

Project-Store Item Demand Forecasting Challenge

```
In [1]: %load_ext autoreload
        %autoreload 2
        %matplotlib inline
        Import matplotlib.pyplot as plt

In [2]: import pandas as pd
        Import numpy as np
        import os
        Import seaborn as sns
        pd.set_option('display.max_rows',12)

In [3]: #loading data
        sample_sub=pd.read_csv(r'E:/Internship/demand/sample_submission.csv')
        train=pd.read_csv(r'E:/Internship/demand/train.csv',
                           parse_dates=['date'], index_col=['date'])
        test=pd.read_csv(r'E:/Internship/demand/test.csv',
                           parse_dates=['date'], index_col=['date'])

In [4]: train.head(14)
```

Out[4]:

store	item	Sales
date		
2013-01-01	1	13
2013-01-02	1	11
2013-01-03	1	14
2013-01-04	1	13
2013-01-05	1	10
2013-01-06	1	12
...
2013-01-09	1	12

2013-01-10	1	1	9
2013-01-11	1	1	9
2013-01-12	1	1	7
2013-01-13	1	1	10
2013-01-14	1	1	12

[14 rows x 3 columns]

```
In [5]:sample_sub.head(10)
```

```
Out[5]:id  sales
0    0    52
1    1    52
2    2    52
3    3    52
4    4    52
5    5    52
6    6    52
7    7    52
8    8    52
9    9    52
```

```
In [6]:train.head(14)
```

```
Out[6]:store  item  Sales
date
2013-01-01    1    1    13
2013-01-02    1    1    11
2013-01-03    1    1    14
2013-01-04    1    1    13
2013-01-05    1    1    10
2013-01-06    1    1    12
...          ...    ...    ...
2013-01-09    1    1    12
2013-01-10    1    1     9
2013-01-11    1    1     9
2013-01-12    1    1     7
2013-01-13    1    1    10
2013-01-14    1    1    12
```

[14 rows x 3 columns]

```
In [7]:print(train.shape,test.shape,sample_sub.shape)
```

```
(913000, 3) (45000, 3) (45000, 2)
```

```
In [8]:(train.dtypes,test.dtypes,sample_sub.dtypes)
```

```

Out[8]: (store      int64
        item       int64
        sales      int64
        dtype: object, id      int64
        store      int64
        item       int64
        dtype: object, id      int64
        sales      int64
        dtype: object)

```

```

In [9]: (train.sales.max(), train.sales.min(), train.sales.mean())

```

```

Out[9]: (231, 0, 52.250286966046005)

```

```

In [10]: #number of unique items and stores
print("number of unique items:", train.item.nunique())
print("number of unique items:", train.store.nunique())
print("number of unique items:", test.item.nunique())
print("number of unique items:", test.store.nunique())

```

```

number of unique items: 50
number of unique items: 10
number of unique items: 50
number of unique items: 10

```

```

In [11]: print("number of unique id:", sample_sub.id.nunique())

```

```

number of unique id: 45000

```

```

In [12]: def dumb_prediction(train, test, submission):
    for _, row in test.iterrows():
        item, store=row['item'], row['store']
        day, month=row.name.day, row.name.month
        itemandstore=(train.item==item) & (train.store==store)
        dayandmonth=(train.index.month==month) & (train.index.day==day)
        train_rows=train.loc[itemandstore&dayandmonth]
        pred_sales=int(round(train_rows.mean()['sales']))
        submission.at[row['id'], 'sales']=pred_sales
    return submission

```

```

In [13]: # Expand dataframe with more useful columns
def expand_df(df):
    data=df.copy()
    data['day']=data.index.day
    data['month']=data.index.month
    data['year']=data.index.year
    data['dayofweek']=data.index.dayofweek

```

```

        return data
    data=expand_df(train)

    grand_avg=data.sales.mean()

```

```
In [14]:data.head()
```

```

Out[14]:store  item  sales  day  month  year  dayofweek
         date
2013-01-01      1      1     13     1      1  2013      1
2013-01-02      1      1     11     2      1  2013      2
2013-01-03      1      1     14     3      1  2013      3
2013-01-04      1      1     13     4      1  2013      4
2013-01-05      1      1     10     5      1  2013      5

