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Practical 9

20BCE057

Date: 17/04/2023

Aim: Implement a Traditional Recommender System using the Collaborative Filtering technique. Evaluation of Recommender system using RMSE(Root mean square error).

```
import pandas as pd
import numpy
import warnings
from nltk.tokenize import word_tokenize
from nltk.corpus import stopwords
from nltk.stem import PorterStemmer
import nltk
import os
import math
import numpy as np
from numpy.linalg import norm
from sklearn.metrics.pairwise import cosine_similarity
import random as rd
from sklearn.metrics import mean_squared_error,mean_absolute_error
```

User-User Collabrative Filtering (Numerical) - Accuracy

```
In [ ]: data = pd.read_csv("temp1.csv",header=None)
        users = ["U"+str(i) for i in range(1,len(data)+1)]
        items = ["P"+str(i) for i in range(1,len(data.columns)+1)]
        print(data)
          0 1 2 3 4
       0 0 3 0 3 4
       1 4 0 0 2 0
       2 0 0 3 0 0
       3 3 0 4 0 3
       4 4 3 0 4 4
In [ ]: with warnings.catch_warnings():
           warnings.filterwarnings("ignore")
           for user in data.index:
               ind = data.loc[user,:]!=0
               data.loc[user,ind] -= data.loc[user,ind].mean()
           print(data)
```

```
0
                                     2
                                              3
                                                        4
                           1
        0 0.000000 -0.333333 0.000000 -0.333333 0.666667
        1 1.000000 0.000000 0.000000 -1.000000 0.000000
        3 -0.333333  0.000000  0.666667  0.000000 -0.333333
        4 0.250000 -0.750000 0.000000 0.250000 0.250000
In [ ]: cos_sim = pd.DataFrame(cosine_similarity(data,data))
        cos_sim = cos_sim.applymap(lambda x: round(x,3))
        print(cos_sim)
               0
                     1
                        2
                                 3
        0 1.000 0.289 0.0 -0.333 0.471
        1 0.289 1.000 0.0 -0.289 -0.000
        2 0.000 0.000 0.0 0.000 0.000
        3 -0.333 -0.289 0.0 1.000 -0.236
        4 0.471 -0.000 0.0 -0.236 1.000
In [ ]: def predict(user,product,data,N):
            sim_list = cos_sim[user]
            ind_list = sorted(range(len(sim_list)), key=lambda x: sim_list[x])[-(N+1):-1]
            A=0
            B=0
            for i in ind_list:
                A += sim_list[i] * data.loc[i,product]
                B += sim_list[i]
            if(B==0):
                return 0
            else:
                return A/B
        N = 3
        users = data.index
        no_user = len(users)
        products = data.columns
        no_products = len(products)
        rmse_val = []
        mae_val = []
        no ite = 10;
        for x in range(no_ite):
            users_range = sorted(rd.sample(range(0,no_user),2))
            products_range = sorted(rd.sample(range(0,no_products),2))
            print("\nUser Sample range : ",users_range)
            print("Products Sample range : ",products_range)
            print("Sample : ")
            print(data.iloc[range(users_range[0],users_range[1]+1),range(products_range[0]
            y pred = []
            y_{true} = []
            for user in range(users_range[0],users_range[1]+1):
                rated_products = data.iloc[user,:].index[data.iloc[user,:]!=0]
                for i in range(products_range[0],products_range[1]+1):
                    if(i in rated_products):
                       y_pred.append(predict(user,i,data,N))
                       y_true.append(data.iloc[user,i])
            rmse = math.sqrt(mean_squared_error(y_true, y_pred))
            print("RMSE : "+str(rmse))
            mae = mean absolute error(y true,y pred)
```

```
print("MAE : "+str(mae))
    rmse_val.append(rmse)
    mae_val.append(mae)
print("\n\n")
print("-"*50)
print("\nAverage RMSE : "+str(sum(rmse_val)/no_ite))
print("\nAverage MAE : "+str(sum(mae_val)/no_ite))
```

```
User Sample range : [3, 4]
Products Sample range : [0, 2]
Sample:
               1
3 -0.333333 0.00 0.666667
4 0.250000 -0.75 0.000000
RMSE: 0.6467130392237664
MAE: 0.5823809523809523
User Sample range : [1, 2]
Products Sample range : [1, 4]
Sample :
              3
         2
    1
                   4
1 0.0 0.0 -1.0 0.0
2 0.0 0.0 0.0 0.0
RMSE: 0.6666666666665
MAE: 0.6666666666665
User Sample range : [2, 4]
Products Sample range : [1, 2]
Sample :
     1
2
  0.00 0.000000
3 0.00 0.666667
4 -0.75 0.000000
RMSE: 0.5559026693385971
MAE: 0.54166666666665
User Sample range : [0, 4]
Products Sample range : [2, 4]
Sample :
         2
                   3
0 0.000000 -0.333333 0.666667
1 0.000000 -1.000000 0.000000
2 0.000000 0.000000 0.000000
3 0.666667 0.000000 -0.333333
4 0.000000 0.250000 0.250000
RMSE: 0.5175455889267379
MAE: 0.4855406373075546
User Sample range : [0, 4]
Products Sample range : [2, 3]
Sample:
         2
 0.000000 -0.333333
  0.000000 -1.000000
2 0.000000 0.000000
3 0.666667 0.000000
4 0.000000 0.250000
RMSE: 0.5569631078568679
MAE: 0.5061677631578947
User Sample range : [2, 4]
Products Sample range : [1, 3]
Sample:
                     3
               2
     1
2 0.00
       0.000000
                  0.00
  0.00 0.666667
                 0.00
4 -0.75 0.000000 0.25
RMSE: 0.565194165260439
MAE: 0.55555555555555
User Sample range : [1, 2]
Products Sample range : [1, 3]
```

```
Sample :
    1 2 3
1 0.0 0.0 -1.0
2 0.0 0.0 0.0
RMSE: 0.6666666666665
MAE: 0.66666666666665
User Sample range : [1, 2]
Products Sample range : [2, 4]
Sample :
    2
        3
1 0.0 -1.0 0.0
2 0.0 0.0 0.0
RMSE: 0.6666666666665
MAE: 0.66666666666655
User Sample range : [2, 3]
Products Sample range : [1, 4]
Sample :
             2 3
2 0.0 0.000000 0.0 0.000000
3 0.0 0.666667 0.0 -0.333333
RMSE: 0.567056288623202
MAE: 0.5561904761904762
User Sample range : [0, 3]
Products Sample range : [1, 3]
Sample :
                  2
0 -0.333333  0.000000 -0.333333
1 0.000000 0.000000 -1.000000
2 0.000000 0.000000 0.000000
3 0.000000 0.666667 0.000000
RMSE: 0.47901931397850245
MAE: 0.39320175438596483
```

Average RMSE: 0.5888394173208111

Average MAE: 0.5620703805645064

Item - Item Collabrative Filtering (Numerical) - Accuracy

```
In [ ]: data = pd.read_csv("temp1.csv",header=None)
       users = ["U"+str(i) for i in range(1,len(data)+1)]
       items = ["P"+str(i) for i in range(1,len(data.columns)+1)]
       print(data)
          0 1 2 3 4
       0 0 3 0 3 4
       1 4 0 0 2 0
       2 0 0 3 0 0
       3 3 0 4 0 3
       4 4 3 0 4 4
```

```
In [ ]: with warnings.catch_warnings():
            warnings.filterwarnings("ignore")
            for product in data.columns:
                ind = data[product]!=0
                data[product][ind] -= data[product][ind].mean()
            print(data)
                  0 1
                         2 3
        0 0.000000 0 0.0 0 0.333333
        1 0.333333 0 0.0 -1 0.000000
        2 0.000000 0 -0.5 0 0.000000
        3 -0.666667 0 0.5 0 -0.666667
        4 0.333333 0 0.0 1 0.333333
In [ ]: cos_sim = pd.DataFrame(cosine_similarity(data.T,data.T))
        cos_sim = cos_sim.applymap(lambda x: round(x,3))
        print(cos_sim)
                  1
                          2
                                 3
        0 1.000 0.0 -0.577 -0.000 0.833
        1 0.000 0.0 0.000 0.000 0.000
        2 -0.577 0.0 1.000 0.000 -0.577
        3 -0.000 0.0 0.000 1.000 0.289
        4 0.833 0.0 -0.577 0.289 1.000
In [ ]: def predict(user,product,data,N):
            sim_list = cos_sim[product]
            ind_list = sorted(range(len(sim_list)), key=lambda x: sim_list[x])[-(N+1):-1]
            A=0
            B=0
            for i in ind list:
                A += sim_list[i] * data[user][i]
                B += sim_list[i]
            if(B==0):
                return 0
            else:
                return A/B
        # N = int(input("Value of N : "))
        # user = data.index.get_loc((input("Enter User Name : ")))
        users = data.index
        no_user = len(users)
        products = data.columns
        no_products = len(products)
        rmse_val = []
        mae val = []
        no_ite = 10;
        for x in range(no_ite):
            users_range = sorted(rd.sample(range(0,no_user),2))
            products_range = sorted(rd.sample(range(0,no_products),2))
            print("\nUser Sample range : ",users_range)
            print("Products Sample range : ",products_range)
            print("Sample : ")
            print(data.iloc[range(users_range[0],users_range[1]+1),range(products_range[0]
            y pred = []
            y_{true} = []
            for user in range(users_range[0],users_range[1]+1):
                rated_products = data.iloc[user,:].index[data.iloc[user,:]!=0]
```

```
for i in range(products_range[0],products_range[1]+1):
        if(i in rated_products):
            y_pred.append(predict(user,i,data,N))
            y_true.append(data.iloc[user,i])

rmse = math.sqrt(mean_squared_error(y_true, y_pred))
print("RMSE : "+str(rmse))
mae = mean_absolute_error(y_true,y_pred)
print("MAE : "+str(mae))
rmse_val.append(rmse)
mae_val.append(mse)
print("\n\n")
print("-"*50)
print("\nAverage RMSE : "+str(sum(rmse_val)/no_ite))
print("\nAverage MAE : "+str(sum(mae_val)/no_ite))
```

```
User Sample range : [2, 3]
Products Sample range : [0, 2]
Sample:
         0 1
                 2
2 0.000000 0 -0.5
3 -0.666667 0 0.5
RMSE: 1.0452715401237098
MAE: 0.88888888888888
User Sample range : [0, 2]
Products Sample range : [3, 4]
Sample:
            4
  3
0 0 0.333333
1 -1 0.000000
  0 0.000000
RMSE: 0.7921729649046887
MAE: 0.75252525252526
User Sample range : [1, 3]
Products Sample range : [2, 4]
Sample :
    2 3
1 0.0 -1 0.000000
2 -0.5 0 0.000000
3 0.5 0 -0.666667
RMSE: 0.6972166887783963
MAE : 0.66666666666666
User Sample range : [2, 3]
Products Sample range : [1, 3]
Sample :
  1
       2 3
2 0 -0.5 0
3 0 0.5
RMSE: 0.5
MAE : 0.5
User Sample range : [2, 3]
Products Sample range : [1, 2]
Sample :
       2
  1
2 0 -0.5
3 0 0.5
RMSE: 0.5
MAE : 0.5
User Sample range : [0, 3]
Products Sample range : [0, 3]
Sample:
           1
                 2 3
0 0.000000 0 0.0 0
1 0.333333 0 0.0 -1
2 0.000000 0 -0.5 0
3 -0.666667 0 0.5
RMSE: 0.936897954837013
MAE: 0.8
User Sample range : [0, 3]
Products Sample range : [3, 4]
Sample:
  3
0 0 0.333333
1 -1 0.000000
```

```
2 0 0.000000
3 0 -0.666667
RMSE: 0.7526664726371646
MAE: 0.7239057239057239
User Sample range : [1, 3]
Products Sample range : [0, 2]
Sample:
         0 1
1 0.333333 0 0.0
2 0.000000 0 -0.5
3 -0.666667 0 0.5
RMSE: 0.9204467514322716
MAE : 0.75
User Sample range : [3, 4]
Products Sample range : [3, 4]
Sample :
  3
3 0 -0.666667
4 1 0.333333
RMSE: 0.5642795287738203
MAE: 0.5303030303030302
User Sample range : [0, 2]
Products Sample range : [2, 4]
Sample :
    2 3
0 0.0 0 0.333333
1 0.0 -1 0.000000
2 -0.5 0 0.000000
RMSE: 0.7083021983710461
MAE: 0.6683501683501684
Average RMSE: 0.741725409985811
```

