Assignment-2

Python Programming

Assignment Date	19 September 2022
Student Name	P.Selin Prabavathy
Student Roll Number	962719106031
Maximum Marks	2Marks

Question-1:

Download the dataset

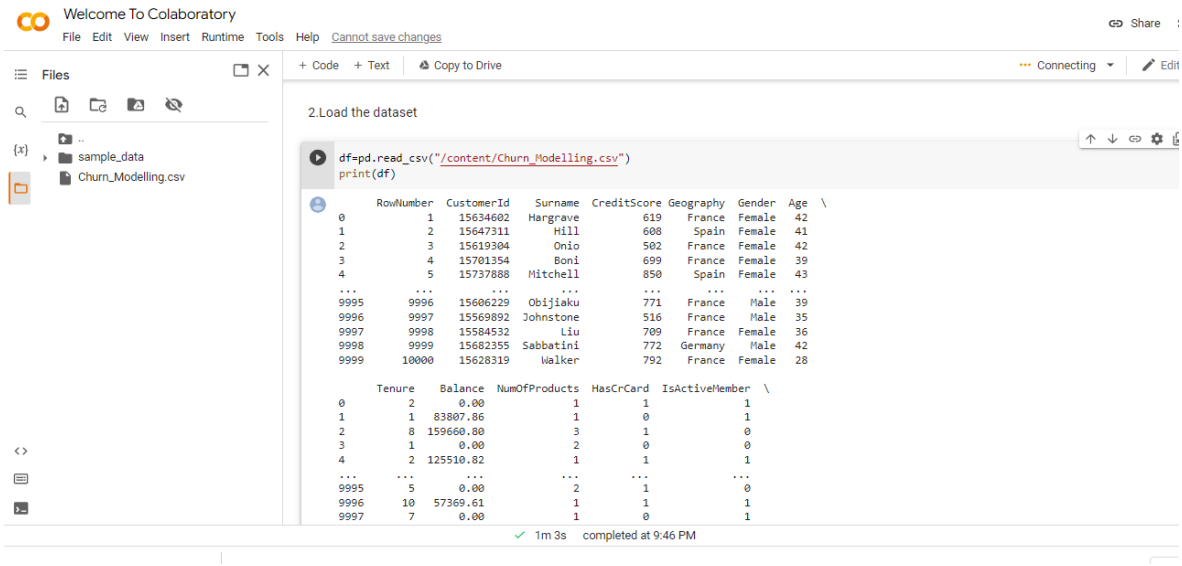
Link:- https://drive.google.com/file/d/15dFx93Pnri_PIPTMGyrs_9d8jcqKPuzF/view?usp=sharing

Question-2:

Load the dataset

Solution:

```
df=pd.read_csv("/content/Churn_Modelling.csv")
print(df)
df.info()
df.describe()
import matplotlib.pyplot as plt
import seaborn as sns
import math
df.isna().sum()
df.isnull().sum()
```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sample_data
Churn_Modelling.csv
2.Load the dataset
df=pd.read_csv("/content/Churn_Modelling.csv")
print(df)
RowNumber CustomerId Surname CreditScore Geography Gender Age \
0 1 15634602 Hargrave 619 France Female 42
1 2 15647311 Hill 608 Spain Female 41
2 3 15619304 Onio 502 France Female 42
3 4 15701354 Boni 699 France Female 39
4 5 15737888 Mitchell 850 Spain Female 43
... ...
9995 9996 15606229 Obijiaku 771 France Male 39
9996 9997 15569892 Johnstone 516 France Male 35
9997 9998 15584532 Liu 709 France Female 36
9998 9999 15682355 Sabbatini 772 Germany Male 42
9999 10000 15628319 Walker 792 France Female 28
Tenure Balance NumOfProducts HasCrCard IsActiveMember \
0 2 0.00 1 1 1
1 1 83807.86 1 0 1
2 8 159660.80 3 1 0
3 1 0.00 2 0 0
4 2 125510.82 1 1 1
... ...
9995 5 0.00 2 1 0
9996 10 57369.61 1 1 1
9997 7 0.00 1 0 1
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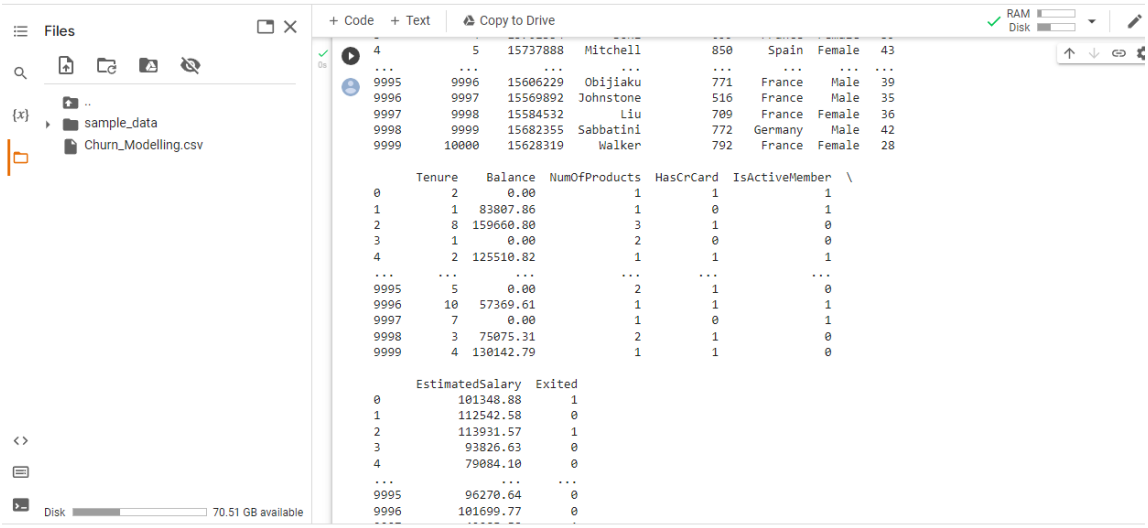
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sample_data
Churn_Modelling.csv
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4 5 15737888 Mitchell 850 Spain Female 43
9995 9996 15606229 Obijiaku 771 France Male 39
9996 9997 15569892 Johnstone 516 France Male 35
9997 9998 15584532 Liu 709 France Female 36
9998 9999 15682355 Sabbatini 772 Germany Male 42
9999 10000 15628319 Walker 792 France Female 28
Tenure Balance NumOfProducts HasCrCard IsActiveMember
0 2 0.00 1 1 1
1 1 83807.86 1 0 1
2 8 159660.80 3 1 0
3 1 0.00 2 0 0
4 2 125510.82 1 1 1
9995 5 0.00 2 1 0
9996 10 57369.61 1 1 1
9997 7 0.00 1 0 1
9998 3 75075.31 2 1 0
9999 4 130142.79 1 1 0
EstimatedSalary Exited
0 101348.88 1
1 112542.58 0
2 113931.57 1
3 93826.63 0
4 79084.10 0
9995 96270.64 0
9996 101699.77 0
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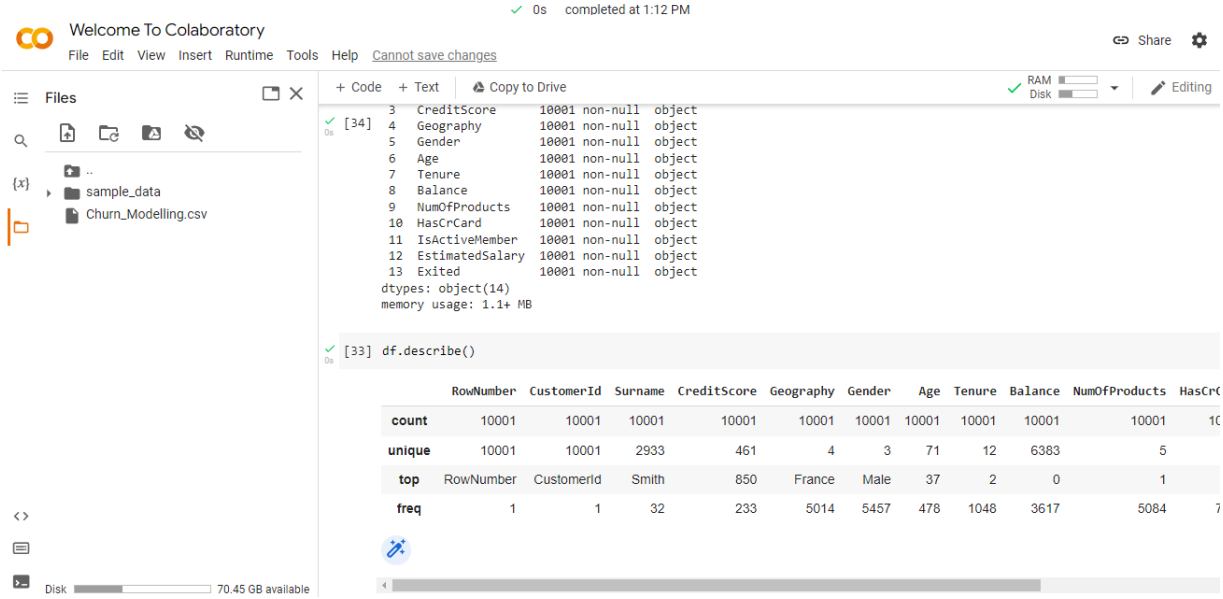
Welcome To Colaboratory
File Edit View Insert Runtime Tools Help Cannot save changes
Share
Files
+ Code
+ Text
Copy to Drive
RAM
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Editing
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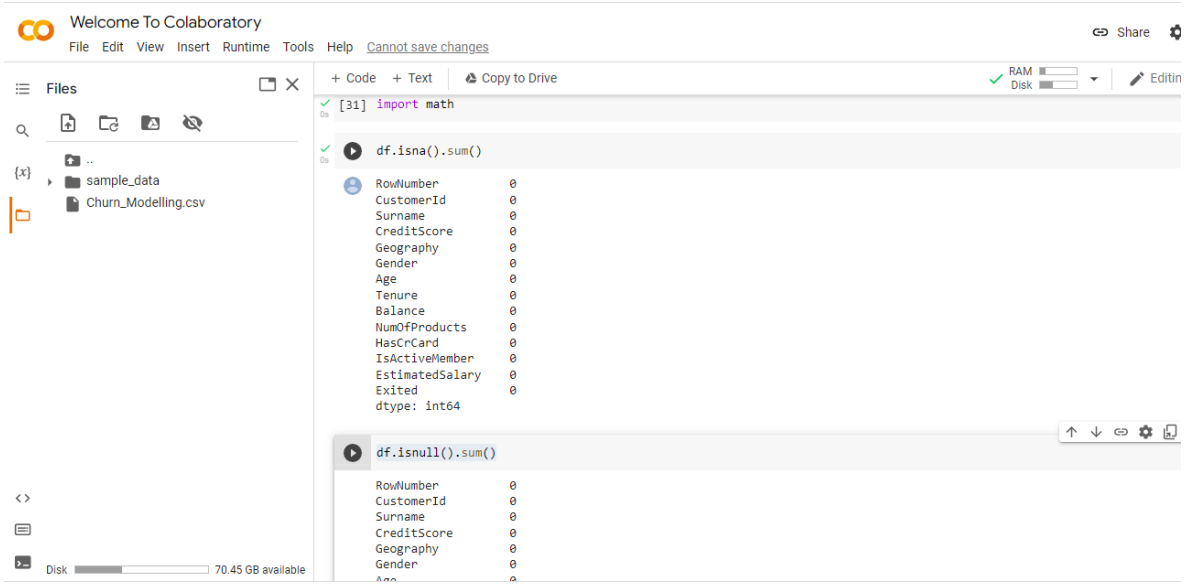
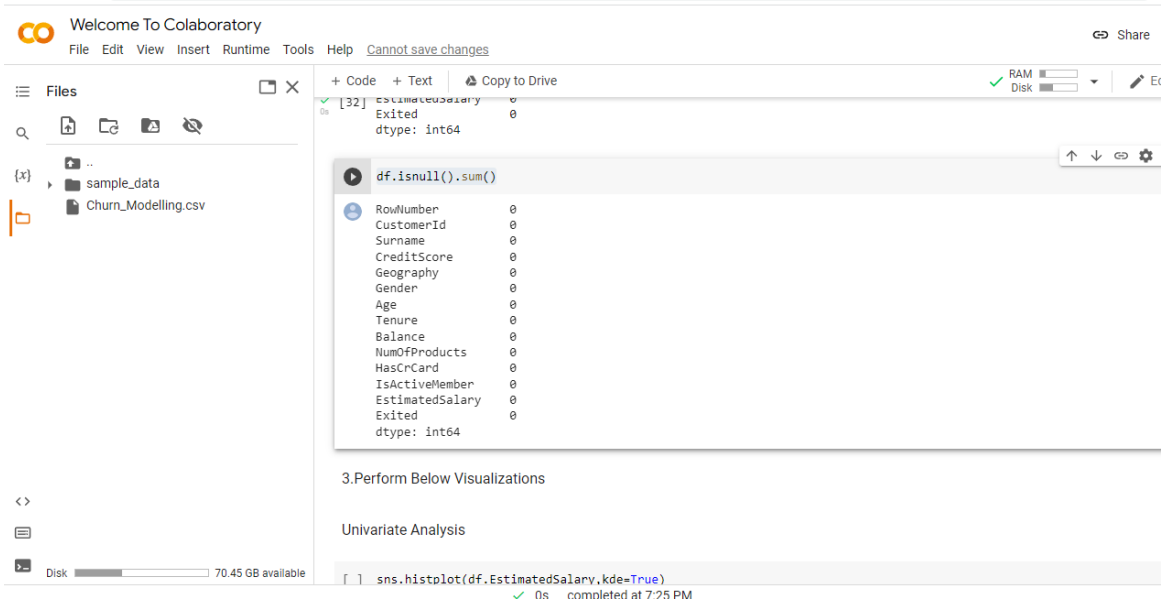
sample_data
Churn_Modelling.csv
Disk
70.45 GB available
[34]
3 CreditScore 10001 non-null object
4 Geography 10001 non-null object
5 Gender 10001 non-null object
6 Age 10001 non-null object
7 Tenure 10001 non-null object
8 Balance 10001 non-null object
9 NumOfProducts 10001 non-null object
10 HasCrCard 10001 non-null object
11 IsActiveMember 10001 non-null object
12 EstimatedSalary 10001 non-null object
13 Exited 10001 non-null object
dtypes: object(14)
memory usage: 1.1+ MB
[33] df.describe()
RowNumber CustomerId Surname CreditScore Geography Gender Age Tenure Balance NumOfProducts HasCrC
count 10001 10001 10001 10001 10001 10001 10001 10001 10001 10001 1
unique 10001 10001 2933 461 4 3 71 12 6383 5
top RowNumber CustomerId Smith 850 France Male 37 2 0 1
freq 1 1 32 233 5014 5457 478 1048 3617 5084





