Credit_Card_Fraud_dataset_analysis

July 30, 2018

1 Credit card fraud dataset Analysis

1.0.1 The dataset contains transactions made by credit cards in September 2013 by european cardholders.

1.0.2 This dataset presents transactions that occurred in two days,where we have 492 frauds out of 284,807

1.0.3 transactions. The dataset is highly unbalanced, the positive class (frauds) account for 0.172% of all

1.0.4 transactions.

1.1 Objective:

1.1.1 1. To do exploratory data analysis of this dataset.

1.1.2 1. Take a sample of 100 transactions and find 10 least similar transaction for each transaction in sample.

```
In [1]: import pandas as pd
        import matplotlib.pyplot as plt
        import seaborn as sns
        import numpy as np
        from sklearn.utils import resample
        from sklearn.metrics.pairwise import cosine_similarity

In [2]: df = pd.read_csv('creditcard.csv')

In [9]: df.shape

Out[9]: (284807, 31)

In [5]: df.head(5)

Out[5]:    Time        V1        V2        V3        V4        V5        V6        V7  \
        0   0.0 -1.359807 -0.072781  2.536347  1.378155 -0.338321  0.462388  0.239599
        1   0.0  1.191857  0.266151  0.166480  0.448154  0.060018 -0.082361 -0.078803
        2   1.0 -1.358354 -1.340163  1.773209  0.379780 -0.503198  1.800499  0.791461
        3   1.0 -0.966272 -0.185226  1.792993 -0.863291 -0.010309  1.247203  0.237609
```

```
4    2.0 -1.158233  0.877737  1.548718  0.403034 -0.407193  0.095921  0.592941

        V8        V9  ...        V21       V22       V23       V24  \
0  0.098698  0.363787  ...  -0.018307  0.277838 -0.110474  0.066928
1  0.085102 -0.255425  ...  -0.225775 -0.638672  0.101288 -0.339846
2  0.247676 -1.514654  ...   0.247998  0.771679  0.909412 -0.689281
3  0.377436 -1.387024  ...  -0.108300  0.005274 -0.190321 -1.175575
4 -0.270533  0.817739  ...  -0.009431  0.798278 -0.137458  0.141267

        V25       V26       V27       V28   Amount  Class
0  0.128539 -0.189115  0.133558 -0.021053  149.62      0
1  0.167170  0.125895 -0.008983  0.014724    2.69      0
2 -0.327642 -0.139097 -0.055353 -0.059752  378.66      0
3  0.647376 -0.221929  0.062723  0.061458  123.50      0
4 -0.206010  0.502292  0.219422  0.215153   69.99      0

[5 rows x 31 columns]
```

In [6]: df['Class'].value_counts()

Out[6]: 0   284315
        1   492
        Name: Class, dtype: int64

In [7]: df['Amount'].describe()

Out[7]: count   284807.000000
        mean   88.349619
        std   250.120109
        min   0.000000
        25%   5.600000
        50%   22.000000
        75%   77.165000
        max   25691.160000
        Name: Amount, dtype: float64

1.2 Observation** 1. In given data 75% of the transactions are of amount below 78. 2. The min value of transaction made is 0.00 and max value of transaction is 25691.16

```
In [8]: # Fraud transactios having zero amounts
        data_sample = df.loc[(df['Amount']== 0) & (df['Class']== 1)]
        print(data_sample.shape)

(27, 31)


In [9]: # Valid transactions having zero amount.
        data_sample = df.loc[(df['Amount']==0) & (df['Class']==0)]
        print(data_sample.shape)
```

```
(1798, 31)
```

##Observations** 1. Out of 284k transactions 1825 transactions were made which had zero value. 2. Out of these transactions only 27 were fradulent and 1798 legal transactions.

```
In [10]: #statistics of fradulent transactions
         data_sample = df[df['Class']==1]
         data_sample['Amount'].describe()

Out[10]: count      492.000000
         mean       122.211321
         std        256.683288
         min          0.000000
         25%          1.000000
         50%          9.250000
         75%        105.890000
         max       2125.870000
         Name: Amount, dtype: float64

In [11]: # statistics of valid transactions
         data_sample = df[df['Class']==0]
         data_sample['Amount'].describe()

Out[11]: count    284315.000000
         mean         88.291022
         std         250.105092
         min           0.000000
         25%           5.650000
         50%          22.000000
         75%          77.050000
         max       25691.160000
         Name: Amount, dtype: float64
```

1.3 Observations 1. The mean value of fradulent transactions is 122.21 while mean value of valid transactions is only 88.29. 2. 50% of the fradulent transactions are below 10 while 50% of valid transactions is below 22. 3. 75% of the fradulent transactions are below 106 while 75% of valid transactions are below 77. 4. Max value of fradulent transaction is 2125.87 while max value of valid transaction is 25691.16**

```
In [12]: corrmat = df.corr() #calculating corelation matrix for the data sample.

In [13]: # plottinf heatmap for this corelation matrix
         fig = plt.figure(figsize=(12,10))
         sns.heatmap(corrmat,square=True)
         plt.show()
```
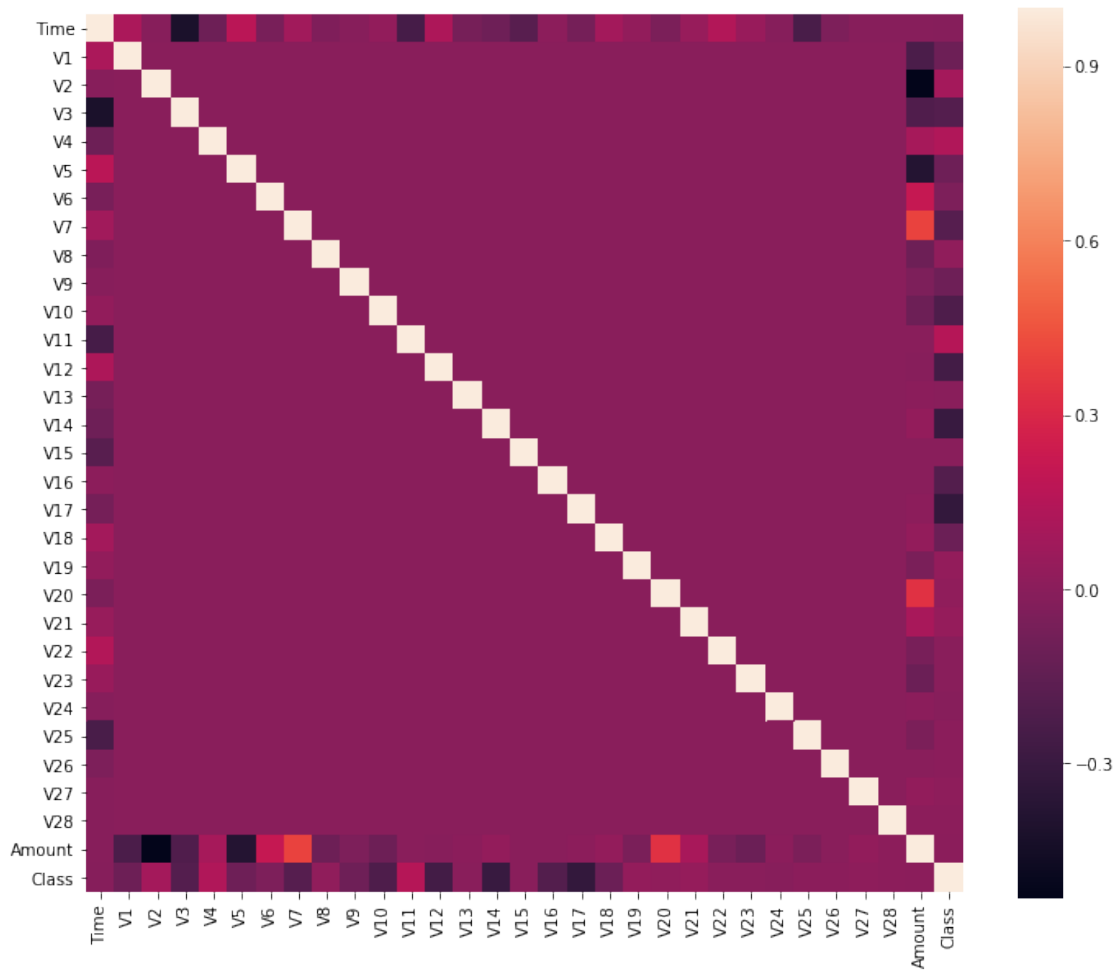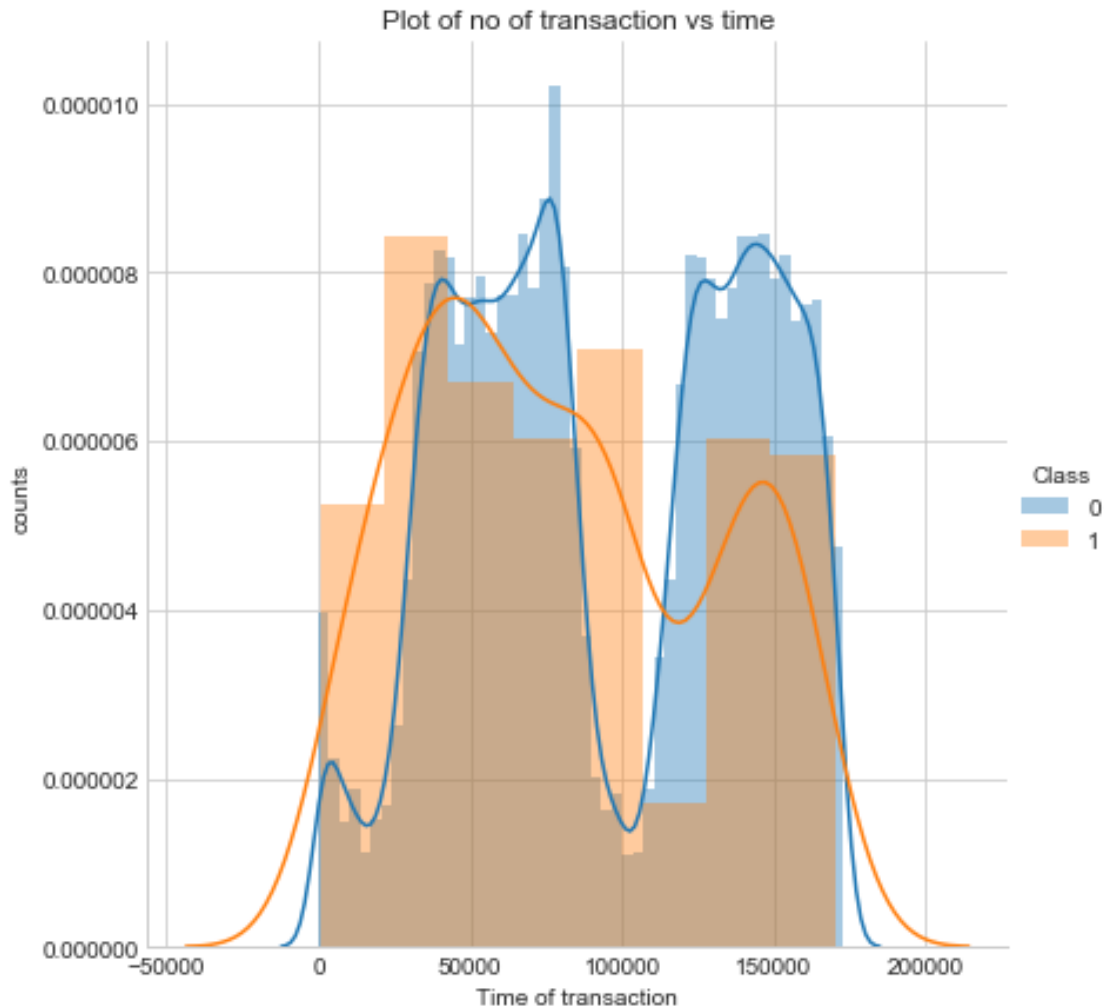
Observation 1. The corelation between the features is almost negligible.

2 Univariate analysis

```
In [14]: sns.set_style('whitegrid');
         sns.FacetGrid(df,hue='Class',size=6)\
            .map(sns.distplot,'Time')\
            .add_legend();
         plt.xlabel("Time of transaction")
         plt.ylabel("counts")
         plt.title("Plot of no of transaction vs time")
         plt.show()
```

Plot of no of transaction vs time

```
In [15]: # In the above plot we can see that for some time interval fradulent transactions are
         # Therefore lets convert the time into hours to see during which time interval maximu
         # fradulent transactions are done.
         import itertools
         data_sample = df[['Time','Class']].copy()# Copies data with Time and class columns.
         data_sample.shape

Out[15]: (284807, 2)

In [27]: # Function which takes time in seconds and returns the time by converting it into hou
         # Divide hours by 2 if it is > 24 so that it can be converted into same time as we ha
         # data of two days.
         def seconds_to_hours(seconds):
             return (seconds/(60*60))

In [28]: # Adding new column Hours to data_sample
         data_sample['Hours'] = data_sample['Time'].apply(seconds_to_hours)
```

5

```
In [29]: data_sample.tail(5)

Out[29]:               Time  Class        Hours
         284802  172786.0      0  47.996111
         284803  172787.0      0  47.996389
         284804  172788.0      0  47.996667
         284805  172788.0      0  47.996667
         284806  172792.0      0  47.997778

In [30]: sns.set_style('whitegrid');
         sns.FacetGrid(data_sample,hue='Class',size=10)\
            .map(sns.distplot,'Hours')\
            .add_legend();
         plt.xlabel("Time of transaction")
         plt.ylabel("Counts")
         plt.title("No. of transaction vs time")
         plt.show()
```
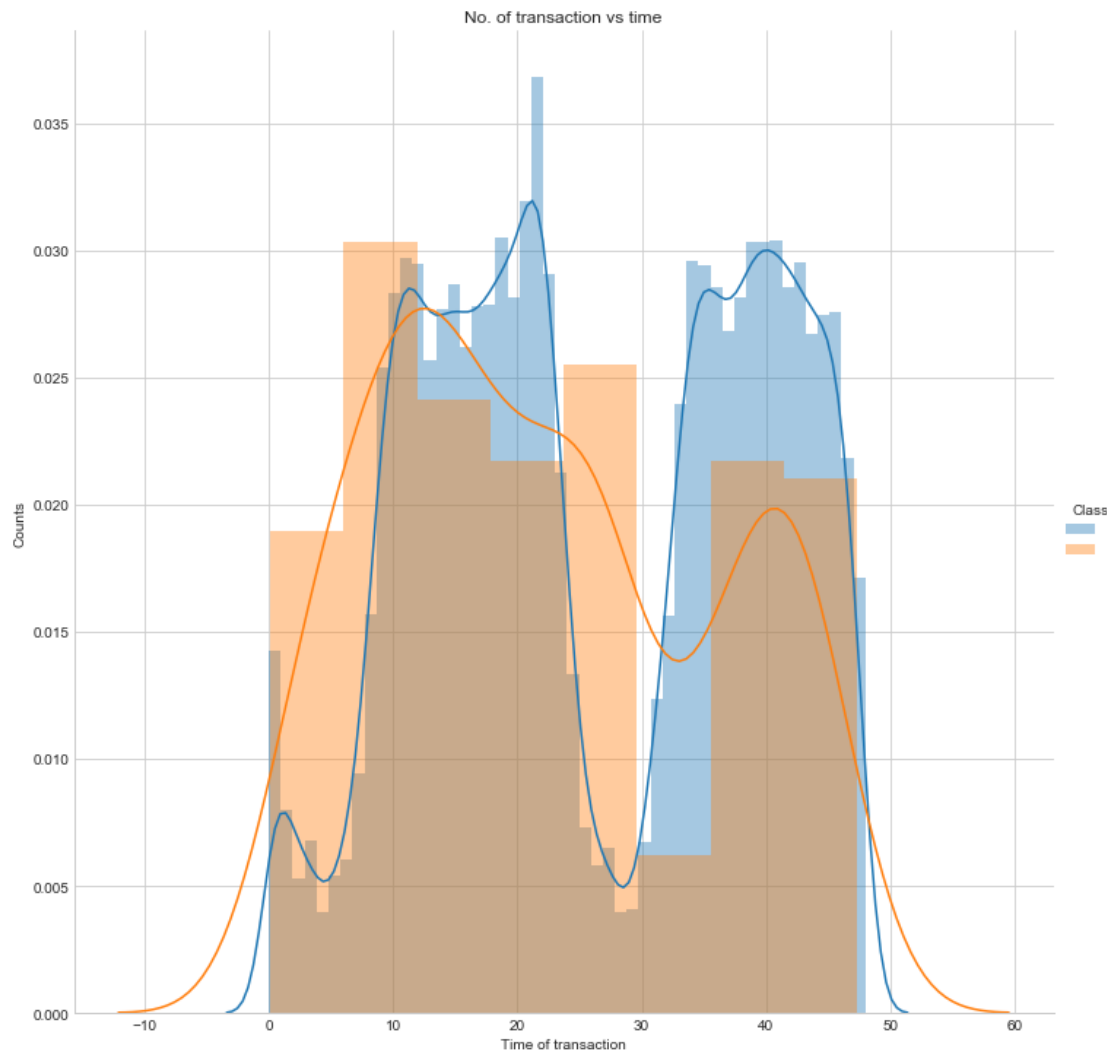
2.1 Observations** 1. More fradulent transaction occurs betweeen first 12 hours and between 23rd and 30th hour. 2. If transaction were recorded from 12'o clock midnight then we can observe that during morning hours there is more chance of occurance of fraud transactions. 3. During rest of the time more chance that legal transaction will occur.

```
In [32]: fraud = data_sample.loc[data_sample['Class']==1]
         print(fraud.shape)

(492, 3)


In [39]: day1_fraud = fraud.loc[fraud['Hours']<10]
         print(day1_fraud.shape)

(101, 3)


In [47]: day2_fraud = fraud.loc[(fraud['Hours']>=24) & (fraud['Hours']<30)]
         print(day2_fraud.shape)

(69, 3)
```