Average MAE: 0.678063973063973

User-User Collabrative Filtering (Dataset) - Accuracy

```
In []: data = pd.read_csv("rating.csv",names=["user","product","rating","time"])
   data = data.pivot_table(columns="product",index="user",values="rating")
   data = data.iloc[:5000,:1500]
   print(data)
```

product	059400232X	089933623X	094339676X	1034385789	\
user					
A001944026UMZ8T3K5QH1	NaN	NaN	NaN	NaN	
A00766851QZZUBOVF4JFT	NaN	NaN	NaN	NaN	
A01255851Z01U93P8RKGE	NaN	NaN	NaN	NaN	
A014623426J5CM7M12MBW	NaN	NaN	NaN	NaN	
A01580702BRW77PSJ9X34	NaN	NaN	NaN	NaN	
 A1F81EE548E0A5	 NaN	··· NaN	 NaN	 NaN	
A1F81U0EZWZ01A	NaN	NaN	NaN	NaN	
A1F83CPW24HZKP	NaN	NaN	NaN	NaN	
A1F898XZRR8C28	NaN	NaN	NaN	NaN	
A1F89D3TC070GE	NaN	NaN	NaN	NaN	
product	1039869017	1085901386	1094441252	1182702627	\
user					`
A001944026UMZ8T3K5QH1	NaN	NaN	NaN	NaN	
A00766851QZZUBOVF4JFT	NaN	NaN	NaN	NaN	
A01255851Z01U93P8RKGE	NaN	NaN	NaN	NaN	
A014623426J5CM7M12MBW	NaN	NaN	NaN	NaN	
A01580702BRW77PSJ9X34	NaN	NaN	NaN	NaN	
• • •	• • •	• • •	• • •	• • •	
A1F81EE548E0A5	NaN	NaN	NaN	NaN	
A1F81U0EZWZ01A	NaN	NaN	NaN	NaN	
A1F83CPW24HZKP	NaN	NaN	NaN	NaN	
A1F898XZRR8C28	NaN	NaN	NaN	NaN	
A1F89D3TC070GE	NaN	NaN	NaN	NaN	
product	1254875778	132793040	вооооој	4CX B00000	J4CY \
user			• • •		
A001944026UMZ8T3K5QH1	NaN	NaN		NaN	NaN
A00766851QZZUBOVF4JFT	NaN	NaN		NaN	NaN
A01255851Z01U93P8RKGE	NaN	NaN		NaN	NaN
A014623426J5CM7M12MBW	NaN	NaN		NaN	NaN
A01580702BRW77PSJ9X34	NaN	NaN	• • •	NaN	NaN
***			• • •		
A1F81EE548E0A5	NaN	NaN		NaN	NaN
A1F81U0EZWZ01A	NaN	NaN		NaN	NaN
A1F83CPW24HZKP	NaN	NaN		NaN	NaN
A1F898XZRR8C28	NaN	NaN		NaN	NaN
A1F89D3TC070GE	NaN	NaN	• • •	NaN	NaN
product	B00000J4D6	B00000J4D7	B00000J4DA	B00000J4DB	\
user	A		A		
A001944026UMZ8T3K5QH1	NaN	NaN	NaN	NaN	
A00766851QZZUB0VF4JFT	NaN	NaN	NaN	NaN	
A01255851Z01U93P8RKGE	NaN	NaN	NaN	NaN	
A014623426J5CM7M12MBW	NaN	NaN	NaN	NaN	
A01580702BRW77PSJ9X34	NaN	NaN	NaN	NaN	
A1F81EE548E0A5	NaN	NaN	NaN	NaN	
A1F81U0EZWZ01A	NaN	NaN	NaN	NaN	
A1F83CPW24HZKP	NaN	NaN	NaN	NaN	
A1F898XZRR8C28	NaN	NaN	NaN	NaN	
A1F89D3TC070GE	NaN	NaN	NaN	NaN	
product	B00000J4DG	B00000J4DI	B00000J4DQ	B00000J4DR	
user					
A001944026UMZ8T3K5QH1	NaN	NaN	NaN	NaN	
A00766851QZZUBOVF4JFT	NaN	NaN	NaN	NaN	
A01255851Z01U93P8RKGE	NaN	NaN	NaN	NaN	
A014623426J5CM7M12MBW	NaN	NaN	NaN	NaN	
A01580702BRW77PSJ9X34	NaN	NaN	NaN	NaN	
•••	•••	•••	•••	•••	

```
A1F81EE548E0A5
                               NaN
                                            NaN
                                                        NaN
                                                                     NaN
                                                                     NaN
A1F81U0EZWZ01A
                               NaN
                                            NaN
                                                        NaN
A1F83CPW24HZKP
                               NaN
                                            NaN
                                                        NaN
                                                                     NaN
A1F898XZRR8C28
                               NaN
                                            NaN
                                                        NaN
                                                                     NaN
A1F89D3TC070GE
                               NaN
                                            NaN
                                                        NaN
                                                                     NaN
```

[5000 rows x 1500 columns]

```
in []: with warnings.catch_warnings():
    warnings.filterwarnings("ignore")
    for user in data.index:
        ind = data.loc[user,:]!=np.nan
        data.loc[user,ind] -= data.loc[user,ind].mean()
    data = data.fillna(0)
    print(data)
```

