CreditCardFraudDetection

April 15, 2018

```python
In [1]: import numpy as np
        import pandas as pd
        import matplotlib.pyplot as plt
        import math
        import datetime as dt
        import seaborn as sns
        %matplotlib inline
```

```python
In [2]: original_data= pd.read_csv("creditcard.csv")
        original_data.head()
        print("Total number of transactions",original_data.shape[0])
        print("Total  features",original_data.shape[1])
```

```
Total number of transactions 284807
Total  features 31
```

Among 31 features,v1 to v28 are pca observations so let's consider 3 main features 1)time 2)amount 3)Class

```python
In [3]: original_data['Class'].value_counts()
```

```
Out[3]: 0    284315
        1       492
        Name: Class, dtype: int64
```

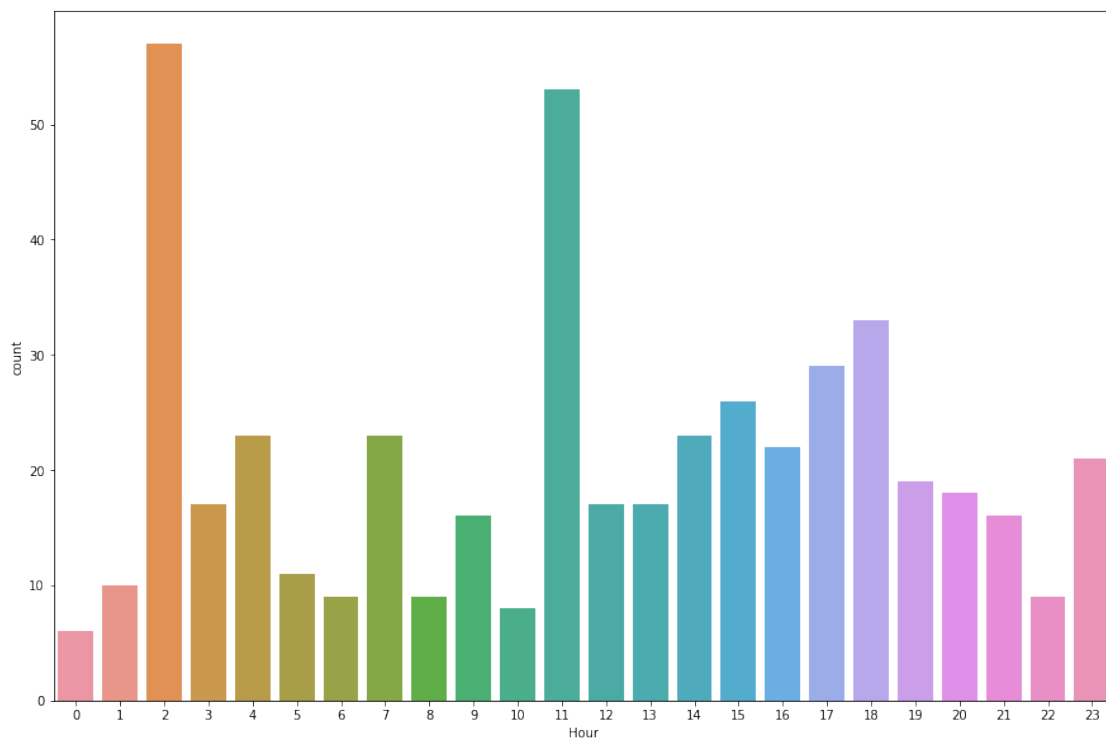Number of fraud transactions are very less(492) compared to valid transactions(2,84,315).

```python
In [4]: valid_data = original_data[original_data['Class']==0]
        fraud_data = original_data[original_data['Class']==1]
        fraud_data['Amount'].describe()
```

```
Out[4]: 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
```

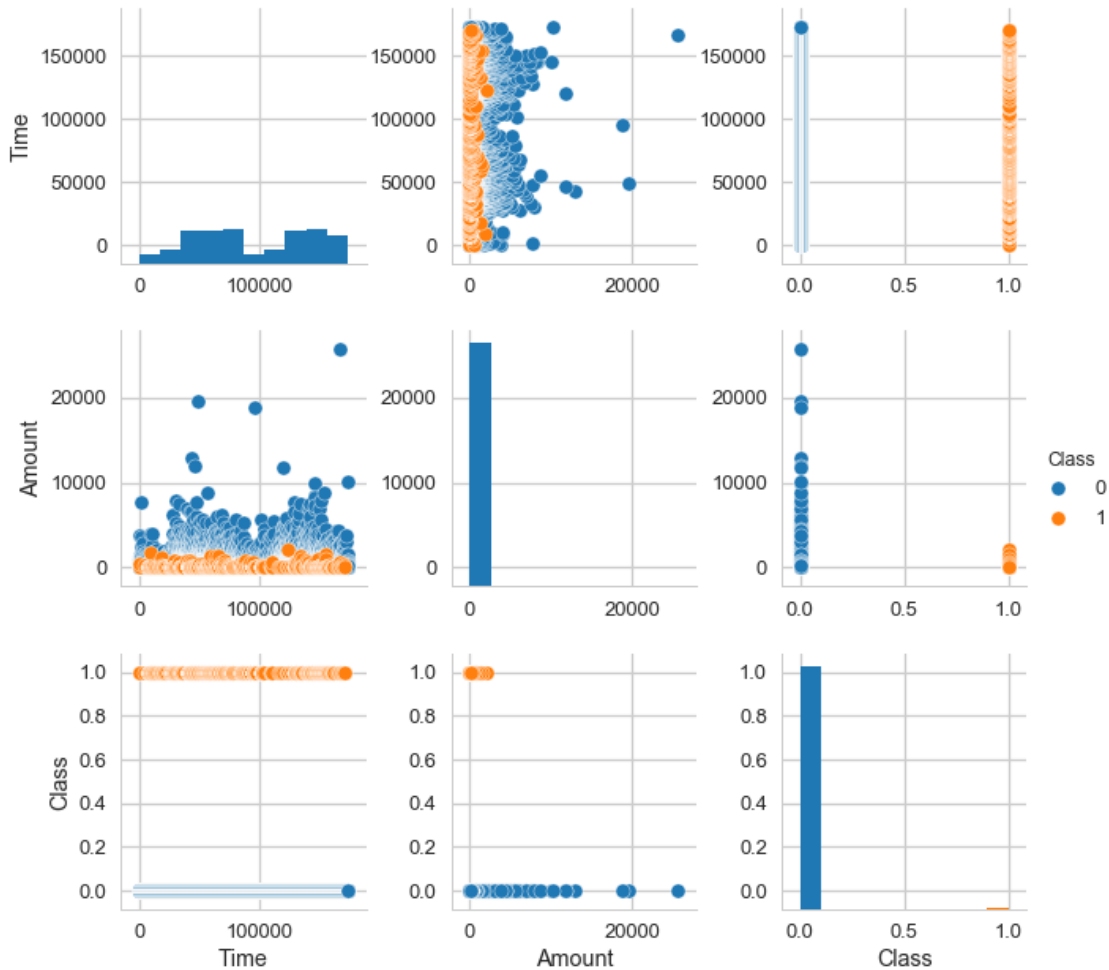Maximum amount in fraud transactions is 2125

```
In [5]: data_analysis = original_data[['Time', 'Amount', 'Class']].copy()
        time_analysis = fraud_data[['Time', 'Amount', 'Class']].copy()
        def convertHour(second):
            return dt.datetime.utcfromtimestamp(second)

        time_analysis['DateWithTime']=time_analysis.Time.apply(convertHour)
        time_analysis['Hour']=time_analysis.DateWithTime.dt.hour
        plt.figure(figsize=(15,10))
        sns.countplot(x='Hour', data=time_analysis)
        plt.show()
```


From graph we can say that in 2nd hour and 11th hour maximum fraud transactions occured.

```
In [6]: sns.set_context("talk", rc={"lines.linewidth": 2})
        sns.set_style("whitegrid");
        sns.pairplot(data_analysis, hue="Class",size=3);
```

from pairplot 1)amount of class 0(fraud transactions) are very less compare to amount of valid transactions

1 All over conclusion

1)from time feature analysis, we can conclude more traffic of fraud transactions hours(2 and 11). 2)from amount,we are not getting much details but we can say fraud transactions are of very less amount(max amount is 2125) 3)from class feature,it is vey clear that fraud transactions are very less compare to valid transactions

2 Task 2

```
In [56]: data= original_data
         data_copy=original_data
         sample_index = np.random.choice(284807,replace=False, size=100)   #taking sample of 10
         sample_data = original_data.iloc[sample_index]
         sample_data['Class'].value_counts()
```

```
Out[56]: 0    98
         1     2
         Name: Class, dtype: int64
```

```python
In [57]: length_of_vector = pd.DataFrame(np.sqrt(np.square(data_copy).sum(axis = 1)))
         length_of_vector_sample=pd.DataFrame(np.sqrt(np.square(sample_data).sum(axis = 1)))
         dot_product_length= length_of_vector_sample.dot(length_of_vector.T)
         #print(dot_product_length.shape)
         dot_product_matrix = sample_data.dot(data_copy.T)
         #print(dot_product_matrix.shape)
         similarty_values= dot_product_matrix.divide(dot_product_length,axis =0)
         similarty_values=similarty_values.round(12)
         similarty_values_final = similarty_values.applymap(lambda z:math.acos(z)) # final res
```

```python
In [58]: for item in range(0,100):
             row=pd.DataFrame(similarty_values_final.iloc[item])
             top_ten=row.sort_values(row.columns[0],ascending=True).head(10)
             # print(top_ten)
             print("---------------------------------------------------------------
             print("Given transaction ",top_ten.index[0],"Class :",data.get_value(col="Class",
             for sim in range(0,10):
                 print(" #Transaction id:",top_ten.index[sim],"#Class:" , data.get_value(col="(
```

```
---------------------------------------------------------------------------------
Given transaction  135858 Class : 0
 #Transaction id: 135858 #Class: 0 #Similarity: 0.00000
 #Transaction id: 115480 #Class: 0 #Similarity: 0.00002
 #Transaction id: 113250 #Class: 0 #Similarity: 0.00002
 #Transaction id: 115976 #Class: 0 #Similarity: 0.00002
 #Transaction id: 117128 #Class: 0 #Similarity: 0.00003
 #Transaction id: 115066 #Class: 0 #Similarity: 0.00003
 #Transaction id: 110029 #Class: 0 #Similarity: 0.00003
 #Transaction id: 127709 #Class: 0 #Similarity: 0.00003
 #Transaction id: 136686 #Class: 0 #Similarity: 0.00003
 #Transaction id: 105252 #Class: 0 #Similarity: 0.00003
---------------------------------------------------------------------------------
Given transaction  147940 Class : 0
 #Transaction id: 147940 #Class: 0 #Similarity: 0.00000
 #Transaction id: 200686 #Class: 0 #Similarity: 0.00002
 #Transaction id: 174968 #Class: 0 #Similarity: 0.00003
 #Transaction id: 183072 #Class: 0 #Similarity: 0.00003
 #Transaction id: 208669 #Class: 0 #Similarity: 0.00003
 #Transaction id: 211376 #Class: 0 #Similarity: 0.00003
 #Transaction id: 220548 #Class: 0 #Similarity: 0.00004
 #Transaction id: 223538 #Class: 0 #Similarity: 0.00004
 #Transaction id: 221070 #Class: 0 #Similarity: 0.00004
 #Transaction id: 163461 #Class: 0 #Similarity: 0.00004
---------------------------------------------------------------------------------
```

```
Given transaction  74652 Class : 0
 #Transaction id: 74652 #Class: 0 #Similarity: 0.00000
 #Transaction id: 75099 #Class: 0 #Similarity: 0.00001
 #Transaction id: 76427 #Class: 0 #Similarity: 0.00004
 #Transaction id: 69377 #Class: 0 #Similarity: 0.00004
 #Transaction id: 63172 #Class: 0 #Similarity: 0.00004
 #Transaction id: 66311 #Class: 0 #Similarity: 0.00005
 #Transaction id: 84054 #Class: 0 #Similarity: 0.00005
 #Transaction id: 174482 #Class: 0 #Similarity: 0.00005
 #Transaction id: 114071 #Class: 0 #Similarity: 0.00006
 #Transaction id: 43849 #Class: 0 #Similarity: 0.00006
---------------------------------------------------------------------------------
Given transaction  28454 Class : 0
 #Transaction id: 28454 #Class: 0 #Similarity: 0.00000
 #Transaction id: 21243 #Class: 0 #Similarity: 0.00004
 #Transaction id: 80059 #Class: 0 #Similarity: 0.00007
 #Transaction id: 37624 #Class: 0 #Similarity: 0.00007
 #Transaction id: 20351 #Class: 0 #Similarity: 0.00009
 #Transaction id: 128543 #Class: 0 #Similarity: 0.00009
 #Transaction id: 24934 #Class: 0 #Similarity: 0.00010
 #Transaction id: 167134 #Class: 0 #Similarity: 0.00010
 #Transaction id: 162155 #Class: 0 #Similarity: 0.00011
 #Transaction id: 275832 #Class: 0 #Similarity: 0.00011
---------------------------------------------------------------------------------
Given transaction  199016 Class : 0
 #Transaction id: 199016 #Class: 0 #Similarity: 0.00000
 #Transaction id: 280304 #Class: 0 #Similarity: 0.00002
 #Transaction id: 247147 #Class: 0 #Similarity: 0.00002
 #Transaction id: 254799 #Class: 0 #Similarity: 0.00002
 #Transaction id: 269410 #Class: 0 #Similarity: 0.00002
 #Transaction id: 211204 #Class: 0 #Similarity: 0.00002
 #Transaction id: 266055 #Class: 0 #Similarity: 0.00002
 #Transaction id: 240421 #Class: 0 #Similarity: 0.00002
 #Transaction id: 200798 #Class: 0 #Similarity: 0.00002
 #Transaction id: 265403 #Class: 0 #Similarity: 0.00002
---------------------------------------------------------------------------------
Given transaction  14635 Class : 0
 #Transaction id: 14635 #Class: 0 #Similarity: 0.00000
 #Transaction id: 22964 #Class: 0 #Similarity: 0.00013
 #Transaction id: 81771 #Class: 0 #Similarity: 0.00013
 #Transaction id: 14497 #Class: 0 #Similarity: 0.00013
 #Transaction id: 26311 #Class: 0 #Similarity: 0.00013
 #Transaction id: 52348 #Class: 0 #Similarity: 0.00013
 #Transaction id: 25305 #Class: 0 #Similarity: 0.00013
 #Transaction id: 39838 #Class: 0 #Similarity: 0.00013
 #Transaction id: 50645 #Class: 0 #Similarity: 0.00013
 #Transaction id: 15280 #Class: 0 #Similarity: 0.00013
---------------------------------------------------------------------------------
```

```
Given transaction  30644 Class : 0
 #Transaction id: 30644 #Class: 0 #Similarity: 0.00000
 #Transaction id: 77189 #Class: 0 #Similarity: 0.00006
 #Transaction id: 107047 #Class: 0 #Similarity: 0.00006
 #Transaction id: 38354 #Class: 0 #Similarity: 0.00007
 #Transaction id: 125359 #Class: 0 #Similarity: 0.00007
 #Transaction id: 46856 #Class: 0 #Similarity: 0.00007
 #Transaction id: 31444 #Class: 0 #Similarity: 0.00007
 #Transaction id: 67412 #Class: 0 #Similarity: 0.00007
 #Transaction id: 101841 #Class: 0 #Similarity: 0.00007
 #Transaction id: 89651 #Class: 0 #Similarity: 0.00007
--------------------------------------------------------------------------------
Given transaction  232442 Class : 0
 #Transaction id: 232442 #Class: 0 #Similarity: 0.00000
