In [1]:

```
from mpl_toolkits.mplot3d import Axes3D
from sklearn.preprocessing import StandardScaler
import matplotlib.pyplot as plt # plotting
import numpy as np # linear algebra
import os # accessing directory structure
import pandas as pd # data processing, CSV file I/O (e.g. pd.read_csv)

```

There is 1 csv file in the current version of the dataset:

In [2]:

```
print(os.listdir('../input'))
```

```
['Churn_Modelling.csv']
```

The next hidden code cells define functions for plotting data. Click on the "Code" button in the published kernel to reveal the hidden code.

In [3]:

```
# Distribution graphs (histogram/bar graph) of column data
def plotPerColumnDistribution(df, nGraphShown, nGraphPerRow):
    nunique = df.nunique()
    df = df[[col for col in df if nunique[col] > 1 and nunique[col] < 5
    nRow, nCol = df.shape
    columnNames = list(df)
    nGraphRow = (nCol + nGraphPerRow - 1) / nGraphPerRow
    plt.figure(num = None, figsize = (6 * nGraphPerRow, 8 * nGraphRow),
    for i in range(min(nCol, nGraphShown)):
        plt.subplot(nGraphRow, nGraphPerRow, i + 1)
        columnDf = df.iloc[:, i]
        if (not np.issubdtype(type(columnDf.iloc[0]), np.number)):
            valueCounts = columnDf.value_counts()
            valueCounts.plot.bar()
        else:
            columnDf.hist()
        plt.ylabel('counts')
        plt.xticks(rotation = 90)
        plt.title(f'{columnNames[i]} (column {i})')
    plt.tight_layout(pad = 1.0, w_pad = 1.0, h_pad = 1.0)
    plt.show()

```

In [4]:

```
# Correlation matrix
def plotCorrelationMatrix(df, graphWidth):
    filename = df.dataframeName
    df = df.dropna('columns') # drop columns with NaN
    df = df[[col for col in df if df[col].nunique() > 1]] # keep columr
    if df.shape[1] < 2:
        print(f'No correlation plots shown: The number of non-NaN or cc
        return
    corr = df.corr()
    plt.figure(num=None, figsize=(graphWidth, graphWidth), dpi=80, face
    corrMat = plt.matshow(corr, fignum = 1)
    plt.xticks(range(len(corr.columns)), corr.columns, rotation=90)
    plt.yticks(range(len(corr.columns)), corr.columns)
    plt.gca().xaxis.tick_bottom()
    plt.colorbar(corrMat)
    plt.title(f'Correlation Matrix for {filename}', fontsize=15)
    plt.show()

```

In [5]:

```
# Scatter and density plots
def plotScatterMatrix(df, plotSize, textSize):
    df = df.select_dtypes(include =[np.number]) # keep only numerical c
    # Remove rows and columns that would lead to df being singular
    df = df.dropna('columns')
    df = df[[col for col in df if df[col].nunique() > 1]] # keep columr
    columnNames = list(df)
    if len(columnNames) > 10: # reduce the number of columns for matrix
        columnNames = columnNames[:10]
    df = df[columnNames]
    ax = pd.plotting.scatter_matrix(df, alpha=0.75, figsize=[plotSize,
    corrs = df.corr().values
    for i, j in zip(*plt.np.triu_indices_from(ax, k = 1)):
        ax[i, j].annotate('Corr. coef = %.3f' % corrs[i, j], (0.8, 0.2)
    plt.suptitle('Scatter and Density Plot')
    plt.show()

```

Now you're ready to read in the data and use the plotting functions to visualize the data.