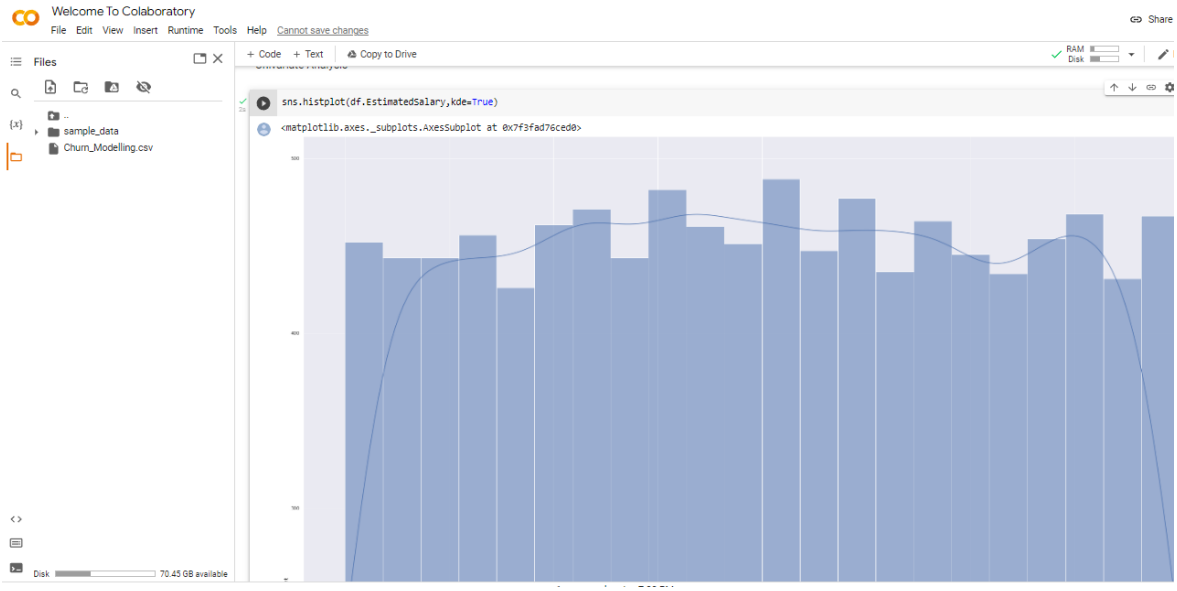
Question-3:

Perform Below Visualizations

*Univariate Analysis

Solution:

```
sns.histplot(df.EstimatedSalary,kde=True
```

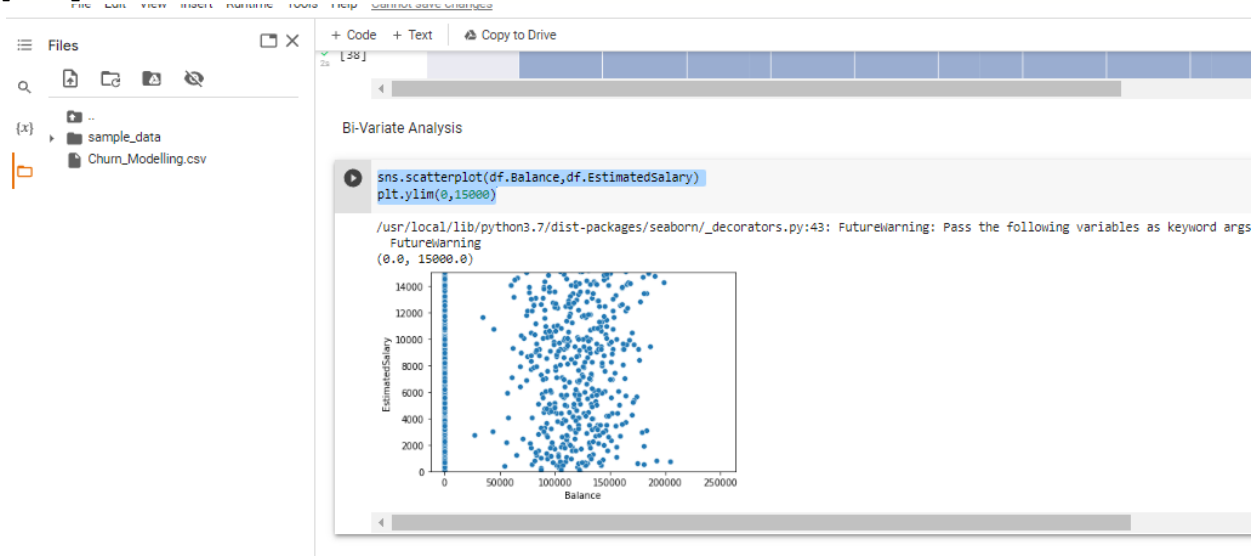


*Bivariate Analysis

Solution:

```
sns.scatterplot(df.Balance,df.EstimatedSalary)

plt.ylim(0,15000)
```

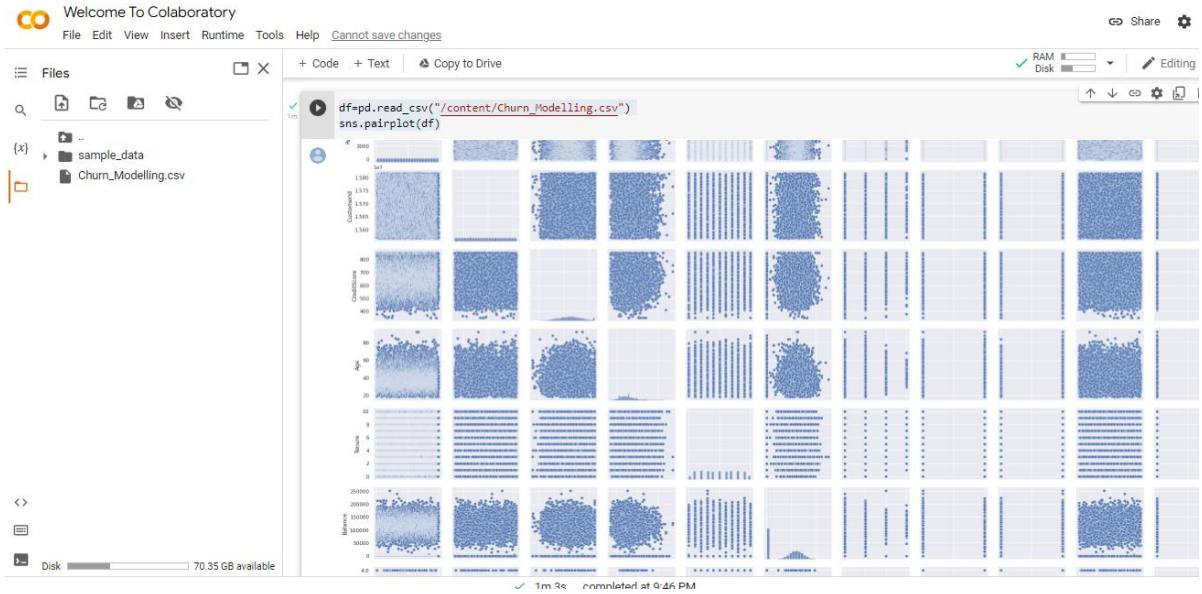


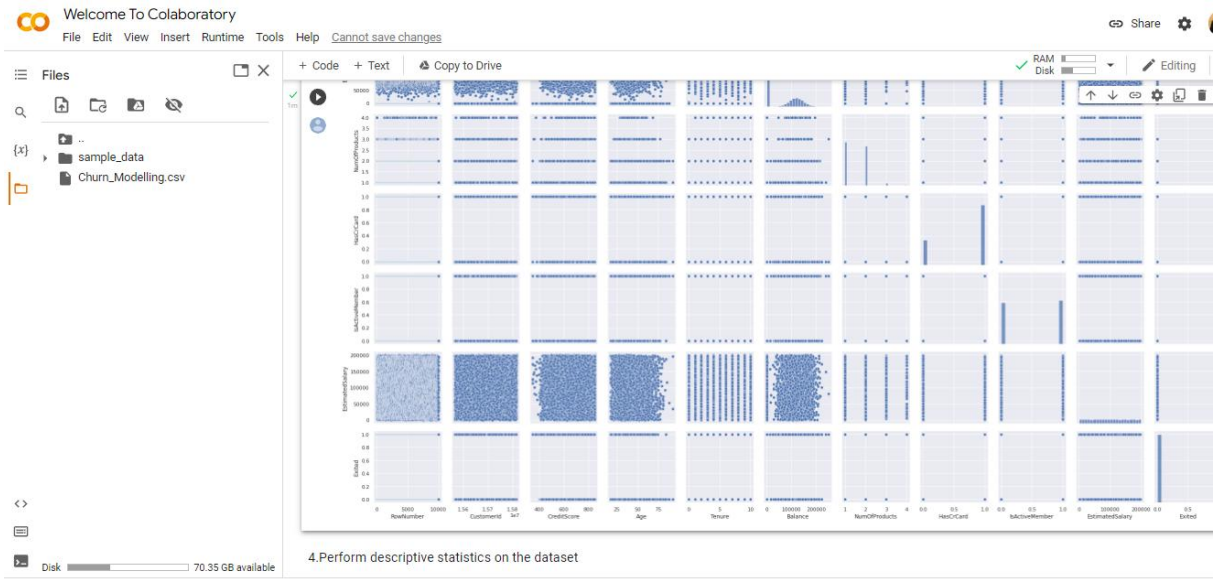
*Multi-Variate Analysis

Solution:

```
df=pd.read_csv("/content/Churn_Modelling.csv")

sns.pairplot(df)
```