 #Transaction id: 270920 #Class: 0 #Similarity: 0.00002
 #Transaction id: 240859 #Class: 0 #Similarity: 0.00002
 #Transaction id: 250417 #Class: 0 #Similarity: 0.00002
 #Transaction id: 244592 #Class: 0 #Similarity: 0.00002
 #Transaction id: 251170 #Class: 0 #Similarity: 0.00002
 #Transaction id: 227642 #Class: 0 #Similarity: 0.00002
 #Transaction id: 268631 #Class: 0 #Similarity: 0.00002
 #Transaction id: 245767 #Class: 0 #Similarity: 0.00002
 #Transaction id: 200018 #Class: 0 #Similarity: 0.00002
--------------------------------------------------------------------------------
Given transaction  278229 Class : 0
 #Transaction id: 278229 #Class: 0 #Similarity: 0.00000
 #Transaction id: 265891 #Class: 0 #Similarity: 0.00000
 #Transaction id: 205965 #Class: 0 #Similarity: 0.00000
 #Transaction id: 274462 #Class: 0 #Similarity: 0.00000
 #Transaction id: 266113 #Class: 0 #Similarity: 0.00000
 #Transaction id: 213517 #Class: 0 #Similarity: 0.00001
 #Transaction id: 277815 #Class: 0 #Similarity: 0.00001
 #Transaction id: 235329 #Class: 0 #Similarity: 0.00001
 #Transaction id: 260533 #Class: 0 #Similarity: 0.00001
 #Transaction id: 266534 #Class: 0 #Similarity: 0.00001
--------------------------------------------------------------------------------
Given transaction  254607 Class : 0
 #Transaction id: 254607 #Class: 0 #Similarity: 0.00000
 #Transaction id: 219392 #Class: 0 #Similarity: 0.00001
 #Transaction id: 239153 #Class: 0 #Similarity: 0.00001
 #Transaction id: 184289 #Class: 0 #Similarity: 0.00001
 #Transaction id: 274147 #Class: 0 #Similarity: 0.00001
 #Transaction id: 231376 #Class: 0 #Similarity: 0.00001
 #Transaction id: 204808 #Class: 0 #Similarity: 0.00001
 #Transaction id: 259281 #Class: 0 #Similarity: 0.00001
 #Transaction id: 224118 #Class: 0 #Similarity: 0.00001
 #Transaction id: 236714 #Class: 0 #Similarity: 0.00001
--------------------------------------------------------------------------------
```

```
Given transaction  172880 Class : 0
 #Transaction id: 172880 #Class: 0 #Similarity: 0.00000
 #Transaction id: 265857 #Class: 0 #Similarity: 0.00003
 #Transaction id: 255910 #Class: 0 #Similarity: 0.00003
 #Transaction id: 229170 #Class: 0 #Similarity: 0.00004
 #Transaction id: 279855 #Class: 0 #Similarity: 0.00004
 #Transaction id: 192947 #Class: 0 #Similarity: 0.00004
 #Transaction id: 177138 #Class: 0 #Similarity: 0.00004
 #Transaction id: 184926 #Class: 0 #Similarity: 0.00004
 #Transaction id: 273042 #Class: 0 #Similarity: 0.00004
 #Transaction id: 170651 #Class: 0 #Similarity: 0.00004
--------------------------------------------------------------------------------
Given transaction  154371 Class : 1
 #Transaction id: 154371 #Class: 1 #Similarity: 0.00000
 #Transaction id: 154234 #Class: 1 #Similarity: 0.00013
 #Transaction id: 154587 #Class: 1 #Similarity: 0.00014
 #Transaction id: 154684 #Class: 1 #Similarity: 0.00017
 #Transaction id: 153835 #Class: 1 #Similarity: 0.00021
 #Transaction id: 151006 #Class: 1 #Similarity: 0.00022
 #Transaction id: 151008 #Class: 1 #Similarity: 0.00022
 #Transaction id: 151007 #Class: 1 #Similarity: 0.00022
 #Transaction id: 151009 #Class: 1 #Similarity: 0.00022
 #Transaction id: 153823 #Class: 1 #Similarity: 0.00024
--------------------------------------------------------------------------------
Given transaction  94306 Class : 0
 #Transaction id: 94306 #Class: 0 #Similarity: 0.00000
 #Transaction id: 107188 #Class: 0 #Similarity: 0.00001
 #Transaction id: 94078 #Class: 0 #Similarity: 0.00001
 #Transaction id: 103963 #Class: 0 #Similarity: 0.00001
 #Transaction id: 75767 #Class: 0 #Similarity: 0.00001
 #Transaction id: 106834 #Class: 0 #Similarity: 0.00001
 #Transaction id: 101052 #Class: 0 #Similarity: 0.00001
 #Transaction id: 112389 #Class: 0 #Similarity: 0.00001
 #Transaction id: 77400 #Class: 0 #Similarity: 0.00001
 #Transaction id: 104311 #Class: 0 #Similarity: 0.00001
--------------------------------------------------------------------------------
Given transaction  89167 Class : 0
 #Transaction id: 89167 #Class: 0 #Similarity: 0.00000
 #Transaction id: 95941 #Class: 0 #Similarity: 0.00004
 #Transaction id: 93416 #Class: 0 #Similarity: 0.00005
 #Transaction id: 144598 #Class: 0 #Similarity: 0.00005
 #Transaction id: 53621 #Class: 0 #Similarity: 0.00005
 #Transaction id: 61384 #Class: 0 #Similarity: 0.00005
 #Transaction id: 95967 #Class: 0 #Similarity: 0.00005
 #Transaction id: 69381 #Class: 0 #Similarity: 0.00005
 #Transaction id: 62277 #Class: 0 #Similarity: 0.00005
 #Transaction id: 139782 #Class: 0 #Similarity: 0.00006
--------------------------------------------------------------------------------
```

```
Given transaction  137420 Class : 0
 #Transaction id: 137420 #Class: 0 #Similarity: 0.00000
 #Transaction id: 144703 #Class: 0 #Similarity: 0.00001
 #Transaction id: 124822 #Class: 0 #Similarity: 0.00002
 #Transaction id: 110389 #Class: 0 #Similarity: 0.00002
 #Transaction id: 141046 #Class: 0 #Similarity: 0.00002
 #Transaction id: 137343 #Class: 0 #Similarity: 0.00002
 #Transaction id: 141531 #Class: 0 #Similarity: 0.00002
 #Transaction id: 72969 #Class: 0 #Similarity: 0.00002
 #Transaction id: 134955 #Class: 0 #Similarity: 0.00003
 #Transaction id: 141602 #Class: 0 #Similarity: 0.00003
------------------------------------------------------------------------------
Given transaction  28881 Class : 0
 #Transaction id: 28881 #Class: 0 #Similarity: 0.00000
 #Transaction id: 94365 #Class: 0 #Similarity: 0.00005
 #Transaction id: 70061 #Class: 0 #Similarity: 0.00005
 #Transaction id: 19205 #Class: 0 #Similarity: 0.00005
 #Transaction id: 97994 #Class: 0 #Similarity: 0.00005
 #Transaction id: 59749 #Class: 0 #Similarity: 0.00005
 #Transaction id: 91592 #Class: 0 #Similarity: 0.00005
 #Transaction id: 31033 #Class: 0 #Similarity: 0.00005
 #Transaction id: 65266 #Class: 0 #Similarity: 0.00005
 #Transaction id: 133520 #Class: 0 #Similarity: 0.00006
------------------------------------------------------------------------------
Given transaction  230382 Class : 0
 #Transaction id: 230382 #Class: 0 #Similarity: 0.00000
 #Transaction id: 258842 #Class: 0 #Similarity: 0.00001
 #Transaction id: 218570 #Class: 0 #Similarity: 0.00001
 #Transaction id: 194975 #Class: 0 #Similarity: 0.00002
 #Transaction id: 282757 #Class: 0 #Similarity: 0.00002
 #Transaction id: 253782 #Class: 0 #Similarity: 0.00002
 #Transaction id: 184951 #Class: 0 #Similarity: 0.00002
 #Transaction id: 233808 #Class: 0 #Similarity: 0.00002
 #Transaction id: 169675 #Class: 0 #Similarity: 0.00002
 #Transaction id: 176746 #Class: 0 #Similarity: 0.00002
------------------------------------------------------------------------------
Given transaction  131476 Class : 0
 #Transaction id: 131476 #Class: 0 #Similarity: 0.00000
 #Transaction id: 81816 #Class: 0 #Similarity: 0.00003
 #Transaction id: 110548 #Class: 0 #Similarity: 0.00003
 #Transaction id: 232730 #Class: 0 #Similarity: 0.00003
 #Transaction id: 114620 #Class: 0 #Similarity: 0.00003
 #Transaction id: 82309 #Class: 0 #Similarity: 0.00003
 #Transaction id: 109140 #Class: 0 #Similarity: 0.00003
 #Transaction id: 244056 #Class: 0 #Similarity: 0.00003
 #Transaction id: 136554 #Class: 0 #Similarity: 0.00003
 #Transaction id: 256013 #Class: 0 #Similarity: 0.00003
------------------------------------------------------------------------------
```

```
Given transaction  149031 Class : 0
 #Transaction id: 149031 #Class: 0 #Similarity: 0.00000
 #Transaction id: 154958 #Class: 0 #Similarity: 0.00004
 #Transaction id: 150673 #Class: 0 #Similarity: 0.00004
 #Transaction id: 152193 #Class: 0 #Similarity: 0.00004
 #Transaction id: 158458 #Class: 0 #Similarity: 0.00004
 #Transaction id: 158338 #Class: 0 #Similarity: 0.00004
 #Transaction id: 153941 #Class: 0 #Similarity: 0.00005
 #Transaction id: 153122 #Class: 0 #Similarity: 0.00005
 #Transaction id: 154594 #Class: 0 #Similarity: 0.00005
 #Transaction id: 149309 #Class: 0 #Similarity: 0.00005
-------------------------------------------------------------------------------
Given transaction  157085 Class : 0
 #Transaction id: 157085 #Class: 0 #Similarity: 0.00000
 #Transaction id: 153301 #Class: 0 #Similarity: 0.00003
 #Transaction id: 153070 #Class: 0 #Similarity: 0.00003
 #Transaction id: 158065 #Class: 0 #Similarity: 0.00004
 #Transaction id: 153838 #Class: 0 #Similarity: 0.00004
 #Transaction id: 148903 #Class: 0 #Similarity: 0.00004
 #Transaction id: 149122 #Class: 0 #Similarity: 0.00004
 #Transaction id: 158388 #Class: 0 #Similarity: 0.00004
 #Transaction id: 152674 #Class: 0 #Similarity: 0.00004
 #Transaction id: 148949 #Class: 0 #Similarity: 0.00004
-------------------------------------------------------------------------------
Given transaction  21493 Class : 0
 #Transaction id: 21493 #Class: 0 #Similarity: 0.00000
 #Transaction id: 46168 #Class: 0 #Similarity: 0.00005
 #Transaction id: 107478 #Class: 0 #Similarity: 0.00009
 #Transaction id: 35724 #Class: 0 #Similarity: 0.00009