2.2 Observations** 1. 34.34% of the fradulent transactions are done during morning hours. 2. On the first day 20.5% of the total fradulent transactions were done in less than 10 hours. 3. On the second day 14.02% of the total fradulent transactions were done in less than 6 hours.

```
In [41]: sns.set_style('whitegrid');
         sns.FacetGrid(df,hue='Class',size=6)\
            .map(sns.distplot,'Amount')\
            .add_legend();
         plt.xlabel('Amount of transactions')
         plt.ylabel('Counts')
         plt.title('Transactions vs Amount')
         plt.show()
```

Transactions vs Amount
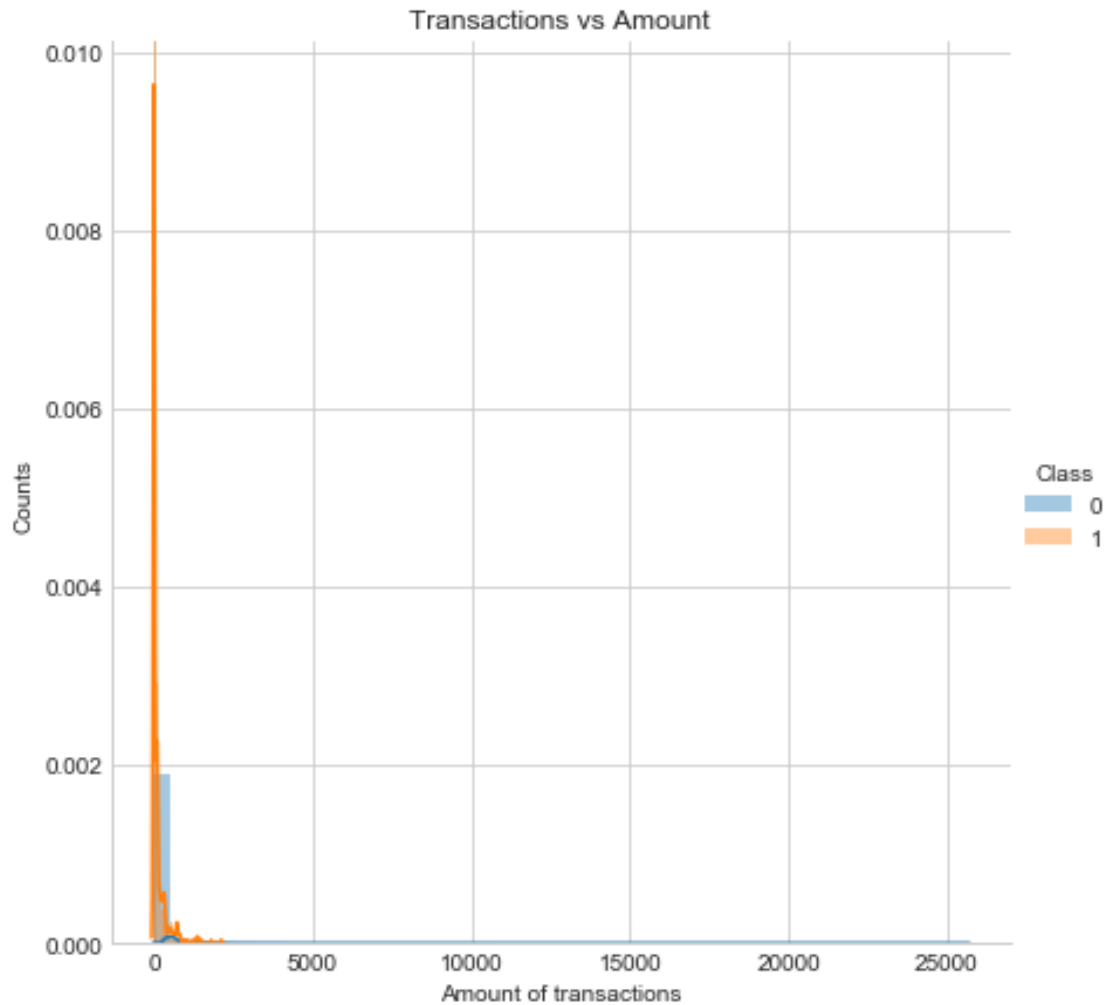
In [51]: sns.set_style('whitegrid');
         sns.FacetGrid(df,hue='Class',size=6)\
             .map(sns.distplot,'V4')\
             .add_legend();
         plt.xlabel('V4')
         plt.ylabel('Counts')
         plt.title('Transactions vs V4')
         plt.show()
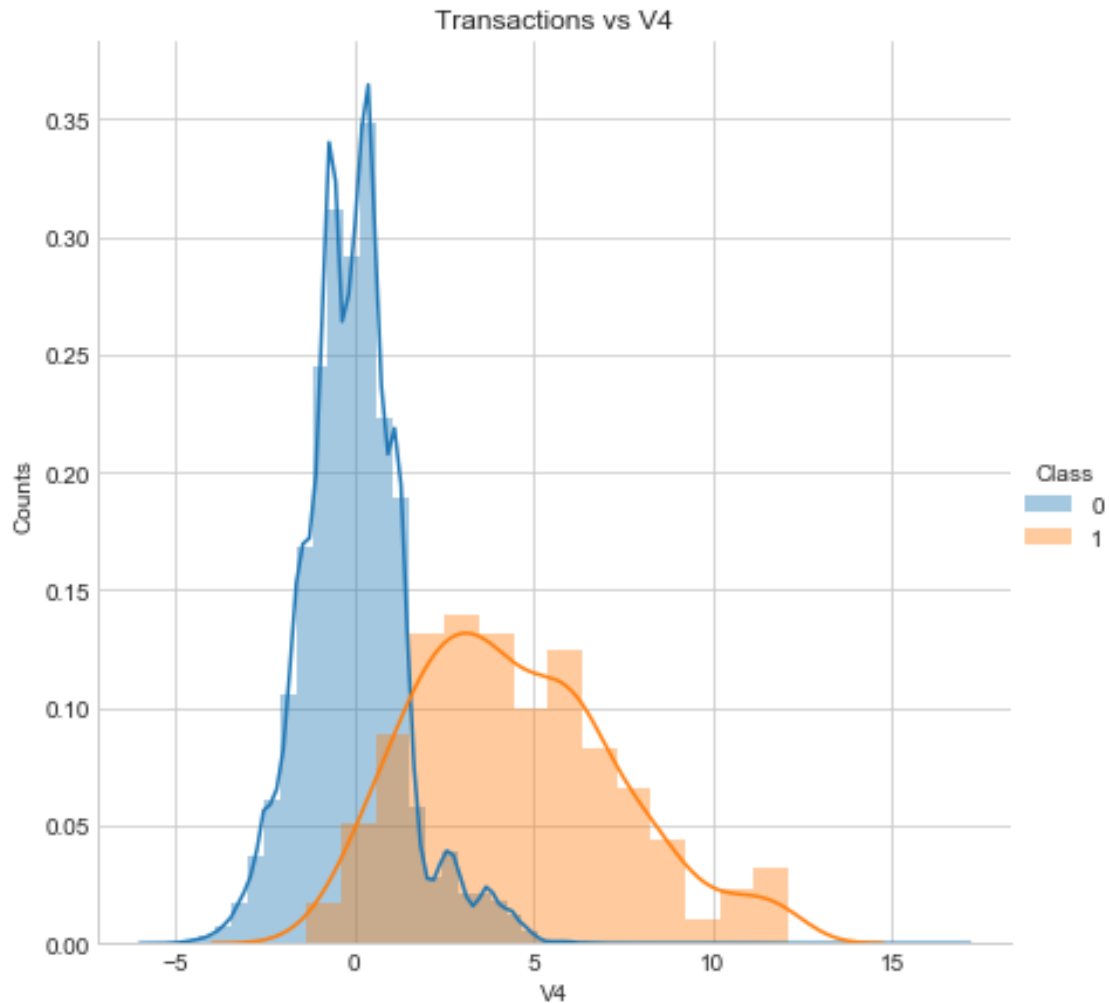
Transactions vs V4

```
In [55]: # lets see the distribution of class at value of V4=2
         data_v4 = df.loc[(df['V4']<2)]
         print(data_v4['Class'].value_counts())
```

```
0    265522
1        96
Name: Class, dtype: int64
```

2.3 Observations** 1. 93.22% of all the legal transactions(Class 0) have V4 value less than 2. 2. 80.04% of all the fradulent transactions(Class 1) have V4 value greater than 2.

```
In [45]: sns.set_style('whitegrid');
         sns.FacetGrid(df,hue='Class',size=6)\
             .map(sns.distplot,'V9')\
```

```
        .add_legend();
plt.xlabel('V9')
plt.ylabel('Counts')
plt.title('Transactions vs V9')
plt.show()
```
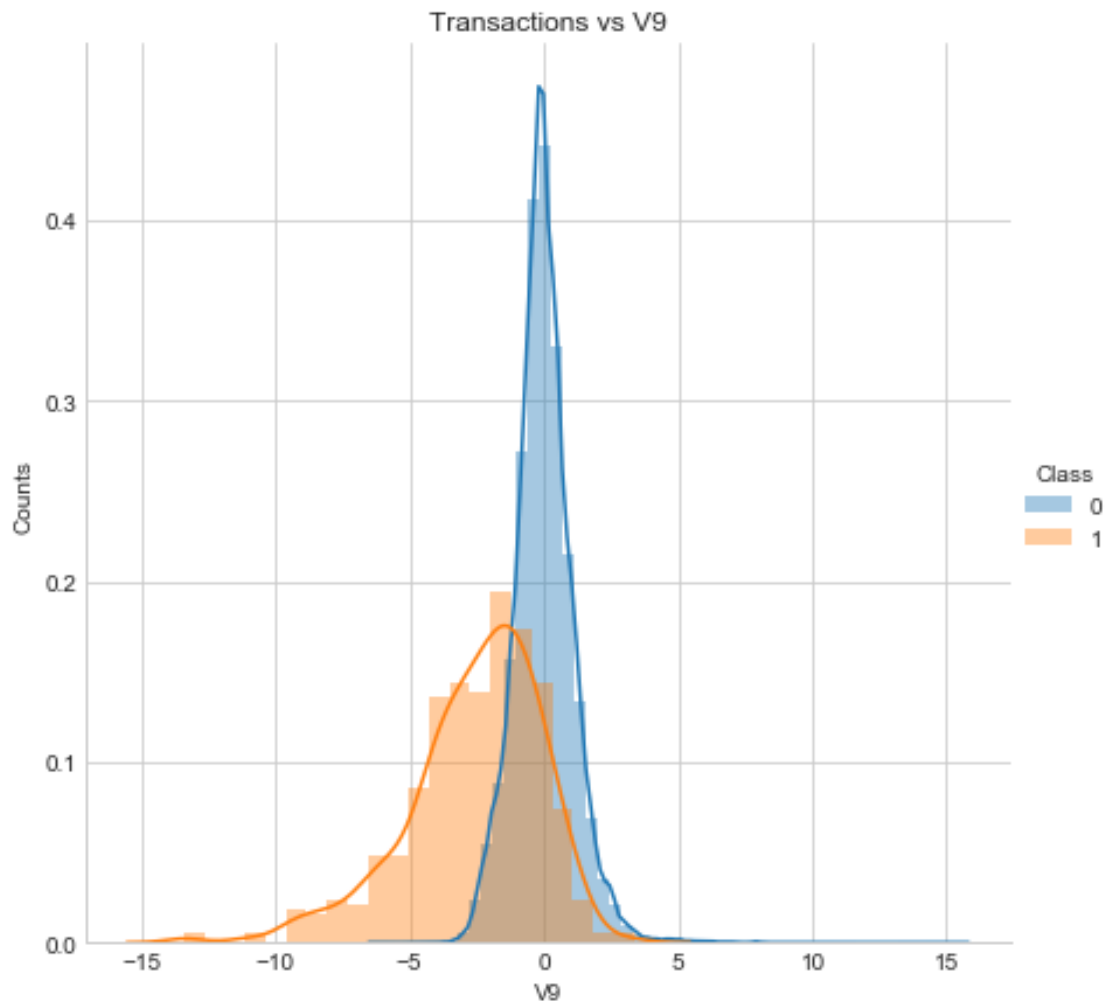


```
In [56]: data_V9 = df.loc[(df['V9']>-2)]
         print(data_V9['Class'].value_counts())

0     275592
1        235
Name: Class, dtype: int64
```

2.4 Observations** 1. 96.76% of valid transactions (Class 0) have V9 > -2. 2. 52.23% of fradulent transaactions (Class 1) have V9 < -2.

```
In [57]: sns.set_style("whitegrid");
         sns.FacetGrid(df,hue='Class',size=6)\
             .map(sns.distplot,'V3')\
             .add_legend();
         plt.xlabel('V3')
         plt.ylabel('Counts')
         plt.title("Transactions Vs V3")
         plt.show()
```



```
In [65]: data_V3 = df.loc[df['V3']>-2.7]
         print(data_V3['Class'].value_counts())

0     274907
1        142
```
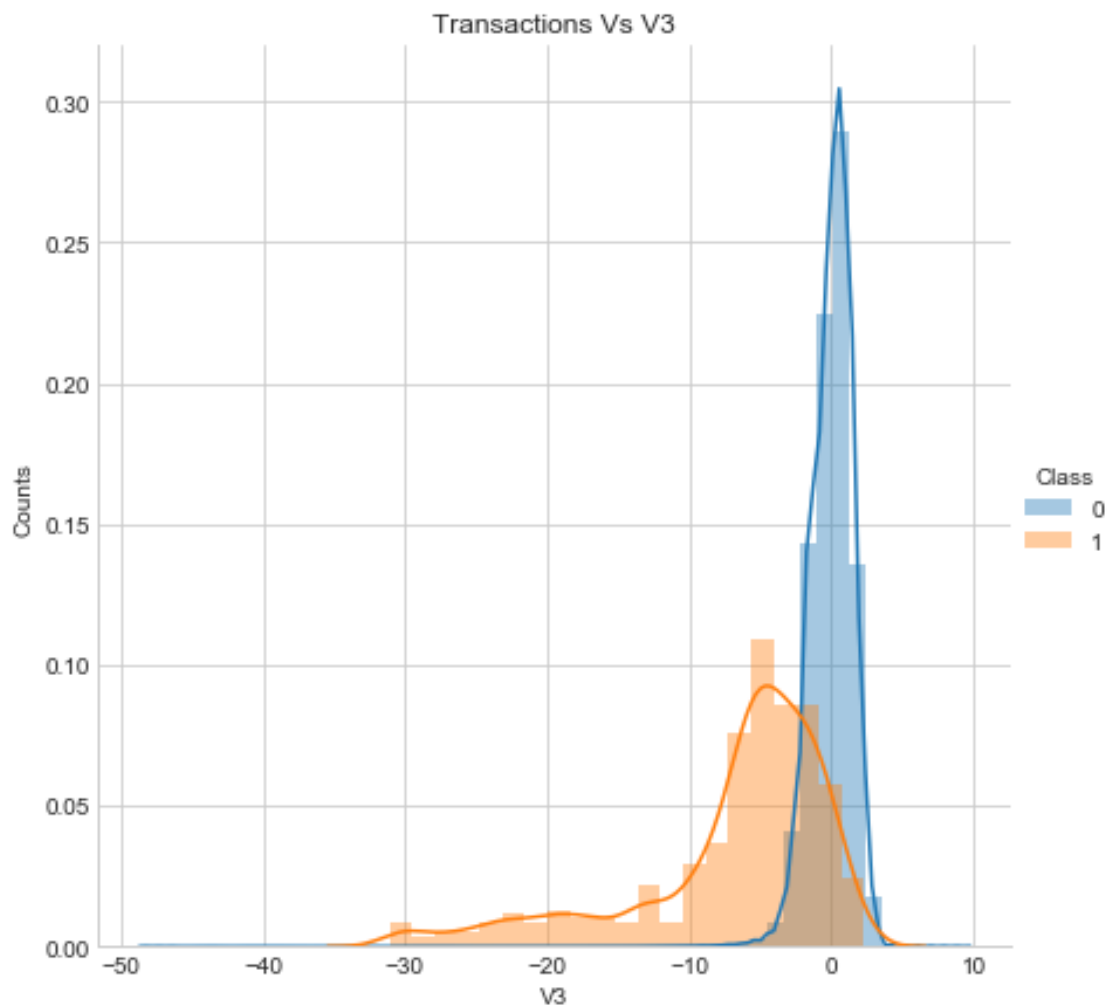
```
Name: Class, dtype: int64
```

2.5 Observations** 1. 96.52% of legal transactions (Class 0) have V3 > -2.7. 2. 71.11% of fradulent transactions (Class 1) have V3 < -2.7.

