
4	Sandesh	63.0	55.0	23.0	47.000000

```
df.dropna(how='any',axis=1)
```

	Total
0	44.000000
1	40.666667
2	55.666667
3	15.000000
4	47.000000
5	35.333333
6	36.333333
7	30.666667

2.Drop the column where all element are missing values

```
df.dropna(how='all',axis=0)
```

	Name	AI	DS	MA	Total
0	Sahil	56.0	NaN	76.0	44.000000
1	Krunal	69.0	53.0	NaN	40.666667
2	Vivek	56.0	55.0	56.0	55.666667
3	NaN	45.0	NaN	NaN	15.000000
4	Sandesh	63.0	55.0	23.0	47.000000
5	NaN	61.0	45.0	NaN	35.333333
6	Megha	56.0	NaN	53.0	36.333333
7	Pallavi	NaN	45.0	47.0	30.666667

Practical No: 7

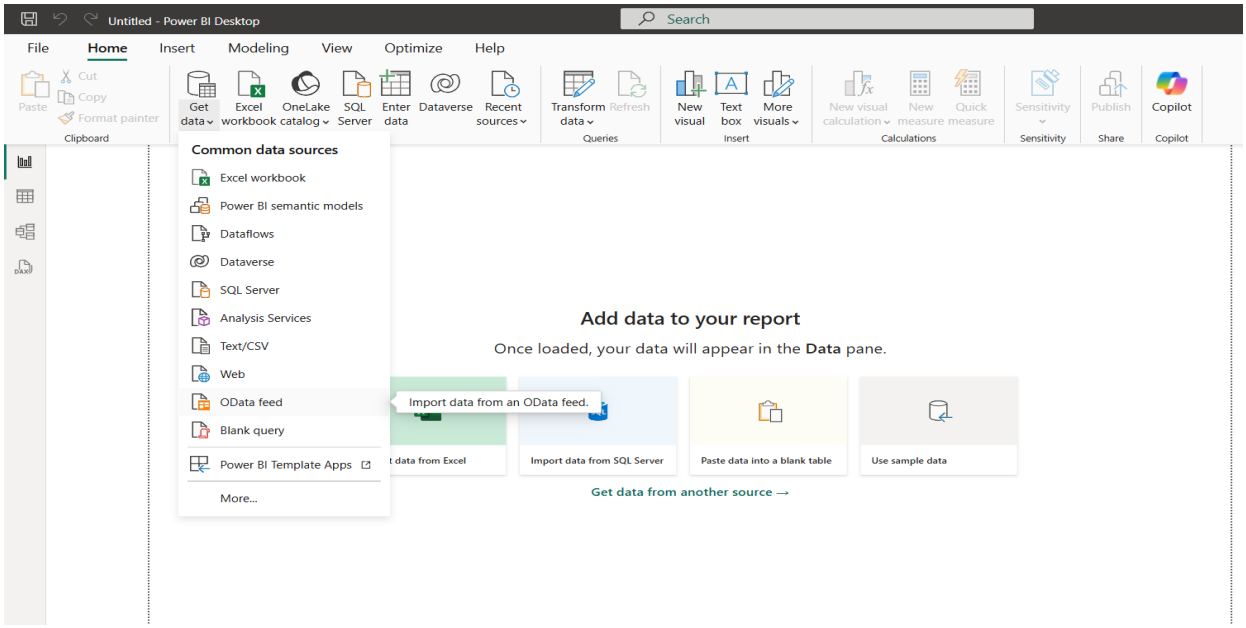
Aim: Import order data from an OData feed.