Let's check 1st file: ../input/Churn_Modelling.csv

In [6]:

```
nRowsRead = 1000 # specify 'None' if want to read whole file
# Churn_Modelling.csv has 10001 rows in reality, but we are only loadir
df1 = pd.read_csv('../input/Churn_Modelling.csv', delimiter=',', nrows
df1.dataframeName = 'Churn_Modelling.csv'
nRow, nCol = df1.shape
print(f'There are {nRow} rows and {nCol} columns')
```

```
There are 1000 rows and 14 columns
```

Let's take a quick look at what the data looks like:

In [7]:

```
df1.head(5)
```

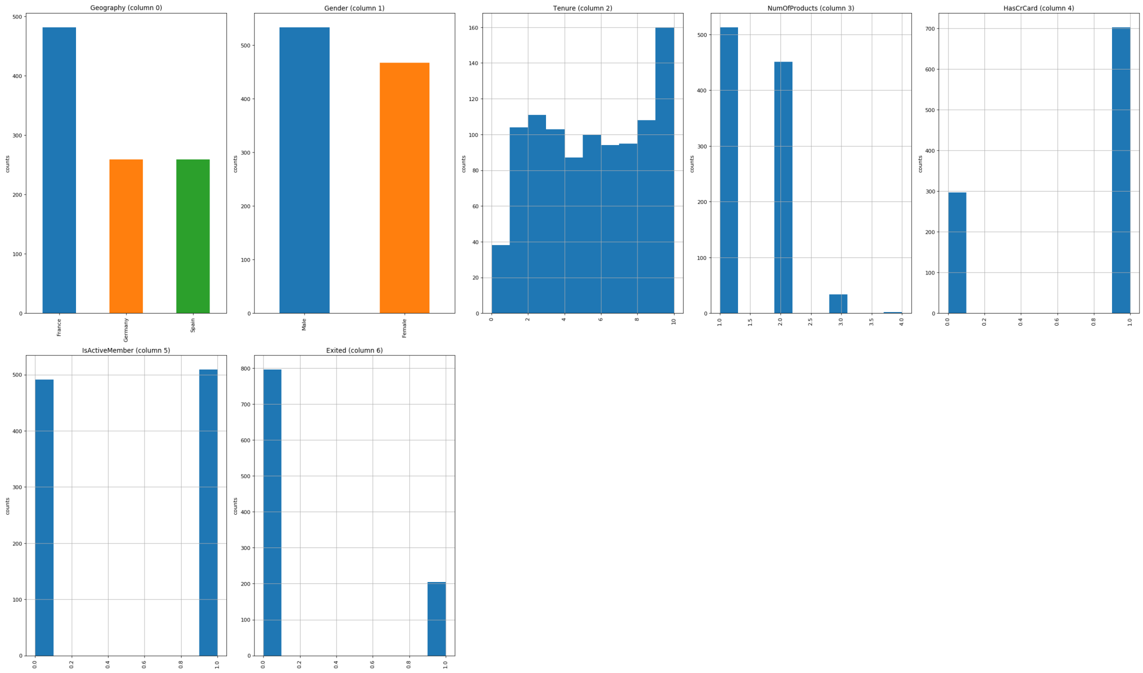
Out[7]:

	RowNumber	CustomerId	Surname	CreditScore	Geography	Gender	Age	Tenure	Bala
0	1	15634602	Hargrave	619	France	Female	42	2	
1	2	15647311	Hill	608	Spain	Female	41	1	8380
2	3	15619304	Onio	502	France	Female	42	8	15966
3	4	15701354	Boni	699	France	Female	39	1	
4	5	15737888	Mitchell	850	Spain	Female	43	2	12551

Distribution graphs (histogram/bar graph) of sampled columns:

In [8]:

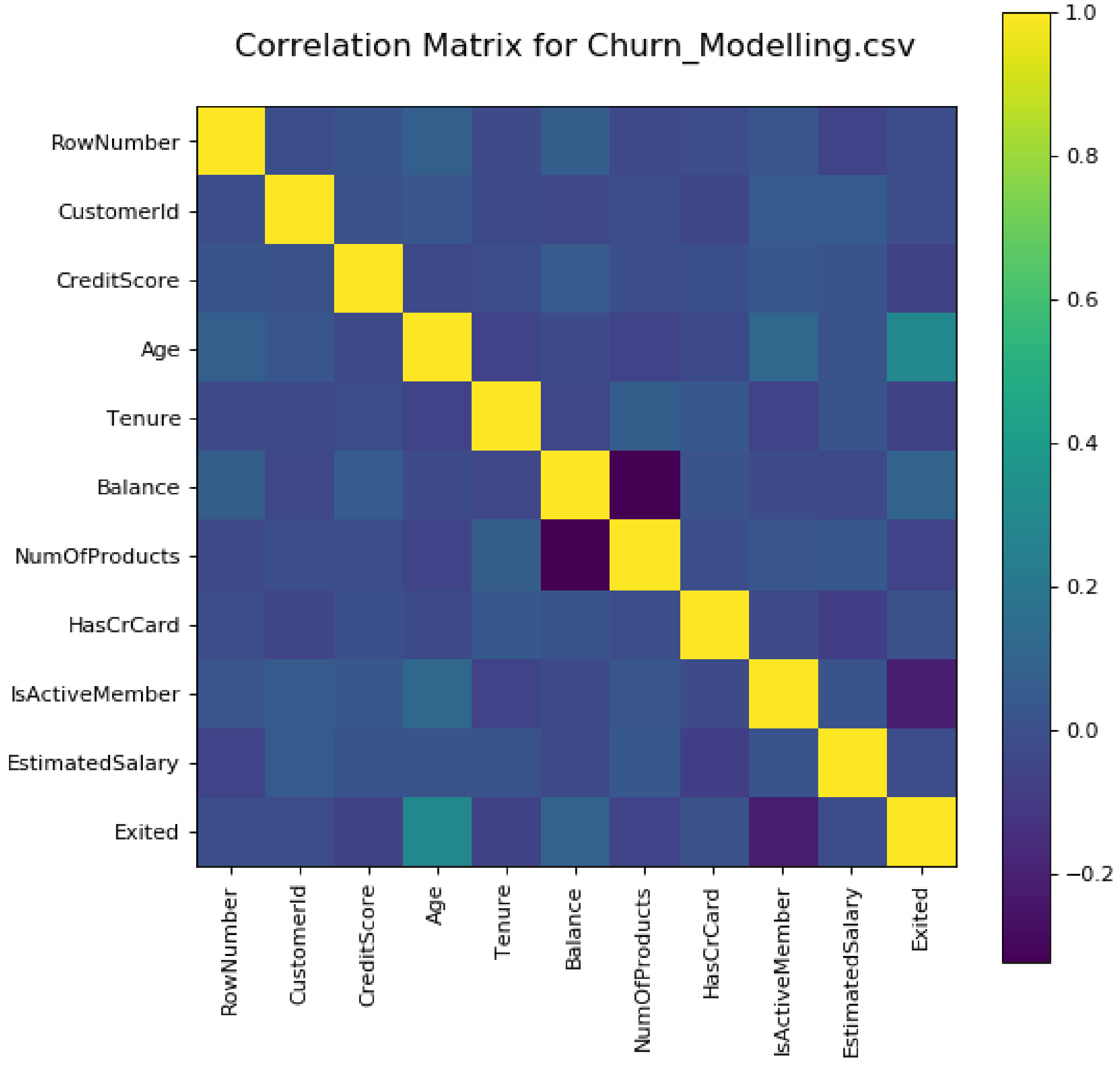
```
plotPerColumnDistribution(df1, 10, 5)
```



Correlation matrix:

In [9]:

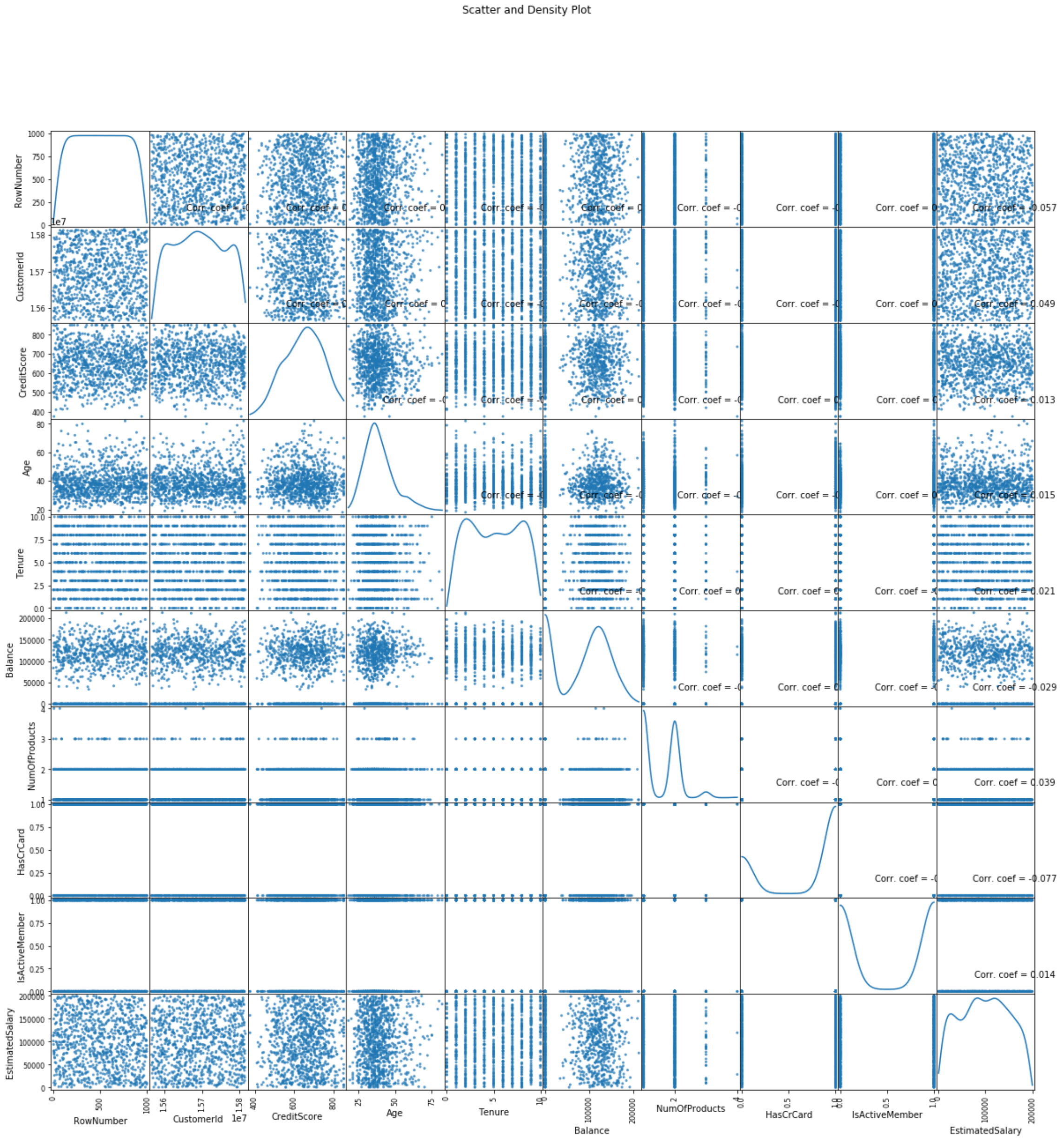
```
plotCorrelationMatrix(df1, 8)
```



Scatter and density plots:

In [10]:

```
plotScatterMatrix(df1, 20, 10)
```



Conclusion

This concludes your starter analysis! To go forward from here, click the blue "Edit Notebook" button at the top of the kernel. This will create a copy of the code and environment for you to edit. Delete, modify, and add code as you please. Happy Kaggling!