```

```
In [15]:data.shape
```

```
Out[15]:(913000, 7)
```

```
In [16]:print(f"The grand average of sales in this dataset is {grand_avg:.4f}")
```

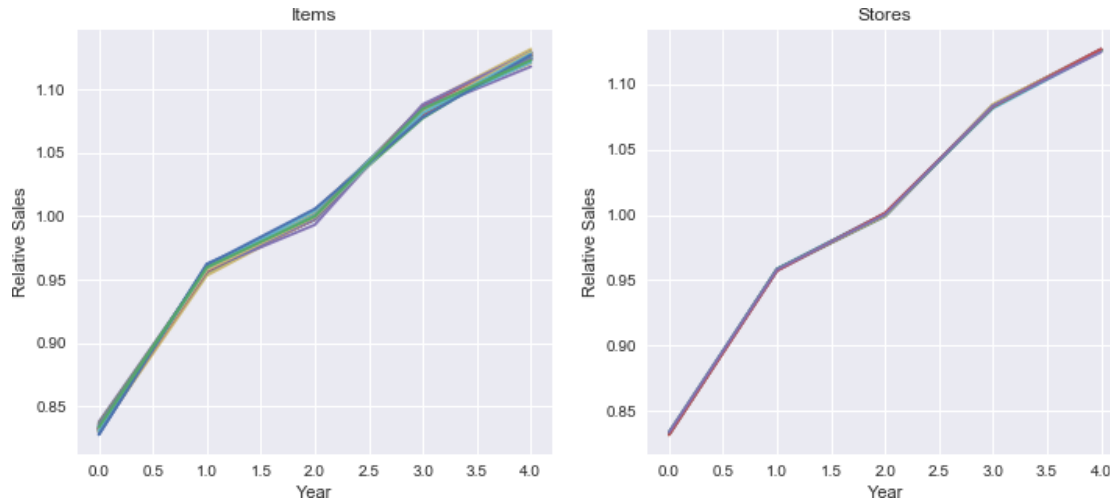
The grand average of sales in this dataset is 52.2503

```

In [17]: importmatplotlib.pyplotasplt
         agg_year_item=pd.pivot_table(data, index='year', columns='item',
                                     values='sales', aggfunc=np.mean).values
         agg_year_store=pd.pivot_table(data, index='year', columns='store',
                                     values='sales', aggfunc=np.mean).values

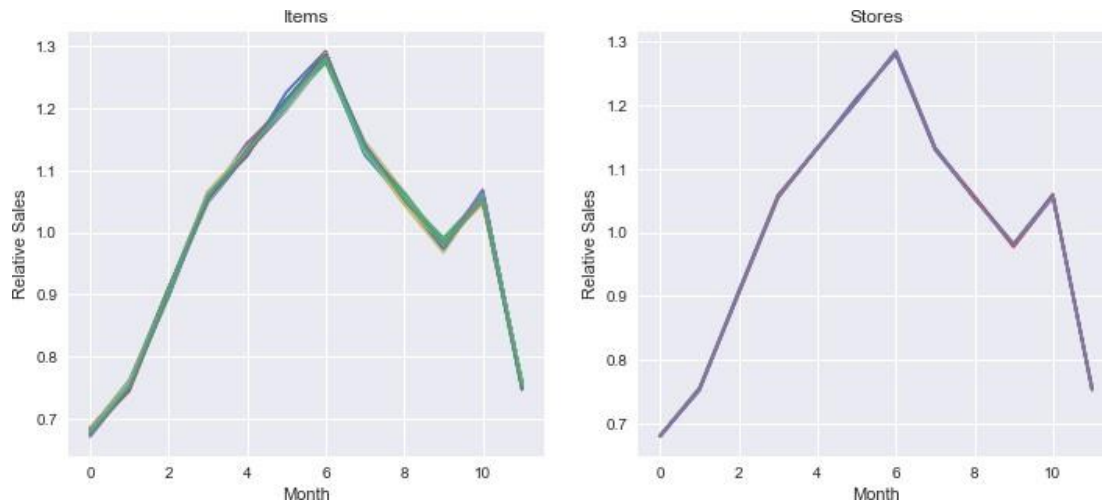
         plt.figure(figsize=(12,5))
         plt.subplot(121)
         plt.plot(agg_year_item/agg_year_item.mean(0)[np.newaxis])
         plt.title("Items")
         plt.xlabel("Year")
         plt.ylabel("Relative Sales")
         plt.subplot(122)
         plt.plot(agg_year_store/agg_year_store.mean(0)[np.newaxis])
         plt.title("Stores")
         plt.xlabel("Year")
         plt.ylabel("Relative Sales")
         plt.show()