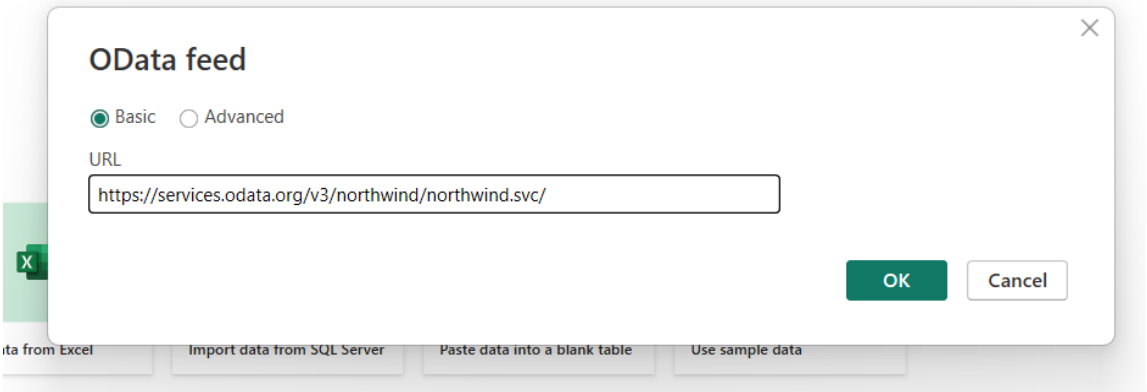
You import data into power BI Desktop from the sample northwind odata feed at the following
URL which you can copy (and then paste) in the steps below:
https://services.odata.org/v3/northwind/northwind.svc/

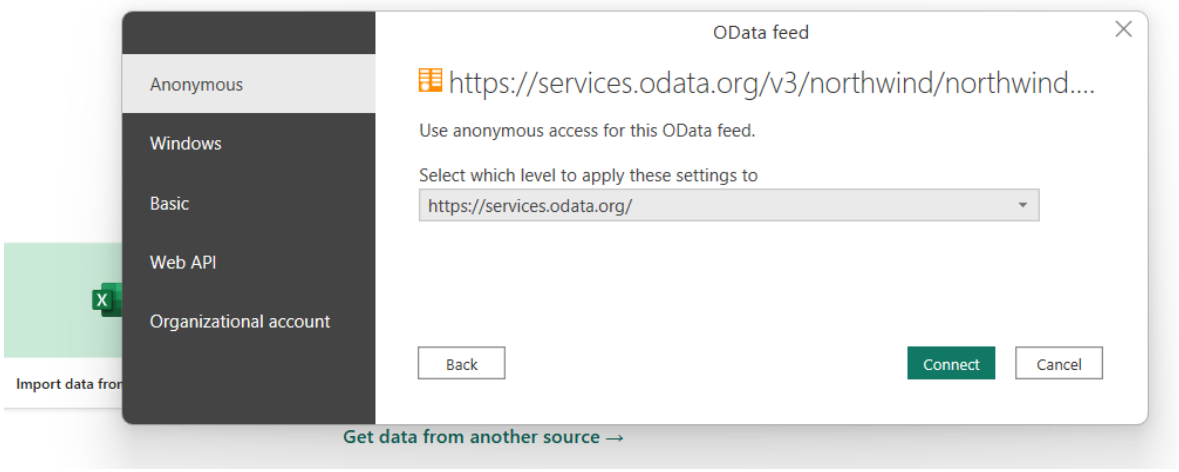
STEP1:

Connect to an Odata feed:

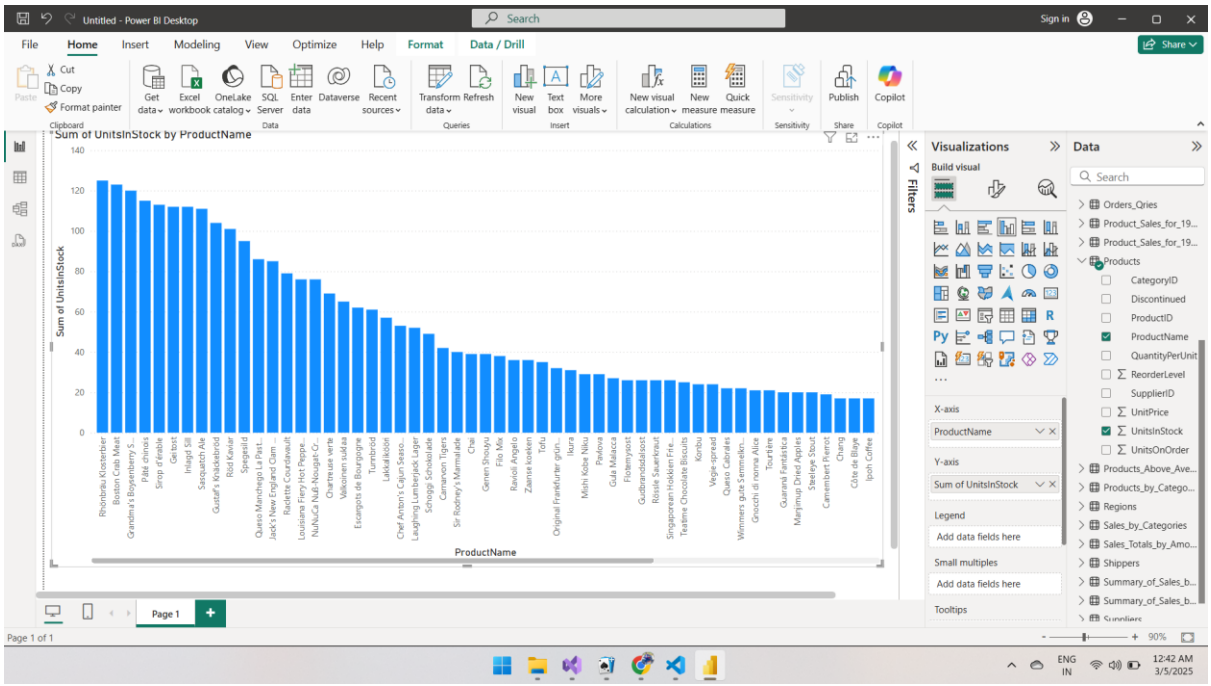
1. From the Home ribbon tab in query editor, select get data.
2. Browse the odata feed data source
3. In the odata feed dialog box paste the URL for the Northwind OData feed.
4. Select Ok.