 #Transaction id: 21864 #Class: 0 #Similarity: 0.00009
 #Transaction id: 44089 #Class: 0 #Similarity: 0.00010
 #Transaction id: 92527 #Class: 0 #Similarity: 0.00010
 #Transaction id: 50188 #Class: 0 #Similarity: 0.00010
 #Transaction id: 45149 #Class: 0 #Similarity: 0.00011
 #Transaction id: 23626 #Class: 0 #Similarity: 0.00011
-------------------------------------------------------------------------------
Given transaction  159831 Class : 0
 #Transaction id: 159831 #Class: 0 #Similarity: 0.00000
 #Transaction id: 280879 #Class: 0 #Similarity: 0.00002
 #Transaction id: 210171 #Class: 0 #Similarity: 0.00002
 #Transaction id: 183239 #Class: 0 #Similarity: 0.00002
 #Transaction id: 272674 #Class: 0 #Similarity: 0.00002
 #Transaction id: 168324 #Class: 0 #Similarity: 0.00002
 #Transaction id: 256424 #Class: 0 #Similarity: 0.00002
 #Transaction id: 170045 #Class: 0 #Similarity: 0.00002
 #Transaction id: 179407 #Class: 0 #Similarity: 0.00002
 #Transaction id: 279204 #Class: 0 #Similarity: 0.00002
-------------------------------------------------------------------------------
```

```
Given transaction  187534 Class : 0
 #Transaction id: 187534 #Class: 0 #Similarity: 0.00000
 #Transaction id: 182355 #Class: 0 #Similarity: 0.00002
 #Transaction id: 273216 #Class: 0 #Similarity: 0.00003
 #Transaction id: 199784 #Class: 0 #Similarity: 0.00003
 #Transaction id: 225232 #Class: 0 #Similarity: 0.00003
 #Transaction id: 279723 #Class: 0 #Similarity: 0.00003
 #Transaction id: 243431 #Class: 0 #Similarity: 0.00003
 #Transaction id: 269072 #Class: 0 #Similarity: 0.00003
 #Transaction id: 210836 #Class: 0 #Similarity: 0.00003
 #Transaction id: 251253 #Class: 0 #Similarity: 0.00003
-------------------------------------------------------------------------------
Given transaction  53730 Class : 0
 #Transaction id: 53730 #Class: 0 #Similarity: 0.00000
 #Transaction id: 30756 #Class: 0 #Similarity: 0.00003
 #Transaction id: 55714 #Class: 0 #Similarity: 0.00003
 #Transaction id: 78019 #Class: 0 #Similarity: 0.00004
 #Transaction id: 58777 #Class: 0 #Similarity: 0.00004
 #Transaction id: 69570 #Class: 0 #Similarity: 0.00004
 #Transaction id: 95996 #Class: 0 #Similarity: 0.00004
 #Transaction id: 59403 #Class: 0 #Similarity: 0.00004
 #Transaction id: 106474 #Class: 0 #Similarity: 0.00004
 #Transaction id: 85946 #Class: 0 #Similarity: 0.00004
-------------------------------------------------------------------------------
Given transaction  29174 Class : 0
 #Transaction id: 29174 #Class: 0 #Similarity: 0.00000
 #Transaction id: 39411 #Class: 0 #Similarity: 0.00004
 #Transaction id: 97181 #Class: 0 #Similarity: 0.00004
 #Transaction id: 84271 #Class: 0 #Similarity: 0.00005
 #Transaction id: 93602 #Class: 0 #Similarity: 0.00005
 #Transaction id: 40375 #Class: 0 #Similarity: 0.00005
 #Transaction id: 95681 #Class: 0 #Similarity: 0.00005
 #Transaction id: 52957 #Class: 0 #Similarity: 0.00005
 #Transaction id: 36899 #Class: 0 #Similarity: 0.00005
 #Transaction id: 46143 #Class: 0 #Similarity: 0.00005
-------------------------------------------------------------------------------
Given transaction  154357 Class : 0
 #Transaction id: 154357 #Class: 0 #Similarity: 0.00000
 #Transaction id: 153401 #Class: 0 #Similarity: 0.00004
 #Transaction id: 158115 #Class: 0 #Similarity: 0.00004
 #Transaction id: 148889 #Class: 0 #Similarity: 0.00004
 #Transaction id: 154309 #Class: 0 #Similarity: 0.00004
 #Transaction id: 153576 #Class: 0 #Similarity: 0.00004
 #Transaction id: 156275 #Class: 0 #Similarity: 0.00004
 #Transaction id: 193946 #Class: 0 #Similarity: 0.00004
 #Transaction id: 237744 #Class: 0 #Similarity: 0.00005
 #Transaction id: 151843 #Class: 0 #Similarity: 0.00005
-------------------------------------------------------------------------------
```

```
Given transaction  68220 Class : 0
 #Transaction id: 68220 #Class: 0 #Similarity: 0.00000
 #Transaction id: 55256 #Class: 0 #Similarity: 0.00003
 #Transaction id: 107118 #Class: 0 #Similarity: 0.00004
 #Transaction id: 75400 #Class: 0 #Similarity: 0.00004
 #Transaction id: 110818 #Class: 0 #Similarity: 0.00004
 #Transaction id: 72533 #Class: 0 #Similarity: 0.00004
 #Transaction id: 108418 #Class: 0 #Similarity: 0.00004
 #Transaction id: 45065 #Class: 0 #Similarity: 0.00004
 #Transaction id: 54591 #Class: 0 #Similarity: 0.00004
 #Transaction id: 67713 #Class: 0 #Similarity: 0.00004
-------------------------------------------------------------------------------
Given transaction  15621 Class : 0
 #Transaction id: 15621 #Class: 0 #Similarity: 0.00000
 #Transaction id: 18880 #Class: 0 #Similarity: 0.00003
 #Transaction id: 14370 #Class: 0 #Similarity: 0.00004
 #Transaction id: 20694 #Class: 0 #Similarity: 0.00004
 #Transaction id: 18100 #Class: 0 #Similarity: 0.00004
 #Transaction id: 58627 #Class: 0 #Similarity: 0.00004
 #Transaction id: 21736 #Class: 0 #Similarity: 0.00004
 #Transaction id: 44240 #Class: 0 #Similarity: 0.00004
 #Transaction id: 46386 #Class: 0 #Similarity: 0.00005
 #Transaction id: 36252 #Class: 0 #Similarity: 0.00005
-------------------------------------------------------------------------------
Given transaction  229207 Class : 0
 #Transaction id: 229207 #Class: 0 #Similarity: 0.00000
 #Transaction id: 257029 #Class: 0 #Similarity: 0.00001
 #Transaction id: 250913 #Class: 0 #Similarity: 0.00001
 #Transaction id: 259763 #Class: 0 #Similarity: 0.00001
 #Transaction id: 251803 #Class: 0 #Similarity: 0.00001
 #Transaction id: 240712 #Class: 0 #Similarity: 0.00001
 #Transaction id: 234990 #Class: 0 #Similarity: 0.00001
 #Transaction id: 250001 #Class: 0 #Similarity: 0.00001
 #Transaction id: 261513 #Class: 0 #Similarity: 0.00001
 #Transaction id: 258317 #Class: 0 #Similarity: 0.00001
-------------------------------------------------------------------------------
Given transaction  38078 Class : 0
 #Transaction id: 38078 #Class: 0 #Similarity: 0.00000
 #Transaction id: 86529 #Class: 0 #Similarity: 0.00003
 #Transaction id: 113935 #Class: 0 #Similarity: 0.00003
 #Transaction id: 122544 #Class: 0 #Similarity: 0.00003
 #Transaction id: 58523 #Class: 0 #Similarity: 0.00003
 #Transaction id: 114571 #Class: 0 #Similarity: 0.00003
 #Transaction id: 20813 #Class: 0 #Similarity: 0.00003
 #Transaction id: 56920 #Class: 0 #Similarity: 0.00004
 #Transaction id: 66440 #Class: 0 #Similarity: 0.00004
 #Transaction id: 86729 #Class: 0 #Similarity: 0.00004
-------------------------------------------------------------------------------
```

```
Given transaction  128858 Class : 0
 #Transaction id: 128858 #Class: 0 #Similarity: 0.00000
 #Transaction id: 136794 #Class: 0 #Similarity: 0.00001
 #Transaction id: 82025 #Class: 0 #Similarity: 0.00002
 #Transaction id: 99155 #Class: 0 #Similarity: 0.00002
 #Transaction id: 113160 #Class: 0 #Similarity: 0.00002
 #Transaction id: 135067 #Class: 0 #Similarity: 0.00002
 #Transaction id: 197968 #Class: 0 #Similarity: 0.00003
 #Transaction id: 112209 #Class: 0 #Similarity: 0.00003
 #Transaction id: 264041 #Class: 0 #Similarity: 0.00003
 #Transaction id: 269944 #Class: 0 #Similarity: 0.00003
---------------------------------------------------------------------------
Given transaction  257994 Class : 0
 #Transaction id: 257994 #Class: 0 #Similarity: 0.00000
 #Transaction id: 224541 #Class: 0 #Similarity: 0.00000
 #Transaction id: 211498 #Class: 0 #Similarity: 0.00001
 #Transaction id: 253637 #Class: 0 #Similarity: 0.00001
 #Transaction id: 226390 #Class: 0 #Similarity: 0.00001
 #Transaction id: 209504 #Class: 0 #Similarity: 0.00001
 #Transaction id: 223190 #Class: 0 #Similarity: 0.00001
 #Transaction id: 257337 #Class: 0 #Similarity: 0.00001
 #Transaction id: 203464 #Class: 0 #Similarity: 0.00001
 #Transaction id: 212639 #Class: 0 #Similarity: 0.00001
---------------------------------------------------------------------------
Given transaction  12952 Class : 0
 #Transaction id: 12952 #Class: 0 #Similarity: 0.00000
 #Transaction id: 12085 #Class: 0 #Similarity: 0.00012
 #Transaction id: 11259 #Class: 0 #Similarity: 0.00016
 #Transaction id: 10758 #Class: 0 #Similarity: 0.00016
 #Transaction id: 13641 #Class: 0 #Similarity: 0.00017
 #Transaction id: 13191 #Class: 0 #Similarity: 0.00017
 #Transaction id: 12739 #Class: 0 #Similarity: 0.00017
 #Transaction id: 14152 #Class: 0 #Similarity: 0.00017
 #Transaction id: 13572 #Class: 0 #Similarity: 0.00017
 #Transaction id: 11878 #Class: 0 #Similarity: 0.00017
---------------------------------------------------------------------------
Given transaction  167419 Class : 0
 #Transaction id: 167419 #Class: 0 #Similarity: 0.00000
 #Transaction id: 237920 #Class: 0 #Similarity: 0.00001
 #Transaction id: 210830 #Class: 0 #Similarity: 0.00001
 #Transaction id: 270681 #Class: 0 #Similarity: 0.00001
 #Transaction id: 224451 #Class: 0 #Similarity: 0.00001
 #Transaction id: 267726 #Class: 0 #Similarity: 0.00002
 #Transaction id: 255942 #Class: 0 #Similarity: 0.00002