```



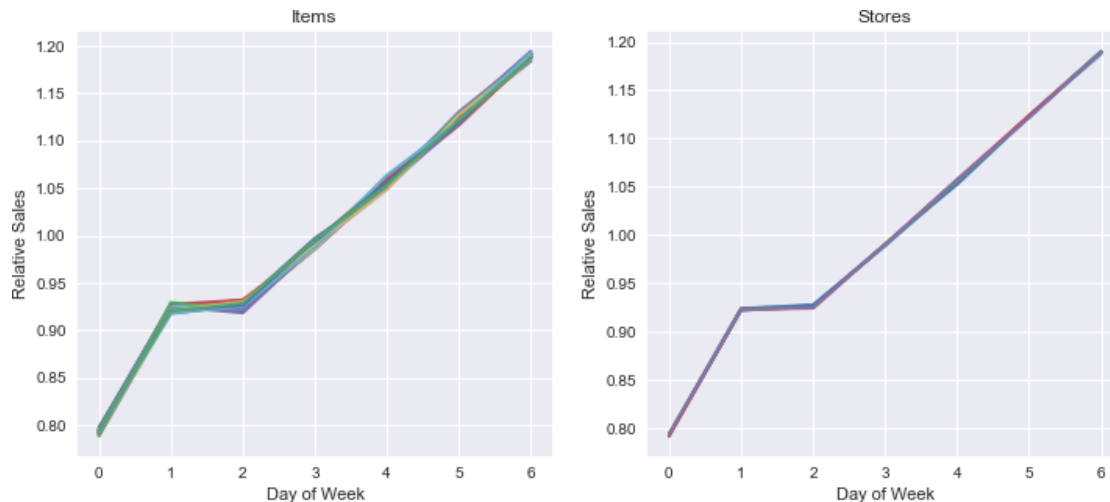
```
In [18]:agg_month_item=pd.pivot_table(data, index='month', columns='item',
                                         values='sales', aggfunc=np.mean).values
        agg_month_store=pd.pivot_table(data, index='month', columns='store',
                                         values='sales', aggfunc=np.mean).values

plt.figure(figsize=(12,5))
plt.subplot(121)
plt.plot(agg_month_item/agg_month_item.mean(0)[np.newaxis])
plt.title("Items")
plt.xlabel("Month")
plt.ylabel("Relative Sales")
plt.subplot(122)
plt.plot(agg_month_store/agg_month_store.mean(0)[np.newaxis])
plt.title("Stores")
plt.xlabel("Month")
plt.ylabel("Relative Sales")
plt.show()
```



```
In [19]:agg_dow_item=pd.pivot_table(data, index='dayofweek', columns='item',
                                     values='sales', aggfunc=np.mean).values
        agg_dow_store=pd.pivot_table(data, index='dayofweek', columns='store',
                                     values='sales', aggfunc=np.mean).values

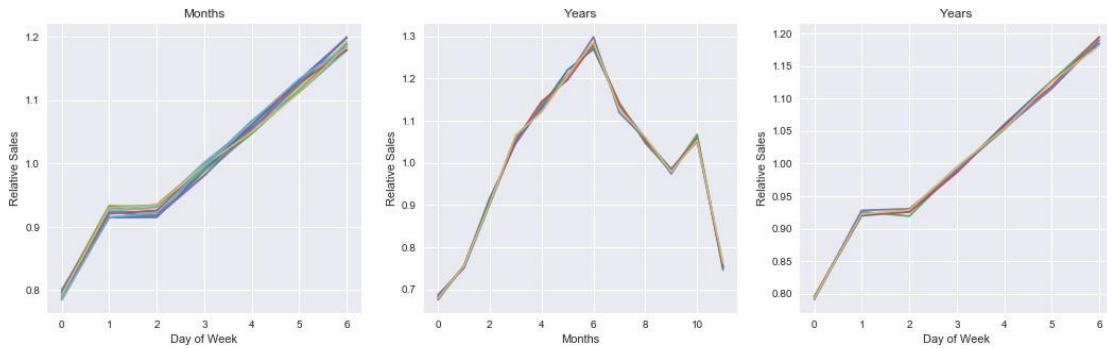
plt.figure(figsize=(12,5))
plt.subplot(121)
plt.plot(agg_dow_item/agg_dow_item.mean(0)[np.newaxis])
plt.title("Items")
plt.xlabel("Day of Week")
plt.ylabel("Relative Sales")
plt.subplot(122)
plt.plot(agg_dow_store/agg_dow_store.mean(0)[np.newaxis])
plt.title("Stores")
plt.xlabel("Day of Week")
plt.ylabel("Relative Sales")
plt.show()
```