product	059400232X	089933623X	094339676X	1034385789	\
user					
A001944026UMZ8T3K5QH1	0.0	0.0	0.0	0.0	
A00766851QZZUBOVF4JFT		0.0	0.0	0.0	
A01255851Z01U93P8RKGE		0.0	0.0	0.0	
A014623426J5CM7M12MBW		0.0	0.0	0.0	
A01580702BRW77PSJ9X34	0.0	0.0	0.0	0.0	
• • •					
A1F81EE548E0A5	0.0	0.0	0.0	0.0	
A1F81U0EZWZ01A	0.0	0.0	0.0	0.0	
A1F83CPW24HZKP	0.0	0.0	0.0		
A1F898XZRR8C28	0.0	0.0	0.0		
A1F89D3TC070GE	0.0	0.0	0.0	0.0	
product	1039869017	1085901386	1094441252	1182702627	\
user					
A001944026UMZ8T3K5QH1	0.0	0.0	0.0	0.0	
A00766851QZZUBOVF4JFT	0.0	0.0	0.0	0.0	
A01255851Z01U93P8RKGE		0.0	0.0	0.0	
A014623426J5CM7M12MBW		0.0	0.0	0.0	
A01580702BRW77PSJ9X34		0.0	0.0	0.0	
	• • •	• • •	• • •	• • •	
A1F81EE548E0A5	0.0	0.0	0.0	0.0	
A1F81UOEZWZ01A	0.0	0.0	0.0	0.0	
A1F83CPW24HZKP	0.0	0.0	0.0	0.0	
A1F898XZRR8C28	0.0	0.0	0.0	0.0	
A1F89D3TC070GE	0.0	0.0	0.0	0.0	
7.2. 0303.007002	0.0	0.0	0.0	0.0	
product	1254875778	132793040	вооооој	4CX B00000J	1CV \
·	1254675776	132793040		4CX D000003	+С1 (
user			• • •		
A001944026UMZ8T3K5QH1		0.0			0.0
A00766851QZZUB0VF4JFT	0.0	0.0	• • •	0.0	0.0
A01255851Z01U93P8RKGE	0.0	0.0	• • •	0.0	0.0
A014623426J5CM7M12MBW	0.0	0.0	• • •	0.0	0.0
A01580702BRW77PSJ9X34	0.0	0.0	• • •	0.0	0.0
	•••	•••	•••		•••
 A1F81EE548E0A5	0.0	0.0			0.0
A1F81U0EZWZ01A					
	0.0	0.0			0.0
A1F83CPW24HZKP	0.0	0.0			0.0
A1F898XZRR8C28	0.0	0.0	• • •		0.0
A1F89D3TC070GE	0.0	0.0	• • •	0.0	0.0
product	B00000J4D6	B00000J4D7	B00000J4DA	B00000J4DB	\
user					
A001944026UMZ8T3K5QH1	0.0	0.0	0.0	0.0	
A00766851QZZUB0VF4JFT		0.0	0.0	0.0	
A01255851Z01U93P8RKGE		0.0	0.0	0.0	
A014623426J5CM7M12MBW		0.0	0.0	0.0	
A01580702BRW77PSJ9X34	0.0	0.0	0.0	0.0	
• • •	• • •	• • •		• • •	
A1F81EE548E0A5	0.0	0.0	0.0	0.0	
A1F81UOEZWZ01A	0.0	0.0	0.0	0.0	
A1F83CPW24HZKP	0.0	0.0	0.0	0.0	
A1F898XZRR8C28	0.0	0.0	0.0	0.0	
A1F89D3TC070GE	0.0	0.0	0.0	0.0	
ATLOSDS I COLOGE	0.0	0.0	0.0	٥.٥	
	B0000074B0	D0000074D7		D0000074DD	
product	B00000J4DG	B00000J4DI	B00000J4DQ	B00000J4DR	
user					
A001944026UMZ8T3K5QH1	0.0	0.0	0.0	0.0	
A00766851QZZUBOVF4JFT	0.0	0.0	0.0	0.0	
A01255851Z01U93P8RKGE	0.0	0.0	0.0	0.0	
A014623426J5CM7M12MBW	0.0	0.0	0.0	0.0	
A01580702BRW77PSJ9X34	0.0	0.0	0.0	0.0	
• • •	• • •	• • •	• • •	• • •	

```
A1F81U0EZWZ01A
                                       0.0
                                                   0.0
                                                                0.0
                                                                            0.0
        A1F83CPW24HZKP
                                       0.0
                                                   0.0
                                                                0.0
                                                                            0.0
                                       0.0
                                                   0.0
        A1F898XZRR8C28
                                                                0.0
                                                                            0.0
        A1F89D3TC070GE
                                       0.0
                                                   0.0
                                                                0.0
                                                                            0.0
        [5000 rows x 1500 columns]
        cos_sim = pd.DataFrame(cosine_similarity(data,data))
In [ ]: |
        cos_sim = cos_sim.applymap(lambda x: round(x,3))
        print(cos_sim)
                    1
                           2
                                 3
                                       4
                                             5
                                                         7
                                                                8
                                                                      9
                                                                                 4990
                                                   6
        0
               0.0
                     0.0
                           0.0
                                  0.0
                                        0.0
                                              0.0
                                                    0.0
                                                          0.0
                                                                 0.0
                                                                       0.0
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        [5000 rows x 5000 columns]
In [ ]: def predict(user,product,data,N):
            sim list = cos sim[user]
            ind_list = sorted(range(len(sim_list)), key=lambda x: sim_list[x])[-(N+1):-1]
            A=0
            B=0
            for i in ind list:
                A += sim_list[i] * data.iloc[i,product]
                B += sim_list[i]
            if(B==0):
                return 0
            else:
                return A/B
        # N = int(input("Value of N : "))
        N = 20
        users = data.index
        no_user = len(users)
        products = data.columns
        no products = len(products)
        users_range = sorted(rd.sample(range(0,no_user),2))
        products range = sorted(rd.sample(range(0,no products),2))
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```
rmse_val = []
mae_val = []
no ite = 10
for x in range(no_ite):
    print("\n\nUser Sample range : ",users_range)
    print("Products Sample range : ",products_range)
    print("Sample : ")
    print(data.iloc[range(users_range[0],users_range[1]+1),range(products_range[0]
   y_pred = []
   y_{true} = []
    for user in range(users_range[0],users_range[1]+1):
        rated_products = data.iloc[user,:].index[data.iloc[user,:]!=0]
        for i in range(products_range[0],products_range[1]+1):
            if(i in rated_products):
                y_pred.append(predict(user,i,data,N))
                y_true.append(data.iloc[user,i])
        if(len(y_pred)>0 and len(y_pred)==len(y_true)):
            rmse = math.sqrt(mean_squared_error(y_true, y_pred))
            print("RMSE : "+str(rmse))
            mae = mean_absolute_error(y_true,y_pred)
            print("MAE : "+str(mae))
            rmse_val.append(rmse)
            mae_val.append(mae)
print("\n\n")
print("-"*50)
print("\nAverage RMSE : "+str(sum(rmse_val)/no_ite))
print("\nAverage MAE : "+str(sum(mae_val)/no_ite))
```

User Sample range : [3049, 4466] Products Sample range : [700, 1172]

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Sample :		,				
product	9983814129	998383054X	9983830884	9983833085	9983853027	\
user	JJ0J01412J	JJ0J0J0J4X	JJ0J0J0004	JJ0J0JJ00J	JJ0J0JJJ027	\
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •						
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK		0.0				
-	0.0		0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
			0000001010			,
product	9983853035	9983877880	9983884313	9983886030	9983890372	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
		•••	•••	•••	• • • •	
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
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A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	999095	0369 999095	061X 999095	0636 999095	0830 \	
product user	999095	0369 999095	061X 999095	0636 999095	0830 \	
user	• • •					
user A1981BJUPA3R8C		0.0	0.0	0.0	0.0	
user A1981BJUPA3R8C A1989944VHPI2I		0.0 0.0	0.0 0.0	0.0 0.0	0.0	
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN		0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T		0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN		0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2		0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL		0.0 0.0 0.0 0.0 0.0 	0.0 0.0 0.0 0.0 0.0 	0.0 0.0 0.0 0.0 0.0 	0.0 0.0 0.0 0.0 0.0	
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2		0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL		0.0 0.0 0.0 0.0 0.0 	0.0 0.0 0.0 0.0 0.0 	0.0 0.0 0.0 0.0 0.0 	0.0 0.0 0.0 0.0 0.0	
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user A1981BJUPA3R8C A1989944VHPI2I A1989WEØZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WEØZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST	9990974845 999097480 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 9991535896 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 9991546634 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 9991549358 0.0 0.0 0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLGENEM4ANWH	9990974845 9990974845 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLGENEM4ANWH A1DLSQMEALZSIK	9990974845 999097480 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLGENEM4ANWH	9990974845 9990974845 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLGENEM4ANWH A1DLSQMEALZSIK	9990974845 999097480 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	\

product B0000001Y user A1981BJUPA3R8C 0.0 A1989944VHPI2I 0.0

A1989WE0ZSBKNN	0.0
A198A15LMKHG8T	0.0
A198CPQ6A1VYD2	0.0
• • •	
A1DLFC5GG1RQFL	0.0
A1DLMTOTHQ4AST	0.0
A1DLQENEM4ANWH	0.0
A1DLSQMEALZSIK	0.0
A1DLUOL9P1VF4A	0.0

[1418 rows x 473 columns]

User Sample range : [3049, 4466] Products Sample range : [700, 1172]

A198A15LMKHG8T

0.0

0.0

0.0

0.0

Sample :	0 .	, ,				
product	9983814129	998383054X	9983830884	9983833085	9983853027	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •				• • •	• • •	
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	9983853035	9983877880	9983884313	9983886030	9983890372	١
user	3363633333	3303077000	3303004313	3363660636	9903090372	\
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
	• • • •	•••	•••	•••	•••	
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	999095	0369 999095	061X 999095	0636 999095	0830 \	
user	• • •					
A1981BJUPA3R8C	• • •	0.0	0.0	0.0	0.0	
A1989944VHPI2I	• • •	0.0	0.0	0.0	0.0	
A1989WEØZSBKNN	• • •	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	• • •	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	• • •	0.0	0.0	0.0	0.0	
	• • •	• • •	• • •		• • •	
A1DLFC5GG1RQFL	• • •	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	• • •	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	• • •	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	• • •	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	• • •	0.0	0.0	0.0	0.0	
product	9990974845	9991330038	9991535896	9991546634	9991549358	\
user						-
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A100A1FLMKUCOT	0.0	0.0	0.0	0.0	0.0	

A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0
• • •					• • •
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0
AIDEOULSI IVI TA	0.0	0.0	0.0	0.0	0.0
product	B00000001Y				
user					
A1981BJUPA3R8C	0.0				
A1989944VHPI2I	0.0				
A1989WE0ZSBKNN	0.0				
A198A15LMKHG8T	0.0				
A198CPQ6A1VYD2	0.0				
-					
 A1DLFC5GG1RQFL	0.0				
A1DLMTOTHQ4AST					
-	0.0				
A1DLQENEM4ANWH	0.0				
A1DLSQMEALZSIK	0.0				
A1DLUOL9P1VF4A	0.0				
_					
[1418 rows x 47	'3 columns]				
User Sample ran		-			
Products Sample	range: [7	00, 1172]			
Sample :					
product	9983814129	998383054X	9983830884	9983833085	9983853027 \
user					
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0
• • •				• • •	• • •
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0
product	9983853035	9983877880	9983884313	9983886030	9983890372 \
user					(
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0
-					
 A1DL FCFCC1B0FL					
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0
1 .	00000	0360 05555	0647 06555	0626 0622	
product	999095	0369 999095	061X 999095	0636 999095	0830 \
user	• • •				
A1981BJUPA3R8C	• • •	0.0	0.0	0.0	0.0
A1989944VHPI2I	• • •	0.0	0.0	0.0	0.0
A1989WE0ZSBKNN	• • •	0.0	0.0	0.0	0.0
A198A15LMKHG8T	• • •	0.0	0.0	0.0	0.0
1100CD0C111N/D2		0 0	0 0	0 0	0 0

0.0

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A198CPQ6A1VYD2 ... 0.0

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. . .