3 Bivatiate Analysis

3.1 Scatter Plots

```
In [75]: sns.set_style('whitegrid');
         sns.FacetGrid(df,hue='Class',size=7)\
           .map(plt.scatter,'V3','V9')\
           .add_legend();
         plt.xlabel('V3')
         plt.ylabel('V9')
         plt.title('V3 Vs V9')
         plt.show()
```
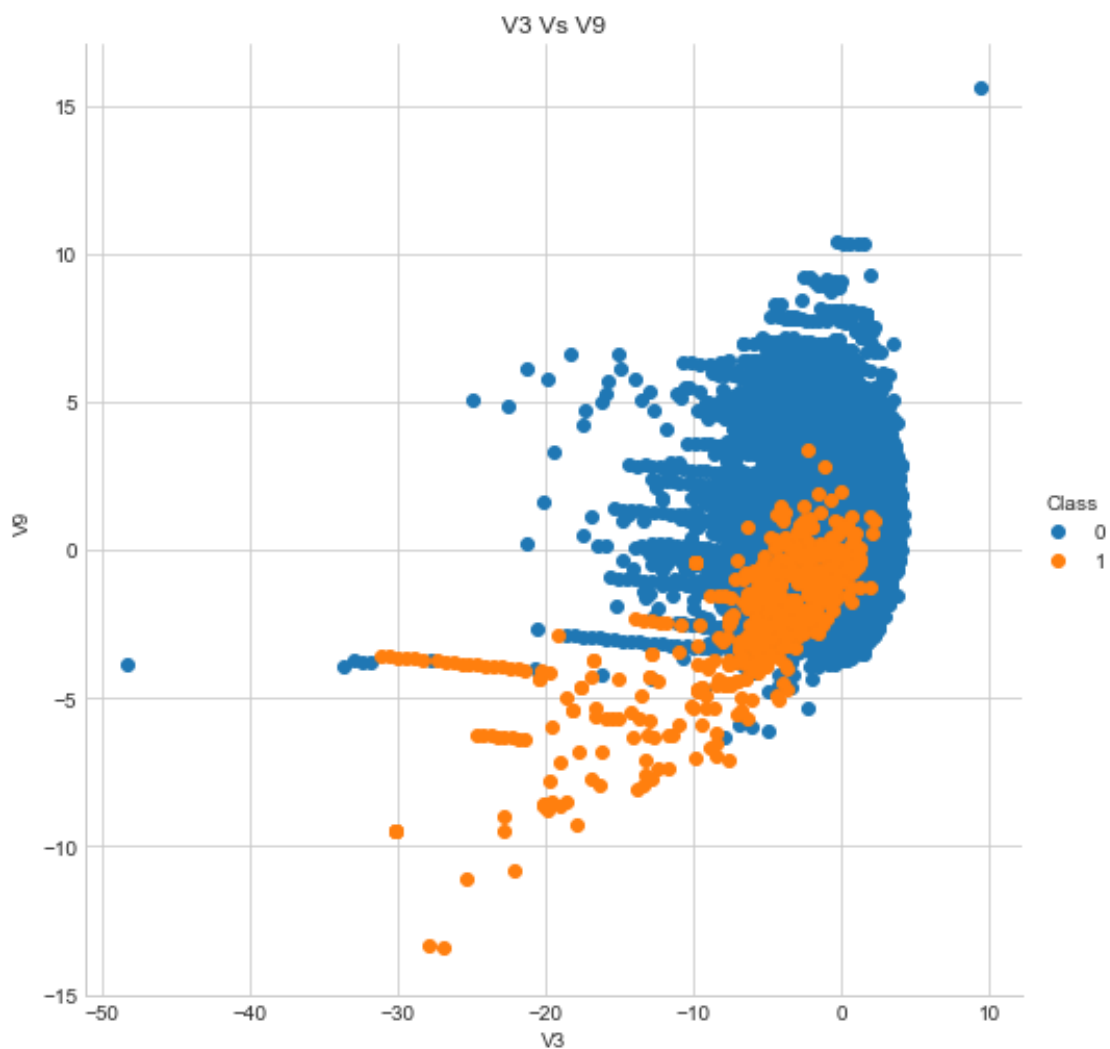
```
In [77]: sns.set_style('whitegrid');
         sns.FacetGrid(df,hue='Class',size=7)\
             .map(plt.scatter,'V4','V9')\
             .add_legend();
         plt.xlabel('V4')
         plt.ylabel('V9')
         plt.title('V4 Vs V9')
         plt.show()
```
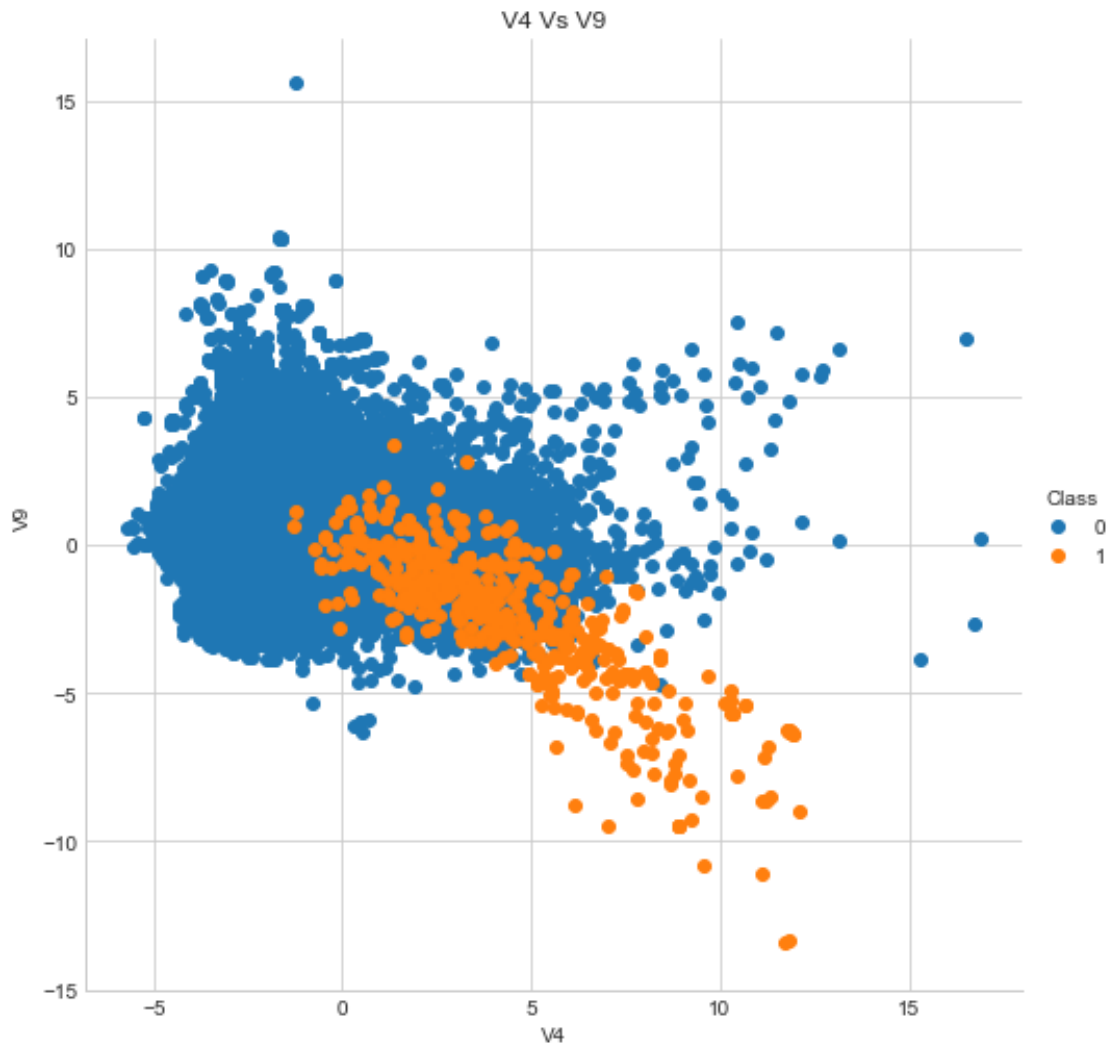
3.2 observations** 1. There is clustering of points but there are overlaps also which makes it difficult to seperate points.

```
In [84]: ## Segregating legal and fradulent transactions
         legal_data = df.loc[df['Class']==0]
         fraud_data = df.loc[df['Class']==1]
         print(legal_data.shape)
         print(fraud_data.shape)
```

```
(284315, 31)
(492, 31)
```

4 PDF and CDF analysis

```
In [90]: # Pdf and cdf analysis of amount of legal transactions (Class 0);
         legal_data = legal_data.sort_values(['Amount'])

         counts,bins_edges = np.histogram(legal_data['Amount'],bins=10,density=True);

         pdf = counts/(sum(counts));
         cdf = np.cumsum(pdf);
         plt.plot(bins_edges[1:],pdf)
         plt.plot(bins_edges[1:],cdf)
         plt.xlabel("Amount of Transactions")
         plt.ylabel("Counts")
         plt.title("PDF and CDF of Amount")
         plt.legend(['pdf','cdf'])
         plt.show()
```

PDF and CDF of Amount
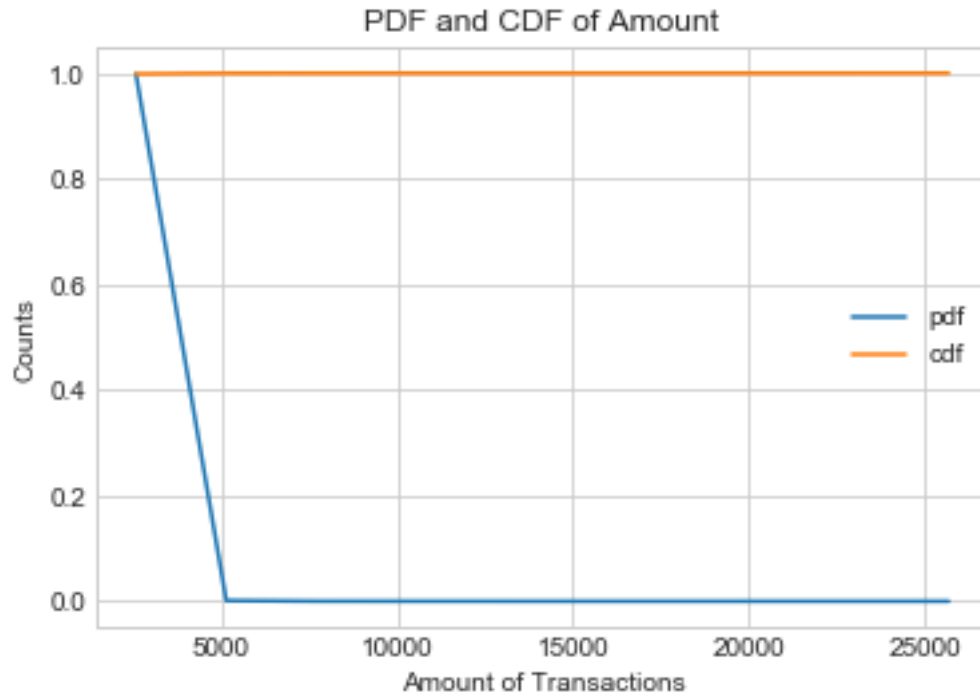
4.0.1 Observations** 1. 99% of the legal transactions are of value less than 2000. 2. Number of legal transactions of value above 5000 is negligible.

In [91]: # Pdf and cdf of fraud transactions (Class 1)

```python
fraud_data = fraud_data.sort_values(['Amount'])

counts,bins_edges = np.histogram(fraud_data['Amount'],bins=10,density=True);

pdf = counts/(sum(counts));
cdf = np.cumsum(pdf);
plt.plot(bins_edges[1:],pdf)
plt.plot(bins_edges[1:],cdf)
plt.xlabel("Amount of Transactions")
plt.ylabel("Counts")
plt.title("PDF and CDF of Amount")
plt.legend(['pdf','cdf'])
plt.show()
```

PDF and CDF of Amount
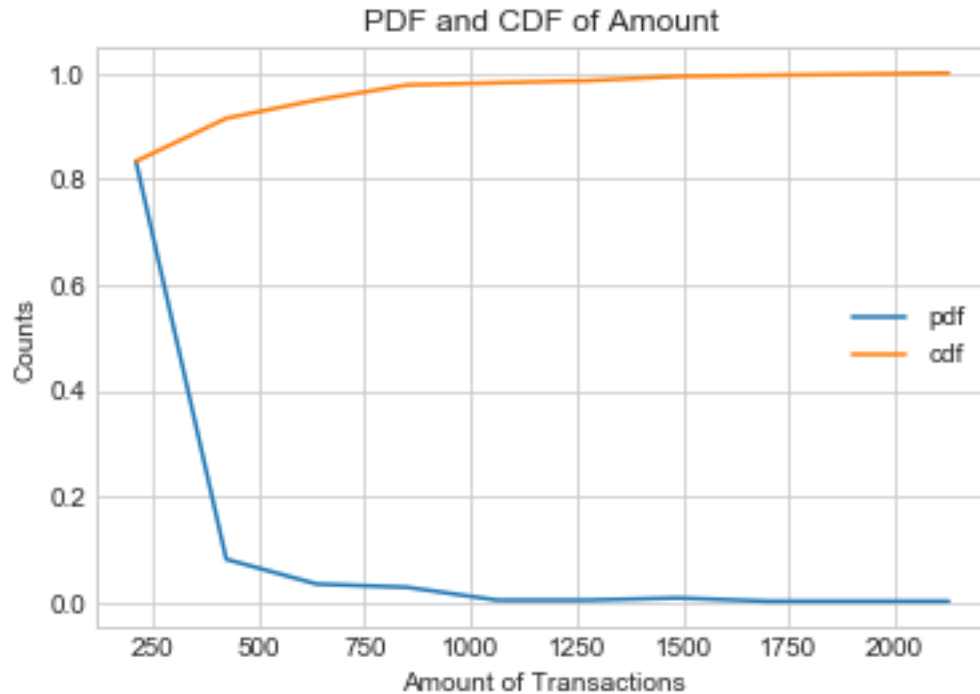
4.0.2 Observations** 1. 99% of the fradulent transactions are of value less than 1250.

```
In [108]: legal_data_sample = legal_data[['Time']].copy() # copies Time column from legal_data
          legal_data_sample.head(5)
          fraud_data_sample = fraud_data[['Time']].copy()
          fraud_data_sample.head(5)
```

```
Out[108]:            Time
          541       406.0
          8842    12093.0
          23308   32686.0
          237107 149096.0
          234705 148074.0
```

```
In [109]: legal_data_sample['Hours'] = legal_data_sample['Time'].apply(seconds_to_hours)
          legal_data_sample.tail(5)
          fraud_data_sample['Hours'] = fraud_data_sample['Time'].apply(seconds_to_hours)
          fraud_data_sample.tail(5)
```

```
Out[109]:            Time       Hours
          81609    59011.0  16.391944
          89190    62467.0  17.351944
          249167  154278.0  42.855000
          6971      9064.0   2.517778
          176049  122608.0  34.057778
```

16

```
In [105]:  # Pdf and cdf of Time of transaction for legal transactions (Class 0).
           legal_data_sample = legal_data_sample.sort_values(['Hours']);

           counts,bin_edges = np.histogram(legal_data_sample['Hours'],bins=10,density=True);

           pdf = counts/(sum(counts))
           cdf = np.cumsum(pdf)

           plt.plot(bin_edges[1:],pdf)
           plt.plot(bin_edges[1:],cdf)
           plt.xlabel("Time of transaction")
           plt.ylabel("Counts")
           plt.title("PDF and CDF of time of transactions")
           plt.legend(['pdf','cdf'])
           plt.show()
```


