

## ASSIGNMENT 2

### Python programming

Assignment date:26.09.2022

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Student Roll Number:923819106001

Maximum Marks:2 Mark

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

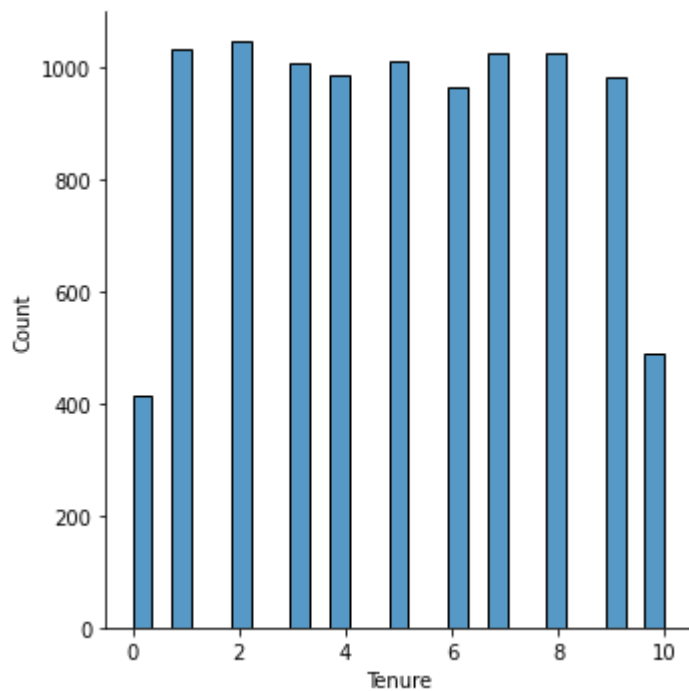
	RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	Tenure
0	1	15634602	Hargrave	619	France	Female	42	1
1	2	15647311	Hill	608	Spain	Female	41	1
2	3	15619304	Onio	502	France	Female	42	1
3	4	15701354	Boni	699	France	Female	39	1
4	5	15737888	Mitchell	850	Spain	Female	43	1
...	...	...	...	...	...	...	...	...
9995	9996	15606229	Obijiaku	771	France	Male	39	1
9996	9997	15569892	Johnstone	516	France	Male	35	10
9997	9998	15584532	Liu	709	France	Female	36	1
9998	9999	15682355	Sabbatini	772	Germany	Male	42	1
9999	10000	15628319	Walker	792	France	Female	28	1

10000 rows × 14 columns



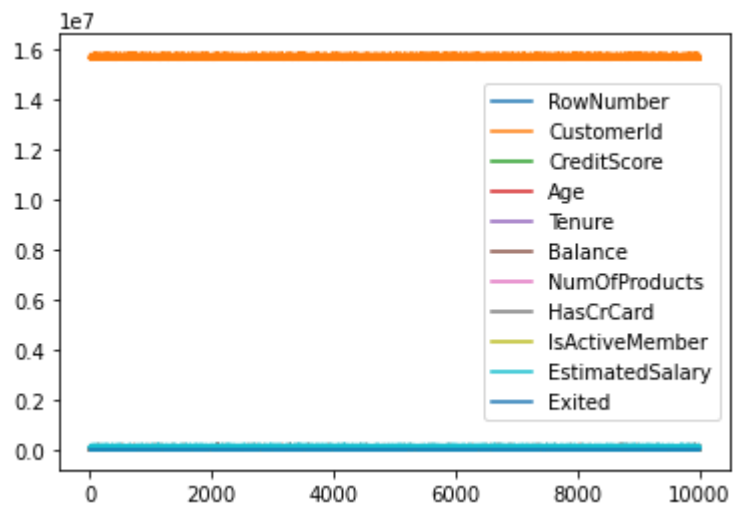
```
sns.displot(df.Tenure)
```

<seaborn.axisgrid.FacetGrid at 0x7f906f885510>



df.plot.line()

<matplotlib.axes.\_subplots.AxesSubplot at 0x7f905a6079d0>



sns.lmplot("Age", "NumOfProducts", df, hue="NumOfProducts", fit\_reg=False);

/usr/local/lib/python3.7/dist-packages/seaborn/\_decorators.py:43: FutureWarning: P  
FutureWarning



df.describe()