A1DLFC5GG1RQFL		0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	• • •	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH		0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK		0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	• • •	0.0	0.0	0.0	0.0	
product	9990974845	9991330038	9991535896	9991546634	9991549358	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •						
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	B00000001Y					
user						
A1981BJUPA3R8C	0.0					
A1989944VHPI2I	0.0					
A1989WE0ZSBKNN	0.0					
A198A15LMKHG8T	0.0					
A198CPQ6A1VYD2	0.0					
• • •						
A1DLFC5GG1RQFL	0.0					
A1DLMTOTHQ4AST	0.0					
A1DLQENEM4ANWH	0.0					
A1DLSQMEALZSIK	0.0					
A1DLUOL9P1VF4A	0.0					
[1418 rows x 473	3 columns]					
_		_				
User Sample rang		_				
Products Sample	range : [7	00, 1172]				
Sample .						

Sample :

Sample :						
product	9983814129	998383054X	9983830884	9983833085	9983853027	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •			• • •	• • •	• • •	
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	9983853035	9983877880	9983884313	9983886030	9983890372	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •	• • •		• • •		• • •	
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	

A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	999095	0369 999095	5061X 999095	50636 999095	0830 \	
user	• • •					
A1981BJUPA3R8C	• • •	0.0	0.0	0.0	0.0	
A1989944VHPI2I	• • •	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	• • •	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	• • •	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	• • •	0.0	0.0	0.0	0.0	
• • •	• • •	• • •	• • •	• • •	• • •	
A1DLFC5GG1RQFL	• • •	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	• • •	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	• • •	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	• • •	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	• • •	0.0	0.0	0.0	0.0	
product	9990974845	9991330038	9991535896	9991546634	9991549358	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •	• • •	• • •	• • •	• • •		
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	B00000001Y					
user						
A1981BJUPA3R8C	0.0					
A1989944VHPI2I	0.0					
A1989WE0ZSBKNN	0.0					
A198A15LMKHG8T	0.0					
A198CPQ6A1VYD2	0.0					
•••	• • •					
A1DLFC5GG1RQFL	0.0					
A1DLMTOTHQ4AST	0.0					
A1DLQENEM4ANWH	0.0					
A1DLSQMEALZSIK	0.0					
A1DLUOL9P1VF4A	0.0					
[1418 rows x 47	'3 columns]					
Hean Cample	ngo . [2040	44667				
User Sample ran		-				
Products Sample	range: [7	[2], (טט, 11/2]				
Sample :	000001111	000000000000000000000000000000000000000	000000000	000000000	00000=====	,
nnoduct	000001/1100	DDOOODEAN	0002020004	0002022005	0000000000	\

•						
product	9983814129	998383054X	9983830884	9983833085	9983853027	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •	• • •	• • •			• • •	
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	

A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product user	9983853035	9983877880	9983884313	9983886030	9983890372	\
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
	• • •	• • •	• • •	• • •	• • •	
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	999095	0369 999095	061X 999095	0636 999095	50830 \	
user			2021. 222022		(
A1981BJUPA3R8C	• • •	0.0	0.0	0.0	0.0	
A1989944VHPI2I	• • •	0.0	0.0	0.0	0.0	
A1989WEØZSBKNN	• • •	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	• • •	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	• • •	0.0	0.0	0.0	0.0	
AI36CFQOAIVID2	• • •	•.•	•••	•••	• • • • • • • • • • • • • • • • • • • •	
A1DLFC5GG1RQFL	• • •	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	• • •	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	• • •	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	• • •	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	• • •	0.0	0.0	0.0	0.0	
AIDLOOLDI IVI TA	• • •	0.0	0.0	0.0	0.0	
product	9990974845	9991330038	9991535896	9991546634	9991549358	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0		
A 4 O O O LIE O T C DIVAINI					0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0 0.0	
A198A15LMKHG8T	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	0.0 0.0	
	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T A198CPQ6A1VYD2	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL	0.0 0.0 0.0 	0.0 0.0 0.0 	0.0 0.0 0.0 	0.0 0.0 0.0 	0.0 0.0 0.0 	
A198A15LMKHG8T A198CPQ6A1VYD2	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user	0.0 0.0 0.0 0.0 0.0 0.0 0.0 800000001Y	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 800000001Y	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WEØZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	
A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK A1DLUOL9P1VF4A product user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	

[1418 rows x 473 columns]

User Sample range : [3049, 4466] Products Sample range : [700, 1172]

Sample :

product	9983814129	998383054X	9983830884	9983833085	9983853027	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • • •						
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	9983853035	9983877880	9983884313	9983886030	9983890372	\
user	3303033033	3303077000	330300 1323	3303000030	3303030372	`
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WEØZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
_						
 A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
-						
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	999095	0369 999095	061X 999095	0636 999095	0830 \	
user	• • •					
A1981BJUPA3R8C	• • •	0.0	0.0	0.0	0.0	
A1989944VHPI2I	• • •	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	• • •	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	• • •	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	• • •	0.0	0.0	0.0	0.0	
• • •	• • •	• • •	• • •	• • •	• • •	
A1DLFC5GG1RQFL	• • •	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	• • •	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	• • •	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	• • •	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	• • •	0.0	0.0	0.0	0.0	
product	9990974845	9991330038	9991535896	9991546634	9991549358	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •	• • •	• • •	• • •	• • •		
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	B00000001Y					
user						
A1981BJUPA3R8C	0.0					
A1989944VHPI2I	0.0					
A1989WE0ZSBKNN	0.0					
A198A15LMKHG8T	0.0					
A198CPQ6A1VYD2	0.0					
	3.0					
~ • •	• • •					

A1DLFC5GG1RQFL	0.0
A1DLMTOTHQ4AST	0.0
A1DLQENEM4ANWH	0.0
A1DLSQMEALZSIK	0.0
A1DLUOL9P1VF4A	0.0

[1418 rows x 473 columns]

A1DLMTOTHQ4AST

0.0

0.0

0.0

0.0

User Sample ran	ge : [3049.	44661				
Products Sample Sample:		-				
•	0002014120	000202054V	0002020004	0002022005	0002052027	\
product	9983814129	998383054X	9983830884	9983833085	9983853027	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •						
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	9983853035	9983877880	9983884313	9983886030	9983890372	١
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
	•••	•••	•••	•••	•••	
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A						
AIDLUUL9PIVF4A	0.0	0.0	0.0	0.0	0.0	
product	999095	0369 999095	061X 999095	0636 999095	0830 \	
user	•••				,	
A1981BJUPA3R8C	• • •	0.0	0.0	0.0	0.0	
A1989944VHPI2I	• • •	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN		0.0	0.0	0.0	0.0	
A198A15LMKHG8T	• • •	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2		0.0	0.0	0.0	0.0	
_	• • •					
 A1DLFC5GG1RQFL	• • •	0.0	0.0	0.0	0.0	
_			0.0	0.0	0.0	
A1DLMTOTHQ4AST	• • •	0.0				
A1DLQENEM4ANWH	• • •	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	• • •	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	• • •	0.0	0.0	0.0	0.0	
product	9990974845	9991330038	9991535896	9991546634	9991549358	\
user	JJJ0J7 1 04J	3331330030	JJJ1JJJ0J0	JJJ1J400J4	JJJ1J4JJJ0	,
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1981B30FA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VIIF121 A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A1989WE025BKNN A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2						
_	0.0	0.0	0.0	0.0	0.0	
 A1DI ECEGG1POEI						
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	

A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
AIDLOOL FIVE 4A	0.0	0.0	0.0	0.0	0.0	
product	B00000001Y					
user	50000001					
A1981BJUPA3R8C	0.0					
A1989944VHPI2I	0.0					
A1989WE0ZSBKNN	0.0					
A198A15LMKHG8T	0.0					
A198CPQ6A1VYD2	0.0					
	• • • •					
A1DLFC5GG1RQFL	0.0					
A1DLMTOTHQ4AST	0.0					
A1DLQENEM4ANWH	0.0					
A1DLSQMEALZSIK	0.0					
A1DLUOL9P1VF4A	0.0					
AIDLOOL FIVE 4A	0.0					
[1418 rows x 47	3 columnsl					
[1120 10115 X 17	5 601451					
User Sample ran	ge: [3049,	4466]				
Products Sample		-				
Sample :	8- 1	, ,				
product	9983814129	998383054X	9983830884	9983833085	9983853027	\
user						-
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
•••	• • •	• • •	• • •	• • •	• • •	
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	9983853035	9983877880	9983884313	9983886030	9983890372	\
user						-
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
•••						
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
	3.3	3.3	3.3	3.0	3.3	
product	999095	0369 999095	061X 999095	0636 999095	i0830 \	
user	•••				-	
A1981BJUPA3R8C		0.0	0.0	0.0	0.0	
A1989944VHPI2I	• • •	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	• • •	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	• • •	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	• • •	0.0	0.0	0.0	0.0	
- 3. C						

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A1DLFC5GG1RQFL

A1DLMTOTHQ4AST

A1DLQENEM4ANWH

A1DLSQMEALZSIK

. . .