 #Transaction id: 184895 #Class: 0 #Similarity: 0.00002
 #Transaction id: 169592 #Class: 0 #Similarity: 0.00002
 #Transaction id: 172580 #Class: 0 #Similarity: 0.00002
---------------------------------------------------------------------------
```

```
Given transaction  283369 Class : 0
 #Transaction id: 283369 #Class: 0 #Similarity: 0.00000
 #Transaction id: 196967 #Class: 0 #Similarity: 0.00002
 #Transaction id: 275127 #Class: 0 #Similarity: 0.00002
 #Transaction id: 229629 #Class: 0 #Similarity: 0.00002
 #Transaction id: 248938 #Class: 0 #Similarity: 0.00002
 #Transaction id: 186103 #Class: 0 #Similarity: 0.00002
 #Transaction id: 200085 #Class: 0 #Similarity: 0.00002
 #Transaction id: 165671 #Class: 0 #Similarity: 0.00002
 #Transaction id: 171411 #Class: 0 #Similarity: 0.00002
 #Transaction id: 238933 #Class: 0 #Similarity: 0.00002
------------------------------------------------------------------------------
Given transaction  18547 Class : 0
 #Transaction id: 18547 #Class: 0 #Similarity: 0.00000
 #Transaction id: 25664 #Class: 0 #Similarity: 0.00006
 #Transaction id: 57916 #Class: 0 #Similarity: 0.00006
 #Transaction id: 124597 #Class: 0 #Similarity: 0.00007
 #Transaction id: 57641 #Class: 0 #Similarity: 0.00007
 #Transaction id: 46022 #Class: 0 #Similarity: 0.00007
 #Transaction id: 64741 #Class: 0 #Similarity: 0.00008
 #Transaction id: 57055 #Class: 0 #Similarity: 0.00008
 #Transaction id: 50292 #Class: 0 #Similarity: 0.00008
 #Transaction id: 26880 #Class: 0 #Similarity: 0.00008
------------------------------------------------------------------------------
Given transaction  82887 Class : 0
 #Transaction id: 82887 #Class: 0 #Similarity: 0.00000
 #Transaction id: 138713 #Class: 0 #Similarity: 0.00009
 #Transaction id: 81971 #Class: 0 #Similarity: 0.00009
 #Transaction id: 146383 #Class: 0 #Similarity: 0.00009
 #Transaction id: 83056 #Class: 0 #Similarity: 0.00009
 #Transaction id: 123323 #Class: 0 #Similarity: 0.00010
 #Transaction id: 204710 #Class: 0 #Similarity: 0.00010
 #Transaction id: 62313 #Class: 0 #Similarity: 0.00010
 #Transaction id: 252920 #Class: 0 #Similarity: 0.00010
 #Transaction id: 233209 #Class: 0 #Similarity: 0.00010
------------------------------------------------------------------------------
Given transaction  27744 Class : 0
 #Transaction id: 27744 #Class: 0 #Similarity: 0.00000
 #Transaction id: 67335 #Class: 0 #Similarity: 0.00013
 #Transaction id: 28049 #Class: 0 #Similarity: 0.00013
 #Transaction id: 84689 #Class: 0 #Similarity: 0.00013
 #Transaction id: 72604 #Class: 0 #Similarity: 0.00013
 #Transaction id: 80531 #Class: 0 #Similarity: 0.00014
 #Transaction id: 39976 #Class: 0 #Similarity: 0.00014
 #Transaction id: 127321 #Class: 0 #Similarity: 0.00014
 #Transaction id: 104581 #Class: 0 #Similarity: 0.00014
 #Transaction id: 38441 #Class: 0 #Similarity: 0.00014
------------------------------------------------------------------------------
```

```
Given transaction  282018 Class : 0
 #Transaction id: 282018 #Class: 0 #Similarity: 0.00000
 #Transaction id: 232351 #Class: 0 #Similarity: 0.00001
 #Transaction id: 277350 #Class: 0 #Similarity: 0.00001
 #Transaction id: 259132 #Class: 0 #Similarity: 0.00001
 #Transaction id: 238716 #Class: 0 #Similarity: 0.00001
 #Transaction id: 284702 #Class: 0 #Similarity: 0.00001
 #Transaction id: 213125 #Class: 0 #Similarity: 0.00001
 #Transaction id: 189528 #Class: 0 #Similarity: 0.00001
 #Transaction id: 279561 #Class: 0 #Similarity: 0.00001
 #Transaction id: 234468 #Class: 0 #Similarity: 0.00001
---------------------------------------------------------------------------
Given transaction  188018 Class : 0
 #Transaction id: 188018 #Class: 0 #Similarity: 0.00000
 #Transaction id: 187723 #Class: 0 #Similarity: 0.00001
 #Transaction id: 240037 #Class: 0 #Similarity: 0.00001
 #Transaction id: 219565 #Class: 0 #Similarity: 0.00001
 #Transaction id: 280946 #Class: 0 #Similarity: 0.00002
 #Transaction id: 205576 #Class: 0 #Similarity: 0.00002
 #Transaction id: 246366 #Class: 0 #Similarity: 0.00002
 #Transaction id: 280460 #Class: 0 #Similarity: 0.00002
 #Transaction id: 267741 #Class: 0 #Similarity: 0.00002
 #Transaction id: 207624 #Class: 0 #Similarity: 0.00002
---------------------------------------------------------------------------
Given transaction  264246 Class : 0
 #Transaction id: 264246 #Class: 0 #Similarity: 0.00000
 #Transaction id: 268811 #Class: 0 #Similarity: 0.00001
 #Transaction id: 214558 #Class: 0 #Similarity: 0.00001
 #Transaction id: 165904 #Class: 0 #Similarity: 0.00001
 #Transaction id: 172002 #Class: 0 #Similarity: 0.00001
 #Transaction id: 264595 #Class: 0 #Similarity: 0.00001
 #Transaction id: 263357 #Class: 0 #Similarity: 0.00001
 #Transaction id: 264326 #Class: 0 #Similarity: 0.00001
 #Transaction id: 215137 #Class: 0 #Similarity: 0.00001
 #Transaction id: 217690 #Class: 0 #Similarity: 0.00001
---------------------------------------------------------------------------
Given transaction  174186 Class : 0
 #Transaction id: 174186 #Class: 0 #Similarity: 0.00000
 #Transaction id: 159463 #Class: 0 #Similarity: 0.00001
 #Transaction id: 168011 #Class: 0 #Similarity: 0.00001
 #Transaction id: 218784 #Class: 0 #Similarity: 0.00001
 #Transaction id: 220347 #Class: 0 #Similarity: 0.00002
 #Transaction id: 222380 #Class: 0 #Similarity: 0.00002
 #Transaction id: 265375 #Class: 0 #Similarity: 0.00002
 #Transaction id: 190209 #Class: 0 #Similarity: 0.00002
 #Transaction id: 165838 #Class: 0 #Similarity: 0.00002
 #Transaction id: 243447 #Class: 0 #Similarity: 0.00002
---------------------------------------------------------------------------
```

```
Given transaction  214038 Class : 0
 #Transaction id: 214038 #Class: 0 #Similarity: 0.00000
 #Transaction id: 272045 #Class: 0 #Similarity: 0.00002
 #Transaction id: 196728 #Class: 0 #Similarity: 0.00003
 #Transaction id: 218345 #Class: 0 #Similarity: 0.00003
 #Transaction id: 216662 #Class: 0 #Similarity: 0.00004
 #Transaction id: 283682 #Class: 0 #Similarity: 0.00004
 #Transaction id: 188788 #Class: 0 #Similarity: 0.00004
 #Transaction id: 248941 #Class: 0 #Similarity: 0.00004
 #Transaction id: 258430 #Class: 0 #Similarity: 0.00004
 #Transaction id: 251796 #Class: 0 #Similarity: 0.00004
-------------------------------------------------------------------------------
Given transaction  258567 Class : 0
 #Transaction id: 258567 #Class: 0 #Similarity: 0.00000
 #Transaction id: 243908 #Class: 0 #Similarity: 0.00002
 #Transaction id: 237595 #Class: 0 #Similarity: 0.00002
 #Transaction id: 210580 #Class: 0 #Similarity: 0.00002
 #Transaction id: 207609 #Class: 0 #Similarity: 0.00002
 #Transaction id: 238049 #Class: 0 #Similarity: 0.00002
 #Transaction id: 195466 #Class: 0 #Similarity: 0.00002
 #Transaction id: 195882 #Class: 0 #Similarity: 0.00002
 #Transaction id: 250556 #Class: 0 #Similarity: 0.00002
 #Transaction id: 213117 #Class: 0 #Similarity: 0.00002
-------------------------------------------------------------------------------
Given transaction  121227 Class : 0
 #Transaction id: 121227 #Class: 0 #Similarity: 0.00000
 #Transaction id: 121518 #Class: 0 #Similarity: 0.00006
 #Transaction id: 78508 #Class: 0 #Similarity: 0.00007
 #Transaction id: 163399 #Class: 0 #Similarity: 0.00007
 #Transaction id: 176182 #Class: 0 #Similarity: 0.00007
 #Transaction id: 109555 #Class: 0 #Similarity: 0.00007
 #Transaction id: 92655 #Class: 0 #Similarity: 0.00007
 #Transaction id: 180617 #Class: 0 #Similarity: 0.00007
 #Transaction id: 156740 #Class: 0 #Similarity: 0.00007
 #Transaction id: 129699 #Class: 0 #Similarity: 0.00007
-------------------------------------------------------------------------------
Given transaction  68382 Class : 0
 #Transaction id: 68382 #Class: 0 #Similarity: 0.00000
 #Transaction id: 72533 #Class: 0 #Similarity: 0.00003
 #Transaction id: 81793 #Class: 0 #Similarity: 0.00003
 #Transaction id: 122164 #Class: 0 #Similarity: 0.00004
 #Transaction id: 37220 #Class: 0 #Similarity: 0.00004
 #Transaction id: 111896 #Class: 0 #Similarity: 0.00004
 #Transaction id: 62207 #Class: 0 #Similarity: 0.00004
 #Transaction id: 92285 #Class: 0 #Similarity: 0.00004
 #Transaction id: 134779 #Class: 0 #Similarity: 0.00004
 #Transaction id: 101616 #Class: 0 #Similarity: 0.00004
-------------------------------------------------------------------------------
```

```
Given transaction  157908 Class : 0
 #Transaction id: 157908 #Class: 0 #Similarity: 0.00000
 #Transaction id: 156678 #Class: 0 #Similarity: 0.00003
 #Transaction id: 151836 #Class: 0 #Similarity: 0.00003
 #Transaction id: 153845 #Class: 0 #Similarity: 0.00004
 #Transaction id: 181666 #Class: 0 #Similarity: 0.00004
 #Transaction id: 168400 #Class: 0 #Similarity: 0.00004
 #Transaction id: 173524 #Class: 0 #Similarity: 0.00004
 #Transaction id: 238682 #Class: 0 #Similarity: 0.00004
 #Transaction id: 149658 #Class: 0 #Similarity: 0.00004
 #Transaction id: 167620 #Class: 0 #Similarity: 0.00004