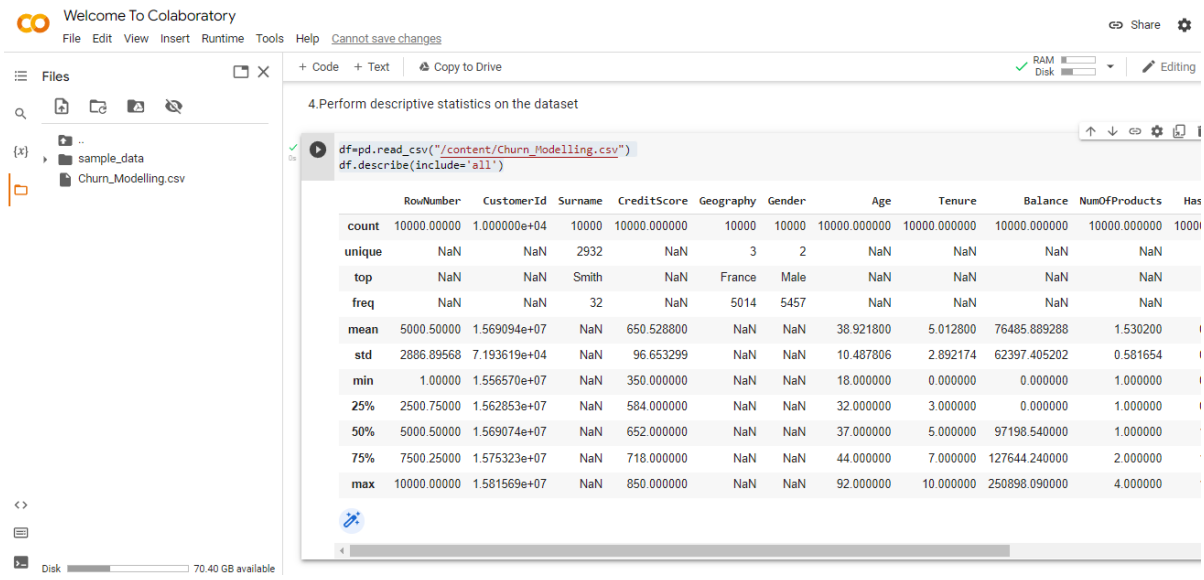


Question-4:

Perform descriptive statistics on the dataset

Solution:

```
df=pd.read_csv("/content/Churn_Modelling.csv")
df.describe(include='all')
```



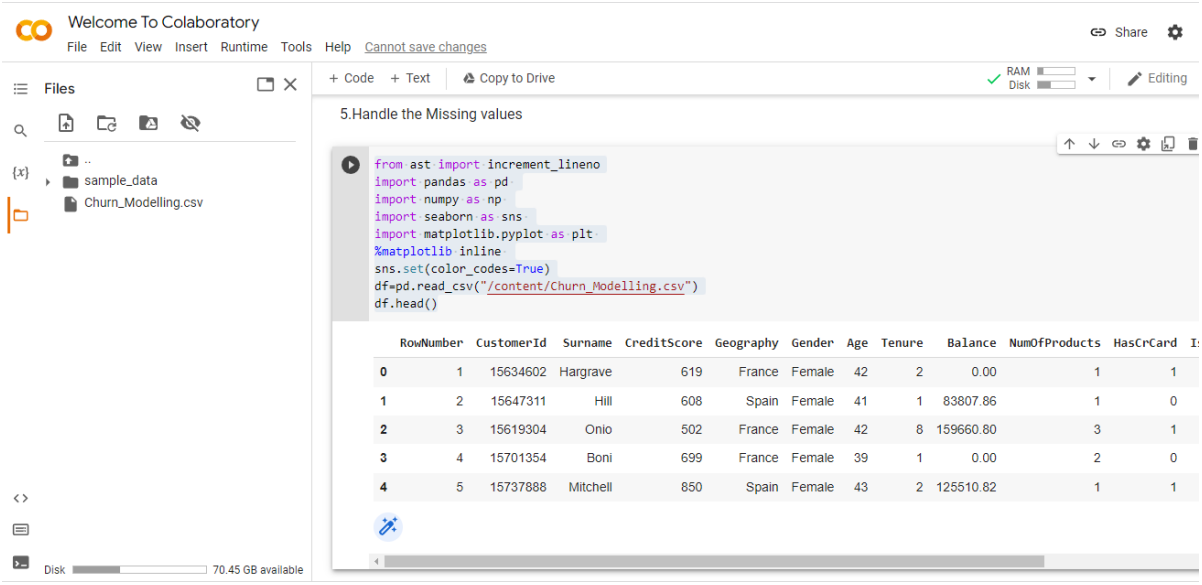
	RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	Tenure	Balance	NumOfProducts	Has
count	10000.00000	1.000000e+04	10000	10000.000000	10000	10000	10000.000000	10000.000000	10000.000000	10000.000000	1000
unique	NaN	NaN	2932	NaN	3	2	NaN	NaN	NaN	NaN	
top	NaN	NaN	Smith	NaN	France	Male	NaN	NaN	NaN	NaN	
freq	NaN	NaN	32	NaN	5014	5457	NaN	NaN	NaN	NaN	
mean	5000.50000	1.569094e+07	NaN	650.528800	NaN	NaN	38.921800	5.012800	76485.889288	1.530200	
std	2886.89568	7.193619e+04	NaN	96.653299	NaN	NaN	10.487806	2.892174	62397.405202	0.581654	
min	1.00000	1.556570e+07	NaN	350.000000	NaN	NaN	18.000000	0.000000	0.000000	1.000000	
25%	2500.75000	1.562853e+07	NaN	584.000000	NaN	NaN	32.000000	3.000000	0.000000	1.000000	
50%	5000.50000	1.569074e+07	NaN	652.000000	NaN	NaN	37.000000	5.000000	97198.540000	1.000000	
75%	7500.25000	1.575323e+07	NaN	718.000000	NaN	NaN	44.000000	7.000000	127644.240000	2.000000	
max	10000.00000	1.581569e+07	NaN	850.000000	NaN	NaN	92.000000	10.000000	250898.090000	4.000000	