4.0.3 Observations** 1. From 14th hour to 24th hour the pdf follow a uniform curve which means the number of transaction doen not vary in this time period.
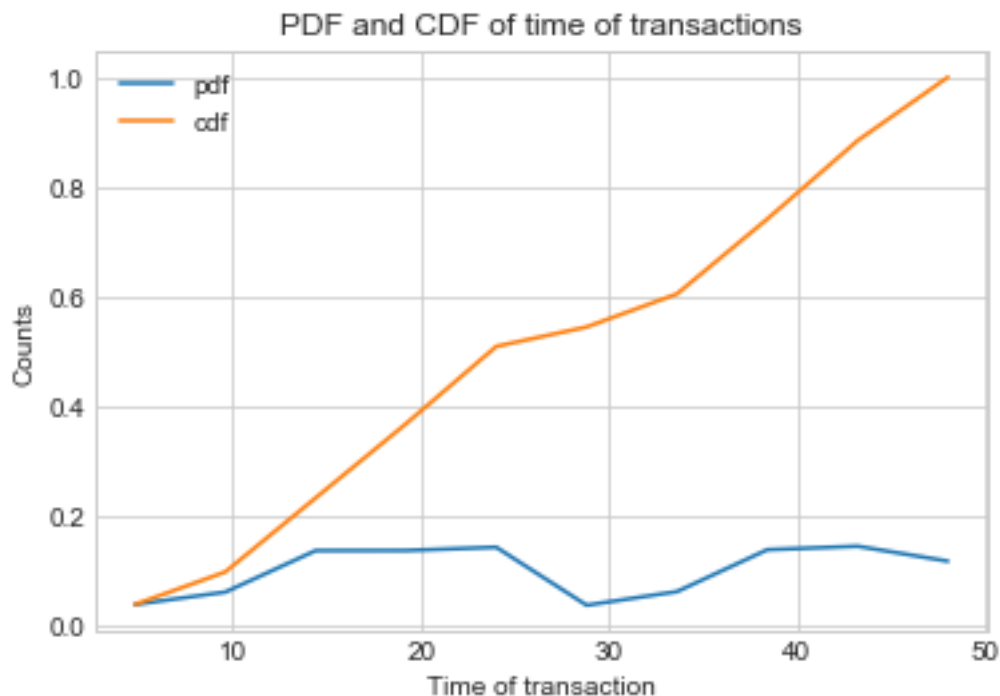
```
In [110]:  # Pdf and cdf of Time of transaction for fradulent transactions (Class 1).
           fraud_data_sample = fraud_data_sample.sort_values(['Hours']);

           counts,bin_edges = np.histogram(fraud_data_sample['Hours'],bins=10,density=True);
```

```
pdf = counts/(sum(counts))
cdf = np.cumsum(pdf)

plt.plot(bin_edges[1:],pdf)
plt.plot(bin_edges[1:],cdf)
plt.xlabel("Time of transaction")
plt.ylabel("Counts")
plt.title("PDF and CDF of time of transactions")
plt.legend(['pdf','cdf'])
plt.show()
```
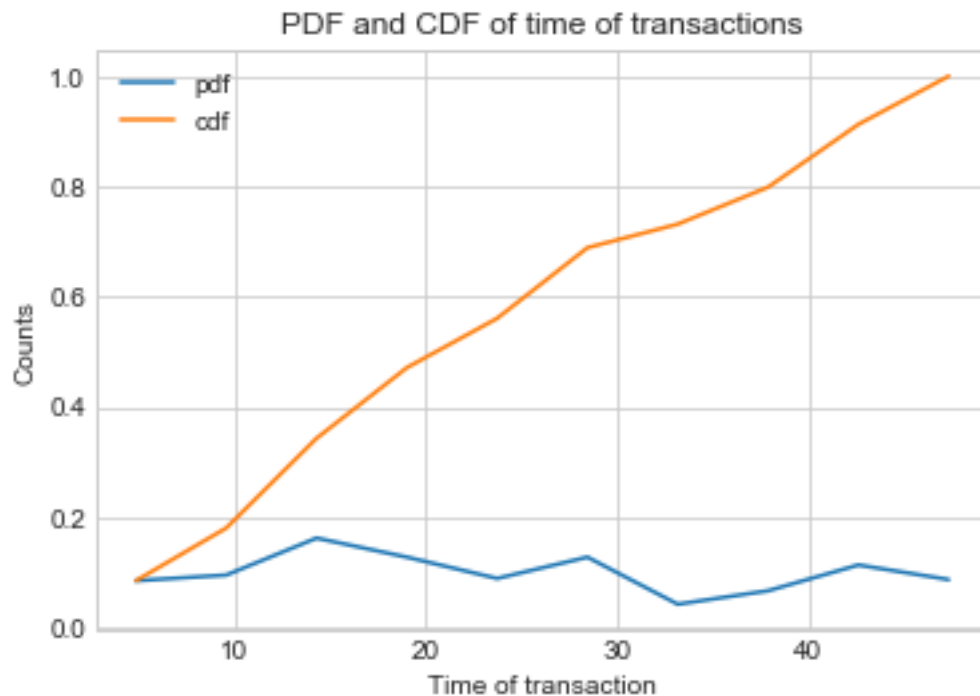

In [116]: # Medians, percentiles, Quantile, MAD of transactions

```
print("**************")
print('Medians')
print('**************')
print('The median amount of legal transactions is : ',np.median(legal_data['Amount'])
print('The median amount of fradulent transactions is : ',np.median(fraud_data['Amoun

print('**************')
print('Quantiles')
print('**************')
print('Quantile of amount of legal transaction is : ',np.percentile(legal_data['Amou
print('Quantile of time of legal transaction is : ',np.percentile(legal_data_sample[
```

18

```python
print('Quantile of amount of fradulent transaction is : ',np.percentile(fraud_data['A
print('Quantile of time of fradulent transaction is : ',np.percentile(fraud_data_samp

print('*************')
print('Percentiles')
print('*************')
print('90 percentile of amount of legal transaction is : ',np.percentile(legal_data[
print('90 percentile of time of legal transaction is : ',np.percentile(legal_data_sam
print('90 percentile of amount of fradulent transaction is : ',np.percentile(fraud_da
print('90 percentile of time of fradulent transaction is : ',np.percentile(fraud_data

print('*************')
print('Median Absolute Deviation')
print('*************')
from statsmodels import robust
print('MAD of amount of legal transaction is : ',robust.mad(legal_data['Amount']))
print('MAD of time of legal transaction is : ',robust.mad(legal_data_sample['Hours'])
print('MAD of amount of fradulent transaction is : ',robust.mad(fraud_data['Amount'])
print('MAD of time of fradulent transaction is : ',robust.mad(fraud_data_sample['Hou
```

```
*************
Medians
*************
The median amount of legal transactions is :  22.0
The median amount of fradulent transactions is :  9.25
*************
Quantiles
*************
Quantile of amount of legal transaction is :  [ 0.12  6.15 23.42 80.5 ]
Quantile of time of legal transaction is :  [ 0.6725     15.39638889 24.11007778 39.02611111]
Quantile of amount of fradulent transaction is :  [  0.        1.       11.1558 109.0204]
Quantile of time of fradulent transaction is :  [ 2.09038056 11.47536111 21.34271944 35.8866
*************
Percentiles
*************
90 percentile of amount of legal transaction is :  202.72400000000022
90 percentile of time of legal transaction is :  43.792388888888894
90 percentile of amount of fradulent transaction is :  346.74600000000004
90 percentile of time of fradulent transaction is :  42.230444444444444
*************
Median Absolute Deviation
*************
MAD of amount of legal transaction is :  29.97821685818327
MAD of time of legal transaction is :  17.569659957190552
MAD of amount of fradulent transaction is :  13.714070521176819
MAD of time of fradulent transaction is :  14.35920840320155
```

```python
In [118]: # Puts legal for class 0 and fraud for class 1.
```

```
df['Class'] = df['Class'].apply(lambda x:'legal' if x==0 else 'fraud')
```

In [119]: # Plotting box plot
```
sns.boxplot(x='Class',y='Amount',data=df)
plt.show()
```
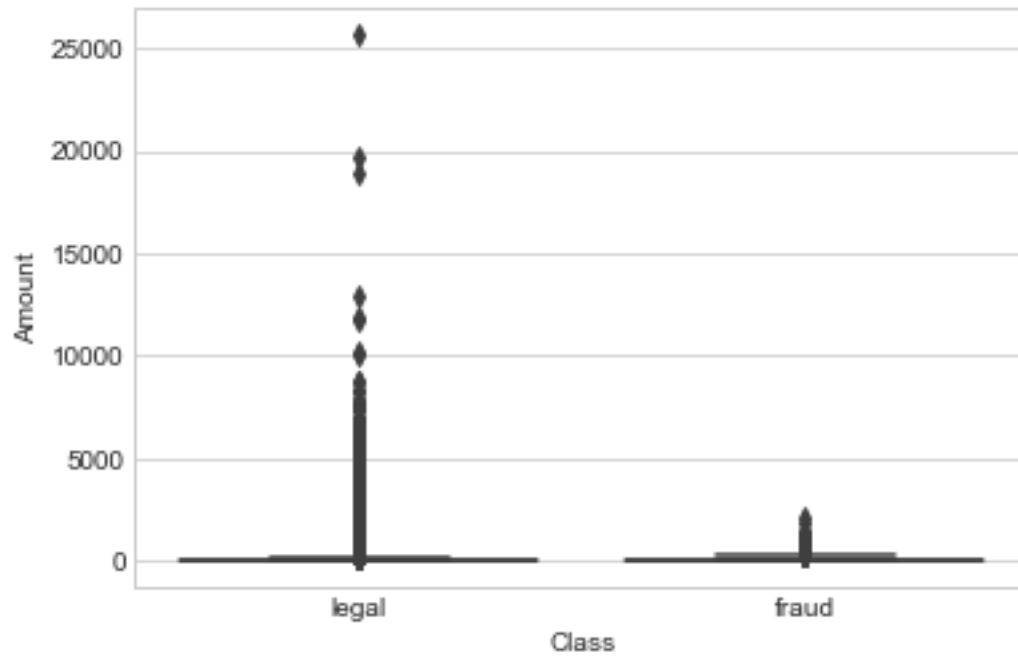

4.0.4 Observation** 1. Nothing much is observable from this plot.

In [123]:
```
sns.boxplot(x='Class',y='V3',data=df)
plt.show()
```
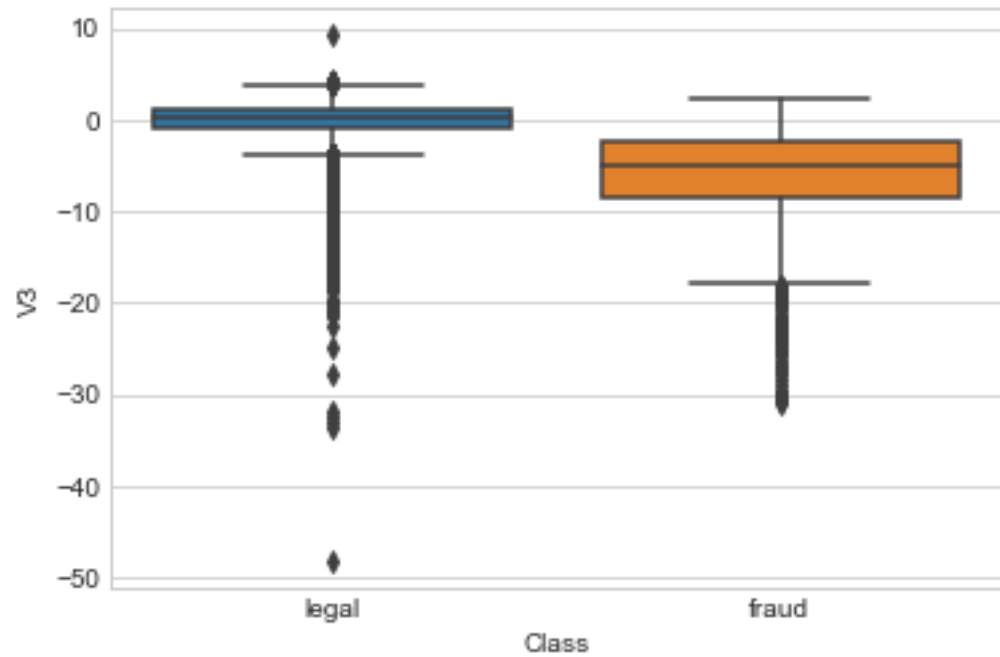
```
In [124]: sns.boxplot(x='Class',y='V4',data=df)
          plt.show()
```
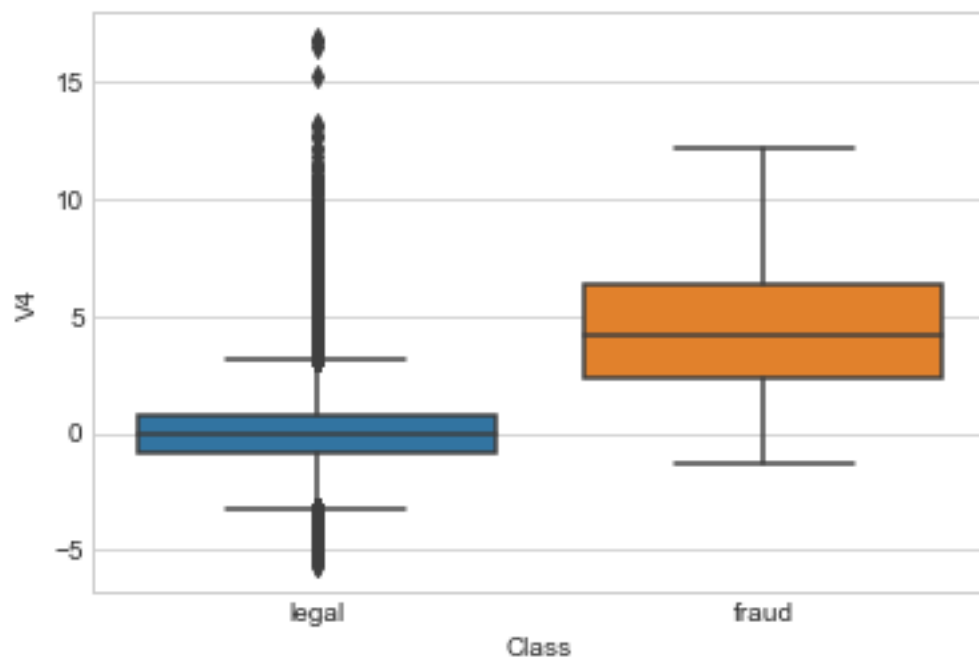
```
In [125]: sns.boxplot(x='Class',y='V9',data=df)
          plt.show()
```
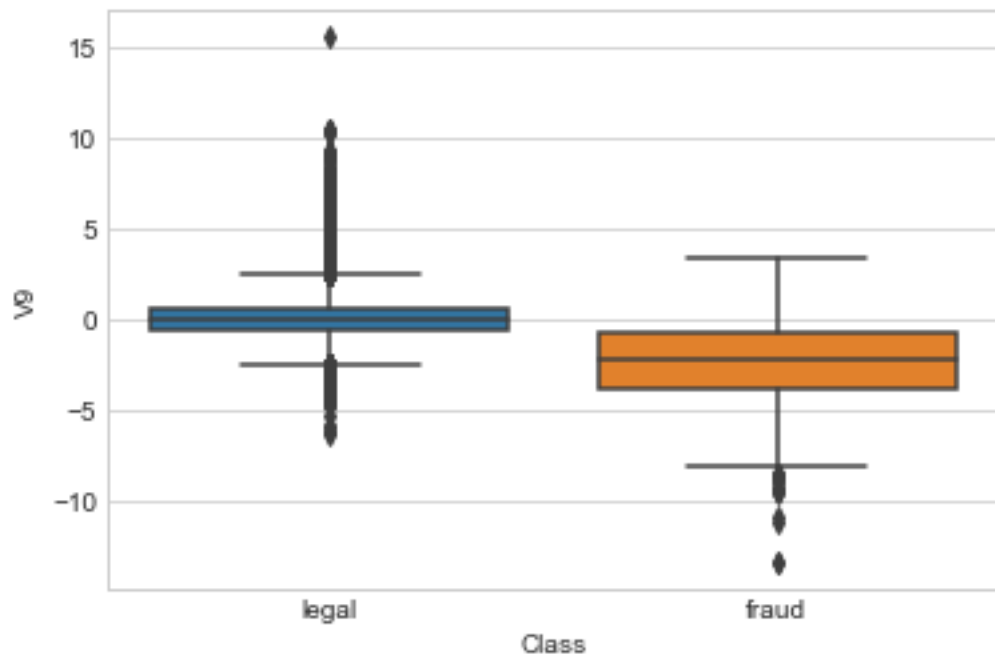


```
In [126]: sns.boxplot(x='Class',y='Time',data=df)
          plt.show()
```
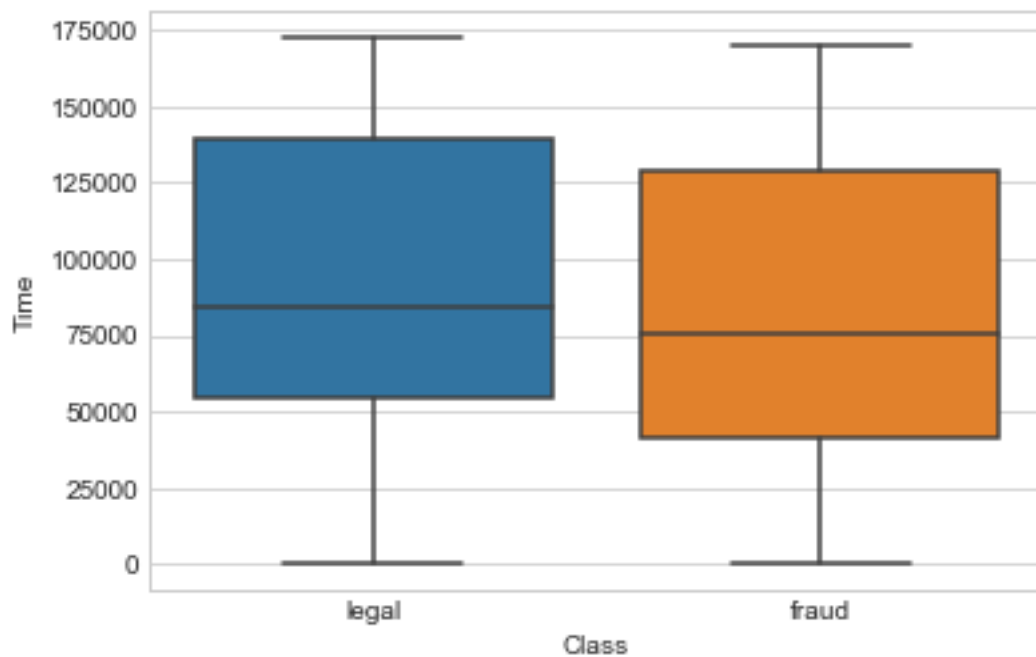
4.0.5 Observations** 1. There is too much overlap hence not much of use.

```
In [129]: # plotting violin plots
          sns.violinplot(x='Class',y='Amount',data=df,size=7)
          plt.show()
```
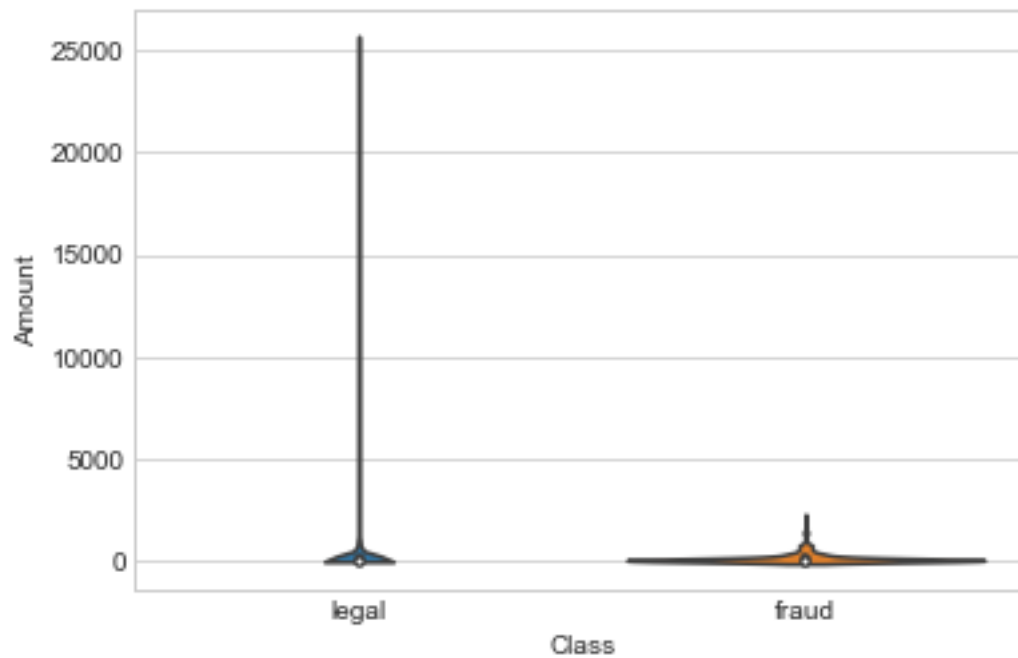


```
In [130]: sns.violinplot(x='Class',y='Time',data=df,size=7)
          plt.show()
```

4.0.6 Observations** 1. At around 100000 secs there are less number of legal transactions. 2. Overall these plots are not providing much insight of tha data.