In [20]:

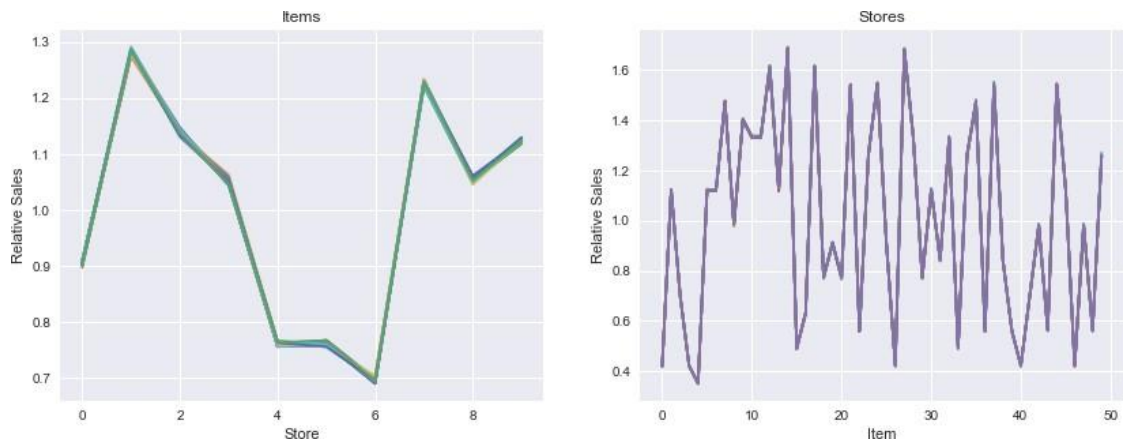
```
agg_dow_month=pd.pivot_table(data, index='dayofweek', columns='month',
                              values='sales', aggfunc=np.mean).values
agg_month_year=pd.pivot_table(data, index='month', columns='year',
                               values='sales', aggfunc=np.mean).values
agg_dow_year=pd.pivot_table(data, index='dayofweek', columns='year',
                             values='sales', aggfunc=np.mean).values

plt.figure(figsize=(18,5))
plt.subplot(131)
plt.plot(agg_dow_month/agg_dow_month.mean(0)[np.newaxis])
plt.title("Months")
plt.xlabel("Day of Week")
plt.ylabel("Relative Sales")
plt.subplot(132)
plt.plot(agg_month_year/agg_month_year.mean(0)[np.newaxis])
plt.title("Years")
plt.xlabel("Months")
plt.ylabel("Relative Sales")
plt.subplot(133)
plt.plot(agg_dow_year/agg_dow_year.mean(0)[np.newaxis])
plt.title("Years")
plt.xlabel("Day of Week")
plt.ylabel("Relative Sales")
plt.show()
```



```
In [21]: agg_store_item=pd.pivot_table(data, index='store', columns='item',
                                         values='sales', aggfunc=np.mean).values
```

```
plt.figure(figsize=(14,5))
plt.subplot(121)
plt.plot(agg_store_item/agg_store_item.mean(0)[np.newaxis])
plt.title("Items")
plt.xlabel("Store")
plt.ylabel("Relative Sales")
plt.subplot(122)
plt.plot(agg_store_item.T/agg_store_item.T.mean(0)[np.newaxis])
plt.title("Stores")
plt.xlabel("Item")
plt.ylabel("Relative Sales")
plt.show()
```



```
In [22]: # Item-Store Look Up Table
store_item_table=pd.pivot_table(data, index='store', columns='item',
```



```

values='sales', aggfunc=np.mean)
store_item_table.head()
Out[22]:
item      1      2      3      4      5      6  \
store
1      19.971522  53.148959  33.208105  19.956188  16.612815  53.060789