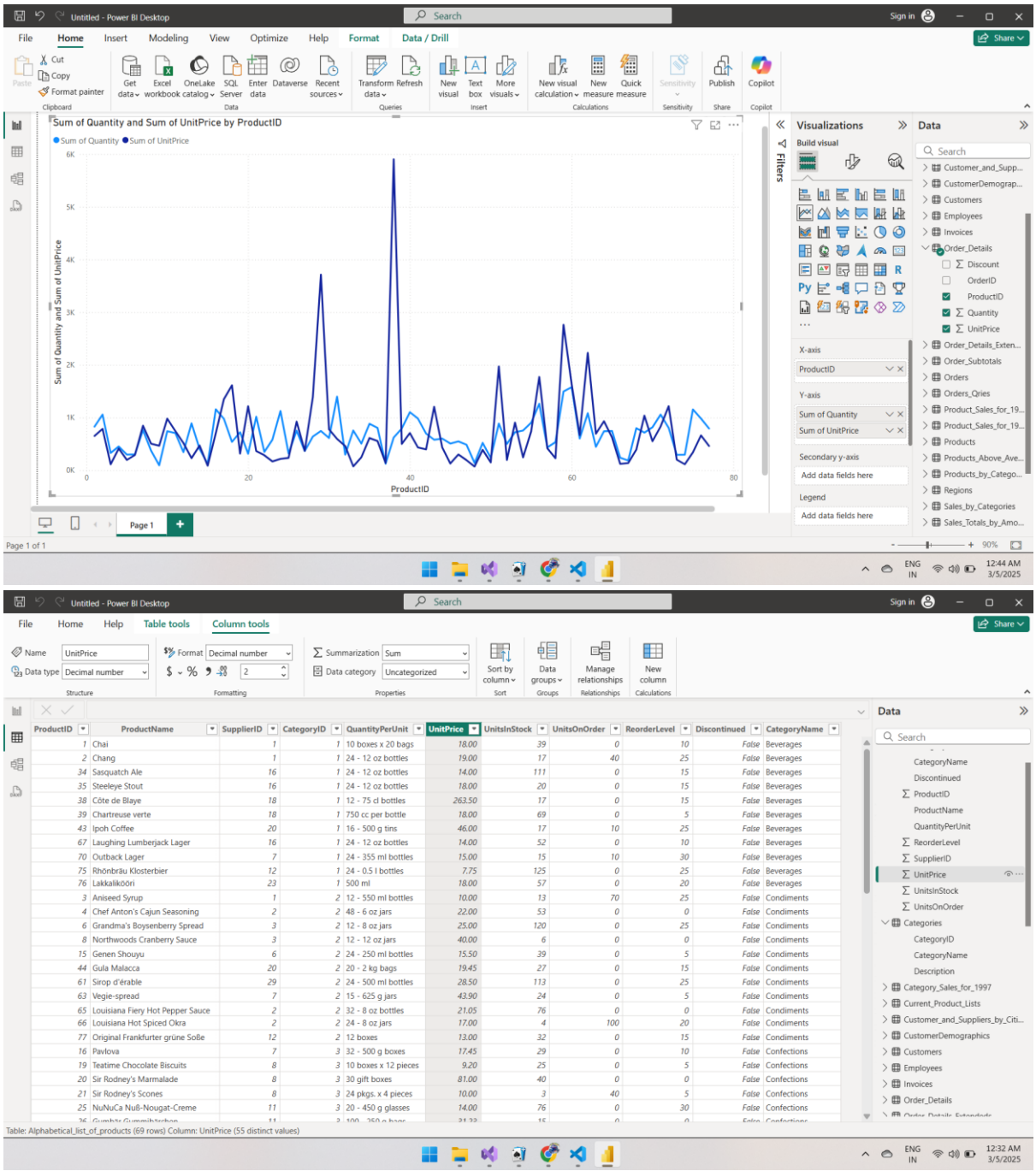




1: Create charts showing Units in Stock by Product and Total Sales by Year

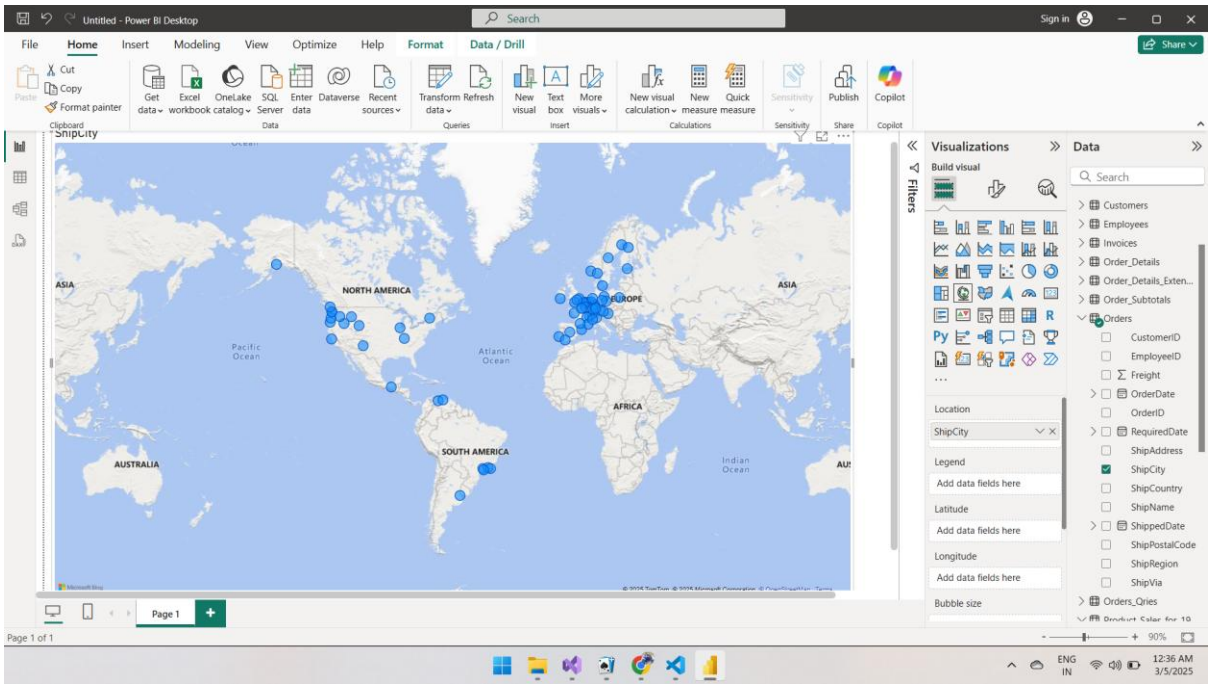


2. Drag OrderDate to the canvas beneath in the first chart, then drag line total (again, from the fields, pane) on to the visual, then select line chart. The following visualization created.



3. Next, drag Ship Country to a space on the canvas in the top right. Because you selected a geographic field, a map was created automatically. Now drag Line Total to the Values field; the circles on the map for each country are now relative in site to the Line Total for orders shipped to that country.

STEP 2: Interact with your report visuals to analyze further



Step 3: Creating Relationships with tables.