5 Taking a sample of 100 transactions and calculating 10 least silmilar

6 transactions for each of the 100 transactions.

```
In [3]: from sklearn.model_selection import train_test_split
        data = pd.read_csv('creditcard.csv')

        # This splits given dataset into test and train samples.
        # The train sample will contain the number of entries passed by you.
        # X_train,X_test,Y_train,Y_test = train_test_split(df.loc[:,df.columns!='Class'],
        #                                        df["Class"],test_size=value,random
        # The first argument(df dataset without 'Class' column) of the train_test_split goes i
        # and second argument(df dataset with only 'Class column) goes into Y_train and Y_test
        # Here we are taking test size 100 to create our sample of 100 rows.
        # X_test (100,30) and Y_test(100,) has 100 entries.

        from sklearn.model_selection import train_test_split
        X_train,X_test,y_train,y_test = train_test_split(data.loc[:, data.columns != 'Class'],
                        data['Class'], test_size=100, random_state=42)

        sample = pd.concat([X_test, y_test], axis=1)
        sample.shape
```

```
Out[3]: (100, 31)

In [4]: from sklearn.metrics.pairwise import cosine_similarity
        similarity_matrix = cosine_similarity(sample,data)
        similarity_matrix.shape

Out[4]: (100, 284807)

In [19]: def printResult(transaction1,first10pairs,sample,dict):
             x=transaction1[1][30]
             y=transaction1[0]
             s1='For the transaction id = '+ '{:d}'.format(y) + ', and Class = ' + \
                '{0:.5g}'.format(x)
             print (s1 +"\n")
             print ('Similar transactions are :'+ '\n')
             for k in first10pairs:
                 printSimilarity(k,dict[k],sample)
             print ('------------------------------------------------------'+"\n")


         def printSimilarity(transactionId,similarity,sample):

             for transaction in sample.iterrows():
                     if transaction[0] == transactionId:
                       x=transaction[1][30]
                       s=similarity
                       y=transactionId
                       print ("Class = " + '{0:.5g}'.format(x) + ", Similarity = "+\
                           '{:f}'.format(s)+ ", transactionId = "+'{:d}'.format(y)+"\n")

In [24]: import operator
         import itertools
         i=-1;
         dict={}
         for transaction1 in sample.iterrows() :
             i=i+1
             j=0
             for transaction2 in data.iterrows():
                 #if i is not j:
                 dict[transaction2[0]] = similarity_matrix[i][j] # This dict holds similarity
                 j=j+1                                           # corresponding trans


             if dict :
                 sorted_dict = sorted(dict, key=dict.__getitem__,reverse=True)[:10] # First 10
                                                                    # dict is sorted in
                                                                    # having similarity
                                                    #The theDict.__getitem__ is actua
             printResult(transaction1,sorted_dict,data,dict)
```

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```
                    dict.clear()                                    #This dict is flushed so that
                                                                    # transactions seperately
```

For the transaction id = 43428, and Class = 1

Similar transactions are :

Class = 1, Similarity = 1.000000, transactionId = 43428

Class = 1, Similarity = 1.000000, transactionId = 42528

Class = 0, Similarity = 0.999999, transactionId = 9111

Class = 0, Similarity = 0.999999, transactionId = 93873

Class = 0, Similarity = 0.999999, transactionId = 36588

Class = 0, Similarity = 0.999999, transactionId = 16849

Class = 0, Similarity = 0.999999, transactionId = 66989

Class = 0, Similarity = 0.999999, transactionId = 128387

Class = 0, Similarity = 0.999999, transactionId = 74190

Class = 0, Similarity = 0.999999, transactionId = 31339

For the transaction id = 49906, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 49906

Class = 0, Similarity = 1.000000, transactionId = 91885

Class = 0, Similarity = 1.000000, transactionId = 46520

Class = 0, Similarity = 1.000000, transactionId = 62405

Class = 0, Similarity = 1.000000, transactionId = 52848

Class = 0, Similarity = 1.000000, transactionId = 93370

Class = 0, Similarity = 1.000000, transactionId = 188494

Class = 0, Similarity = 1.000000, transactionId = 118714

Class = 0, Similarity = 1.000000, transactionId = 26653

Class = 0, Similarity = 1.000000, transactionId = 81313

For the transaction id = 29474, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 29474

Class = 0, Similarity = 1.000000, transactionId = 50361

Class = 0, Similarity = 1.000000, transactionId = 52387

Class = 0, Similarity = 1.000000, transactionId = 67369

Class = 0, Similarity = 1.000000, transactionId = 91551

Class = 0, Similarity = 1.000000, transactionId = 28598

Class = 0, Similarity = 1.000000, transactionId = 25973

Class = 0, Similarity = 1.000000, transactionId = 38173

Class = 0, Similarity = 1.000000, transactionId = 29025

Class = 0, Similarity = 1.000000, transactionId = 25948

For the transaction id = 276481, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 276481

Class = 0, Similarity = 1.000000, transactionId = 228641

Class = 0, Similarity = 1.000000, transactionId = 214877

Class = 0, Similarity = 1.000000, transactionId = 272798

Class = 0, Similarity = 1.000000, transactionId = 208069

Class = 0, Similarity = 1.000000, transactionId = 248315

```
Class = 0, Similarity = 1.000000, transactionId = 232351

Class = 0, Similarity = 1.000000, transactionId = 210274

Class = 0, Similarity = 1.000000, transactionId = 256905

Class = 0, Similarity = 1.000000, transactionId = 271391

----------------------------------------------------------

For the transaction id = 278846, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 278846

Class = 0, Similarity = 1.000000, transactionId = 258696

Class = 0, Similarity = 1.000000, transactionId = 277395

Class = 0, Similarity = 1.000000, transactionId = 272628

Class = 0, Similarity = 1.000000, transactionId = 271178

Class = 0, Similarity = 1.000000, transactionId = 282493

Class = 0, Similarity = 1.000000, transactionId = 266695

Class = 0, Similarity = 1.000000, transactionId = 259672

Class = 0, Similarity = 1.000000, transactionId = 243871

Class = 0, Similarity = 1.000000, transactionId = 280255

----------------------------------------------------------

For the transaction id = 101565, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 101565

Class = 0, Similarity = 1.000000, transactionId = 52759

Class = 0, Similarity = 1.000000, transactionId = 141092

Class = 0, Similarity = 1.000000, transactionId = 57955
```

```
Class = 0, Similarity = 1.000000, transactionId = 142883

Class = 0, Similarity = 1.000000, transactionId = 126991

Class = 0, Similarity = 1.000000, transactionId = 103709

Class = 0, Similarity = 1.000000, transactionId = 229451

Class = 0, Similarity = 1.000000, transactionId = 137847

Class = 0, Similarity = 1.000000, transactionId = 202407

----------------------------------------------------------

For the transaction id = 260880, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 260880

Class = 0, Similarity = 1.000000, transactionId = 258258

Class = 0, Similarity = 1.000000, transactionId = 274830

Class = 0, Similarity = 1.000000, transactionId = 281241

Class = 0, Similarity = 1.000000, transactionId = 274652

Class = 0, Similarity = 1.000000, transactionId = 220185

Class = 0, Similarity = 1.000000, transactionId = 250126

Class = 0, Similarity = 1.000000, transactionId = 267865

Class = 0, Similarity = 1.000000, transactionId = 207316

Class = 0, Similarity = 1.000000, transactionId = 283295

----------------------------------------------------------

For the transaction id = 214337, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 214337

Class = 0, Similarity = 1.000000, transactionId = 220763
```

```
Class = 0, Similarity = 1.000000, transactionId = 208924

Class = 0, Similarity = 1.000000, transactionId = 225635

Class = 0, Similarity = 1.000000, transactionId = 261339

Class = 0, Similarity = 1.000000, transactionId = 252031

Class = 0, Similarity = 1.000000, transactionId = 241362

Class = 0, Similarity = 1.000000, transactionId = 212414

Class = 0, Similarity = 1.000000, transactionId = 225969

Class = 0, Similarity = 1.000000, transactionId = 276844

---------------------------------------------------------

For the transaction id = 201575, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 201575

Class = 0, Similarity = 1.000000, transactionId = 200840

Class = 0, Similarity = 1.000000, transactionId = 202209

Class = 0, Similarity = 1.000000, transactionId = 201227

Class = 0, Similarity = 1.000000, transactionId = 200459

Class = 0, Similarity = 1.000000, transactionId = 200133

Class = 0, Similarity = 1.000000, transactionId = 202697

Class = 0, Similarity = 1.000000, transactionId = 200653

Class = 0, Similarity = 1.000000, transactionId = 203202

Class = 0, Similarity = 1.000000, transactionId = 202371

---------------------------------------------------------

For the transaction id = 81055, and Class = 0

Similar transactions are :
```

```
Class = 0, Similarity = 1.000000, transactionId = 81055

Class = 0, Similarity = 1.000000, transactionId = 161434

Class = 0, Similarity = 1.000000, transactionId = 144338

Class = 0, Similarity = 1.000000, transactionId = 265961

Class = 0, Similarity = 1.000000, transactionId = 143468

Class = 0, Similarity = 1.000000, transactionId = 207782

Class = 0, Similarity = 1.000000, transactionId = 202845

Class = 0, Similarity = 1.000000, transactionId = 96681

Class = 0, Similarity = 1.000000, transactionId = 84066

Class = 0, Similarity = 1.000000, transactionId = 147144

------------------------------------------------------------

For the transaction id = 134976, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 134976

Class = 0, Similarity = 1.000000, transactionId = 203643

Class = 0, Similarity = 1.000000, transactionId = 115167

Class = 0, Similarity = 1.000000, transactionId = 94814

Class = 0, Similarity = 1.000000, transactionId = 114066

Class = 0, Similarity = 1.000000, transactionId = 135415

Class = 0, Similarity = 1.000000, transactionId = 161852

Class = 0, Similarity = 1.000000, transactionId = 234933

Class = 0, Similarity = 1.000000, transactionId = 216647

Class = 0, Similarity = 1.000000, transactionId = 114865

------------------------------------------------------------
```

For the transaction id = 237701, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 237701

Class = 0, Similarity = 1.000000, transactionId = 224816

Class = 0, Similarity = 1.000000, transactionId = 194548

Class = 0, Similarity = 1.000000, transactionId = 212380

Class = 0, Similarity = 1.000000, transactionId = 196394

Class = 0, Similarity = 1.000000, transactionId = 190212

Class = 0, Similarity = 1.000000, transactionId = 248845

Class = 0, Similarity = 1.000000, transactionId = 264763

Class = 0, Similarity = 1.000000, transactionId = 280993

Class = 0, Similarity = 1.000000, transactionId = 212391

For the transaction id = 256836, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 256836

Class = 0, Similarity = 1.000000, transactionId = 185125

Class = 0, Similarity = 1.000000, transactionId = 265855

Class = 0, Similarity = 1.000000, transactionId = 201278

Class = 0, Similarity = 1.000000, transactionId = 258731

Class = 0, Similarity = 1.000000, transactionId = 205048

Class = 0, Similarity = 1.000000, transactionId = 210457

Class = 0, Similarity = 1.000000, transactionId = 254613

Class = 0, Similarity = 1.000000, transactionId = 263384

```
Class = 0, Similarity = 1.000000, transactionId = 269550

----------------------------------------------------------

For the transaction id = 97650, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 97650

Class = 0, Similarity = 1.000000, transactionId = 102853

Class = 0, Similarity = 1.000000, transactionId = 101675

Class = 0, Similarity = 1.000000, transactionId = 97806

Class = 0, Similarity = 1.000000, transactionId = 107400

Class = 0, Similarity = 1.000000, transactionId = 101853

Class = 0, Similarity = 1.000000, transactionId = 249219

Class = 0, Similarity = 1.000000, transactionId = 179941

Class = 0, Similarity = 1.000000, transactionId = 129440

Class = 0, Similarity = 1.000000, transactionId = 98767

----------------------------------------------------------

For the transaction id = 158290, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 158290

Class = 0, Similarity = 1.000000, transactionId = 158282

Class = 0, Similarity = 1.000000, transactionId = 158308

Class = 0, Similarity = 1.000000, transactionId = 158210

Class = 0, Similarity = 1.000000, transactionId = 158360

Class = 0, Similarity = 1.000000, transactionId = 157304

Class = 0, Similarity = 1.000000, transactionId = 158289
```

```
Class = 0, Similarity = 1.000000, transactionId = 158305

Class = 0, Similarity = 1.000000, transactionId = 158209

Class = 0, Similarity = 1.000000, transactionId = 157419

---------------------------------------------------------

For the transaction id = 246697, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 246697

Class = 0, Similarity = 1.000000, transactionId = 282668

Class = 0, Similarity = 1.000000, transactionId = 181409

Class = 0, Similarity = 1.000000, transactionId = 236908

Class = 0, Similarity = 1.000000, transactionId = 196549

Class = 0, Similarity = 1.000000, transactionId = 231565

Class = 0, Similarity = 1.000000, transactionId = 140555

Class = 0, Similarity = 1.000000, transactionId = 143959

Class = 0, Similarity = 1.000000, transactionId = 191984

Class = 0, Similarity = 1.000000, transactionId = 262855

---------------------------------------------------------

For the transaction id = 68279, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 68279

Class = 0, Similarity = 1.000000, transactionId = 69755

Class = 0, Similarity = 1.000000, transactionId = 76904

Class = 0, Similarity = 1.000000, transactionId = 68437

Class = 0, Similarity = 1.000000, transactionId = 69918
```

```
Class = 0, Similarity = 1.000000, transactionId = 55886

Class = 0, Similarity = 1.000000, transactionId = 103376

Class = 0, Similarity = 1.000000, transactionId = 115806

Class = 0, Similarity = 1.000000, transactionId = 103453

Class = 0, Similarity = 1.000000, transactionId = 73102

----------------------------------------------------------

For the transaction id = 267585, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 267585

Class = 0, Similarity = 1.000000, transactionId = 265160

Class = 0, Similarity = 1.000000, transactionId = 200280

Class = 0, Similarity = 1.000000, transactionId = 245100

Class = 0, Similarity = 1.000000, transactionId = 262345

Class = 0, Similarity = 1.000000, transactionId = 194800

Class = 0, Similarity = 1.000000, transactionId = 220147

Class = 0, Similarity = 1.000000, transactionId = 277531

Class = 0, Similarity = 1.000000, transactionId = 271128

Class = 0, Similarity = 1.000000, transactionId = 274203

----------------------------------------------------------

For the transaction id = 26525, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 26525

Class = 0, Similarity = 1.000000, transactionId = 70926

Class = 0, Similarity = 1.000000, transactionId = 15437
```

```
Class = 0, Similarity = 1.000000, transactionId = 38526

Class = 0, Similarity = 1.000000, transactionId = 20219

Class = 0, Similarity = 1.000000, transactionId = 28082

Class = 0, Similarity = 1.000000, transactionId = 51638

Class = 0, Similarity = 1.000000, transactionId = 31060

Class = 0, Similarity = 1.000000, transactionId = 15604

Class = 0, Similarity = 1.000000, transactionId = 73160

---------------------------------------------------------

For the transaction id = 74422, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 74422

Class = 0, Similarity = 1.000000, transactionId = 69260

Class = 0, Similarity = 1.000000, transactionId = 30725

Class = 0, Similarity = 1.000000, transactionId = 112143

Class = 0, Similarity = 1.000000, transactionId = 63786

Class = 0, Similarity = 1.000000, transactionId = 82666

Class = 0, Similarity = 1.000000, transactionId = 54181

Class = 0, Similarity = 1.000000, transactionId = 95827

Class = 0, Similarity = 1.000000, transactionId = 71336

Class = 0, Similarity = 1.000000, transactionId = 120206

---------------------------------------------------------

For the transaction id = 206357, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 206357
```