2      28.173604  75.316539  46.992333  28.234940  23.540526  74.945235
3      25.070099  66.804491  41.771084  25.116101  20.857612  67.007119
4      22.938664  61.715225  38.548193  23.086528  19.525192  61.270537
5      16.739321  44.488499  27.835706  16.776561  14.086528  44.564622

item      7      8      9     10     ...      41
store
1      52.783680  69.472070  46.504929  66.354326  ...      20.002738
2      75.058598  99.090361  65.478094  94.097481  ...      28.069551
3      66.647864  87.517525  58.486857  83.387733  ...      24.989047
4      61.625411  80.819825  54.043812  77.047645  ...      23.168127
5      44.535597  58.565717  38.837349  55.509858  ...      16.830778

item      42      43      44      45      46      47
store
1      33.105696  46.242607  26.594195  72.720701  52.845016  19.814348
2      47.368018  65.785323  37.785871  103.381161  75.219606  28.187842
3      41.797371  58.197700  33.386090  91.851041  66.748083  25.120482
4      38.539978  54.018620  30.952355  84.687295  61.420044  23.114458
5      27.730559  39.163198  22.415115  61.427163  44.734940  16.699343

item      48      49      50
store
1      46.546002  26.461665  59.342826
2      66.028478  37.711939  84.622125
3      58.700986  33.259584  74.958379
4      53.765608  30.840635  68.921687
5      39.281490  22.371851  50.319277

[5 rows x 50 columns]

In [23]: # Yearly growth pattern
year_table=pd.pivot_table(data, index='year', values='sales', aggfunc=np.
year_table/=grand_avg

years=np.arange(2013,2019)
annual_sales_avg=year_table.values.squeeze()

In [24]: p1=np.poly1d(np.polyfit(years[:-1], annual_sales_avg,1))
p2=np.poly1d(np.polyfit(years[:-1], annual_sales_avg,2))

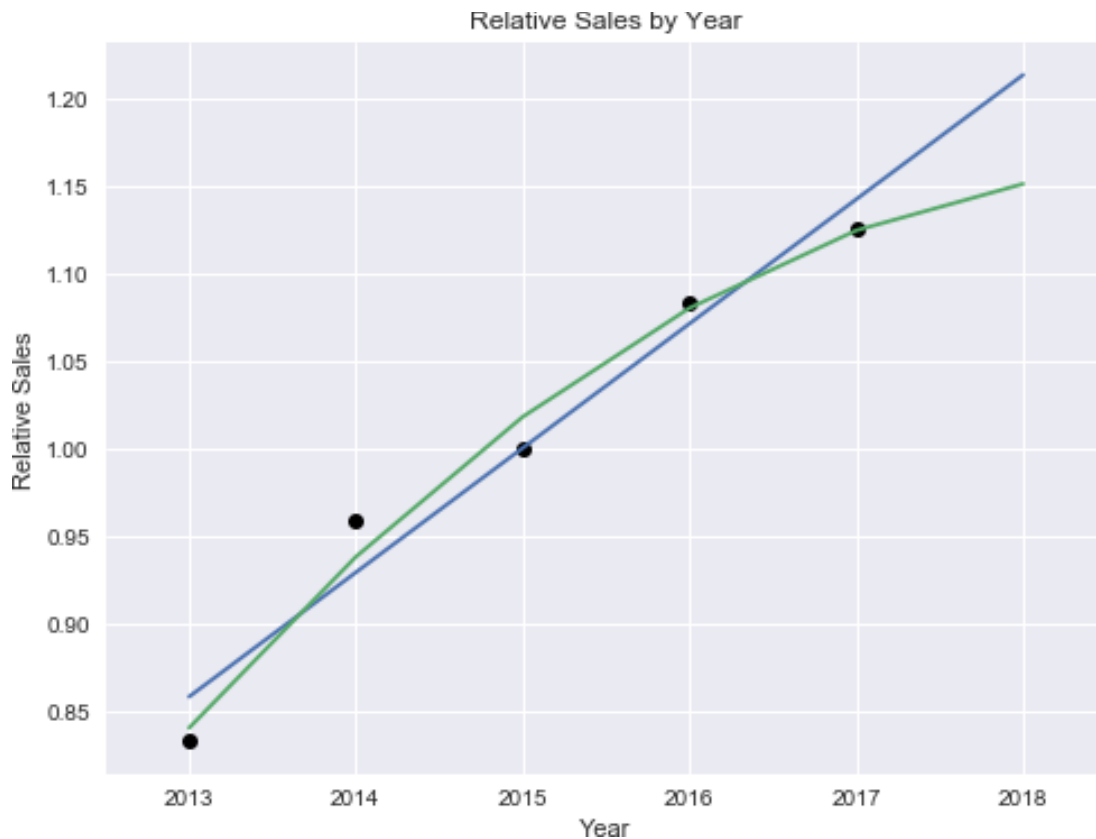
plt.figure(figsize=(8,6))