---------------------------------------------------------------------------
Given transaction  254434 Class : 0
 #Transaction id: 254434 #Class: 0 #Similarity: 0.00000
 #Transaction id: 260467 #Class: 0 #Similarity: 0.00003
 #Transaction id: 158996 #Class: 0 #Similarity: 0.00003
 #Transaction id: 209968 #Class: 0 #Similarity: 0.00004
 #Transaction id: 233052 #Class: 0 #Similarity: 0.00004
 #Transaction id: 200870 #Class: 0 #Similarity: 0.00004
 #Transaction id: 179750 #Class: 0 #Similarity: 0.00004
 #Transaction id: 216914 #Class: 0 #Similarity: 0.00005
 #Transaction id: 206090 #Class: 0 #Similarity: 0.00005
 #Transaction id: 186517 #Class: 0 #Similarity: 0.00005
---------------------------------------------------------------------------
Given transaction  219252 Class : 0
 #Transaction id: 219252 #Class: 0 #Similarity: 0.00000
 #Transaction id: 196922 #Class: 0 #Similarity: 0.00001
 #Transaction id: 273884 #Class: 0 #Similarity: 0.00002
 #Transaction id: 219881 #Class: 0 #Similarity: 0.00002
 #Transaction id: 229552 #Class: 0 #Similarity: 0.00002
 #Transaction id: 166192 #Class: 0 #Similarity: 0.00002
 #Transaction id: 209020 #Class: 0 #Similarity: 0.00002
 #Transaction id: 223873 #Class: 0 #Similarity: 0.00002
 #Transaction id: 262504 #Class: 0 #Similarity: 0.00002
 #Transaction id: 268682 #Class: 0 #Similarity: 0.00002
---------------------------------------------------------------------------
Given transaction  24593 Class : 0
 #Transaction id: 24593 #Class: 0 #Similarity: 0.00000
 #Transaction id: 54652 #Class: 0 #Similarity: 0.00003
 #Transaction id: 72279 #Class: 0 #Similarity: 0.00003
 #Transaction id: 21788 #Class: 0 #Similarity: 0.00003
 #Transaction id: 49896 #Class: 0 #Similarity: 0.00004
 #Transaction id: 72920 #Class: 0 #Similarity: 0.00004
 #Transaction id: 25572 #Class: 0 #Similarity: 0.00004
 #Transaction id: 56040 #Class: 0 #Similarity: 0.00004
 #Transaction id: 64098 #Class: 0 #Similarity: 0.00004
 #Transaction id: 70295 #Class: 0 #Similarity: 0.00004
---------------------------------------------------------------------------
```

```
Given transaction  149841 Class : 0
 #Transaction id: 149841 #Class: 0 #Similarity: 0.00000
 #Transaction id: 154208 #Class: 0 #Similarity: 0.00003
 #Transaction id: 154753 #Class: 0 #Similarity: 0.00003
 #Transaction id: 154562 #Class: 0 #Similarity: 0.00003
 #Transaction id: 152767 #Class: 0 #Similarity: 0.00004
 #Transaction id: 157351 #Class: 0 #Similarity: 0.00004
 #Transaction id: 154008 #Class: 0 #Similarity: 0.00004
 #Transaction id: 156642 #Class: 0 #Similarity: 0.00004
 #Transaction id: 156566 #Class: 0 #Similarity: 0.00004
 #Transaction id: 154197 #Class: 0 #Similarity: 0.00004
--------------------------------------------------------------------------------
Given transaction  251798 Class : 0
 #Transaction id: 251798 #Class: 0 #Similarity: 0.00000
 #Transaction id: 260748 #Class: 0 #Similarity: 0.00003
 #Transaction id: 189532 #Class: 0 #Similarity: 0.00003
 #Transaction id: 242045 #Class: 0 #Similarity: 0.00003
 #Transaction id: 284290 #Class: 0 #Similarity: 0.00003
 #Transaction id: 204455 #Class: 0 #Similarity: 0.00004
 #Transaction id: 235224 #Class: 0 #Similarity: 0.00004
 #Transaction id: 202821 #Class: 0 #Similarity: 0.00004
 #Transaction id: 274827 #Class: 0 #Similarity: 0.00004
 #Transaction id: 218191 #Class: 0 #Similarity: 0.00004
--------------------------------------------------------------------------------
Given transaction  174244 Class : 0
 #Transaction id: 174244 #Class: 0 #Similarity: 0.00000
 #Transaction id: 174243 #Class: 0 #Similarity: 0.00000
 #Transaction id: 165855 #Class: 0 #Similarity: 0.00002
 #Transaction id: 267903 #Class: 0 #Similarity: 0.00002
 #Transaction id: 178342 #Class: 0 #Similarity: 0.00002
 #Transaction id: 228860 #Class: 0 #Similarity: 0.00002
 #Transaction id: 252583 #Class: 0 #Similarity: 0.00002
 #Transaction id: 197449 #Class: 0 #Similarity: 0.00003
 #Transaction id: 265842 #Class: 0 #Similarity: 0.00003
 #Transaction id: 224297 #Class: 0 #Similarity: 0.00003
--------------------------------------------------------------------------------
Given transaction  110149 Class : 0
 #Transaction id: 110149 #Class: 0 #Similarity: 0.00000
 #Transaction id: 79680 #Class: 0 #Similarity: 0.00002
 #Transaction id: 133583 #Class: 0 #Similarity: 0.00003
 #Transaction id: 85435 #Class: 0 #Similarity: 0.00003
 #Transaction id: 110234 #Class: 0 #Similarity: 0.00003
 #Transaction id: 140497 #Class: 0 #Similarity: 0.00003
 #Transaction id: 140498 #Class: 0 #Similarity: 0.00003
 #Transaction id: 75241 #Class: 0 #Similarity: 0.00003
 #Transaction id: 75072 #Class: 0 #Similarity: 0.00003
 #Transaction id: 117074 #Class: 0 #Similarity: 0.00003
--------------------------------------------------------------------------------
```

```
Given transaction  278478 Class : 0
 #Transaction id: 278478 #Class: 0 #Similarity: 0.00000
 #Transaction id: 210718 #Class: 0 #Similarity: 0.00001
 #Transaction id: 184867 #Class: 0 #Similarity: 0.00001
 #Transaction id: 232901 #Class: 0 #Similarity: 0.00001
 #Transaction id: 241992 #Class: 0 #Similarity: 0.00001
 #Transaction id: 253216 #Class: 0 #Similarity: 0.00002
 #Transaction id: 274413 #Class: 0 #Similarity: 0.00002
 #Transaction id: 253664 #Class: 0 #Similarity: 0.00002
 #Transaction id: 164495 #Class: 0 #Similarity: 0.00002
 #Transaction id: 276843 #Class: 0 #Similarity: 0.00002
--------------------------------------------------------------------------------
Given transaction  2841 Class : 0
 #Transaction id: 2841 #Class: 0 #Similarity: 0.00000
 #Transaction id: 2422 #Class: 0 #Similarity: 0.00273
 #Transaction id: 5382 #Class: 0 #Similarity: 0.00291
 #Transaction id: 5922 #Class: 0 #Similarity: 0.00292
 #Transaction id: 82331 #Class: 0 #Similarity: 0.00293
 #Transaction id: 32932 #Class: 0 #Similarity: 0.00298
 #Transaction id: 3644 #Class: 0 #Similarity: 0.00299
 #Transaction id: 50569 #Class: 0 #Similarity: 0.00302
 #Transaction id: 19920 #Class: 0 #Similarity: 0.00316
 #Transaction id: 20946 #Class: 0 #Similarity: 0.00322
--------------------------------------------------------------------------------
Given transaction  28904 Class : 0
 #Transaction id: 28904 #Class: 0 #Similarity: 0.00000
 #Transaction id: 24982 #Class: 0 #Similarity: 0.00005
 #Transaction id: 34587 #Class: 0 #Similarity: 0.00006
 #Transaction id: 21127 #Class: 0 #Similarity: 0.00006
 #Transaction id: 37617 #Class: 0 #Similarity: 0.00006
 #Transaction id: 83048 #Class: 0 #Similarity: 0.00006
 #Transaction id: 78394 #Class: 0 #Similarity: 0.00007
 #Transaction id: 35782 #Class: 0 #Similarity: 0.00007
 #Transaction id: 120137 #Class: 0 #Similarity: 0.00007
 #Transaction id: 101480 #Class: 0 #Similarity: 0.00007
--------------------------------------------------------------------------------
Given transaction  229066 Class : 0
 #Transaction id: 229066 #Class: 0 #Similarity: 0.00000
 #Transaction id: 271511 #Class: 0 #Similarity: 0.00002
 #Transaction id: 178073 #Class: 0 #Similarity: 0.00002
 #Transaction id: 232093 #Class: 0 #Similarity: 0.00002
 #Transaction id: 281090 #Class: 0 #Similarity: 0.00002
 #Transaction id: 237914 #Class: 0 #Similarity: 0.00002
 #Transaction id: 268042 #Class: 0 #Similarity: 0.00002
 #Transaction id: 246696 #Class: 0 #Similarity: 0.00002
 #Transaction id: 245211 #Class: 0 #Similarity: 0.00002
 #Transaction id: 236684 #Class: 0 #Similarity: 0.00002
--------------------------------------------------------------------------------
```

```
Given transaction  121475 Class : 0
 #Transaction id: 121475 #Class: 0 #Similarity: 0.00000
 #Transaction id: 100977 #Class: 0 #Similarity: 0.00001
 #Transaction id: 130202 #Class: 0 #Similarity: 0.00001
 #Transaction id: 128025 #Class: 0 #Similarity: 0.00001
 #Transaction id: 114962 #Class: 0 #Similarity: 0.00001
 #Transaction id: 136420 #Class: 0 #Similarity: 0.00002
 #Transaction id: 140863 #Class: 0 #Similarity: 0.00002
 #Transaction id: 90867 #Class: 0 #Similarity: 0.00002
 #Transaction id: 122130 #Class: 0 #Similarity: 0.00002
 #Transaction id: 103576 #Class: 0 #Similarity: 0.00002
------------------------------------------------------------------------------
Given transaction  119226 Class : 0
 #Transaction id: 119226 #Class: 0 #Similarity: 0.00000
 #Transaction id: 115114 #Class: 0 #Similarity: 0.00002
 #Transaction id: 84956 #Class: 0 #Similarity: 0.00002
 #Transaction id: 182557 #Class: 0 #Similarity: 0.00003
 #Transaction id: 64738 #Class: 0 #Similarity: 0.00003
 #Transaction id: 134656 #Class: 0 #Similarity: 0.00003
 #Transaction id: 195339 #Class: 0 #Similarity: 0.00003
 #Transaction id: 105996 #Class: 0 #Similarity: 0.00003
 #Transaction id: 214386 #Class: 0 #Similarity: 0.00003
 #Transaction id: 98982 #Class: 0 #Similarity: 0.00003
------------------------------------------------------------------------------
Given transaction  15270 Class : 0
 #Transaction id: 15270 #Class: 0 #Similarity: 0.00000