```
Class = 0, Similarity = 1.000000, transactionId = 276172

Class = 0, Similarity = 1.000000, transactionId = 237513

Class = 0, Similarity = 1.000000, transactionId = 240243

Class = 0, Similarity = 1.000000, transactionId = 228597

Class = 0, Similarity = 1.000000, transactionId = 235335

Class = 0, Similarity = 1.000000, transactionId = 167386

Class = 0, Similarity = 1.000000, transactionId = 284111

Class = 0, Similarity = 1.000000, transactionId = 243732

Class = 0, Similarity = 1.000000, transactionId = 240249

----------------------------------------------------------

For the transaction id = 257395, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 257395

Class = 0, Similarity = 1.000000, transactionId = 276513

Class = 0, Similarity = 1.000000, transactionId = 221710

Class = 0, Similarity = 1.000000, transactionId = 268741

Class = 0, Similarity = 1.000000, transactionId = 196033

Class = 0, Similarity = 1.000000, transactionId = 254243

Class = 0, Similarity = 1.000000, transactionId = 260273

Class = 0, Similarity = 1.000000, transactionId = 273348

Class = 0, Similarity = 1.000000, transactionId = 211551

Class = 0, Similarity = 1.000000, transactionId = 278887

----------------------------------------------------------

For the transaction id = 283656, and Class = 0
```

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 283656

Class = 0, Similarity = 1.000000, transactionId = 261723

Class = 0, Similarity = 1.000000, transactionId = 281041

Class = 0, Similarity = 1.000000, transactionId = 254648

Class = 0, Similarity = 1.000000, transactionId = 278249

Class = 0, Similarity = 1.000000, transactionId = 176098

Class = 0, Similarity = 1.000000, transactionId = 216913

Class = 0, Similarity = 1.000000, transactionId = 255411

Class = 0, Similarity = 1.000000, transactionId = 212596

Class = 0, Similarity = 1.000000, transactionId = 231008

For the transaction id = 231156, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 231156

Class = 0, Similarity = 1.000000, transactionId = 203593

Class = 0, Similarity = 1.000000, transactionId = 213943

Class = 0, Similarity = 1.000000, transactionId = 245591

Class = 0, Similarity = 1.000000, transactionId = 183068

Class = 0, Similarity = 1.000000, transactionId = 274083

Class = 0, Similarity = 1.000000, transactionId = 204203

Class = 0, Similarity = 1.000000, transactionId = 269916

Class = 0, Similarity = 1.000000, transactionId = 224615

Class = 0, Similarity = 1.000000, transactionId = 183500

For the transaction id = 38442, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 38442

Class = 0, Similarity = 1.000000, transactionId = 72604

Class = 0, Similarity = 1.000000, transactionId = 60763

Class = 0, Similarity = 1.000000, transactionId = 65932

Class = 0, Similarity = 1.000000, transactionId = 18169

Class = 0, Similarity = 1.000000, transactionId = 77669

Class = 0, Similarity = 1.000000, transactionId = 67335

Class = 0, Similarity = 1.000000, transactionId = 88143

Class = 0, Similarity = 1.000000, transactionId = 33404

Class = 0, Similarity = 1.000000, transactionId = 80531

For the transaction id = 225485, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 225485

Class = 0, Similarity = 1.000000, transactionId = 254500

Class = 0, Similarity = 1.000000, transactionId = 229710

Class = 0, Similarity = 1.000000, transactionId = 201304

Class = 0, Similarity = 1.000000, transactionId = 252336

Class = 0, Similarity = 1.000000, transactionId = 225980

Class = 0, Similarity = 1.000000, transactionId = 284340

Class = 0, Similarity = 1.000000, transactionId = 236075

```
Class = 0, Similarity = 1.000000, transactionId = 270731

Class = 0, Similarity = 1.000000, transactionId = 169942

----------------------------------------------------------

For the transaction id = 92410, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 92410

Class = 0, Similarity = 1.000000, transactionId = 133326

Class = 0, Similarity = 1.000000, transactionId = 90866

Class = 0, Similarity = 1.000000, transactionId = 97197

Class = 0, Similarity = 1.000000, transactionId = 92262

Class = 0, Similarity = 1.000000, transactionId = 56030

Class = 0, Similarity = 1.000000, transactionId = 111365

Class = 0, Similarity = 1.000000, transactionId = 114511

Class = 0, Similarity = 1.000000, transactionId = 122514

Class = 0, Similarity = 1.000000, transactionId = 140597

----------------------------------------------------------

For the transaction id = 10828, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 10828

Class = 0, Similarity = 1.000000, transactionId = 12644

Class = 0, Similarity = 1.000000, transactionId = 13980

Class = 0, Similarity = 1.000000, transactionId = 9562

Class = 0, Similarity = 1.000000, transactionId = 13407

Class = 0, Similarity = 1.000000, transactionId = 13444
```

```
Class = 0, Similarity = 1.000000, transactionId = 13316

Class = 0, Similarity = 1.000000, transactionId = 13591

Class = 0, Similarity = 1.000000, transactionId = 13987

Class = 0, Similarity = 1.000000, transactionId = 10640

----------------------------------------------------------

For the transaction id = 61461, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 61461

Class = 0, Similarity = 1.000000, transactionId = 60531

Class = 0, Similarity = 1.000000, transactionId = 93534

Class = 0, Similarity = 1.000000, transactionId = 109624

Class = 0, Similarity = 1.000000, transactionId = 86596

Class = 0, Similarity = 1.000000, transactionId = 118468

Class = 0, Similarity = 1.000000, transactionId = 87748

Class = 0, Similarity = 1.000000, transactionId = 56534

Class = 0, Similarity = 1.000000, transactionId = 125639

Class = 0, Similarity = 1.000000, transactionId = 131287

----------------------------------------------------------

For the transaction id = 134354, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 134354

Class = 0, Similarity = 1.000000, transactionId = 102253

Class = 0, Similarity = 1.000000, transactionId = 132253

Class = 0, Similarity = 1.000000, transactionId = 179378
```

```
Class = 0, Similarity = 1.000000, transactionId = 97943

Class = 0, Similarity = 1.000000, transactionId = 80331

Class = 0, Similarity = 1.000000, transactionId = 127320

Class = 0, Similarity = 1.000000, transactionId = 115003

Class = 0, Similarity = 1.000000, transactionId = 135851

Class = 0, Similarity = 1.000000, transactionId = 230273

---------------------------------------------------------

For the transaction id = 45265, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 45265

Class = 0, Similarity = 1.000000, transactionId = 46313

Class = 0, Similarity = 1.000000, transactionId = 88657

Class = 0, Similarity = 1.000000, transactionId = 91800

Class = 0, Similarity = 1.000000, transactionId = 39862

Class = 0, Similarity = 1.000000, transactionId = 21717

Class = 0, Similarity = 1.000000, transactionId = 59506

Class = 0, Similarity = 1.000000, transactionId = 83474

Class = 0, Similarity = 1.000000, transactionId = 110523

Class = 0, Similarity = 1.000000, transactionId = 34795

---------------------------------------------------------

For the transaction id = 151374, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 151374

Class = 0, Similarity = 1.000000, transactionId = 152916
```

```
Class = 0, Similarity = 1.000000, transactionId = 151481

Class = 0, Similarity = 1.000000, transactionId = 151379

Class = 0, Similarity = 1.000000, transactionId = 151429

Class = 0, Similarity = 1.000000, transactionId = 156717

Class = 0, Similarity = 1.000000, transactionId = 156755

Class = 0, Similarity = 1.000000, transactionId = 155311

Class = 0, Similarity = 1.000000, transactionId = 158143

Class = 0, Similarity = 1.000000, transactionId = 151428

----------------------------------------------------------

For the transaction id = 219257, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 219257

Class = 0, Similarity = 1.000000, transactionId = 244674

Class = 0, Similarity = 1.000000, transactionId = 61987

Class = 0, Similarity = 1.000000, transactionId = 186913

Class = 0, Similarity = 1.000000, transactionId = 36571

Class = 0, Similarity = 1.000000, transactionId = 224696

Class = 0, Similarity = 1.000000, transactionId = 192092

Class = 0, Similarity = 1.000000, transactionId = 86157

Class = 0, Similarity = 1.000000, transactionId = 182940

Class = 0, Similarity = 1.000000, transactionId = 185785

----------------------------------------------------------

For the transaction id = 49275, and Class = 0

Similar transactions are :
```

```
Class = 0, Similarity = 1.000000, transactionId = 49275

Class = 0, Similarity = 1.000000, transactionId = 80820

Class = 0, Similarity = 1.000000, transactionId = 86004

Class = 0, Similarity = 1.000000, transactionId = 85318

Class = 0, Similarity = 1.000000, transactionId = 94016

Class = 0, Similarity = 1.000000, transactionId = 66132

Class = 0, Similarity = 1.000000, transactionId = 114531

Class = 0, Similarity = 1.000000, transactionId = 164098

Class = 0, Similarity = 1.000000, transactionId = 105954

Class = 0, Similarity = 1.000000, transactionId = 83392

-----------------------------------------------------------

For the transaction id = 113769, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 113769

Class = 0, Similarity = 1.000000, transactionId = 138944

Class = 0, Similarity = 1.000000, transactionId = 140440

Class = 0, Similarity = 1.000000, transactionId = 70970

Class = 0, Similarity = 1.000000, transactionId = 184720

Class = 0, Similarity = 1.000000, transactionId = 108672

Class = 0, Similarity = 1.000000, transactionId = 127538

Class = 0, Similarity = 1.000000, transactionId = 98175

Class = 0, Similarity = 1.000000, transactionId = 177963

Class = 0, Similarity = 1.000000, transactionId = 245092

-----------------------------------------------------------
```

For the transaction id = 205650, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 205650

Class = 0, Similarity = 1.000000, transactionId = 209860

Class = 0, Similarity = 1.000000, transactionId = 205446

Class = 0, Similarity = 1.000000, transactionId = 267010

Class = 0, Similarity = 1.000000, transactionId = 198077

Class = 0, Similarity = 1.000000, transactionId = 196807

Class = 0, Similarity = 1.000000, transactionId = 186077

Class = 0, Similarity = 1.000000, transactionId = 217053

Class = 0, Similarity = 1.000000, transactionId = 196508

Class = 0, Similarity = 1.000000, transactionId = 193765

For the transaction id = 250467, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 250467

Class = 0, Similarity = 1.000000, transactionId = 261231

Class = 0, Similarity = 1.000000, transactionId = 205904

Class = 0, Similarity = 1.000000, transactionId = 240673

Class = 0, Similarity = 1.000000, transactionId = 254330

Class = 0, Similarity = 1.000000, transactionId = 184965

Class = 0, Similarity = 1.000000, transactionId = 280565

Class = 0, Similarity = 1.000000, transactionId = 283959

Class = 0, Similarity = 1.000000, transactionId = 171634

```
Class = 0, Similarity = 1.000000, transactionId = 203288

-----------------------------------------------------------

For the transaction id = 194599, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 194599

Class = 0, Similarity = 1.000000, transactionId = 198510

Class = 0, Similarity = 1.000000, transactionId = 258046

Class = 0, Similarity = 1.000000, transactionId = 211982

Class = 0, Similarity = 1.000000, transactionId = 272549

Class = 0, Similarity = 1.000000, transactionId = 194172

Class = 0, Similarity = 1.000000, transactionId = 211724

Class = 0, Similarity = 1.000000, transactionId = 240910

Class = 0, Similarity = 1.000000, transactionId = 194511

Class = 0, Similarity = 1.000000, transactionId = 257251

-----------------------------------------------------------

For the transaction id = 266912, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 266912

Class = 0, Similarity = 1.000000, transactionId = 283286

Class = 0, Similarity = 1.000000, transactionId = 254974

Class = 0, Similarity = 1.000000, transactionId = 277228

Class = 0, Similarity = 1.000000, transactionId = 271121

Class = 0, Similarity = 1.000000, transactionId = 281761

Class = 0, Similarity = 1.000000, transactionId = 251667
```

```
Class = 0, Similarity = 1.000000, transactionId = 261464

Class = 0, Similarity = 1.000000, transactionId = 251297

Class = 0, Similarity = 1.000000, transactionId = 280391

--------------------------------------------------------

For the transaction id = 228215, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 228215

Class = 0, Similarity = 1.000000, transactionId = 257097

Class = 0, Similarity = 1.000000, transactionId = 217880

Class = 0, Similarity = 1.000000, transactionId = 214998

Class = 0, Similarity = 1.000000, transactionId = 181654

Class = 0, Similarity = 1.000000, transactionId = 237731

Class = 0, Similarity = 1.000000, transactionId = 214220

Class = 0, Similarity = 1.000000, transactionId = 239092

Class = 0, Similarity = 1.000000, transactionId = 200481

Class = 0, Similarity = 1.000000, transactionId = 160898

--------------------------------------------------------

For the transaction id = 259706, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 259706

Class = 0, Similarity = 1.000000, transactionId = 195832

Class = 0, Similarity = 1.000000, transactionId = 183421

Class = 0, Similarity = 1.000000, transactionId = 267276

Class = 0, Similarity = 1.000000, transactionId = 273925
```

```
Class = 0, Similarity = 1.000000, transactionId = 244631

Class = 0, Similarity = 1.000000, transactionId = 270716

Class = 0, Similarity = 1.000000, transactionId = 218782

Class = 0, Similarity = 1.000000, transactionId = 272307

Class = 0, Similarity = 1.000000, transactionId = 209465

-----------------------------------------------------

For the transaction id = 149066, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 149066

Class = 0, Similarity = 1.000000, transactionId = 149473

Class = 0, Similarity = 1.000000, transactionId = 158605

Class = 0, Similarity = 1.000000, transactionId = 149088

Class = 0, Similarity = 1.000000, transactionId = 165830

Class = 0, Similarity = 1.000000, transactionId = 197477

Class = 0, Similarity = 1.000000, transactionId = 166031

Class = 0, Similarity = 1.000000, transactionId = 152123

Class = 0, Similarity = 1.000000, transactionId = 197190

Class = 0, Similarity = 1.000000, transactionId = 153719

-----------------------------------------------------

For the transaction id = 68119, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 68119

Class = 0, Similarity = 1.000000, transactionId = 46897

Class = 0, Similarity = 1.000000, transactionId = 87445
```

```
Class = 0, Similarity = 1.000000, transactionId = 140128

Class = 0, Similarity = 1.000000, transactionId = 164324

Class = 0, Similarity = 1.000000, transactionId = 164232

Class = 0, Similarity = 1.000000, transactionId = 85068

Class = 0, Similarity = 1.000000, transactionId = 115553

Class = 0, Similarity = 1.000000, transactionId = 124066

Class = 0, Similarity = 1.000000, transactionId = 164124

---------------------------------------------------------

For the transaction id = 225255, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 225255

Class = 0, Similarity = 1.000000, transactionId = 189588

Class = 0, Similarity = 1.000000, transactionId = 256952

Class = 0, Similarity = 1.000000, transactionId = 281642

Class = 0, Similarity = 1.000000, transactionId = 263599

Class = 0, Similarity = 1.000000, transactionId = 190874

Class = 0, Similarity = 1.000000, transactionId = 256050

Class = 0, Similarity = 1.000000, transactionId = 191695

Class = 0, Similarity = 1.000000, transactionId = 162862

Class = 0, Similarity = 1.000000, transactionId = 277580

---------------------------------------------------------

For the transaction id = 21934, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 21934
```

Class = 0, Similarity = 1.000000, transactionId = 64693

Class = 0, Similarity = 1.000000, transactionId = 62639

Class = 0, Similarity = 1.000000, transactionId = 76881

Class = 0, Similarity = 1.000000, transactionId = 107309

Class = 0, Similarity = 1.000000, transactionId = 63504

Class = 0, Similarity = 1.000000, transactionId = 23714

Class = 0, Similarity = 1.000000, transactionId = 39156

Class = 0, Similarity = 1.000000, transactionId = 32280

Class = 0, Similarity = 1.000000, transactionId = 25784

For the transaction id = 105030, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 105030

Class = 0, Similarity = 1.000000, transactionId = 102256

Class = 0, Similarity = 1.000000, transactionId = 188886

Class = 0, Similarity = 1.000000, transactionId = 254177

Class = 0, Similarity = 1.000000, transactionId = 212396

Class = 0, Similarity = 1.000000, transactionId = 227653

Class = 0, Similarity = 1.000000, transactionId = 239408

Class = 0, Similarity = 1.000000, transactionId = 248305

Class = 0, Similarity = 1.000000, transactionId = 262754

Class = 0, Similarity = 1.000000, transactionId = 51882

For the transaction id = 114027, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 114027

Class = 0, Similarity = 1.000000, transactionId = 130574

Class = 0, Similarity = 1.000000, transactionId = 120120

Class = 0, Similarity = 1.000000, transactionId = 105332

Class = 0, Similarity = 1.000000, transactionId = 102640

Class = 0, Similarity = 1.000000, transactionId = 102044

Class = 0, Similarity = 1.000000, transactionId = 108673

Class = 0, Similarity = 1.000000, transactionId = 124708

Class = 0, Similarity = 1.000000, transactionId = 107883

Class = 0, Similarity = 1.000000, transactionId = 100393

For the transaction id = 178329, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 178329

Class = 0, Similarity = 1.000000, transactionId = 186244

Class = 0, Similarity = 1.000000, transactionId = 164226

Class = 0, Similarity = 1.000000, transactionId = 191387

Class = 0, Similarity = 1.000000, transactionId = 189839

Class = 0, Similarity = 1.000000, transactionId = 175432

Class = 0, Similarity = 1.000000, transactionId = 175092

Class = 0, Similarity = 1.000000, transactionId = 176384

Class = 0, Similarity = 1.000000, transactionId = 164971

Class = 0, Similarity = 1.000000, transactionId = 250757

For the transaction id = 109526, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 109526

Class = 0, Similarity = 1.000000, transactionId = 81634

Class = 0, Similarity = 1.000000, transactionId = 110726

Class = 0, Similarity = 1.000000, transactionId = 100853

Class = 0, Similarity = 1.000000, transactionId = 95454

Class = 0, Similarity = 1.000000, transactionId = 93425

Class = 0, Similarity = 1.000000, transactionId = 94015

Class = 0, Similarity = 1.000000, transactionId = 125227

Class = 0, Similarity = 1.000000, transactionId = 121582

Class = 0, Similarity = 1.000000, transactionId = 87130

For the transaction id = 32278, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 32278

Class = 0, Similarity = 1.000000, transactionId = 31479

Class = 0, Similarity = 1.000000, transactionId = 36597

Class = 0, Similarity = 1.000000, transactionId = 32850

Class = 0, Similarity = 1.000000, transactionId = 18122

Class = 0, Similarity = 1.000000, transactionId = 35018

Class = 0, Similarity = 1.000000, transactionId = 38034

Class = 0, Similarity = 1.000000, transactionId = 20213