```

```

plt.plot(years[:-1], annual_sales_avg, 'ko')
plt.plot(years, p1(years), 'C0-')
plt.plot(years, p2(years), 'C1-')
plt.xlim(2012.5, 2018.5)
plt.title("Relative Sales by Year")
plt.ylabel("Relative Sales")
plt.xlabel("Year")
plt.show()

```



```

In [25]: print(f"2018 Relative Sales by Degree-1 (Linear) Fit ={p1(2018):.4f}")
         print(f"2018 Relative Sales by Degree-2 (Quadratic) Fit={p2(2018):.4f}")

```

```

# We pick the quadratic fit
annual_growth=p2

```

```

2018 Relative Sales by Degree-1 (Linear) Fit = 1.2132
2018 Relative Sales by Degree-2 (Quadratic) Fit = 1.1509

```

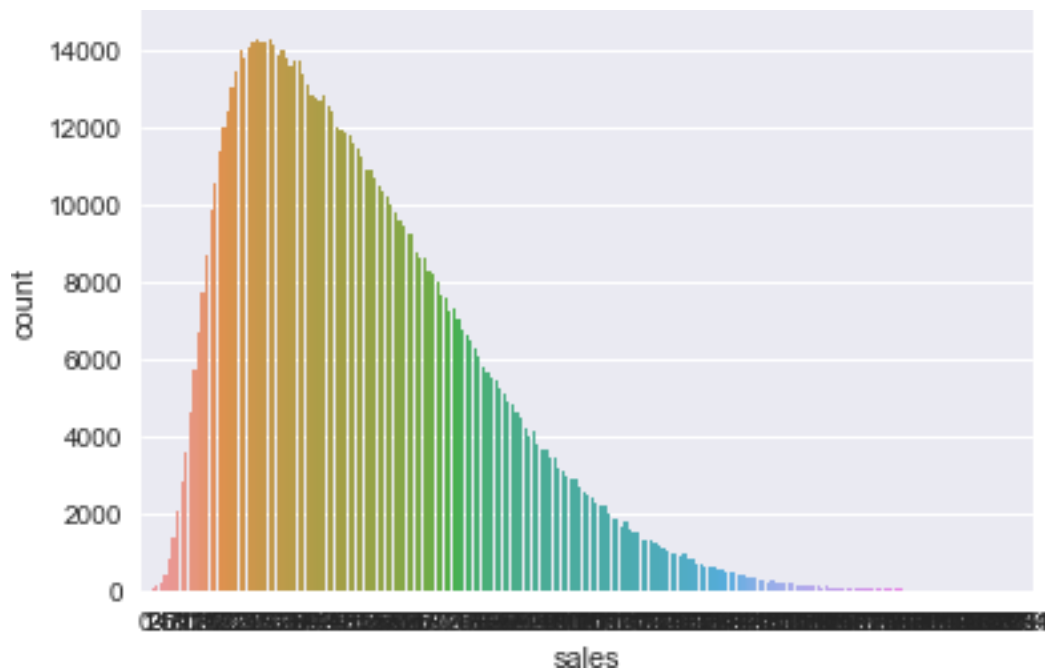
```

In [26]: sample_sub=pd.read_csv(r'E:/Internship/demand/sample_submission.csv')
         train=pd.read_csv(r'E:/Internship/demand/train.csv',parse_dates=['date'])
         test=pd.read_csv(r'E:/Internship/demand/test.csv',parse_dates=['date'])

```

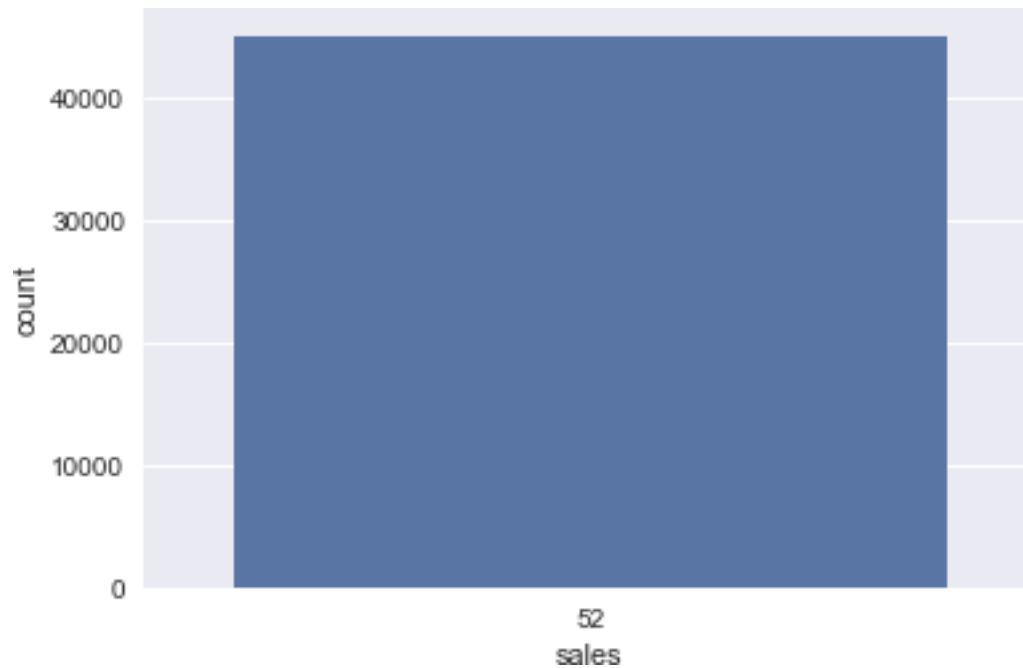
```
In [27]: #visualization
import matplotlib.pyplot as plt
import seaborn as sns
%matplotlib inline
sns.countplot(x='sales', data=train)
```