0.0

0.0

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0.0

0.0

0.0

A1DLUOL9P1VF4A	• • •	0.0	0.0	0.0	0.0	
nnoduct	9990974845	9991330038	0001525006	9991546634	9991549358	\
product user	3330374643	9991330036	9991555696	9991546654	9991549556	\
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • • •						
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	B00000001Y					
user						
A1981BJUPA3R8C	0.0					
A1989944VHPI2I	0.0					
A1989WE0ZSBKNN	0.0					
A198A15LMKHG8T	0.0					
A198CPQ6A1VYD2	0.0					
A1DLFC5GG1RQFL	0.0					
A1DLMTOTHQ4AST	0.0					
A1DLQENEM4ANWH	0.0					
A1DLSQMEALZSIK	0.0					
A1DLUOL9P1VF4A	0.0					
[1418 rows x 47	3 columnsl					
[1.10 : 0W3 X 4/	2 501411112]					
User Sample ran	ge: [3049,	4466]				
Products Sample	range : [7	00, 1172]				
Sample :						

Sampie .						
product	9983814129	998383054X	9983830884	9983833085	9983853027	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •	• • •	• • •	• • •	• • •	• • •	
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	9983853035	9983877880	9983884313	9983886030	9983890372	\
user						\
user A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	\
user A1981BJUPA3R8C A1989944VHPI2I	0.0 0.0	0.0	0.0 0.0	0.0 0.0	0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0	0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH A1DLSQMEALZSIK	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	\
user A1981BJUPA3R8C A1989944VHPI2I A1989WE0ZSBKNN A198A15LMKHG8T A198CPQ6A1VYD2 A1DLFC5GG1RQFL A1DLMTOTHQ4AST A1DLQENEM4ANWH	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0	\

product	999	0950369	999095	061X	999095	0636	999095	0830	\	
user	• • •									
A1981BJUPA3R8C	• • •	0.0		0.0		0.0		0.0		
A1989944VHPI2I	• • •	0.0		0.0		0.0		0.0		
A1989WE0ZSBKNN	• • •	0.0		0.0		0.0		0.0		
A198A15LMKHG8T	• • •	0.0		0.0		0.0		0.0		
A198CPQ6A1VYD2	• • •	0.0		0.0		0.0		0.0		
• • •	• • •	• • •		• • •		• • •		• • •		
A1DLFC5GG1RQFL	• • •	0.0		0.0		0.0		0.0		
A1DLMTOTHQ4AST	• • •	0.0		0.0		0.0		0.0		
A1DLQENEM4ANWH	• • •	0.0		0.0		0.0		0.0		
A1DLSQMEALZSIK	• • •	0.0		0.0		0.0		0.0		
A1DLUOL9P1VF4A	• • •	0.0		0.0		0.0		0.0		
product	99909748	45 9991	.330038	9991	535896	9991	546634	9991	549358	\
user	33303710	.5 5552	.550050	,,,,	333030	2222		J J J <u>I</u>	,,,,,,	`
A1981BJUPA3R8C	9	.0	0.0		0.0		0.0		0.0	
A1989944VHPI2I		.0	0.0		0.0		0.0		0.0	
A1989WE0ZSBKNN		.0	0.0		0.0		0.0		0.0	
A198A15LMKHG8T		.0	0.0		0.0		0.0		0.0	
A198CPQ6A1VYD2		.0	0.0		0.0		0.0		0.0	
			•••		• • • •		• • • •		• • • •	
A1DLFC5GG1RQFL		.0	0.0		0.0		0.0		0.0	
A1DLMTOTHQ4AST		.0	0.0		0.0		0.0		0.0	
A1DLQENEM4ANWH		.0	0.0		0.0		0.0		0.0	
A1DLSQMEALZSIK		.0	0.0		0.0		0.0		0.0	
A1DLUOL9P1VF4A		.0	0.0		0.0		0.0		0.0	
AIDEOULSI IVI TA	O	•0	0.0		0.0		0.0		0.0	
product	B0000000	1Y								
user										
A1981BJUPA3R8C	0	.0								
A1989944VHPI2I	0	.0								
A1989WE0ZSBKNN	0	.0								
A198A15LMKHG8T	0	.0								
A198CPQ6A1VYD2	0	.0								
 A1DLFC5GG1RQFL										
A1DLPC3GG1RQFL A1DLMTOTHQ4AST		.0								
A1DLQENEM4ANWH		.0								
A1DLSQMEALZSIK		.0								
A1DLUOL9P1VF4A		.0								
AIDLOOL FIVI 4A	0	.0								
[1418 rows x 47	3 columns]								
User Sample ran	-		_							
Products Sample Sample :	range :	[700, 1	.172]							
Jampic .										

Sambie:						
product	9983814129	998383054X	9983830884	9983833085	9983853027	\
user						
A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •						
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	

product 9983853035 9983877880 9983884313 9983886030 9983890372 \ user

A1981BJUPA3R8C	0.0	0.0	0.0	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.6	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.0	0.0	0.0	
• • •						
A1DLFC5GG1RQFL	0.0	0.0	0.0	0.0	0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	0.0	0.0	0.0	0.0	0.0	
A1DLSQMEALZSIK	0.0	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.0	0.0	0.0	
product	999095	0369 999095	061X 99909	950636 99909	50830 \	
user	• • •					
A1981BJUPA3R8C	• • •	0.0	0.0	0.0	0.0	
A1989944VHPI2I	• • •	0.0	0.0	0.0	0.0	
A1989WE0ZSBKNN	• • •	0.0	0.0	0.0	0.0	
A198A15LMKHG8T	• • •	0.0	0.0	0.0	0.0	
A198CPQ6A1VYD2	• • •	0.0	0.0	0.0	0.0	
 A1DLFC5GG1RQFL	• • •	0.0	0.0	0.0	0.0	
A1DLPC3GG1RQFL A1DLMTOTHQ4AST	• • •	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH	• • •	0.0	0.0	0.0	0.0	
A1DLQENEM4ANWH A1DLSQMEALZSIK	• • •	0.0	0.0	0.0	0.0	
A1DLUOL9P1VF4A	• • •	0.0	0.0	0.0	0.0	
AIDLUUL9PIVF4A	•••	0.0	0.0	0.0	0.0	
product	9990974845	9991330038	9991535896	9991546634	9991549358	\
user						
A1981BJUPA3R8C	0.0	0.0	0.6	0.0	0.0	
A1989944VHPI2I	0.0	0.0	0.6	0.0	0.0	
A1989WE0ZSBKNN	0.0	0.0	0.6	0.0	0.0	
A198A15LMKHG8T	0.0	0.0	0.6	0.0	0.0	
A198CPQ6A1VYD2	0.0	0.0	0.6	0.0	0.0	
• • •	• • •	• • •	• • •		• • •	
A1DLFC5GG1RQFL	0.0	0.0	0.6		0.0	
A1DLMTOTHQ4AST	0.0	0.0	0.6		0.0	
A1DLQENEM4ANWH	0.0	0.0	0.6		0.0	
A1DLSQMEALZSIK	0.0	0.0	0.6		0.0	
A1DLUOL9P1VF4A	0.0	0.0	0.6	0.0	0.0	
product	B00000001Y					
user	200000011					
A1981BJUPA3R8C	0.0					
A1981B30FA3K8C A1989944VHPI2I	0.0					
A1989WE0ZSBKNN	0.0					
A198A15LMKHG8T	0.0					
A198CPQ6A1VYD2	0.0					
AI98CPQOAIVID2	•.•					
A1DLFC5GG1RQFL	0.0					
A1DLMTOTHQ4AST	0.0					
A1DLQENEM4ANWH	0.0					
A1DLSQMEALZSIK	0.0					
A1DLUOL9P1VF4A	0.0					
	2.0					
F4.44.0						

[1418 rows x 473 columns]

Average RMSE : 0.0

Average MAE : 0.0

Item - Item Collabrative Filtering (Dataset)

```
In [ ]: data = pd.read_csv("rating.csv",names=["user","product","rating","time"])
   data = data.pivot_table(columns="product",index="user",values="rating")
   print(data)
```

product	059400232X	089933623X	094339676X	1034385789	\
user					
A001944026UMZ8T3K5QH1	NaN	NaN	NaN	NaN	
A00766851QZZUBOVF4JFT	NaN	NaN	NaN	NaN	
A01255851Z01U93P8RKGE	NaN	NaN	NaN	NaN	
A014623426J5CM7M12MBW	NaN	NaN	NaN	NaN	
A01580702BRW77PSJ9X34	NaN	NaN	NaN	NaN	
AZZMV5VT9W7Y8	 NaN	··· NaN	··· NaN	 NaN	
AZZP8BC9WEØN8	NaN	NaN	NaN	NaN	
AZZST80YL5P4Q	NaN	NaN	NaN	NaN	
AZZUBI2MEAHI9	NaN	NaN	NaN	NaN	
AZZZEWADNFNUM	NaN	NaN	NaN	NaN	
					,
product user	1039869017	1085901386	1094441252	1182702627	\
A001944026UMZ8T3K5QH1	NaN	NaN	NaN	NaN	
A00766851QZZUBOVF4JFT	NaN	NaN	NaN	NaN	
A01255851Z01U93P8RKGE	NaN	NaN	NaN	NaN	
A014623426J5CM7M12MBW	NaN	NaN	NaN	NaN	
A01580702BRW77PSJ9X34	NaN	NaN	NaN	NaN	
• • •					
AZZMV5VT9W7Y8	NaN	NaN	NaN	NaN	
AZZP8BC9WEØN8	NaN	NaN	NaN	NaN	
AZZST80YL5P4Q	NaN	NaN	NaN	NaN	
AZZUBI2MEAHI9	NaN	NaN	NaN	NaN	
AZZZEWADNFNUM	NaN	NaN	NaN	NaN	
product user	1254875778	132793040	В00004Т	DMZ B000041	TDN0 \
A001944026UMZ8T3K5QH1	NaN	NaN	• • •	NaN	NaN
A00766851QZZUB0VF4JFT	NaN	NaN		NaN	NaN
A01255851Z01U93P8RKGE	NaN	NaN		NaN	NaN
A014623426J5CM7M12MBW	NaN	NaN		NaN	NaN
A01580702BRW77PSJ9X34	NaN	NaN		NaN	NaN
AZZMV5VT9W7Y8	 NaN	 NaN	• • •	NaN	NaN
AZZP8BC9WEØN8	NaN	NaN		NaN	NaN
AZZST80YL5P4Q	NaN	NaN		NaN	NaN
AZZUBI2MEAHI9	NaN	NaN		NaN	NaN
AZZZEWADNFNUM	NaN	NaN		NaN	NaN
,			•••		
product	B00004TDN1	B00004TDN2	B00004TDN3	B00004TDN4	\
USEr	NaN	NaN	NaN	NaN	
A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT	NaN NaN	NaN NaN	NaN NaN	NaN NaN	
A01255851Z01U93P8RKGE	NaN	NaN	NaN	NaN	
A014623426J5CM7M12MBW	NaN	NaN	NaN	NaN	
A01580702BRW77PSJ9X34	NaN	NaN	NaN	NaN	
A01300702DRW771333X34	···	•••	···	•••	
AZZMV5VT9W7Y8	NaN	NaN	NaN	NaN	
AZZP8BC9WEØN8	NaN	NaN	NaN	NaN	
AZZST80YL5P4Q	NaN	NaN	NaN	NaN	
AZZUBI2MEAHI9	NaN	NaN	NaN	NaN	
AZZZEWADNFNUM	NaN	NaN	NaN	NaN	
product	B00004TDN5	B00004TDN7	B00004TDPP	B00004TDRH	
user					
A001944026UMZ8T3K5QH1	NaN	NaN	NaN	NaN	
A00766851QZZUBOVF4JFT	NaN	NaN	NaN	NaN	
A01255851Z01U93P8RKGE	NaN	NaN	NaN	NaN	
A014623426J5CM7M12MBW	NaN	NaN	NaN	NaN	
A01580702BRW77PSJ9X34	NaN	NaN	NaN	NaN	
•••	•••	• • •	• • •	• • •	

```
AZZMV5VT9W7Y8
                               NaN
                                            NaN
                                                        NaN
                                                                     NaN
                                                                     NaN
AZZP8BC9WE0N8
                               NaN
                                            NaN
                                                        NaN
AZZST80YL5P4Q
                               NaN
                                            NaN
                                                        NaN
                                                                     NaN
AZZUBI2MEAHI9
                               NaN
                                            NaN
                                                        NaN
                                                                     NaN
AZZZEWADNFNUM
                               NaN
                                            NaN
                                                        NaN
                                                                     NaN
```