```
Class = 0, Similarity = 1.000000, transactionId = 36659

Class = 0, Similarity = 1.000000, transactionId = 82771

------------------------------------------------------------

For the transaction id = 233533, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 233533

Class = 0, Similarity = 1.000000, transactionId = 251440

Class = 0, Similarity = 1.000000, transactionId = 230778

Class = 0, Similarity = 1.000000, transactionId = 212755

Class = 0, Similarity = 1.000000, transactionId = 196325

Class = 0, Similarity = 1.000000, transactionId = 254828

Class = 0, Similarity = 1.000000, transactionId = 273201

Class = 0, Similarity = 1.000000, transactionId = 260552

Class = 0, Similarity = 1.000000, transactionId = 239816

Class = 0, Similarity = 1.000000, transactionId = 222409

------------------------------------------------------------

For the transaction id = 76922, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 76922

Class = 0, Similarity = 1.000000, transactionId = 65505

Class = 0, Similarity = 1.000000, transactionId = 90854

Class = 0, Similarity = 1.000000, transactionId = 94538

Class = 0, Similarity = 1.000000, transactionId = 100087

Class = 0, Similarity = 1.000000, transactionId = 92145
```

```
Class = 0, Similarity = 1.000000, transactionId = 107017

Class = 0, Similarity = 1.000000, transactionId = 74015

Class = 0, Similarity = 1.000000, transactionId = 51719

Class = 0, Similarity = 1.000000, transactionId = 75456

----------------------------------------------------------

For the transaction id = 187045, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 187045

Class = 0, Similarity = 1.000000, transactionId = 240262

Class = 0, Similarity = 1.000000, transactionId = 229553

Class = 0, Similarity = 1.000000, transactionId = 248526

Class = 0, Similarity = 1.000000, transactionId = 248207

Class = 0, Similarity = 1.000000, transactionId = 264913

Class = 0, Similarity = 1.000000, transactionId = 204667

Class = 0, Similarity = 1.000000, transactionId = 264943

Class = 0, Similarity = 1.000000, transactionId = 228091

Class = 0, Similarity = 1.000000, transactionId = 229676

----------------------------------------------------------

For the transaction id = 149100, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 149100

Class = 0, Similarity = 1.000000, transactionId = 156209

Class = 0, Similarity = 1.000000, transactionId = 151104

Class = 0, Similarity = 1.000000, transactionId = 150702
```

```
Class = 0, Similarity = 1.000000, transactionId = 148924

Class = 0, Similarity = 1.000000, transactionId = 155539

Class = 0, Similarity = 1.000000, transactionId = 157232

Class = 0, Similarity = 1.000000, transactionId = 150277

Class = 0, Similarity = 1.000000, transactionId = 156883

Class = 0, Similarity = 1.000000, transactionId = 151215

---------------------------------------------------------

For the transaction id = 133186, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 133186

Class = 0, Similarity = 1.000000, transactionId = 142877

Class = 0, Similarity = 1.000000, transactionId = 133120

Class = 0, Similarity = 1.000000, transactionId = 144763

Class = 0, Similarity = 1.000000, transactionId = 105508

Class = 0, Similarity = 1.000000, transactionId = 133047

Class = 0, Similarity = 1.000000, transactionId = 209918

Class = 0, Similarity = 1.000000, transactionId = 121940

Class = 0, Similarity = 1.000000, transactionId = 209821

Class = 0, Similarity = 1.000000, transactionId = 110089

---------------------------------------------------------

For the transaction id = 89165, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 89165

Class = 0, Similarity = 1.000000, transactionId = 105980
```

```
Class = 0, Similarity = 1.000000, transactionId = 114442

Class = 0, Similarity = 1.000000, transactionId = 101893

Class = 0, Similarity = 1.000000, transactionId = 123683

Class = 0, Similarity = 1.000000, transactionId = 102722

Class = 0, Similarity = 1.000000, transactionId = 114425

Class = 0, Similarity = 1.000000, transactionId = 118778

Class = 0, Similarity = 1.000000, transactionId = 119242

Class = 0, Similarity = 1.000000, transactionId = 105952

---------------------------------------------------------

For the transaction id = 138728, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 138728

Class = 0, Similarity = 1.000000, transactionId = 75931

Class = 0, Similarity = 1.000000, transactionId = 103555

Class = 0, Similarity = 1.000000, transactionId = 85675

Class = 0, Similarity = 1.000000, transactionId = 86727

Class = 0, Similarity = 1.000000, transactionId = 113425

Class = 0, Similarity = 1.000000, transactionId = 135229

Class = 0, Similarity = 1.000000, transactionId = 64895

Class = 0, Similarity = 1.000000, transactionId = 76197

Class = 0, Similarity = 1.000000, transactionId = 116547

---------------------------------------------------------

For the transaction id = 161808, and Class = 0

Similar transactions are :
```

```
Class = 0, Similarity = 1.000000, transactionId = 161808

Class = 0, Similarity = 1.000000, transactionId = 169904

Class = 0, Similarity = 1.000000, transactionId = 211647

Class = 0, Similarity = 1.000000, transactionId = 228308

Class = 0, Similarity = 1.000000, transactionId = 162640

Class = 0, Similarity = 1.000000, transactionId = 199289

Class = 0, Similarity = 1.000000, transactionId = 266954

Class = 0, Similarity = 1.000000, transactionId = 204962

Class = 0, Similarity = 1.000000, transactionId = 267404

Class = 0, Similarity = 1.000000, transactionId = 242756

------------------------------------------------------------

For the transaction id = 15816, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 15816

Class = 0, Similarity = 1.000000, transactionId = 33083

Class = 0, Similarity = 1.000000, transactionId = 16466

Class = 0, Similarity = 1.000000, transactionId = 29473

Class = 0, Similarity = 1.000000, transactionId = 32970

Class = 0, Similarity = 1.000000, transactionId = 47134

Class = 0, Similarity = 1.000000, transactionId = 22046

Class = 0, Similarity = 1.000000, transactionId = 23138

Class = 0, Similarity = 1.000000, transactionId = 26200

Class = 0, Similarity = 1.000000, transactionId = 20327

------------------------------------------------------------
```

For the transaction id = 150994, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 150994

Class = 0, Similarity = 1.000000, transactionId = 154646

Class = 0, Similarity = 1.000000, transactionId = 151602

Class = 0, Similarity = 1.000000, transactionId = 153151

Class = 0, Similarity = 1.000000, transactionId = 156798

Class = 0, Similarity = 1.000000, transactionId = 154740

Class = 0, Similarity = 1.000000, transactionId = 150940

Class = 0, Similarity = 1.000000, transactionId = 149536

Class = 0, Similarity = 1.000000, transactionId = 154938

Class = 0, Similarity = 1.000000, transactionId = 151222

For the transaction id = 79591, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 79591

Class = 0, Similarity = 1.000000, transactionId = 137278

Class = 0, Similarity = 1.000000, transactionId = 99423

Class = 0, Similarity = 1.000000, transactionId = 134046

Class = 0, Similarity = 1.000000, transactionId = 107499

Class = 0, Similarity = 1.000000, transactionId = 106771

Class = 0, Similarity = 1.000000, transactionId = 128559

Class = 0, Similarity = 1.000000, transactionId = 120554

Class = 0, Similarity = 1.000000, transactionId = 72586

Class = 0, Similarity = 1.000000, transactionId = 94044

For the transaction id = 36749, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 36749

Class = 0, Similarity = 1.000000, transactionId = 49830

Class = 0, Similarity = 1.000000, transactionId = 19840

Class = 0, Similarity = 1.000000, transactionId = 118062

Class = 0, Similarity = 1.000000, transactionId = 104465

Class = 0, Similarity = 1.000000, transactionId = 14559

Class = 0, Similarity = 1.000000, transactionId = 29131

Class = 0, Similarity = 1.000000, transactionId = 39006

Class = 0, Similarity = 1.000000, transactionId = 123679

Class = 0, Similarity = 1.000000, transactionId = 93676

For the transaction id = 28828, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 28828

Class = 0, Similarity = 1.000000, transactionId = 36721

Class = 0, Similarity = 1.000000, transactionId = 39608

Class = 0, Similarity = 1.000000, transactionId = 29047

Class = 0, Similarity = 1.000000, transactionId = 51057

Class = 0, Similarity = 1.000000, transactionId = 28901

Class = 0, Similarity = 1.000000, transactionId = 29506

```
Class = 0, Similarity = 1.000000, transactionId = 19936

Class = 0, Similarity = 1.000000, transactionId = 55494

Class = 0, Similarity = 1.000000, transactionId = 51993

----------------------------------------------------------

For the transaction id = 232448, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 232448

Class = 0, Similarity = 1.000000, transactionId = 216144

Class = 0, Similarity = 1.000000, transactionId = 198125

Class = 0, Similarity = 1.000000, transactionId = 174407

Class = 0, Similarity = 1.000000, transactionId = 259835

Class = 0, Similarity = 1.000000, transactionId = 219248

Class = 0, Similarity = 1.000000, transactionId = 257906

Class = 0, Similarity = 1.000000, transactionId = 238180

Class = 0, Similarity = 1.000000, transactionId = 199568

Class = 0, Similarity = 1.000000, transactionId = 235746

----------------------------------------------------------

For the transaction id = 28195, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 28195

Class = 0, Similarity = 1.000000, transactionId = 35223

Class = 0, Similarity = 1.000000, transactionId = 31259

Class = 0, Similarity = 1.000000, transactionId = 29622

Class = 0, Similarity = 1.000000, transactionId = 69007
```

```
Class = 0, Similarity = 1.000000, transactionId = 26907

Class = 0, Similarity = 1.000000, transactionId = 49590

Class = 0, Similarity = 1.000000, transactionId = 86462

Class = 0, Similarity = 1.000000, transactionId = 50771

Class = 0, Similarity = 1.000000, transactionId = 63696

----------------------------------------------------------

For the transaction id = 240146, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 240146

Class = 0, Similarity = 1.000000, transactionId = 206075

Class = 0, Similarity = 1.000000, transactionId = 238788

Class = 0, Similarity = 1.000000, transactionId = 205317

Class = 0, Similarity = 1.000000, transactionId = 198862

Class = 0, Similarity = 1.000000, transactionId = 264848

Class = 0, Similarity = 1.000000, transactionId = 282384

Class = 0, Similarity = 1.000000, transactionId = 239986

Class = 0, Similarity = 1.000000, transactionId = 230558

Class = 0, Similarity = 1.000000, transactionId = 260143

----------------------------------------------------------

For the transaction id = 240449, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 240449

Class = 0, Similarity = 1.000000, transactionId = 235079

Class = 0, Similarity = 1.000000, transactionId = 230818
```

```
Class = 0, Similarity = 1.000000, transactionId = 195837

Class = 0, Similarity = 1.000000, transactionId = 195579

Class = 0, Similarity = 1.000000, transactionId = 282637

Class = 0, Similarity = 1.000000, transactionId = 272983

Class = 0, Similarity = 1.000000, transactionId = 200744

Class = 0, Similarity = 1.000000, transactionId = 279835

Class = 0, Similarity = 1.000000, transactionId = 245546

----------------------------------------------------------

For the transaction id = 49296, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 49296

Class = 0, Similarity = 1.000000, transactionId = 75609

Class = 0, Similarity = 1.000000, transactionId = 68029

Class = 0, Similarity = 1.000000, transactionId = 67923

Class = 0, Similarity = 1.000000, transactionId = 68366

Class = 0, Similarity = 1.000000, transactionId = 88958

Class = 0, Similarity = 1.000000, transactionId = 40942

Class = 0, Similarity = 1.000000, transactionId = 37945

Class = 0, Similarity = 1.000000, transactionId = 76813

Class = 0, Similarity = 1.000000, transactionId = 43992

----------------------------------------------------------

For the transaction id = 14176, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 14176
```

```
Class = 0, Similarity = 1.000000, transactionId = 19129

Class = 0, Similarity = 1.000000, transactionId = 63371

Class = 0, Similarity = 1.000000, transactionId = 70410

Class = 0, Similarity = 1.000000, transactionId = 16208

Class = 0, Similarity = 1.000000, transactionId = 26036

Class = 0, Similarity = 1.000000, transactionId = 17263

Class = 0, Similarity = 1.000000, transactionId = 31879

Class = 0, Similarity = 1.000000, transactionId = 87230

Class = 0, Similarity = 1.000000, transactionId = 29244

----------------------------------------------------------

For the transaction id = 80419, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 80419

Class = 0, Similarity = 1.000000, transactionId = 141962

Class = 0, Similarity = 1.000000, transactionId = 158914

Class = 0, Similarity = 1.000000, transactionId = 201618

Class = 0, Similarity = 1.000000, transactionId = 142484

Class = 0, Similarity = 1.000000, transactionId = 61107

Class = 0, Similarity = 1.000000, transactionId = 188030

Class = 0, Similarity = 1.000000, transactionId = 179637

Class = 0, Similarity = 1.000000, transactionId = 113945

Class = 0, Similarity = 1.000000, transactionId = 227260

----------------------------------------------------------

For the transaction id = 210194, and Class = 0
```

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 210194

Class = 0, Similarity = 1.000000, transactionId = 244245

Class = 0, Similarity = 1.000000, transactionId = 225473

Class = 0, Similarity = 1.000000, transactionId = 258764

Class = 0, Similarity = 1.000000, transactionId = 167214

Class = 0, Similarity = 1.000000, transactionId = 270293

Class = 0, Similarity = 1.000000, transactionId = 204587

Class = 0, Similarity = 1.000000, transactionId = 277518

Class = 0, Similarity = 1.000000, transactionId = 217109

Class = 0, Similarity = 1.000000, transactionId = 262216

For the transaction id = 177473, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 177473

Class = 0, Similarity = 1.000000, transactionId = 259895

Class = 0, Similarity = 1.000000, transactionId = 186952

Class = 0, Similarity = 1.000000, transactionId = 282284

Class = 0, Similarity = 1.000000, transactionId = 275185

Class = 0, Similarity = 1.000000, transactionId = 217236

Class = 0, Similarity = 1.000000, transactionId = 197717

Class = 0, Similarity = 1.000000, transactionId = 143691

Class = 0, Similarity = 1.000000, transactionId = 258268

Class = 0, Similarity = 1.000000, transactionId = 204184

For the transaction id = 81436, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 81436

Class = 0, Similarity = 1.000000, transactionId = 81216

Class = 0, Similarity = 1.000000, transactionId = 81035

Class = 0, Similarity = 1.000000, transactionId = 80269

Class = 0, Similarity = 1.000000, transactionId = 83487

Class = 0, Similarity = 1.000000, transactionId = 78506

Class = 0, Similarity = 1.000000, transactionId = 77371

Class = 0, Similarity = 1.000000, transactionId = 75221

Class = 0, Similarity = 1.000000, transactionId = 75064

Class = 0, Similarity = 1.000000, transactionId = 90324

For the transaction id = 104674, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 104674

Class = 0, Similarity = 1.000000, transactionId = 119704

Class = 0, Similarity = 1.000000, transactionId = 97331

Class = 0, Similarity = 1.000000, transactionId = 139129

Class = 0, Similarity = 1.000000, transactionId = 102475

Class = 0, Similarity = 1.000000, transactionId = 144422

Class = 0, Similarity = 1.000000, transactionId = 140059

Class = 0, Similarity = 1.000000, transactionId = 112079

Class = 0, Similarity = 1.000000, transactionId = 114083

Class = 0, Similarity = 1.000000, transactionId = 104837

For the transaction id = 102058, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 102058

Class = 0, Similarity = 1.000000, transactionId = 98307

Class = 0, Similarity = 1.000000, transactionId = 85912

Class = 0, Similarity = 1.000000, transactionId = 143341

Class = 0, Similarity = 1.000000, transactionId = 140986

Class = 0, Similarity = 1.000000, transactionId = 95031

Class = 0, Similarity = 1.000000, transactionId = 122673

Class = 0, Similarity = 1.000000, transactionId = 97585

Class = 0, Similarity = 1.000000, transactionId = 82602

Class = 0, Similarity = 1.000000, transactionId = 104412

For the transaction id = 237523, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 237523

Class = 0, Similarity = 1.000000, transactionId = 255878

Class = 0, Similarity = 1.000000, transactionId = 259897

Class = 0, Similarity = 1.000000, transactionId = 235997

Class = 0, Similarity = 1.000000, transactionId = 270387

Class = 0, Similarity = 1.000000, transactionId = 235533

