Happy Money

Love, Trust & Hustle

HAPPY MONEY- INTERN CASE

Happy Money Case - Anirudha Balkrishna

In [52]:
```
#IMPORTING REQUIRED LIBRARIES

import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
import sklearn
```

In [53]:
```
#LOAD THE DATA
from google.colab import files
print('\nUpload the Risk Dataset file')
file = files.upload()
df = pd.read_csv("risk_dataset.csv")
```

```
Upload the Risk Dataset file
```

Choose Files No file chosen

Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.

```
Saving risk_dataset.csv to risk_dataset (4).csv
```

In [54]:
```
#EXPLORE THE DATA

df.head(5)
```

Out[54]:

	Unnamed: 0	ID	FicoScore	CustomScore1	CustomScore2	CreditCardBalance	Inqur
0	1	0123ca88-b4ae-4dfa-a647-3d59955af8b2	646	0.318988	0.290841	14701	
1	2	8a5cd764-f2a8-4f2d-b936-e22f46c74cba	646	0.229145	0.230242	16300	
2	3	a4706386-9fe4-49e0-a92b-7901d752670c	741	0.059483	0.037298	13827	
3	4	31ead444-e33e-437a-b481-6c5fafbdb755	772	0.068970	0.063600	15612	
4	5	afe8dc16-8865-4156-9d4c-f2825e2645c5	724	0.077304	0.085119	37588	

In [55]:
```
df = df.drop(["Unnamed: 0"],axis="columns")
df.describe()
```

Out[55]:

	FicoScore	CustomScore1	CustomScore2	CreditCardBalance	InquriesInLast6Months	I
count	95633.000000	95633.000000	95633.000000	95633.000000	95633.000000	
mean	695.772850	0.150160	0.132196	15853.039045	0.779344	
std	38.739602	0.106321	0.111487	14037.265130	1.311809	
min	620.000000	0.009894	0.004201	-3.000000	0.000000	
25%	668.000000	0.076755	0.055359	6907.000000	0.000000	
50%	692.000000	0.120925	0.100279	12342.000000	0.000000	
75%	720.000000	0.191725	0.172429	20578.000000	1.000000	
max	850.000000	0.864869	0.921332	570409.000000	61.000000	9

In [56]:

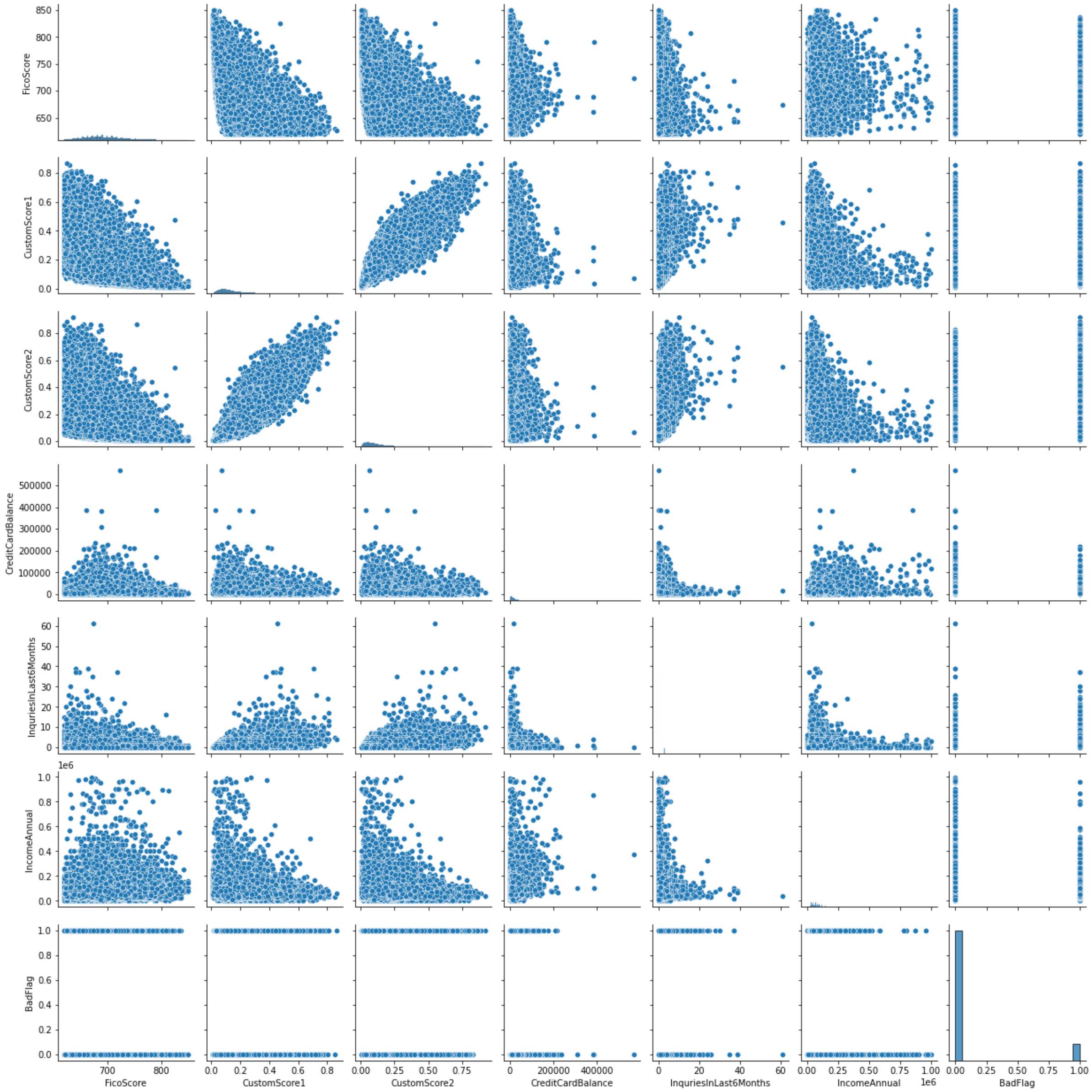
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 95633 entries, 0 to 95632
Data columns (total 8 columns):
 #   Column                Non-Null Count  Dtype  
---  ------                --------------  -----  
 0   ID                    95633 non-null  object 
 1   FicoScore             95633 non-null  int64  
 2   CustomScore1          95633 non-null  float64
 3   CustomScore2          95633 non-null  float64
 4   CreditCardBalance     95633 non-null  int64  
 5   InquriesInLast6Months  95633 non-null  int64  
 6   IncomeAnnual          95633 non-null  int64  
 7   BadFlag               95633 non-null  int64  
dtypes: float64(2), int64(5), object(1)
memory usage: 5.8+ MB
```

There are no missing values in the dataset, so we can proceed with finding relations amongst variables (& the target variable)

In [57]:
```
sns.pairplot(df)
```

Out[57]:
```
<seaborn.axisgrid.PairGrid at 0x7fe8b448de90>
```



In order to check the importance of various features to predict the target variable, we can employ multiple analytical tools like Regression, Decision trees, Random Forests, XG Boost, K-nearest neighbours etc.

Since the problem at hand is a Classification problem, I will employ 2 techniques -

1. Decision Trees
2. Random Forest

In [58]:

```
#DEFINE THE FEATURES & TARGETS
df = df.drop(columns='ID')
features = df.drop(columns='BadFlag')
targets = pd.DataFrame(df['BadFlag'])
feature_names = features.columns
print(feature_names)
print(targets.shape)
```

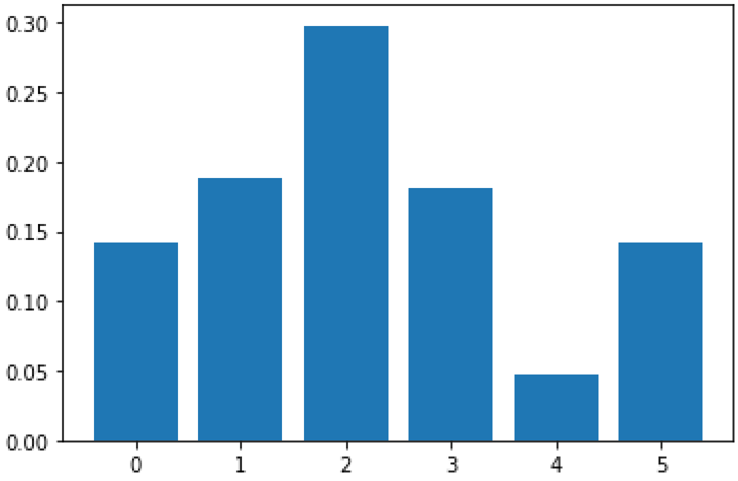
```
Index(['FicoScore', 'CustomScore1', 'CustomScore2', 'CreditCardBalance',
       'InqurriesInLast6Months', 'IncomeAnnual'],
      dtype='object')
(95633, 1)
```

In [59]:

```
#DECISION TREE MODEL
from sklearn.tree import DecisionTreeClassifier
# define the model
model = DecisionTreeClassifier()
# fit the model
model.fit(features, targets)
# get importance
importance = model.feature_importances_
# summarize feature importance
for i,v in enumerate(importance):
        print('Feature: %0d, Score: %.5f' % (i,v))
# plot feature importance
plt.bar([x for x in range(len(importance))], importance)
#plt.xticks([0,1,2,3,4,5],feature_names)
plt.show()

# checking accuracy using confusion matrix
from sklearn.metrics import confusion_matrix
pred = model.predict(features)
confusion_matrix(targets,pred)
```

```
Feature: 0, Score: 0.14270
Feature: 1, Score: 0.18864
Feature: 2, Score: 0.29818
Feature: 3, Score: 0.18100
Feature: 4, Score: 0.04662
Feature: 5, Score: 0.14286
```



Out[59]:

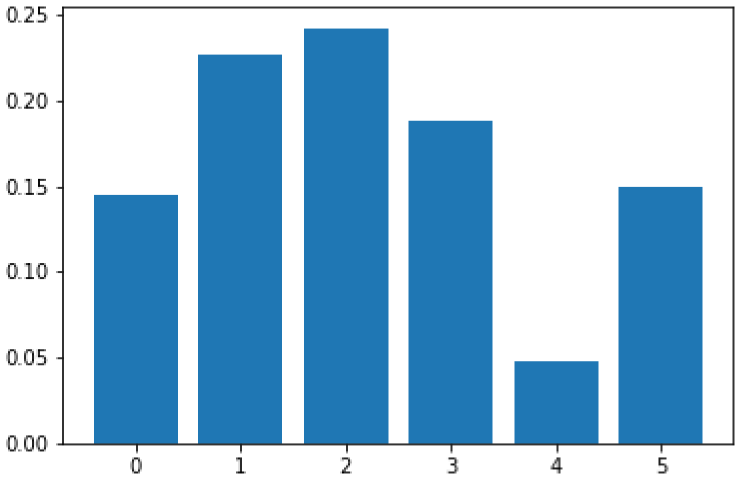
```
array([[84820,     0],
       [    0, 10813]])
```

In [60]:
```
#RANDOM FOREST MODEL
from sklearn.ensemble import RandomForestClassifier
# define the model
model2 = RandomForestClassifier()
# fit the model
model2.fit(features, targets)
# get importance
importance = model2.feature_importances_
# summarize feature importance
for i,v in enumerate(importance):
        print('Feature: %0d, Score: %.5f' % (i,v))
# plot feature importance
plt.bar([x for x in range(len(importance))], importance)
plt.show()

from sklearn.metrics import confusion_matrix
pred = model2.predict(features)
confusion_matrix(targets,pred)
```

```
/usr/local/lib/python3.7/dist-packages/ipykernel_launcher.py:6: DataConversio
nWarning: A column-vector y was passed when a 1d array was expected. Please c
hange the shape of y to (n_samples,), for example using ravel().


Feature: 0, Score: 0.14525
Feature: 1, Score: 0.22707
Feature: 2, Score: 0.24224
Feature: 3, Score: 0.18784
Feature: 4, Score: 0.04761
Feature: 5, Score: 0.15000
```



Out[60]:
```
array([[84820,     0],
       [    3, 10810]])
```