 #Transaction id: 45213 #Class: 0 #Similarity: 0.00008
 #Transaction id: 25173 #Class: 0 #Similarity: 0.00008
 #Transaction id: 28693 #Class: 0 #Similarity: 0.00009
 #Transaction id: 16671 #Class: 0 #Similarity: 0.00009
 #Transaction id: 28597 #Class: 0 #Similarity: 0.00009
 #Transaction id: 26597 #Class: 0 #Similarity: 0.00009
 #Transaction id: 76256 #Class: 0 #Similarity: 0.00009
 #Transaction id: 79020 #Class: 0 #Similarity: 0.00009
 #Transaction id: 26337 #Class: 0 #Similarity: 0.00009
------------------------------------------------------------------------------
Given transaction  38692 Class : 0
 #Transaction id: 38692 #Class: 0 #Similarity: 0.00000
 #Transaction id: 188529 #Class: 0 #Similarity: 0.00012
 #Transaction id: 36250 #Class: 0 #Similarity: 0.00012
 #Transaction id: 201592 #Class: 0 #Similarity: 0.00012
 #Transaction id: 52010 #Class: 0 #Similarity: 0.00012
 #Transaction id: 43492 #Class: 0 #Similarity: 0.00014
 #Transaction id: 31093 #Class: 0 #Similarity: 0.00014
 #Transaction id: 44922 #Class: 0 #Similarity: 0.00014
 #Transaction id: 192863 #Class: 0 #Similarity: 0.00015
 #Transaction id: 15455 #Class: 0 #Similarity: 0.00015
------------------------------------------------------------------------------
```

```
Given transaction  78940 Class : 0
 #Transaction id: 78940 #Class: 0 #Similarity: 0.00000
 #Transaction id: 107093 #Class: 0 #Similarity: 0.00003
 #Transaction id: 115971 #Class: 0 #Similarity: 0.00003
 #Transaction id: 97183 #Class: 0 #Similarity: 0.00003
 #Transaction id: 53903 #Class: 0 #Similarity: 0.00003
 #Transaction id: 83311 #Class: 0 #Similarity: 0.00003
 #Transaction id: 65999 #Class: 0 #Similarity: 0.00003
 #Transaction id: 82114 #Class: 0 #Similarity: 0.00003
 #Transaction id: 141209 #Class: 0 #Similarity: 0.00003
 #Transaction id: 117862 #Class: 0 #Similarity: 0.00003
-----------------------------------------------------------------------------
Given transaction  251638 Class : 0
 #Transaction id: 251638 #Class: 0 #Similarity: 0.00000
 #Transaction id: 227856 #Class: 0 #Similarity: 0.00001
 #Transaction id: 175040 #Class: 0 #Similarity: 0.00001
 #Transaction id: 253150 #Class: 0 #Similarity: 0.00001
 #Transaction id: 208795 #Class: 0 #Similarity: 0.00001
 #Transaction id: 240323 #Class: 0 #Similarity: 0.00001
 #Transaction id: 284275 #Class: 0 #Similarity: 0.00001
 #Transaction id: 184368 #Class: 0 #Similarity: 0.00001
 #Transaction id: 212998 #Class: 0 #Similarity: 0.00002
 #Transaction id: 245376 #Class: 0 #Similarity: 0.00002
-----------------------------------------------------------------------------
Given transaction  29261 Class : 0
 #Transaction id: 29261 #Class: 0 #Similarity: 0.00000
 #Transaction id: 43007 #Class: 0 #Similarity: 0.00008
 #Transaction id: 54100 #Class: 0 #Similarity: 0.00009
 #Transaction id: 21267 #Class: 0 #Similarity: 0.00009
 #Transaction id: 47430 #Class: 0 #Similarity: 0.00010
 #Transaction id: 30290 #Class: 0 #Similarity: 0.00010
 #Transaction id: 14688 #Class: 0 #Similarity: 0.00010
 #Transaction id: 33019 #Class: 0 #Similarity: 0.00010
 #Transaction id: 43610 #Class: 0 #Similarity: 0.00010
 #Transaction id: 66349 #Class: 0 #Similarity: 0.00010
-----------------------------------------------------------------------------
Given transaction  39224 Class : 0
 #Transaction id: 39224 #Class: 0 #Similarity: 0.00000
 #Transaction id: 25423 #Class: 0 #Similarity: 0.00002
 #Transaction id: 43407 #Class: 0 #Similarity: 0.00003
 #Transaction id: 35501 #Class: 0 #Similarity: 0.00004
 #Transaction id: 32564 #Class: 0 #Similarity: 0.00004
 #Transaction id: 40367 #Class: 0 #Similarity: 0.00004
 #Transaction id: 95552 #Class: 0 #Similarity: 0.00005
 #Transaction id: 88114 #Class: 0 #Similarity: 0.00005
 #Transaction id: 52911 #Class: 0 #Similarity: 0.00005
 #Transaction id: 112489 #Class: 0 #Similarity: 0.00005
-----------------------------------------------------------------------------
```

```
Given transaction  243861 Class : 0
 #Transaction id: 243861 #Class: 0 #Similarity: 0.00000
 #Transaction id: 199600 #Class: 0 #Similarity: 0.00002
 #Transaction id: 261006 #Class: 0 #Similarity: 0.00002
 #Transaction id: 200109 #Class: 0 #Similarity: 0.00002
 #Transaction id: 262636 #Class: 0 #Similarity: 0.00002
 #Transaction id: 188004 #Class: 0 #Similarity: 0.00002
 #Transaction id: 252017 #Class: 0 #Similarity: 0.00002
 #Transaction id: 242782 #Class: 0 #Similarity: 0.00002
 #Transaction id: 203579 #Class: 0 #Similarity: 0.00002
 #Transaction id: 255491 #Class: 0 #Similarity: 0.00002
-------------------------------------------------------------------------------
Given transaction  120065 Class : 0
 #Transaction id: 120065 #Class: 0 #Similarity: 0.00000
 #Transaction id: 117320 #Class: 0 #Similarity: 0.00001
 #Transaction id: 129904 #Class: 0 #Similarity: 0.00003
 #Transaction id: 119705 #Class: 0 #Similarity: 0.00003
 #Transaction id: 98826 #Class: 0 #Similarity: 0.00003
 #Transaction id: 98188 #Class: 0 #Similarity: 0.00003
 #Transaction id: 131798 #Class: 0 #Similarity: 0.00004
 #Transaction id: 112391 #Class: 0 #Similarity: 0.00004
 #Transaction id: 118205 #Class: 0 #Similarity: 0.00004
 #Transaction id: 135428 #Class: 0 #Similarity: 0.00004
-------------------------------------------------------------------------------
Given transaction  259614 Class : 0
 #Transaction id: 259614 #Class: 0 #Similarity: 0.00000
 #Transaction id: 283429 #Class: 0 #Similarity: 0.00001
 #Transaction id: 264483 #Class: 0 #Similarity: 0.00001
 #Transaction id: 277255 #Class: 0 #Similarity: 0.00001
 #Transaction id: 255527 #Class: 0 #Similarity: 0.00001
 #Transaction id: 282392 #Class: 0 #Similarity: 0.00001
 #Transaction id: 275005 #Class: 0 #Similarity: 0.00001
 #Transaction id: 248811 #Class: 0 #Similarity: 0.00001
 #Transaction id: 228322 #Class: 0 #Similarity: 0.00001
 #Transaction id: 262052 #Class: 0 #Similarity: 0.00001
-------------------------------------------------------------------------------
Given transaction  84316 Class : 0
 #Transaction id: 84316 #Class: 0 #Similarity: 0.00000
 #Transaction id: 124979 #Class: 0 #Similarity: 0.00005
 #Transaction id: 210286 #Class: 0 #Similarity: 0.00006
 #Transaction id: 210259 #Class: 0 #Similarity: 0.00006
 #Transaction id: 115765 #Class: 0 #Similarity: 0.00006
 #Transaction id: 228446 #Class: 0 #Similarity: 0.00006
 #Transaction id: 85072 #Class: 0 #Similarity: 0.00006
 #Transaction id: 119259 #Class: 0 #Similarity: 0.00006
 #Transaction id: 226568 #Class: 0 #Similarity: 0.00006
 #Transaction id: 73341 #Class: 0 #Similarity: 0.00006
-------------------------------------------------------------------------------
```

```
Given transaction  212865 Class : 0
 #Transaction id: 212865 #Class: 0 #Similarity: 0.00000
 #Transaction id: 200369 #Class: 0 #Similarity: 0.00001
 #Transaction id: 267753 #Class: 0 #Similarity: 0.00002
 #Transaction id: 166445 #Class: 0 #Similarity: 0.00002
 #Transaction id: 272082 #Class: 0 #Similarity: 0.00002
 #Transaction id: 275771 #Class: 0 #Similarity: 0.00002
 #Transaction id: 265398 #Class: 0 #Similarity: 0.00002
 #Transaction id: 246973 #Class: 0 #Similarity: 0.00002
 #Transaction id: 259470 #Class: 0 #Similarity: 0.00002
 #Transaction id: 178407 #Class: 0 #Similarity: 0.00002
 ------------------------------------------------------------------------
Given transaction  69137 Class : 0
 #Transaction id: 69137 #Class: 0 #Similarity: 0.00000
 #Transaction id: 143772 #Class: 0 #Similarity: 0.00005
 #Transaction id: 115528 #Class: 0 #Similarity: 0.00005
 #Transaction id: 240215 #Class: 0 #Similarity: 0.00005
 #Transaction id: 100711 #Class: 0 #Similarity: 0.00005
 #Transaction id: 144009 #Class: 0 #Similarity: 0.00005
 #Transaction id: 76146 #Class: 0 #Similarity: 0.00005
 #Transaction id: 128984 #Class: 0 #Similarity: 0.00005
 #Transaction id: 121970 #Class: 0 #Similarity: 0.00005
 #Transaction id: 101911 #Class: 0 #Similarity: 0.00005
 ------------------------------------------------------------------------
Given transaction  79986 Class : 0
 #Transaction id: 79986 #Class: 0 #Similarity: 0.00000
 #Transaction id: 83188 #Class: 0 #Similarity: 0.00001
 #Transaction id: 72290 #Class: 0 #Similarity: 0.00002
 #Transaction id: 78886 #Class: 0 #Similarity: 0.00002
 #Transaction id: 84008 #Class: 0 #Similarity: 0.00003
 #Transaction id: 132499 #Class: 0 #Similarity: 0.00003
 #Transaction id: 83339 #Class: 0 #Similarity: 0.00003
 #Transaction id: 74734 #Class: 0 #Similarity: 0.00003
 #Transaction id: 103109 #Class: 0 #Similarity: 0.00003
 #Transaction id: 78648 #Class: 0 #Similarity: 0.00003
 ------------------------------------------------------------------------
Given transaction  223346 Class : 0
 #Transaction id: 223346 #Class: 0 #Similarity: 0.00000
 #Transaction id: 218823 #Class: 0 #Similarity: 0.00000
 #Transaction id: 266076 #Class: 0 #Similarity: 0.00000
 #Transaction id: 192138 #Class: 0 #Similarity: 0.00000