[44625 rows x 3333 columns]

```
in [ ]: with warnings.catch_warnings():
    warnings.filterwarnings("ignore")
    for product in data.columns:
        ind = data[product]!=np.nan
        data[product][ind] -= data[product][ind].mean()
    data = data.fillna(0)
    print(data)
```

product	059400232X	089933623X	094339676X	1034385789	\
user					
A001944026UMZ8T3K5QH1	0.0	0.0	0.0	0.0	
_					
A00766851QZZUBOVF4JFT		0.0	0.0	0.0	
A01255851Z01U93P8RKGE	0.0	0.0	0.0	0.0	
A014623426J5CM7M12MBW	0.0	0.0	0.0	0.0	
A01580702BRW77PSJ9X34	0.0	0.0	0.0	0.0	
A01900702BIW771339X34					
	• • •	• • •	• • •	• • •	
AZZMV5VT9W7Y8	0.0	0.0	0.0	0.0	
AZZP8BC9WE0N8	0.0	0.0	0.0	0.0	
AZZST80YL5P4Q	0.0	0.0	0.0	0.0	
AZZUBI2MEAHI9	0.0	0.0	0.0	0.0	
AZZZEWADNFNUM	0.0	0.0	0.0	0.0	
AZZZEWADNENOM	0.0	0.0	0.0	0.0	
product	1039869017	1085901386	1094441252	1182702627	\
user					
A001944026UMZ8T3K5QH1	0.0	0.0	0.0	0.0	
A00766851QZZUBOVF4JFT	0.0	0.0	0.0	0.0	
A01255851Z01U93P8RKGE	0.0	0.0	0.0	0.0	
A014623426J5CM7M12MBW	0.0	0.0	0.0	0.0	
A01580702BRW77PSJ9X34	0.0	0.0	0.0	0.0	
• • •	• • •				
AZZMV5VT9W7Y8	0.0	0.0	0.0	0.0	
AZZP8BC9WEØN8	0.0	0.0	0.0	0.0	
AZZST80YL5P4Q	0.0	0.0	0.0	0.0	
_					
AZZUBI2MEAHI9	0.0	0.0	0.0	0.0	
AZZZEWADNFNUM	0.0	0.0	0.0	0.0	
product	1254875778	132793040	B00004T	DMZ B00004TI	ON0 \
user					
A001944026UMZ8T3K5QH1	0.0	0.0		0.0	0.0
					0.0 0.0
A00766851QZZUB0VF4JFT		0.0			
A01255851Z01U93P8RKGE	0.0	0.0			0.0
A014623426J5CM7M12MBW	0.0	0.0	• • •	0.0	0.0
A01580702BRW77PSJ9X34	0.0	0.0		0.0	0.0
• • •					
AZZMV5VT9W7Y8	0.0	0.0	• • •	0.0	0.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8	0.0 0.0	0.0 0.0	• • • •	0.0 0.0	0.0 0.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q	0.0 0.0 0.0	0.0 0.0 0.0		0.0 0.0 0.0	0.0 0.0 0.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8	0.0 0.0	0.0 0.0		0.0 0.0 0.0	0.0 0.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q	0.0 0.0 0.0	0.0 0.0 0.0		0.0 0.0 0.0 0.0	0.0 0.0 0.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9	0.0 0.0 0.0	0.0 0.0 0.0		0.0 0.0 0.0 0.0	ð.0 ð.0 ð.0 ð.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM	0.0 0.0 0.0	0.0 0.0 0.0		0.0 0.0 0.0 0.0	ð.0 ð.0 ð.0 ð.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST8OYL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0		0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user	0.0 0.0 0.0 0.0 0.0 B00004TDN1	0.0 0.0 0.0 0.0 0.0	B00004TDN3	0.0 0.0 0.0 0.0 0.0 0.0 0.0 B00004TDN4	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1	0.0 0.0 0.0 0.0 0.0 B00004TDN1	0.0 0.0 0.0 0.0 0.0 B00004TDN2	 B00004TDN3	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST8OYL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT	0.0 0.0 0.0 0.0 0.0 B00004TDN1	0.0 0.0 0.0 0.0 0.0 B00004TDN2	B00004TDN3 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT A01255851Z01U93P8RKGE	0.0 0.0 0.0 0.0 0.0 B00004TDN1 0.0 0.0	0.0 0.0 0.0 0.0 0.0 B00004TDN2	B00004TDN3 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST8OYL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT	0.0 0.0 0.0 0.0 0.0 B00004TDN1	0.0 0.0 0.0 0.0 0.0 B00004TDN2	B00004TDN3 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT A01255851Z01U93P8RKGE	0.0 0.0 0.0 0.0 0.0 B00004TDN1 0.0 0.0	0.0 0.0 0.0 0.0 0.0 B00004TDN2	B00004TDN3 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34	0.0 0.0 0.0 0.0 0.0 800004TDN1 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 B00004TDN2 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34	0.0 0.0 0.0 0.0 0.0 B00004TDN1 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 800004TDN2 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8	0.0 0.0 0.0 0.0 0.0 B00004TDN1 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 800004TDN2 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 800004TDN2 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 800004TDN2 0.0 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 800004TDN2 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 800004TDN2 0.0 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUBOVF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
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AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0
AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW A01580702BRW77PSJ9X34 AZZMV5VT9W7Y8 AZZP8BC9WE0N8 AZZST80YL5P4Q AZZUBI2MEAHI9 AZZZEWADNFNUM product user A001944026UMZ8T3K5QH1 A00766851QZZUB0VF4JFT A01255851Z01U93P8RKGE A014623426J5CM7M12MBW	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B00004TDN3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	3.0 3.0 3.0 3.0 3.0

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        [44625 rows x 3333 columns]
        cos_sim = pd.DataFrame(cosine_similarity(data.T,data.T))
        cos_sim = cos_sim.applymap(lambda x: round(x,3))
        print(cos_sim)
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                                    0.0 1.000 -0.007 0.05
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                    0.004 0.009
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        3329 0.000 0.000 0.010
                                    0.0 -0.007 1.000 0.00
                                                              0.0
                                                                    0.0
        3330 0.008 0.000 0.001
                                    0.0 0.050 0.000 1.00
                                                              0.0
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        3331 0.000 0.000 0.000
                                    0.0 0.000 0.000 0.00
                                                              1.0
                                                                    0.0
        3332 0.000 0.000 0.000
                                    0.0 0.000 0.000 0.00
                                                              0.0
                                                                    1.0
        [3333 rows x 3333 columns]
In [ ]: def predict(user,product,data,N):
            sim list = cos sim[product]
            ind_list = sorted(range(len(sim_list)), key=lambda x: sim_list[x])[-(N+1):-1]
            A=0
            B=0
            for i in ind list:
                A += sim_list[i] * data.iloc[user,i]
                B += sim_list[i]
            if(B==0):
                return 0
            else:
                return A/B
        # N = int(input("Value of N : "))
        N = 20
        users = data.index
        no_user = len(users)
        products = data.columns
        no products = len(products)
        users_range = sorted(rd.sample(range(0,no_user),2))
        products range = sorted(rd.sample(range(0,no products),2))
```