Question-5:

Handle the Missing Values

Solution:

```
from ast import increment_lineno
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
%matplotlib inline
sns.set(color_codes=True)
df=pd.read_csv("/content/Churn_Modelling.csv")
df.head()
```



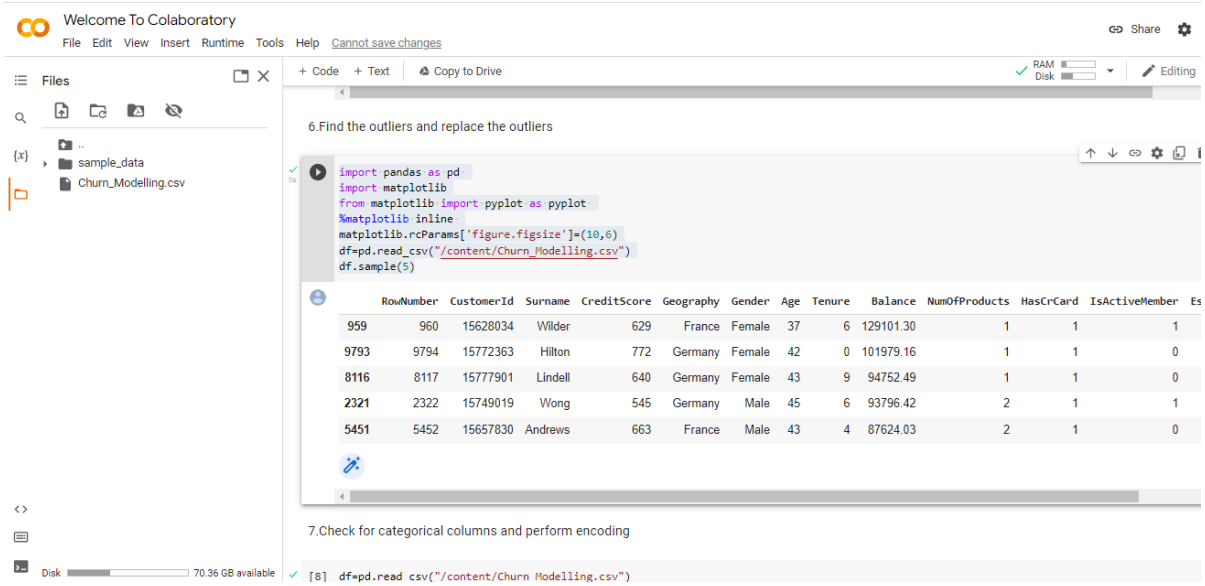
	RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	Tenure	Balance	NumOfProducts	HasCrCard	I
0	1	15634602	Hargrave	619	France	Female	42	2	0.00	1	1	
1	2	15647311	Hill	608	Spain	Female	41	1	83807.86	1	0	
2	3	15619304	Onio	502	France	Female	42	8	159660.80	3	1	
3	4	15701354	Boni	699	France	Female	39	1	0.00	2	0	
4	5	15737888	Mitchell	850	Spain	Female	43	2	125510.82	1	1	

Question-6:

Find the outliers and replace the outliers

Solution:

```
import pandas as pd
import matplotlib
from matplotlib import pyplot as pyplot
%matplotlib inline
matplotlib.rcParams['figure.figsize']=(10,6)
df=pd.read_csv("/content/Churn_Modelling.csv")
df.sample(5)
```

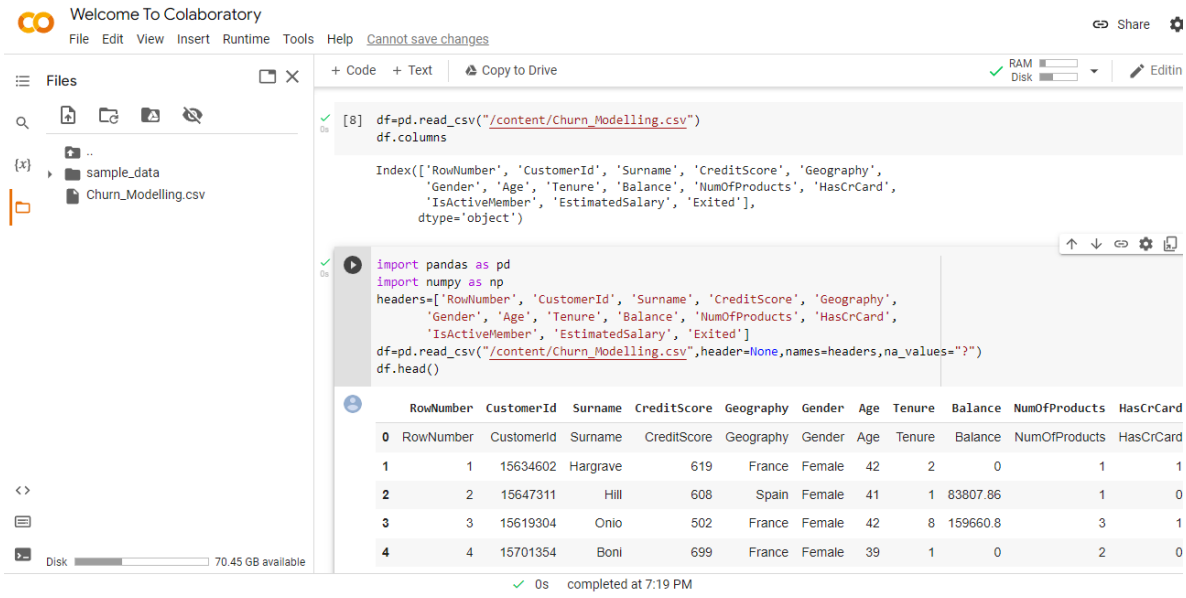


Question-7:

Check for Categorical columns and perform encoding

Solution:

```
df=pd.read_csv("/content/Churn_Modelling.csv")
df.columns
import pandas as pd
import numpy as np
headers=['RowNumber', 'CustomerId', 'Surname', 'CreditScore', 'Geography',
       'Gender', 'Age', 'Tenure', 'Balance', 'NumOfProducts', 'HasCrCard',
       'IsActiveMember', 'EstimatedSalary', 'Exited']
df=pd.read_csv("/content/Churn_Modelling.csv",header=None,names=headers,na
_values="?")
df.head()
```

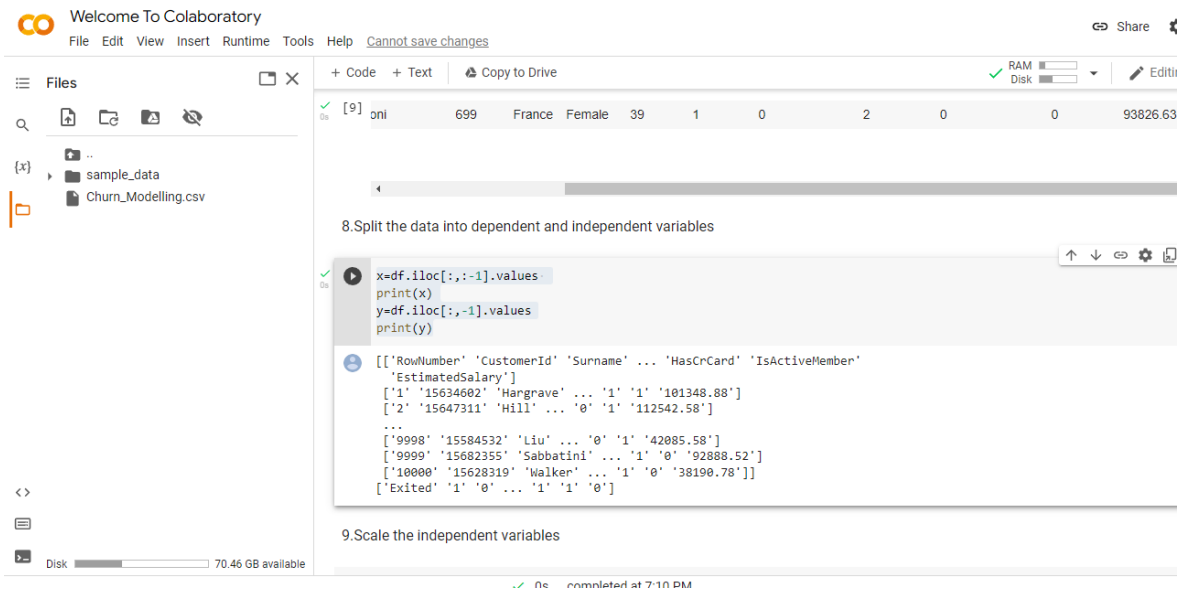


Question-8:

Split the data into dependent and independent variables

Solution:

```
x=df.iloc[:,:-1].values
print(x)
y=df.iloc[:,-1].values
print(y)
```

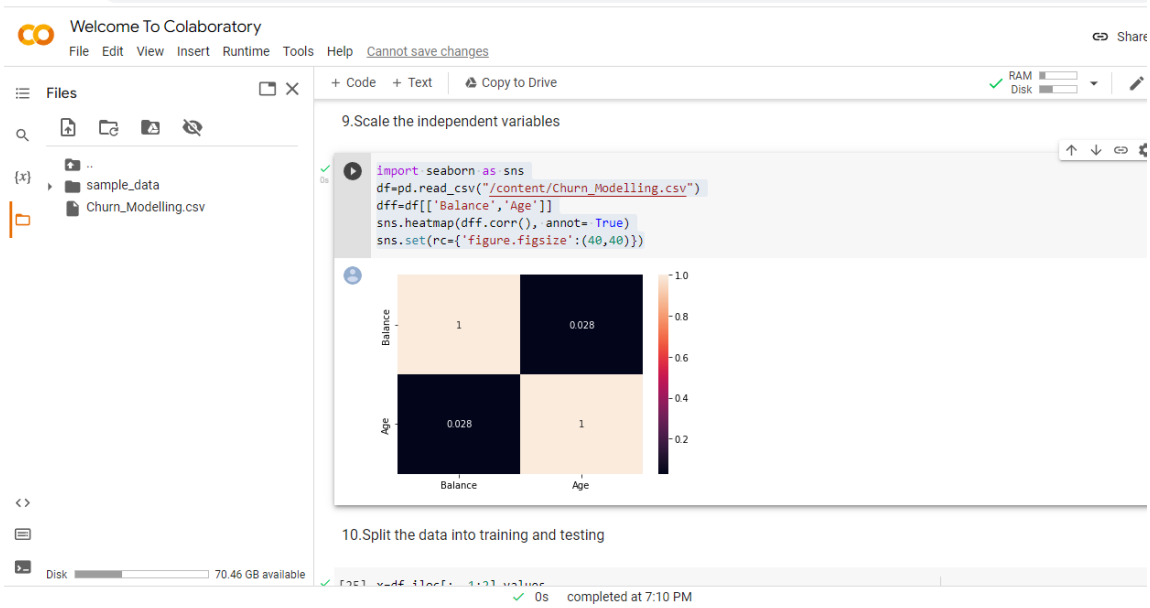


Question-9:

Scale the independent variables

Solution:

```
import seaborn as sns
df=pd.read_csv("/content/Churn_Modelling.csv")
dff=df[['Balance','Age']]
sns.heatmap(dff.corr(), annot= True)
sns.set(rc={'figure.figsize':(40,40)})
```