 #Transaction id: 249660 #Class: 0 #Similarity: 0.00000
 #Transaction id: 267162 #Class: 0 #Similarity: 0.00000
 #Transaction id: 255582 #Class: 0 #Similarity: 0.00000
 #Transaction id: 217278 #Class: 0 #Similarity: 0.00000
 #Transaction id: 259255 #Class: 0 #Similarity: 0.00000
 #Transaction id: 244282 #Class: 0 #Similarity: 0.00000
 ------------------------------------------------------------------------
```

```
Given transaction  23995 Class : 0
 #Transaction id: 23995 #Class: 0 #Similarity: 0.00000
 #Transaction id: 38715 #Class: 0 #Similarity: 0.00002
 #Transaction id: 65898 #Class: 0 #Similarity: 0.00003
 #Transaction id: 19120 #Class: 0 #Similarity: 0.00004
 #Transaction id: 31436 #Class: 0 #Similarity: 0.00004
 #Transaction id: 75137 #Class: 0 #Similarity: 0.00004
 #Transaction id: 66425 #Class: 0 #Similarity: 0.00004
 #Transaction id: 28164 #Class: 0 #Similarity: 0.00004
 #Transaction id: 38212 #Class: 0 #Similarity: 0.00004
 #Transaction id: 70060 #Class: 0 #Similarity: 0.00004
-------------------------------------------------------------------------------
Given transaction  159741 Class : 0
 #Transaction id: 159741 #Class: 0 #Similarity: 0.00000
 #Transaction id: 240349 #Class: 0 #Similarity: 0.00002
 #Transaction id: 167575 #Class: 0 #Similarity: 0.00002
 #Transaction id: 167509 #Class: 0 #Similarity: 0.00002
 #Transaction id: 237203 #Class: 0 #Similarity: 0.00002
 #Transaction id: 200143 #Class: 0 #Similarity: 0.00002
 #Transaction id: 197856 #Class: 0 #Similarity: 0.00002
 #Transaction id: 229930 #Class: 0 #Similarity: 0.00002
 #Transaction id: 275500 #Class: 0 #Similarity: 0.00002
 #Transaction id: 240416 #Class: 0 #Similarity: 0.00002
-------------------------------------------------------------------------------
Given transaction  40426 Class : 0
 #Transaction id: 40426 #Class: 0 #Similarity: 0.00000
 #Transaction id: 41465 #Class: 0 #Similarity: 0.00004
 #Transaction id: 30030 #Class: 0 #Similarity: 0.00004
 #Transaction id: 31127 #Class: 0 #Similarity: 0.00004
 #Transaction id: 43745 #Class: 0 #Similarity: 0.00004
 #Transaction id: 45178 #Class: 0 #Similarity: 0.00004
 #Transaction id: 64041 #Class: 0 #Similarity: 0.00005
 #Transaction id: 33307 #Class: 0 #Similarity: 0.00005
 #Transaction id: 52887 #Class: 0 #Similarity: 0.00005
 #Transaction id: 57548 #Class: 0 #Similarity: 0.00005
-------------------------------------------------------------------------------
Given transaction  184751 Class : 0
 #Transaction id: 184751 #Class: 0 #Similarity: 0.00000
 #Transaction id: 184434 #Class: 0 #Similarity: 0.00001
 #Transaction id: 191841 #Class: 0 #Similarity: 0.00001
 #Transaction id: 228774 #Class: 0 #Similarity: 0.00001
 #Transaction id: 183494 #Class: 0 #Similarity: 0.00001
 #Transaction id: 195558 #Class: 0 #Similarity: 0.00001
 #Transaction id: 252065 #Class: 0 #Similarity: 0.00002
 #Transaction id: 258296 #Class: 0 #Similarity: 0.00002
 #Transaction id: 218485 #Class: 0 #Similarity: 0.00002
 #Transaction id: 241468 #Class: 0 #Similarity: 0.00002
-------------------------------------------------------------------------------
```

```
Given transaction  93840 Class : 0
 #Transaction id: 93840 #Class: 0 #Similarity: 0.00000
 #Transaction id: 83081 #Class: 0 #Similarity: 0.00008
 #Transaction id: 126052 #Class: 0 #Similarity: 0.00009
 #Transaction id: 59576 #Class: 0 #Similarity: 0.00009
 #Transaction id: 108776 #Class: 0 #Similarity: 0.00010
 #Transaction id: 110581 #Class: 0 #Similarity: 0.00010
 #Transaction id: 119220 #Class: 0 #Similarity: 0.00010
 #Transaction id: 57185 #Class: 0 #Similarity: 0.00011
 #Transaction id: 251278 #Class: 0 #Similarity: 0.00011
 #Transaction id: 268651 #Class: 0 #Similarity: 0.00011
------------------------------------------------------------------------------
Given transaction  111197 Class : 0
 #Transaction id: 111197 #Class: 0 #Similarity: 0.00000
 #Transaction id: 78489 #Class: 0 #Similarity: 0.00004
 #Transaction id: 197731 #Class: 0 #Similarity: 0.00004
 #Transaction id: 124702 #Class: 0 #Similarity: 0.00005
 #Transaction id: 255169 #Class: 0 #Similarity: 0.00005
 #Transaction id: 139019 #Class: 0 #Similarity: 0.00005
 #Transaction id: 270671 #Class: 0 #Similarity: 0.00005
 #Transaction id: 53810 #Class: 0 #Similarity: 0.00005
 #Transaction id: 115692 #Class: 0 #Similarity: 0.00005
 #Transaction id: 224680 #Class: 0 #Similarity: 0.00005
------------------------------------------------------------------------------
Given transaction  188124 Class : 0
 #Transaction id: 188124 #Class: 0 #Similarity: 0.00000
 #Transaction id: 252373 #Class: 0 #Similarity: 0.00001
 #Transaction id: 252438 #Class: 0 #Similarity: 0.00001
 #Transaction id: 211162 #Class: 0 #Similarity: 0.00002
 #Transaction id: 277805 #Class: 0 #Similarity: 0.00002
 #Transaction id: 270603 #Class: 0 #Similarity: 0.00002
 #Transaction id: 260830 #Class: 0 #Similarity: 0.00002
 #Transaction id: 197832 #Class: 0 #Similarity: 0.00002
 #Transaction id: 251944 #Class: 0 #Similarity: 0.00002
 #Transaction id: 252553 #Class: 0 #Similarity: 0.00002
------------------------------------------------------------------------------
Given transaction  140080 Class : 0
 #Transaction id: 140080 #Class: 0 #Similarity: 0.00000
 #Transaction id: 213585 #Class: 0 #Similarity: 0.00005
 #Transaction id: 160893 #Class: 0 #Similarity: 0.00005
 #Transaction id: 161422 #Class: 0 #Similarity: 0.00005
 #Transaction id: 171852 #Class: 0 #Similarity: 0.00005
 #Transaction id: 87053 #Class: 0 #Similarity: 0.00006
 #Transaction id: 197287 #Class: 0 #Similarity: 0.00006
 #Transaction id: 232360 #Class: 0 #Similarity: 0.00006
 #Transaction id: 129097 #Class: 0 #Similarity: 0.00006
 #Transaction id: 211697 #Class: 0 #Similarity: 0.00006
------------------------------------------------------------------------------
```

```
Given transaction  106679 Class : 1
 #Transaction id: 106679 #Class: 1 #Similarity: 0.00000
 #Transaction id: 111690 #Class: 1 #Similarity: 0.00009
 #Transaction id: 123141 #Class: 1 #Similarity: 0.00016
 #Transaction id: 154694 #Class: 1 #Similarity: 0.00017
 #Transaction id: 245437 #Class: 0 #Similarity: 0.00021
 #Transaction id: 189449 #Class: 0 #Similarity: 0.00021
 #Transaction id: 282122 #Class: 0 #Similarity: 0.00021
 #Transaction id: 118125 #Class: 0 #Similarity: 0.00021
 #Transaction id: 160768 #Class: 0 #Similarity: 0.00021
 #Transaction id: 273614 #Class: 0 #Similarity: 0.00021
-------------------------------------------------------------------------------
Given transaction  199243 Class : 0
 #Transaction id: 199243 #Class: 0 #Similarity: 0.00000
 #Transaction id: 275133 #Class: 0 #Similarity: 0.00001
 #Transaction id: 263483 #Class: 0 #Similarity: 0.00001
 #Transaction id: 248835 #Class: 0 #Similarity: 0.00001
 #Transaction id: 208394 #Class: 0 #Similarity: 0.00001
 #Transaction id: 273702 #Class: 0 #Similarity: 0.00001
 #Transaction id: 206445 #Class: 0 #Similarity: 0.00001
 #Transaction id: 241288 #Class: 0 #Similarity: 0.00001
 #Transaction id: 196027 #Class: 0 #Similarity: 0.00001
 #Transaction id: 249956 #Class: 0 #Similarity: 0.00001
-------------------------------------------------------------------------------
Given transaction  256004 Class : 0
 #Transaction id: 256004 #Class: 0 #Similarity: 0.00000
 #Transaction id: 264301 #Class: 0 #Similarity: 0.00000
 #Transaction id: 230122 #Class: 0 #Similarity: 0.00000
 #Transaction id: 282889 #Class: 0 #Similarity: 0.00001
 #Transaction id: 283278 #Class: 0 #Similarity: 0.00001
 #Transaction id: 228946 #Class: 0 #Similarity: 0.00001
 #Transaction id: 265637 #Class: 0 #Similarity: 0.00001
 #Transaction id: 267481 #Class: 0 #Similarity: 0.00001
 #Transaction id: 270052 #Class: 0 #Similarity: 0.00001
 #Transaction id: 259255 #Class: 0 #Similarity: 0.00001
-------------------------------------------------------------------------------
Given transaction  212440 Class : 0
 #Transaction id: 212440 #Class: 0 #Similarity: 0.00000
 #Transaction id: 192506 #Class: 0 #Similarity: 0.00000
 #Transaction id: 277472 #Class: 0 #Similarity: 0.00001
 #Transaction id: 181912 #Class: 0 #Similarity: 0.00001
 #Transaction id: 282497 #Class: 0 #Similarity: 0.00001
 #Transaction id: 237995 #Class: 0 #Similarity: 0.00001
 #Transaction id: 164066 #Class: 0 #Similarity: 0.00001
 #Transaction id: 158797 #Class: 0 #Similarity: 0.00001
 #Transaction id: 180792 #Class: 0 #Similarity: 0.00001
 #Transaction id: 178895 #Class: 0 #Similarity: 0.00001
-------------------------------------------------------------------------------
```

```
Given transaction  189384 Class : 0
 #Transaction id: 189384 #Class: 0 #Similarity: 0.00000
 #Transaction id: 235675 #Class: 0 #Similarity: 0.00003
 #Transaction id: 180897 #Class: 0 #Similarity: 0.00005
 #Transaction id: 241301 #Class: 0 #Similarity: 0.00005
 #Transaction id: 238349 #Class: 0 #Similarity: 0.00005
 #Transaction id: 218443 #Class: 0 #Similarity: 0.00005
 #Transaction id: 217959 #Class: 0 #Similarity: 0.00005