```
rmse_val = []
mae_val = []
no ite = 10
for x in range(no_ite):
    print("\n\nUser Sample range : ",users_range)
    print("Products Sample range : ",products_range)
    print("Sample : ")
    print(data.iloc[range(users_range[0],users_range[1]+1),range(products_range[0]
   y_pred = []
   y_{true} = []
    for user in range(users_range[0],users_range[1]+1):
        rated_products = data.iloc[user,:].index[data.iloc[user,:]!=0]
        for i in range(products_range[0],products_range[1]+1):
            if(i in rated_products):
                y_pred.append(predict(user,i,data,N))
                y_true.append(data.iloc[user,i])
        if(len(y_pred)>0 and len(y_pred)==len(y_true)):
            rmse = math.sqrt(mean_squared_error(y_true, y_pred))
            print("RMSE : "+str(rmse))
            mae = mean_absolute_error(y_true,y_pred)
            print("MAE : "+str(mae))
            rmse_val.append(rmse)
            mae_val.append(mae)
print("\n\n")
print("-"*50)
print("\nAverage RMSE : "+str(sum(rmse_val)/no_ite))
print("\nAverage MAE : "+str(sum(mae_val)/no_ite))
```

User Sample range : [265, 16307]
Products Sample range : [764, 2388]

Products	Sampie	range	:	[/6
Cample .				

Sample :	. aBe . [,	0., _500]				
product	9984976734	9984976866	9984977234	9984977595	9984977730	\
user						,
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
***			• • •	• • • •	• • •	
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	9984977803	9984977986	9984978249	9984978265	9984978370	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •						
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	В00001	ZWXA B00001	ZWXB B00001	ZWXI B00001	ZX0K \	
user	• • •					
A10R7XM20Z0323	• • •	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	• • •	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	• • •	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	• • •	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	• • •	0.0	0.0	0.0	0.0	
AIONIIIINDG+W	• • •					
A2E6WMRJAR02Q1	• • •	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	• • •	0.0	0.0	0.0	0.0	
	• • •					
A2E76LB77DZVN2	• • •	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	• • •	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	• • •	0.0	0.0	0.0	0.0	
product	B0000205ZG	P000020570	B0000205ZZ	B000020629	B0000206CG	١
•	B00002032G	B00002032Q	B000020322	B000020029	B0000200CG	\
user	0.0	0.0	0.0	0.0	0.0	
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •	• • •				• • •	
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	B0000206CN					

user 0.0 A10R7XM20Z0323 A10RDB0FTFA5S3 0.0

A10RFZ7WJD1Y2C	0.0
A10RHYA8B2K9QT	0.0
A10RMMITRBG4W	0.0
A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3	0.0 0.0 0.0 0.0 0.0

[16043 rows x 1625 columns]

User Sample range : [265, 16307] Products Sample range : [764, 2388]

Sample :

A10RFZ7WJD1Y2C

A10RHYA8B2K9QT

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

0.0

Sample :						
product	9984976734	9984976866	9984977234	9984977595	9984977730	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
 A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
	0004077003	0004077006	0004070240	0004070365	0004070370	,
product	9984977803	9984977986	9984978249	9984978265	9984978370	\
user	0.0	0.0	0.0	0.0	0.0	
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •	• • •	• • •	• • •	• • •	• • •	
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	В00001	ZWXA B00001	.ZWXB B00001	.ZWXI B00001	.ZX0K \	
user	• • •					
A10R7XM20Z0323	• • •	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	• • •	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C		0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT		0.0	0.0	0.0	0.0	
A10RMMITRBG4W	• • •	0.0	0.0	0.0	0.0	
• • •	• • •	• • •			• • •	
A2E6WMRJAR02Q1	• • •	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB		0.0	0.0	0.0	0.0	
A2E76LB77DZVN2		0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ		0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3		0.0	0.0	0.0	0.0	
product	B0000205ZG	B0000205ZQ	B0000205ZZ	B000020629	B0000206CG	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
***********	0.0		0 0	0.0	0.0	

A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •	• • •	• • •	• • •	• • •	• • •	
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product user	B0000206CN					
A10R7XM20Z0323	0.0					
A10RDB0FTFA5S3	0.0					
A10RFZ7WJD1Y2C	0.0					
A10RHYA8B2K9QT	0.0					
A10RMMITRBG4W	0.0					
• • •	• • •					
A2E6WMRJAR02Q1	0.0					
A2E74YKJXGZCJB	0.0					
A2E76LB77DZVN2	0.0					
A2E7CEPDGY42VQ	0.0					
A2E7DYSIYY3HP3	0.0					
[16043 rows x 1	625 columns]					
_		_				
User Sample ran		-				
Products Sample	range : [76	54, 2388]				
Sample :						
product user	9984976734	9984976866	9984977234	9984977595	9984977730	\
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMTTRRG4W	9.0	9.0	9.0	9.0	9.0	

Jampic .						
product	9984976734	9984976866	9984977234	9984977595	9984977730	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •		• • •	• • •	• • •	• • •	
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product user	9984977803	9984977986	9984978249	9984978265	9984978370	\
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •						
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product user	B00001	ZWXA B00001	ZWXB B00001	.ZWXI B00001	ZX0K \	
A10R7XM20Z0323	• • •	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	• • •	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	• • •	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	• • •	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	• • •	0.0	0.0	0.0	0.0	
•••	• • •	•••	•••	•••	•••	
	.	-	· · ·		· · ·	

A2E6WMRJAR02Q1		0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	• • •	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2		0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	• • •	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	• • •	0.0	0.0	0.0	0.0	
product	B0000205ZG	B0000205ZQ	B0000205ZZ	B000020629	B0000206CG	\
user		C				•
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •						
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	B0000206CN					
user						
A10R7XM20Z0323	0.0					
A10RDB0FTFA5S3	0.0					
A10RFZ7WJD1Y2C	0.0					
A10RHYA8B2K9QT	0.0					
A10RMMITRBG4W	0.0					
• • •						
A2E6WMRJAR02Q1	0.0					
A2E74YKJXGZCJB	0.0					
A2E76LB77DZVN2	0.0					
A2E7CEPDGY42VQ	0.0					
A2E7DYSIYY3HP3	0.0					
[16043 rows x 1	625 columns]					
-	-					

User Sample range : [265, 16307]

Products Sample range : [764, 2388]

Cample .		-				
Sample : product	9984976734	9984976866	9984977234	9984977595	9984977730	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •						
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	9984977803	9984977986	9984978249	9984978265	9984978370	\
user	3364377603	3364377360	3364376243	3364376203	3364376376	\
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •						
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	

A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0
product	в00001	.ZWXA B00001	ZWXB B00001	.ZWXI B00001	.ZX0K \
user	• • •				
A10R7XM20Z0323		0.0	0.0	0.0	0.0
A10RDB0FTFA5S3	• • •	0.0	0.0	0.0	0.0
A10RFZ7WJD1Y2C	• • •	0.0	0.0	0.0	0.0
A10RHYA8B2K9QT	• • •	0.0	0.0	0.0	0.0
A10RMMITRBG4W	• • •	0.0	0.0	0.0	0.0
•••	• • •	•••	• • •	•••	• • •
A2E6WMRJAR02Q1	• • •	0.0	0.0	0.0	0.0
A2E74YKJXGZCJB	• • •	0.0	0.0	0.0	0.0
A2E76LB77DZVN2	• • •	0.0	0.0	0.0	0.0
A2E7CEPDGY42VQ	• • •	0.0	0.0	0.0	0.0
A2E7DYSIYY3HP3		0.0	0.0	0.0	0.0
	• • • •				
product	B0000205ZG	B0000205ZQ	B0000205ZZ	B000020629	B0000206CG \
user	2000020320		2000020322	200002002	,
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0
•••	•••	•••	•••	•••	•••
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0
product	B0000206CN				
user					
A10R7XM20Z0323	0.0				
A10RDB0FTFA5S3	0.0				
A10RFZ7WJD1Y2C	0.0				
A10RHYA8B2K9QT	0.0				
A10RMMITRBG4W	0.0				
•••	•••				
A2E6WMRJAR02Q1	0.0				
A2E74YKJXGZCJB	0.0				
A2E76LB77DZVN2	0.0				
A2E7CEPDGY42VQ	0.0				
A2E7DYSIYY3HP3	0.0				
	3.0				
[16043 rows x 1	625 columns1				
L_200.5 . 0.15 X 1					

User Sample range : [265, 16307] Products Sample range : [764, 2388]
Sample :

Sampie .						
product	9984976734	9984976866	9984977234	9984977595	9984977730	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •						
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	

A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	9984977803	9984977986	9984978249	9984978265	9984978370	\
user	0.0	0.0	0.0	0.0	0.0	
A10R7XM20Z0323	0.0 0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3		0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
•••	• • •	• • •	• • •	• • • •	• • •	
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	В00001	ZWXA B00001	ZWXB B00001	.ZWXI B00001	.ZX0K \	
user	• • •				-	
A10R7XM20Z0323	• • •	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	• • •	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C		0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	• • •	0.0	0.0	0.0	0.0	
A10RMMITRBG4W		0.0	0.0	0.0	0.0	
• • •						
A2E6WMRJAR02Q1	• • •	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	• • •	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	• • •	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	• • •	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	• • •	0.0	0.0	0.0	0.0	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	• • •	0.0	0.0	0.0	0.0	
product	 В0000205ZG	B0000205ZQ	B0000205ZZ	B000020629	B0000206CG	\
						\
product						\
product user	B0000205ZG	B0000205ZQ	B0000205ZZ	B000020629	B0000206CG	\
product user A10R7XM20Z0323	B0000205ZG 0.0	B0000205ZQ	B0000205ZZ 0.0	B000020629	B0000206CG	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3	B0000205ZG 0.0 0.0	B0000205ZQ 0.0 0.0	B0000205ZZ 0.0 0.0	B000020629 0.0 0.0	B0000206CG 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C	B0000205ZG 0.0 0.0 0.0	B0000205ZQ 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0	B000020629 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT	B0000205ZG 0.0 0.0 0.0 0.0	B0000205ZQ 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT	B0000205ZG 0.0 0.0 0.0 0.0 0.0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W	B0000205ZG 0.0 0.0 0.0 0.0 0.0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W 	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product user	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product user A10R7XM20Z0323	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 B0000206CN	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product user A10R7XM20Z0323 A10RDB0FTFA5S3	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	\
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	