```
Class = 0, Similarity = 1.000000, transactionId = 281509

Class = 0, Similarity = 1.000000, transactionId = 206820

Class = 0, Similarity = 1.000000, transactionId = 241981

Class = 0, Similarity = 1.000000, transactionId = 269603

----------------------------------------------------------

For the transaction id = 51750, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 51749

Class = 0, Similarity = 1.000000, transactionId = 51750

Class = 0, Similarity = 1.000000, transactionId = 80787

Class = 0, Similarity = 1.000000, transactionId = 144652

Class = 0, Similarity = 1.000000, transactionId = 119424

Class = 0, Similarity = 1.000000, transactionId = 87753

Class = 0, Similarity = 1.000000, transactionId = 231190

Class = 0, Similarity = 1.000000, transactionId = 64554

Class = 0, Similarity = 1.000000, transactionId = 124183

Class = 0, Similarity = 1.000000, transactionId = 62353

----------------------------------------------------------

For the transaction id = 93581, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 93581

Class = 0, Similarity = 1.000000, transactionId = 80837

Class = 0, Similarity = 1.000000, transactionId = 108497

Class = 0, Similarity = 1.000000, transactionId = 135753
```

```
Class = 0, Similarity = 1.000000, transactionId = 127035

Class = 0, Similarity = 1.000000, transactionId = 109239

Class = 0, Similarity = 1.000000, transactionId = 80755

Class = 0, Similarity = 1.000000, transactionId = 125198

Class = 0, Similarity = 1.000000, transactionId = 95377

Class = 0, Similarity = 1.000000, transactionId = 65255

----------------------------------------------------------

For the transaction id = 228491, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 228491

Class = 0, Similarity = 1.000000, transactionId = 238130

Class = 0, Similarity = 1.000000, transactionId = 260352

Class = 0, Similarity = 1.000000, transactionId = 262324

Class = 0, Similarity = 1.000000, transactionId = 281861

Class = 0, Similarity = 1.000000, transactionId = 277841

Class = 0, Similarity = 1.000000, transactionId = 255452

Class = 0, Similarity = 1.000000, transactionId = 187549

Class = 0, Similarity = 1.000000, transactionId = 250710

Class = 0, Similarity = 1.000000, transactionId = 278223

----------------------------------------------------------

For the transaction id = 217792, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 217792

Class = 0, Similarity = 1.000000, transactionId = 184206
```

```
Class = 0, Similarity = 1.000000, transactionId = 224662

Class = 0, Similarity = 1.000000, transactionId = 235126

Class = 0, Similarity = 1.000000, transactionId = 253427

Class = 0, Similarity = 1.000000, transactionId = 202718

Class = 0, Similarity = 1.000000, transactionId = 254683

Class = 0, Similarity = 1.000000, transactionId = 222877

Class = 1, Similarity = 1.000000, transactionId = 254344

Class = 0, Similarity = 1.000000, transactionId = 254981

----------------------------------------------------------

For the transaction id = 276741, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 276741

Class = 0, Similarity = 1.000000, transactionId = 259999

Class = 0, Similarity = 1.000000, transactionId = 257676

Class = 0, Similarity = 1.000000, transactionId = 274040

Class = 0, Similarity = 1.000000, transactionId = 273776

Class = 0, Similarity = 1.000000, transactionId = 252055

Class = 0, Similarity = 1.000000, transactionId = 263090

Class = 0, Similarity = 1.000000, transactionId = 281999

Class = 0, Similarity = 1.000000, transactionId = 199287

Class = 0, Similarity = 1.000000, transactionId = 267297

----------------------------------------------------------

For the transaction id = 71345, and Class = 0

Similar transactions are :
```

```
Class = 0, Similarity = 1.000000, transactionId = 71345

Class = 0, Similarity = 1.000000, transactionId = 101396

Class = 0, Similarity = 1.000000, transactionId = 109787

Class = 0, Similarity = 1.000000, transactionId = 80435

Class = 0, Similarity = 1.000000, transactionId = 72547

Class = 0, Similarity = 1.000000, transactionId = 75488

Class = 0, Similarity = 1.000000, transactionId = 114854

Class = 0, Similarity = 1.000000, transactionId = 105443

Class = 0, Similarity = 1.000000, transactionId = 109201

Class = 0, Similarity = 1.000000, transactionId = 128765

------------------------------------------------------------

For the transaction id = 234744, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 234744

Class = 0, Similarity = 1.000000, transactionId = 237179

Class = 0, Similarity = 1.000000, transactionId = 279029

Class = 0, Similarity = 1.000000, transactionId = 261186

Class = 0, Similarity = 1.000000, transactionId = 221462

Class = 0, Similarity = 1.000000, transactionId = 274327

Class = 0, Similarity = 1.000000, transactionId = 202824

Class = 0, Similarity = 1.000000, transactionId = 207940

Class = 0, Similarity = 1.000000, transactionId = 181436

Class = 0, Similarity = 1.000000, transactionId = 221444

------------------------------------------------------------
```

For the transaction id = 7730, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 7730

Class = 0, Similarity = 1.000000, transactionId = 7519

Class = 0, Similarity = 1.000000, transactionId = 8477

Class = 0, Similarity = 1.000000, transactionId = 8809

Class = 0, Similarity = 1.000000, transactionId = 7849

Class = 0, Similarity = 1.000000, transactionId = 9236

Class = 0, Similarity = 1.000000, transactionId = 7299

Class = 0, Similarity = 1.000000, transactionId = 10073

Class = 0, Similarity = 1.000000, transactionId = 9547

Class = 0, Similarity = 1.000000, transactionId = 7293

For the transaction id = 35730, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 35730

Class = 0, Similarity = 1.000000, transactionId = 85241

Class = 0, Similarity = 1.000000, transactionId = 132979

Class = 0, Similarity = 1.000000, transactionId = 143599

Class = 0, Similarity = 1.000000, transactionId = 91861

Class = 0, Similarity = 1.000000, transactionId = 71444

Class = 0, Similarity = 1.000000, transactionId = 211723

Class = 0, Similarity = 1.000000, transactionId = 90387

Class = 0, Similarity = 1.000000, transactionId = 221816

Class = 0, Similarity = 1.000000, transactionId = 63038

For the transaction id = 24338, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 24338

Class = 0, Similarity = 1.000000, transactionId = 28351

Class = 0, Similarity = 1.000000, transactionId = 18119

Class = 0, Similarity = 1.000000, transactionId = 47418

Class = 0, Similarity = 1.000000, transactionId = 27938

Class = 0, Similarity = 1.000000, transactionId = 69935

Class = 0, Similarity = 1.000000, transactionId = 45992

Class = 0, Similarity = 1.000000, transactionId = 35916

Class = 0, Similarity = 1.000000, transactionId = 31386

Class = 0, Similarity = 1.000000, transactionId = 25677

For the transaction id = 44942, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 44942

Class = 0, Similarity = 1.000000, transactionId = 56848

Class = 0, Similarity = 1.000000, transactionId = 27610

Class = 0, Similarity = 1.000000, transactionId = 69646

Class = 0, Similarity = 1.000000, transactionId = 77205

Class = 0, Similarity = 1.000000, transactionId = 36038

Class = 0, Similarity = 1.000000, transactionId = 59044

```
Class = 0, Similarity = 1.000000, transactionId = 120163

Class = 0, Similarity = 1.000000, transactionId = 48883

Class = 0, Similarity = 1.000000, transactionId = 102453

---------------------------------------------------------

For the transaction id = 80953, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 80953

Class = 0, Similarity = 1.000000, transactionId = 129488

Class = 0, Similarity = 1.000000, transactionId = 130097

Class = 0, Similarity = 1.000000, transactionId = 137698

Class = 0, Similarity = 1.000000, transactionId = 104344

Class = 0, Similarity = 1.000000, transactionId = 81454

Class = 0, Similarity = 1.000000, transactionId = 87702

Class = 0, Similarity = 1.000000, transactionId = 143954

Class = 0, Similarity = 1.000000, transactionId = 117273

Class = 0, Similarity = 1.000000, transactionId = 135191

---------------------------------------------------------

For the transaction id = 212975, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 212975

Class = 0, Similarity = 1.000000, transactionId = 211865

Class = 0, Similarity = 1.000000, transactionId = 225466

Class = 0, Similarity = 1.000000, transactionId = 171244

Class = 0, Similarity = 1.000000, transactionId = 244596
```

```
Class = 0, Similarity = 1.000000, transactionId = 182463

Class = 0, Similarity = 1.000000, transactionId = 187008

Class = 0, Similarity = 1.000000, transactionId = 165205

Class = 0, Similarity = 1.000000, transactionId = 206097

Class = 0, Similarity = 1.000000, transactionId = 246881

----------------------------------------------------------

For the transaction id = 209862, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 209862

Class = 0, Similarity = 1.000000, transactionId = 214287

Class = 0, Similarity = 1.000000, transactionId = 202627

Class = 0, Similarity = 1.000000, transactionId = 215875

Class = 0, Similarity = 1.000000, transactionId = 242493

Class = 0, Similarity = 1.000000, transactionId = 219125

Class = 0, Similarity = 1.000000, transactionId = 208690

Class = 0, Similarity = 1.000000, transactionId = 218750

Class = 0, Similarity = 1.000000, transactionId = 222254

Class = 0, Similarity = 1.000000, transactionId = 274851

----------------------------------------------------------

For the transaction id = 91821, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 91821

Class = 0, Similarity = 1.000000, transactionId = 98375

Class = 0, Similarity = 1.000000, transactionId = 95845
```

Class = 0, Similarity = 1.000000, transactionId = 108249

Class = 0, Similarity = 1.000000, transactionId = 102697

Class = 0, Similarity = 1.000000, transactionId = 109296

Class = 0, Similarity = 1.000000, transactionId = 79143

Class = 0, Similarity = 1.000000, transactionId = 101807

Class = 0, Similarity = 1.000000, transactionId = 89058

Class = 0, Similarity = 1.000000, transactionId = 87605

For the transaction id = 208257, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 208257

Class = 0, Similarity = 1.000000, transactionId = 190733

Class = 0, Similarity = 1.000000, transactionId = 268612

Class = 0, Similarity = 1.000000, transactionId = 172364

Class = 0, Similarity = 1.000000, transactionId = 220881

Class = 0, Similarity = 1.000000, transactionId = 177095

Class = 0, Similarity = 1.000000, transactionId = 210292

Class = 0, Similarity = 1.000000, transactionId = 216467

Class = 0, Similarity = 1.000000, transactionId = 249441

Class = 0, Similarity = 1.000000, transactionId = 228658

For the transaction id = 185213, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 185213

```
Class = 0, Similarity = 1.000000, transactionId = 191816

Class = 0, Similarity = 1.000000, transactionId = 195409

Class = 0, Similarity = 1.000000, transactionId = 204318

Class = 0, Similarity = 1.000000, transactionId = 186281

Class = 0, Similarity = 1.000000, transactionId = 174772

Class = 0, Similarity = 1.000000, transactionId = 161389

Class = 0, Similarity = 1.000000, transactionId = 236866

Class = 0, Similarity = 1.000000, transactionId = 279420

Class = 0, Similarity = 1.000000, transactionId = 176812

----------------------------------------------------------

For the transaction id = 265204, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 265204

Class = 0, Similarity = 1.000000, transactionId = 273208

Class = 0, Similarity = 1.000000, transactionId = 265332

Class = 0, Similarity = 1.000000, transactionId = 224812

Class = 0, Similarity = 1.000000, transactionId = 279693

Class = 0, Similarity = 1.000000, transactionId = 278088

Class = 0, Similarity = 1.000000, transactionId = 210090

Class = 0, Similarity = 1.000000, transactionId = 219435

Class = 0, Similarity = 1.000000, transactionId = 276119

Class = 0, Similarity = 1.000000, transactionId = 273942

----------------------------------------------------------

For the transaction id = 188412, and Class = 0
```

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 188412

Class = 0, Similarity = 1.000000, transactionId = 188693

Class = 0, Similarity = 1.000000, transactionId = 251482

Class = 0, Similarity = 1.000000, transactionId = 219258

Class = 0, Similarity = 1.000000, transactionId = 261557

Class = 0, Similarity = 1.000000, transactionId = 216721

Class = 0, Similarity = 1.000000, transactionId = 166609

Class = 0, Similarity = 1.000000, transactionId = 249820

Class = 0, Similarity = 1.000000, transactionId = 189169

Class = 0, Similarity = 1.000000, transactionId = 160929

For the transaction id = 11648, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 11648

Class = 0, Similarity = 1.000000, transactionId = 11543

Class = 0, Similarity = 1.000000, transactionId = 11581

Class = 0, Similarity = 1.000000, transactionId = 11561

Class = 0, Similarity = 1.000000, transactionId = 11394

Class = 0, Similarity = 1.000000, transactionId = 11562

Class = 0, Similarity = 1.000000, transactionId = 11602

Class = 0, Similarity = 1.000000, transactionId = 11491

Class = 0, Similarity = 1.000000, transactionId = 11557

Class = 0, Similarity = 1.000000, transactionId = 11434

For the transaction id = 252178, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 252178

Class = 0, Similarity = 1.000000, transactionId = 274097

Class = 0, Similarity = 1.000000, transactionId = 250843

Class = 0, Similarity = 1.000000, transactionId = 247260

Class = 0, Similarity = 1.000000, transactionId = 247340

Class = 0, Similarity = 1.000000, transactionId = 248076

Class = 0, Similarity = 1.000000, transactionId = 211683

Class = 0, Similarity = 1.000000, transactionId = 247197

Class = 0, Similarity = 1.000000, transactionId = 247441

Class = 0, Similarity = 1.000000, transactionId = 204433

For the transaction id = 162203, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 162203

Class = 0, Similarity = 1.000000, transactionId = 212295

Class = 0, Similarity = 1.000000, transactionId = 192051

Class = 0, Similarity = 1.000000, transactionId = 163109

Class = 0, Similarity = 1.000000, transactionId = 194790

Class = 0, Similarity = 1.000000, transactionId = 216218

Class = 0, Similarity = 1.000000, transactionId = 252751

Class = 0, Similarity = 1.000000, transactionId = 209344

Class = 0, Similarity = 1.000000, transactionId = 249559

Class = 0, Similarity = 1.000000, transactionId = 246605

For the transaction id = 221033, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 221033

Class = 0, Similarity = 1.000000, transactionId = 250295

Class = 0, Similarity = 1.000000, transactionId = 248169

Class = 0, Similarity = 1.000000, transactionId = 242939

Class = 0, Similarity = 1.000000, transactionId = 272009

Class = 0, Similarity = 1.000000, transactionId = 249189

Class = 0, Similarity = 1.000000, transactionId = 253869

Class = 0, Similarity = 1.000000, transactionId = 257504

Class = 0, Similarity = 1.000000, transactionId = 252833

Class = 0, Similarity = 1.000000, transactionId = 278963

For the transaction id = 147106, and Class = 0

Similar transactions are :

Class = 0, Similarity = 1.000000, transactionId = 147106

Class = 0, Similarity = 1.000000, transactionId = 147753

Class = 0, Similarity = 1.000000, transactionId = 146957

Class = 0, Similarity = 1.000000, transactionId = 265508

Class = 0, Similarity = 1.000000, transactionId = 146774

Class = 0, Similarity = 1.000000, transactionId = 163742

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Class = 0, Similarity = 1.000000, transactionId = 163844

Class = 0, Similarity = 1.000000, transactionId = 256737

Class = 0, Similarity = 1.000000, transactionId = 265410

Class = 0, Similarity = 1.000000, transactionId = 148504


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7 Conclusion::

1. The given data is highly imbalanced as 99.9982% of data belonging to class 0 and just .0017% data belonging to class 1.

2. In given data 75% of the transactions are of amount below 78.

3. The min value of transaction made is 0.00 and max value of transaction is 25691.16

4. Out of 284k transactions 1825 transactions were made which had zero value.

5. Out of these transactions only 27 were fradulent and 1798 legal transactions.

6. The mean value of fradulent transactions is 122.21 while mean value of valid

transactions is only 88.29.

7. 50% of the fradulent transactions are below 10 while 50% of valid transactions

is below 22.

8. 75% of the fradulent transactions are below 106 while 75% of valid

transactions are below 77.

9. Max value of fradulent transaction is 2125.87 while max value of valid

transaction is 25691.16

10. More fradulent transaction occurs betweeen first 12 hours and between 23rd and 30th hour.

11. If transaction were recorded from 12'o clock midnight then we can observe that during morning

hours there is more chance of occurance of fraud transactions. During rest of the time more chance

that legal transaction will occur.

12. On the first day 20.5% of the total fradulent transactions were done in less than 10 hours.

13. On the second day 14.02% of the total fradulent transactions were done in less than 6 hours.

14. 93.22% of all the legal transactions(Class 0) have V4 value less than 2.

15. 80.04% of all the fradulent transactions(Class 1) have V4 value greater than 2.

16. 96.76% of valid transactions (Class 0) have V9 > -2.

17. 52.23% of fradulent transaactions (Class 1) have V9 < -2.

18. 96.52% of legal transactions (Class 0) have V3 > -2.7.

19. 71.11% of fradulent transactions (Class 1) have V3 < -2.7.

20. 99% of the legal transactions are of value less than 2000.

21. 99% of the fradulent transactions are of value less than 1250.