 #Transaction id: 145877 #Class: 0 #Similarity: 0.00005
 #Transaction id: 238250 #Class: 0 #Similarity: 0.00005
 #Transaction id: 267516 #Class: 0 #Similarity: 0.00005
------------------------------------------------------------------------
Given transaction  282126 Class : 0
 #Transaction id: 282126 #Class: 0 #Similarity: 0.00000
 #Transaction id: 213855 #Class: 0 #Similarity: 0.00001
 #Transaction id: 277103 #Class: 0 #Similarity: 0.00001
 #Transaction id: 216952 #Class: 0 #Similarity: 0.00001
 #Transaction id: 242887 #Class: 0 #Similarity: 0.00001
 #Transaction id: 251455 #Class: 0 #Similarity: 0.00001
 #Transaction id: 278708 #Class: 0 #Similarity: 0.00001
 #Transaction id: 268281 #Class: 0 #Similarity: 0.00001
 #Transaction id: 207405 #Class: 0 #Similarity: 0.00001
 #Transaction id: 187090 #Class: 0 #Similarity: 0.00001
------------------------------------------------------------------------
Given transaction  40696 Class : 0
 #Transaction id: 40696 #Class: 0 #Similarity: 0.00000
 #Transaction id: 213675 #Class: 0 #Similarity: 0.00053
 #Transaction id: 100106 #Class: 0 #Similarity: 0.00055
 #Transaction id: 41040 #Class: 0 #Similarity: 0.00058
 #Transaction id: 192092 #Class: 0 #Similarity: 0.00064
 #Transaction id: 182940 #Class: 0 #Similarity: 0.00064
 #Transaction id: 182669 #Class: 0 #Similarity: 0.00064
 #Transaction id: 86157 #Class: 0 #Similarity: 0.00065
 #Transaction id: 83502 #Class: 0 #Similarity: 0.00065
 #Transaction id: 62189 #Class: 0 #Similarity: 0.00065
------------------------------------------------------------------------
Given transaction  181169 Class : 0
 #Transaction id: 181169 #Class: 0 #Similarity: 0.00000
 #Transaction id: 188029 #Class: 0 #Similarity: 0.00000
 #Transaction id: 182601 #Class: 0 #Similarity: 0.00000
 #Transaction id: 227634 #Class: 0 #Similarity: 0.00001
 #Transaction id: 244572 #Class: 0 #Similarity: 0.00001
 #Transaction id: 175621 #Class: 0 #Similarity: 0.00001
 #Transaction id: 194900 #Class: 0 #Similarity: 0.00001
 #Transaction id: 234799 #Class: 0 #Similarity: 0.00001
 #Transaction id: 200229 #Class: 0 #Similarity: 0.00001
 #Transaction id: 229233 #Class: 0 #Similarity: 0.00001
------------------------------------------------------------------------
```

```
Given transaction  34117 Class : 0
 #Transaction id: 34117 #Class: 0 #Similarity: 0.00000
 #Transaction id: 63446 #Class: 0 #Similarity: 0.00010
 #Transaction id: 108273 #Class: 0 #Similarity: 0.00011
 #Transaction id: 164230 #Class: 0 #Similarity: 0.00011
 #Transaction id: 30362 #Class: 0 #Similarity: 0.00011
 #Transaction id: 52558 #Class: 0 #Similarity: 0.00011
 #Transaction id: 27781 #Class: 0 #Similarity: 0.00011
 #Transaction id: 69750 #Class: 0 #Similarity: 0.00011
 #Transaction id: 67376 #Class: 0 #Similarity: 0.00012
 #Transaction id: 33321 #Class: 0 #Similarity: 0.00012
------------------------------------------------------------------------------
Given transaction  77270 Class : 0
 #Transaction id: 77270 #Class: 0 #Similarity: 0.00000
 #Transaction id: 142725 #Class: 0 #Similarity: 0.00005
 #Transaction id: 54418 #Class: 0 #Similarity: 0.00005
 #Transaction id: 41310 #Class: 0 #Similarity: 0.00005
 #Transaction id: 203267 #Class: 0 #Similarity: 0.00005
 #Transaction id: 55275 #Class: 0 #Similarity: 0.00006
 #Transaction id: 184972 #Class: 0 #Similarity: 0.00006
 #Transaction id: 191215 #Class: 0 #Similarity: 0.00006
 #Transaction id: 51973 #Class: 0 #Similarity: 0.00006
 #Transaction id: 161899 #Class: 0 #Similarity: 0.00006
------------------------------------------------------------------------------
Given transaction  284643 Class : 0
 #Transaction id: 284643 #Class: 0 #Similarity: 0.00000
 #Transaction id: 284612 #Class: 0 #Similarity: 0.00001
 #Transaction id: 250907 #Class: 0 #Similarity: 0.00001
 #Transaction id: 222332 #Class: 0 #Similarity: 0.00001
 #Transaction id: 222566 #Class: 0 #Similarity: 0.00001
 #Transaction id: 166935 #Class: 0 #Similarity: 0.00001
 #Transaction id: 265770 #Class: 0 #Similarity: 0.00001
 #Transaction id: 253381 #Class: 0 #Similarity: 0.00001
 #Transaction id: 250870 #Class: 0 #Similarity: 0.00002
 #Transaction id: 220456 #Class: 0 #Similarity: 0.00002
------------------------------------------------------------------------------
Given transaction  202492 Class : 0
 #Transaction id: 202492 #Class: 0 #Similarity: 0.00000
 #Transaction id: 254774 #Class: 0 #Similarity: 0.00000
 #Transaction id: 230871 #Class: 0 #Similarity: 0.00000
 #Transaction id: 236809 #Class: 0 #Similarity: 0.00000
 #Transaction id: 233834 #Class: 0 #Similarity: 0.00000
 #Transaction id: 233466 #Class: 0 #Similarity: 0.00000
 #Transaction id: 234180 #Class: 0 #Similarity: 0.00000
 #Transaction id: 188694 #Class: 0 #Similarity: 0.00000
 #Transaction id: 238041 #Class: 0 #Similarity: 0.00000
 #Transaction id: 260982 #Class: 0 #Similarity: 0.00000
------------------------------------------------------------------------------
```

```
Given transaction  26349 Class : 0
 #Transaction id: 26349 #Class: 0 #Similarity: 0.00000
 #Transaction id: 23874 #Class: 0 #Similarity: 0.00009
 #Transaction id: 81057 #Class: 0 #Similarity: 0.00009
 #Transaction id: 29400 #Class: 0 #Similarity: 0.00010
 #Transaction id: 35638 #Class: 0 #Similarity: 0.00010
 #Transaction id: 45084 #Class: 0 #Similarity: 0.00010
 #Transaction id: 90001 #Class: 0 #Similarity: 0.00011
 #Transaction id: 16965 #Class: 0 #Similarity: 0.00011
 #Transaction id: 94172 #Class: 0 #Similarity: 0.00011
 #Transaction id: 66698 #Class: 0 #Similarity: 0.00011
----------------------------------------------------------------------------
Given transaction  263937 Class : 0
 #Transaction id: 263937 #Class: 0 #Similarity: 0.00000
 #Transaction id: 192626 #Class: 0 #Similarity: 0.00001
 #Transaction id: 278059 #Class: 0 #Similarity: 0.00001
 #Transaction id: 251535 #Class: 0 #Similarity: 0.00002
 #Transaction id: 228861 #Class: 0 #Similarity: 0.00002
 #Transaction id: 264051 #Class: 0 #Similarity: 0.00002
 #Transaction id: 250580 #Class: 0 #Similarity: 0.00002
 #Transaction id: 284438 #Class: 0 #Similarity: 0.00002
 #Transaction id: 184519 #Class: 0 #Similarity: 0.00002
 #Transaction id: 262943 #Class: 0 #Similarity: 0.00002
----------------------------------------------------------------------------
Given transaction  274439 Class : 0
 #Transaction id: 274439 #Class: 0 #Similarity: 0.00000
 #Transaction id: 270913 #Class: 0 #Similarity: 0.00001
 #Transaction id: 243856 #Class: 0 #Similarity: 0.00001
 #Transaction id: 279236 #Class: 0 #Similarity: 0.00001
 #Transaction id: 268535 #Class: 0 #Similarity: 0.00001
 #Transaction id: 232033 #Class: 0 #Similarity: 0.00001
 #Transaction id: 256288 #Class: 0 #Similarity: 0.00001
 #Transaction id: 267393 #Class: 0 #Similarity: 0.00001
 #Transaction id: 266730 #Class: 0 #Similarity: 0.00001
 #Transaction id: 283267 #Class: 0 #Similarity: 0.00001
----------------------------------------------------------------------------
Given transaction  64231 Class : 0
 #Transaction id: 64231 #Class: 0 #Similarity: 0.00000
 #Transaction id: 89498 #Class: 0 #Similarity: 0.00004
 #Transaction id: 35971 #Class: 0 #Similarity: 0.00004
 #Transaction id: 115564 #Class: 0 #Similarity: 0.00005
 #Transaction id: 66988 #Class: 0 #Similarity: 0.00005
 #Transaction id: 96521 #Class: 0 #Similarity: 0.00005
 #Transaction id: 83985 #Class: 0 #Similarity: 0.00005
 #Transaction id: 38458 #Class: 0 #Similarity: 0.00005
 #Transaction id: 123555 #Class: 0 #Similarity: 0.00006
 #Transaction id: 172784 #Class: 0 #Similarity: 0.00006
----------------------------------------------------------------------------
```

```
Given transaction  153100 Class : 0
 #Transaction id: 153100 #Class: 0 #Similarity: 0.00000
 #Transaction id: 148709 #Class: 0 #Similarity: 0.00001
 #Transaction id: 148672 #Class: 0 #Similarity: 0.00001
 #Transaction id: 148802 #Class: 0 #Similarity: 0.00001
 #Transaction id: 148749 #Class: 0 #Similarity: 0.00001
 #Transaction id: 148921 #Class: 0 #Similarity: 0.00001
 #Transaction id: 148794 #Class: 0 #Similarity: 0.00001
 #Transaction id: 148593 #Class: 0 #Similarity: 0.00001
 #Transaction id: 148952 #Class: 0 #Similarity: 0.00001
 #Transaction id: 148797 #Class: 0 #Similarity: 0.00001
--------------------------------------------------------------------------------
Given transaction  103460 Class : 0
 #Transaction id: 103460 #Class: 0 #Similarity: 0.00000
 #Transaction id: 122124 #Class: 0 #Similarity: 0.00002
 #Transaction id: 111402 #Class: 0 #Similarity: 0.00003
 #Transaction id: 113050 #Class: 0 #Similarity: 0.00003
 #Transaction id: 88878 #Class: 0 #Similarity: 0.00003
 #Transaction id: 116096 #Class: 0 #Similarity: 0.00003
 #Transaction id: 114980 #Class: 0 #Similarity: 0.00003
 #Transaction id: 143372 #Class: 0 #Similarity: 0.00003
 #Transaction id: 118395 #Class: 0 #Similarity: 0.00003
 #Transaction id: 93436 #Class: 0 #Similarity: 0.00003
```