product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2 A2E7CEPDGY42VQ A2E7DYSIYY3HP3 product user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2	B0000205ZG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0	B0000205ZQ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000205ZZ 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B000020629 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	B0000206CG 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0	

[16043 rows x 1625 columns]

User Sample range : [265, 16307] Products Sample range : [764, 2388]

Sample :

product	9984976734	9984976866	9984977234	9984977595	9984977730	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •						
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
7.22751321131113	0.0	0.0	0.0	0.0	0.0	
product	9984977803	9984977986	9984978249	9984978265	9984978370	\
user	JJ04J7700J	3304377300	JJ04J7024J	3304370203	3304370370	\
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •	• • •	• • •	• • •	• • •	• • •	
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	В00001	ZWXA B00001	ZWXB B00001	ZWXI B00001	ZX0K \	
user						
A10R7XM20Z0323		0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3		0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C		0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	• • •	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	• • •	0.0	0.0	0.0	0.0	
•••	• • •	•••	•••	•••	•••	
A2E6WMRJAR02Q1	•••	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	•••	0.0	0.0	0.0	0.0	
A2E74TR3XG2C3B		0.0	0.0	0.0	0.0	
	• • •	0.0	0.0		0.0	
A2E7CEPDGY42VQ	• • •			0.0		
A2E7DYSIYY3HP3	• • •	0.0	0.0	0.0	0.0	
	B0000000576	D0000000570	D000000577	D0000000000	D000000000	,
product	B0000205ZG	B0000205ZQ	B0000205ZZ	B000020629	B0000206CG	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •	• • •				• • •	
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
	0.0	3.3	3.3	3.3	0.0	
product	B0000206CN					
user	20000200CN					
A10R7XM20Z0323	0.0					
A10RDB0FTFA5S3	IA IA					
	0.0					
	0.0					
A10RFZ7WJD1Y2C	0.0 0.0					
A10RFZ7WJD1Y2C A10RHYA8B2K9QT	0.0 0.0 0.0					
A10RFZ7WJD1Y2C	0.0 0.0					

A2E6WMRJAR02Q1	0.0
A2E74YKJXGZCJB	0.0
A2E76LB77DZVN2	0.0
A2E7CEPDGY42VQ	0.0
A2E7DYSIYY3HP3	0.0

[16043 rows x 1625 columns]

A10RMMITRBG4W

A2E6WMRJAR02Q1

A2E74YKJXGZCJB

0.0

...

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•	-					
6 3	F0.65	4.62.077				
User Sample ran	-					
Products Sample	range : [/	64, 2388]				
Sample :	9984976734	9984976866	0004077224	9984977595	0004077730	`
product	3304370734	9904970000	9984977234	3304377333	9984977730	\
user A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
•••	•••	•••	•••	•••	•••	
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	9984977803	9984977986	9984978249	9984978265	9984978370	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •						
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	В00001	.ZWXA B00001	ZWXB B00001	.ZWXI B00001	ZX0K \	
user	• • •					
A10R7XM20Z0323	• • •	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	• • •	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	• • •	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	• • •	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	• • •	0.0	0.0	0.0	0.0	
	• • •					
A2E6WMRJAR02Q1	• • •	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	• • •	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	• • •	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	• • •	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	• • •	0.0	0.0	0.0	0.0	
product	B0000205ZG	B0000205ZQ	B0000205ZZ	B000020629	B0000206CG	\
user	2000020320	200002032Q	2000020722	5000020029	2000020000	\
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10DMMTTDDC4U	0.0	0.0	0.0	0.0	0.0	

A2E76LB77DZVN2 0.0 0.0 0.0 0.0 0.0 0.0 A2E7DYSIYY3HP3 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.	9
A2E7CEPDGY42VQ 0.0 0.0 0.0 0.0 0.0	9
·	
A2E7DYSIYY3HP3 0.0 0.0 0.0 0.0 0.0	9
product B0000206CN	
user	
A10R7XM20Z0323 0.0	
A10RDB0FTFA5S3 0.0	
A10RFZ7WJD1Y2C 0.0	
A10RHYA8B2K9QT 0.0	
A10RMMITRBG4W 0.0	
•••	
A2E6WMRJAR02Q1 0.0	
A2E74YKJXGZCJB 0.0	
A2E76LB77DZVN2 0.0	
A2E7CEPDGY42VQ 0.0	
A2E7DYSIYY3HP3 0.0	
[16042 page v 1625 palumpa]	
[16043 rows x 1625 columns]	
User Sample range : [265, 16307]	
Products Sample range : [764, 2388]	
Sample:	
product 9984976734 9984976866 9984977234 9984977595 998497773	3
user	
A10R7XM20Z0323 0.0 0.0 0.0 0.0 0.0	3

		0., _500]					
Sample :							
product	9984976734	9984976866	9984977234	9984977595	9984977	730	\
user							
A10R7XM20Z0323	0.0	0.0	0.0	0.0		0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0		0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0		0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0		0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0		0.0	
• • •							
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0		0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0		0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0		0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0		0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0		0.0	
product	9984977803	0094077096	9984978249	9984978265	9984978	270	`
•	3364377663	3304377300	3304370243	9904970203	3304370	370	١
user A10R7XM20Z0323	0.0	0.0	0.0	0.0		0 0	
		0.0	0.0	0.0		0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0		0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0		0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0		0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0		0.0	
• • •	• • •	• • •		• • •		• • •	
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0		0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0		0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0		0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0		0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0		0.0	
product	B00001	ZWXA B00001	.ZWXB B00001	.ZWXI B00001	.ZX0K \		
user		200001	200001		.27.01.		
A10R7XM20Z0323	• • •	0.0	0.0	0.0	0.0		
A10RDB0FTFA5S3		0.0	0.0	0.0	0.0		
A10RFZ7WJD1Y2C	• • •	0.0	0.0	0.0	0.0		
	• • •						
A10RHYA8B2K9QT	• • •	0.0	0.0	0.0	0.0		
A10RMMITRBG4W	• • •	0.0	0.0	0.0	0.0		
A2E6WMRJAR02Q1	• • •	0.0	0.0	0.0	0.0		
A2E74YKJXGZCJB	• • •	0.0	0.0	0.0	0.0		
	• • •						
A2E76LB77DZVN2	• • •	0.0	0.0	0.0	0.0		

0.0

0.0 0.0

A2E7CEPDGY42VQ ...

A2E7DYSIYY3HP3	•••	0.0	0.0	0.0	0.0	
product	B0000205ZG	B0000205ZQ	B0000205ZZ	B000020629	B0000206CG	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •						
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	B0000206CN					
user						
A10R7XM20Z0323	0.0					
A10RDB0FTFA5S3	0.0					
A10RFZ7WJD1Y2C	0.0					
A10RHYA8B2K9QT	0.0					
A10RMMITRBG4W	0.0					
• • •						
A2E6WMRJAR02Q1	0.0					
A2E74YKJXGZCJB	0.0					
A2E76LB77DZVN2	0.0					
A2E7CEPDGY42VQ	0.0					
A2E7DYSIYY3HP3	0.0					
[16043 rows x 1	625 columns]					

User Sample range : [265, 16307] Products Sample range : [764, 2388]

Sample :						
product	9984976734	9984976866	9984977234	9984977595	9984977730	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •		• • •			• • •	
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	9984977803	9984977986	9984978249	9984978265	9984978370	\
product user	9984977803	9984977986	9984978249	9984978265	9984978370	\
•	9984977803	9984977986	9984978249	9984978265	9984978370	\
user						\
user A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	\
user A10R7XM20Z0323 A10RDB0FTFA5S3	0.0	0.0	0.0 0.0	0.0 0.0	0.0 0.0	\
user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	\
user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	0.0 0.0 0.0	\
user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	\
user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0	\
user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	\
user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 	\
user A10R7XM20Z0323 A10RDB0FTFA5S3 A10RFZ7WJD1Y2C A10RHYA8B2K9QT A10RMMITRBG4W A2E6WMRJAR02Q1 A2E74YKJXGZCJB A2E76LB77DZVN2	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	0.0 0.0 0.0 0.0 0.0 0.0	\

product	в00001	ZWXA B00001	ZWXB B0000	1ZWXI B00001	LZXØK \	
user						
A10R7XM20Z0323	• • •	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3		0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C		0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT		0.0	0.0	0.0	0.0	
A10RMMITRBG4W		0.0	0.0	0.0	0.0	
• • •				• • •	• • •	
A2E6WMRJAR02Q1		0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	• • •	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2		0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ		0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	• • •	0.0	0.0	0.0	0.0	
product	B0000205ZG	B0000205ZQ	B0000205ZZ	B000020629	B0000206CG	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •				• • •		
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	B0000206CN					
user						
A10R7XM20Z0323	0.0					
A10RDB0FTFA5S3	0.0					
A10RFZ7WJD1Y2C	0.0					
A10RHYA8B2K9QT	0.0					
A10RMMITRBG4W	0.0					
• • •						
A2E6WMRJAR02Q1	0.0					
A2E74YKJXGZCJB	0.0					
A2E76LB77DZVN2	0.0					
A2E7CEPDGY42VQ	0.0					
A2E7DYSIYY3HP3	0.0					
_						

[16043 rows x 1625 columns]

User Sample range : [265, 16307] Products Sample range : [764, 2388]

Sample :

Sampie :						
product	9984976734	9984976866	9984977234	9984977595	9984977730	\
user						
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •	• • •					
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	

product 9984977803 9984977986 9984978249 9984978265 9984978370 \

user

A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •						
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
					_	
product	В00001	ZWXA B00001	ZWXB B00001	LZWXI B00001	.ZX0K \	
user	• • •					
A10R7XM20Z0323	• • •	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	• • •	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	• • •	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	• • •	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	• • •	0.0	0.0	0.0	0.0	
 A2E6WMRJAR02Q1	• • •	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	• • •	0.0	0.0	0.0	0.0	
	• • •					
A2E76LB77DZVN2	• • •	0.0	0.0	0.0	0.0 0.0	
A2E7CEPDGY42VQ A2E7DYSIYY3HP3	• • •	0.0 0.0	0.0 0.0	0.0 0.0	0.0	
AZE/DISTITSONS	• • •	0.0	0.0	0.0	0.0	
product user	B0000205ZG	B0000205ZQ	B0000205ZZ	B000020629	B0000206CG	\
A10R7XM20Z0323	0.0	0.0	0.0	0.0	0.0	
A10RDB0FTFA5S3	0.0	0.0	0.0	0.0	0.0	
A10RFZ7WJD1Y2C	0.0	0.0	0.0	0.0	0.0	
A10RHYA8B2K9QT	0.0	0.0	0.0	0.0	0.0	
A10RMMITRBG4W	0.0	0.0	0.0	0.0	0.0	
• • •	• • •	• • •				
A2E6WMRJAR02Q1	0.0	0.0	0.0	0.0	0.0	
A2E74YKJXGZCJB	0.0	0.0	0.0	0.0	0.0	
A2E76LB77DZVN2	0.0	0.0	0.0	0.0	0.0	
A2E7CEPDGY42VQ	0.0	0.0	0.0	0.0	0.0	
A2E7DYSIYY3HP3	0.0	0.0	0.0	0.0	0.0	
product	B0000206CN					
user A10R7XM20Z0323	0.0					
A10RDB0FTFA5S3	0.0					
A10RFZ7WJD1Y2C	0.0					
A10RHYA8B2K9QT	0.0					
A10RMMITRBG4W	0.0					
ATOMPHI I NDU4W	•.•					
A2E6WMRJAR02Q1	0.0					
A2E74YKJXGZCJB	0.0					
A2E74TR3XG2C3B	0.0					
A2E7CEPDGY42VQ	0.0					
A2E7CE170G142VQ A2E7DYSIYY3HP3	0.0					
	0.3					
[46043	625 1 1					

[16043 rows x 1625 columns]

Average RMSE : 0.0

Average MAE : 0.0