	RowNumber	CustomerId	CreditScore	Age	Tenure	Ba
<b>count</b>	10000.00000	1.000000e+04	10000.000000	10000.000000	10000.000000	10000.0
<b>mean</b>	5000.50000	1.569094e+07	650.528800	38.921800	5.012800	76485.8
<b>std</b>	2886.89568	7.193619e+04	96.653299	10.487806	2.892174	62397.4
<b>min</b>	1.00000	1.556570e+07	350.000000	18.000000	0.000000	0.0
<b>25%</b>	2500.75000	1.562853e+07	584.000000	32.000000	3.000000	0.0
<b>50%</b>	5000.50000	1.569074e+07	652.000000	37.000000	5.000000	97198.5
<b>75%</b>	7500.25000	1.575323e+07	718.000000	44.000000	7.000000	127644.2
<b>max</b>	10000.00000	1.581569e+07	850.000000	92.000000	10.000000	250898.0

```
data = pd.read_csv("Churn_Modelling.csv")
pd.isnull(data["Gender"])
```

```
0      False
1      False
2      False
3      False
4      False
...
9995   False
9996   False
9997   False
9998   False
9999   False
Name: Gender, Length: 10000, dtype: bool
```

```
df["Tenure"] = np.where(df["Tenure"] > 10, np.median(df["Tenure"]))
df["Tenure"]
```

```
0      2
```

```

1      1
2      8
3      1
4      2
..
9995   5
9996  10
9997   7
9998   3
9999   4

```

Name: Tenure, Length: 10000, dtype: object

```

pd.get_dummies(df, columns=["Gender", "Age"], prefix=["Age", "Gender"])
df.head()

```

	RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	Tenure
0	0.0000	15634602	Hargrave	619	France	Female	42	2
1	0.0001	15647311	Hill	608	Spain	Female	41	1
2	0.0002	15619304	Onio	502	France	Female	42	8
3	0.0003	15701354	Boni	699	France	Female	39	1
4	0.0004	15737888	Mitchell	850	Spain	Female	43	2

```

X = df.iloc[:, :-2].values
print(X)

```

```

[[1 15634602 'Hargrave' ... 1 1 1]
 [2 15647311 'Hill' ... 1 0 1]
 [3 15619304 'Onio' ... 3 1 0]
 ...
 [9998 15584532 'Liu' ... 1 0 1]
 [9999 15682355 'Sabbatini' ... 2 1 0]
 [10000 15628319 'Walker' ... 1 1 0]]

```

```

Y = df.iloc[:, -1].values
print(Y)

```

```
[1 0 1 ... 1 1 0]
```

```

import pandas as pd
from sklearn.preprocessing import MinMaxScaler
scaler = MinMaxScaler()
df[["RowNumber"]] = scaler.fit_transform(df[["RowNumber"]])
print(df)

```

	RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	\
0	0.0000	15634602	Hargrave	619	France	Female	42	
1	0.0001	15647311	Hill	608	Spain	Female	41	

2	0.0002	15619304	Onio	502	France	Female	42
3	0.0003	15701354	Boni	699	France	Female	39
4	0.0004	15737888	Mitchell	850	Spain	Female	43
...	...	...	...	...	...	...	...
9995	0.9996	15606229	Obijiaku	771	France	Male	39
9996	0.9997	15569892	Johnstone	516	France	Male	35
9997	0.9998	15584532	Liu	709	France	Female	36
9998	0.9999	15682355	Sabbatini	772	Germany	Male	42
9999	1.0000	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
9997	42085.58	1
9998	92888.52	1
9999	38190.78	0

[10000 rows x 14 columns]

```

from sklearn.model_selection import train_test_split
train_size=0.8
X = df.drop(columns = ['Tenure']).copy()
y = df['Tenure']
X_train, X_rem, y_train, y_rem = train_test_split(X,y, train_size=0.8)
test_size = 0.5
X_valid, X_test, y_valid, y_test = train_test_split(X_rem,y_rem, test_size=0.5)
print(X_train.shape), print(y_train.shape)
print(X_valid.shape), print(y_valid.shape)
print(X_test.shape), print(y_test.shape)

```

```

(8000, 13)
(8000,)
(1000, 13)
(1000,)
(1000, 13)

```

(1000,)  
(None, None)

[Colab paid products](#) - [Cancel contracts here](#)