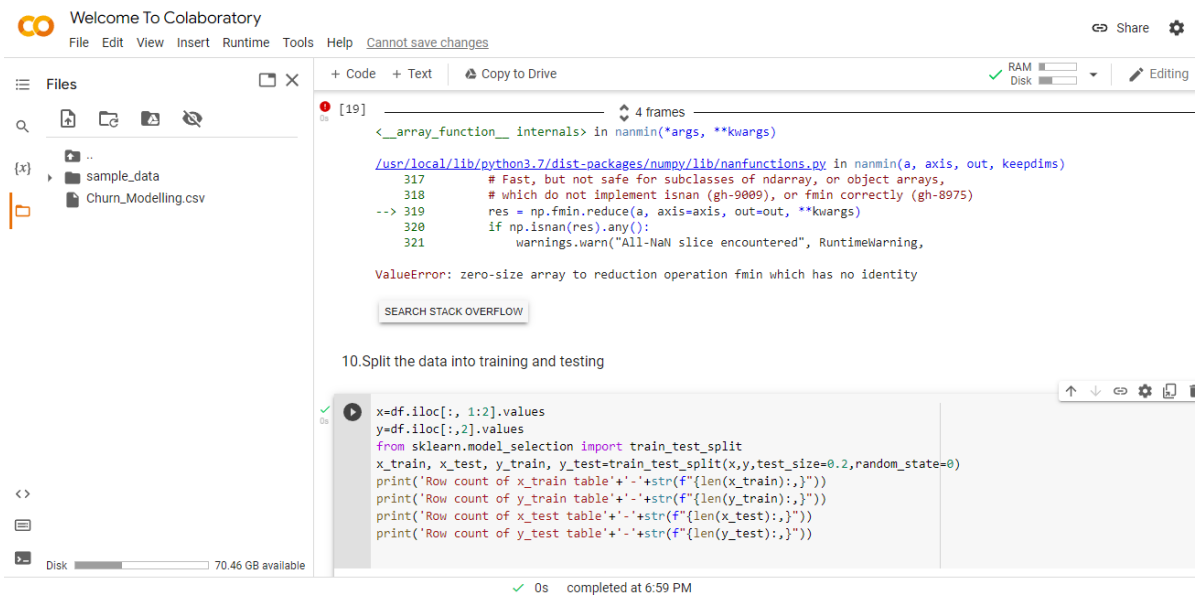


Question-10

Split the data into training and testing

Solution:

```
x=df.iloc[:, 1:2].values
y=df.iloc[:,2].values
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test=train_test_split(x,y,test_size=0.2,random
_state=0)
print('Row count of x_train table'+'-'+str(f"{len(x_train):,}"))
print('Row count of y_train table'+'-'+str(f"{len(y_train):,}"))
print('Row count of x_test table'+'-'+str(f"{len(x_test):,}"))
print('Row count of y_test table'+'-'+str(f"{len(y_test):,}"))
```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[19]
4 frames
<__array_function__ internals> in nanmin(*args, **kwargs)
/usr/local/lib/python3.7/dist-packages/numpy/lib/nanfunctions.py in nanmin(a, axis, out, keepdims)
317 # Fast, but not safe for subclasses of ndarray, or object arrays,
318 # which do not implement isnan (gh-9009), or fmin correctly (gh-8975)
--> 319 res = np.fmin.reduce(a, axis=axis, out=out, **kwargs)
320 if np.isnan(res).any():
321 warnings.warn("All-NaN slice encountered", RuntimeWarning,
ValueError: zero-size array to reduction operation fmin which has no identity
SEARCH STACK OVERFLOW
10.Split the data into training and testing
x=df.iloc[:, 1:2].values
y=df.iloc[:,2].values
from sklearn.model_selection import train_test_split
x_train, x_test, y_train, y_test=train_test_split(x,y,test_size=0.2,random_state=0)
print('Row count of x_train table'+'-'+str(f"{len(x_train):,}"))
print('Row count of y_train table'+'-'+str(f"{len(y_train):,}"))
print('Row count of x_test table'+'-'+str(f"{len(x_test):,}"))
print('Row count of y_test table'+'-'+str(f"{len(y_test):,}"))
..
sample_data
Churn_Modelling.csv
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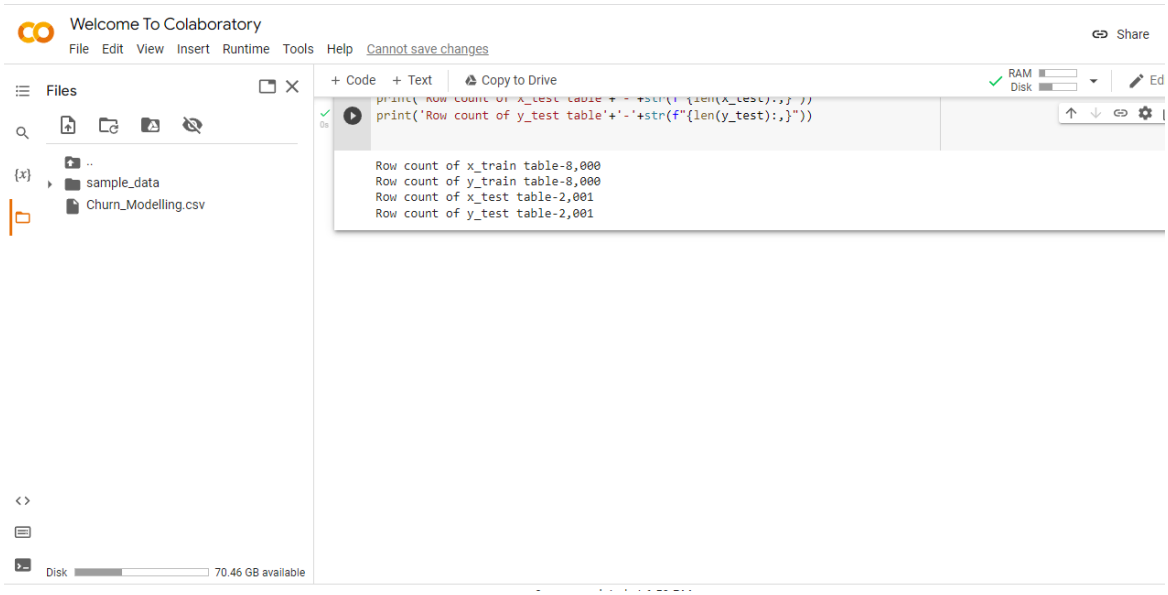
Welcome To Colaboratory
File Edit View Insert Runtime Tools Help Cannot save changes
Share
Files
+ Code + Text Copy to Drive
RAM
Disk
print('Row count of y_test table'+'-'+str(f"{len(y_test):,}"))
Row count of x_train table-8,000
Row count of y_train table-8,000
Row count of x_test table-2,001
Row count of y_test table-2,001
..
sample_data
Churn_Modelling.csv
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