Out[27]: <matplotlib.axes._subplots.AxesSubplot at 0x27bc92ecc18>

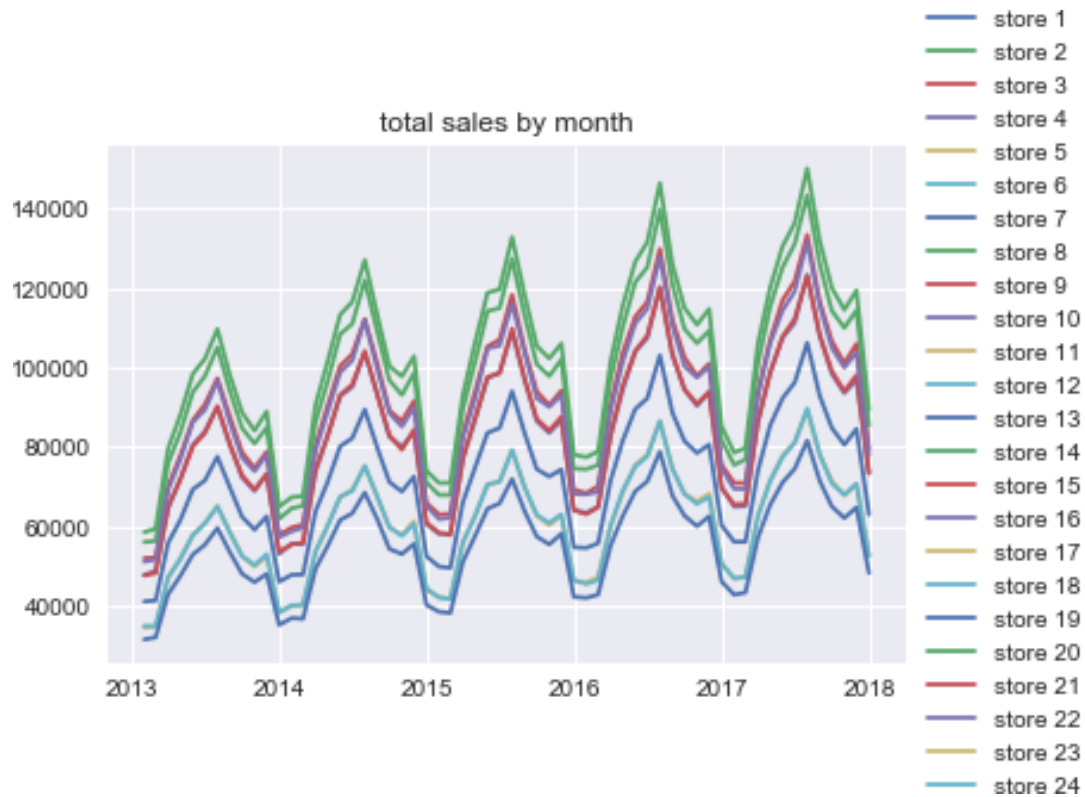


```
In [28]: import seaborn as sns
%matplotlib inline
sns.countplot(x='sales', data=sample_sub)
```

Out[28]: <matplotlib.axes._subplots.AxesSubplot at 0x27bc7fcca90>



```
In [29]: for i in range(1,25):
          month_df=train[train.store==i].resample('M',on='date').sum()
          x=np.array(month_df.index)
          y=np.array(month_df.sales)
          plt.plot(x,y,label='store %s '%i)
plt.legend(loc='center left',bbox_to_anchor=(1,0.5))
plt.title("total sales by month")
plt.show()
```



```
In [30]: store_item_df=train.groupby(['store','item']).sum()
        matrixStoreItem=np.zeros((10,50))
        for i in range(1,11):
            for j in range(1,51):
                matrixStoreItem[i-1,j-1]=store_item_df.loc[i,j].sales

        plt.figure(figsize=(50,10))
        ax=sns.heatmap(matrixStoreItem,cmap='PuRd_r')
        plt.xlabel("Item",fontsize=35)
        plt.xlabel("Store",fontsize=35)
        plt.title("Store/Item sales heatmap",fontsize=45)
```

Out[30]:<matplotlib.text.Text at 0x27bc974e128>



```

In [31]: item_df=train.groupby(['item']).mean()

In [32]: item_df.sort_values('sales',ascending=True,inplace=True)

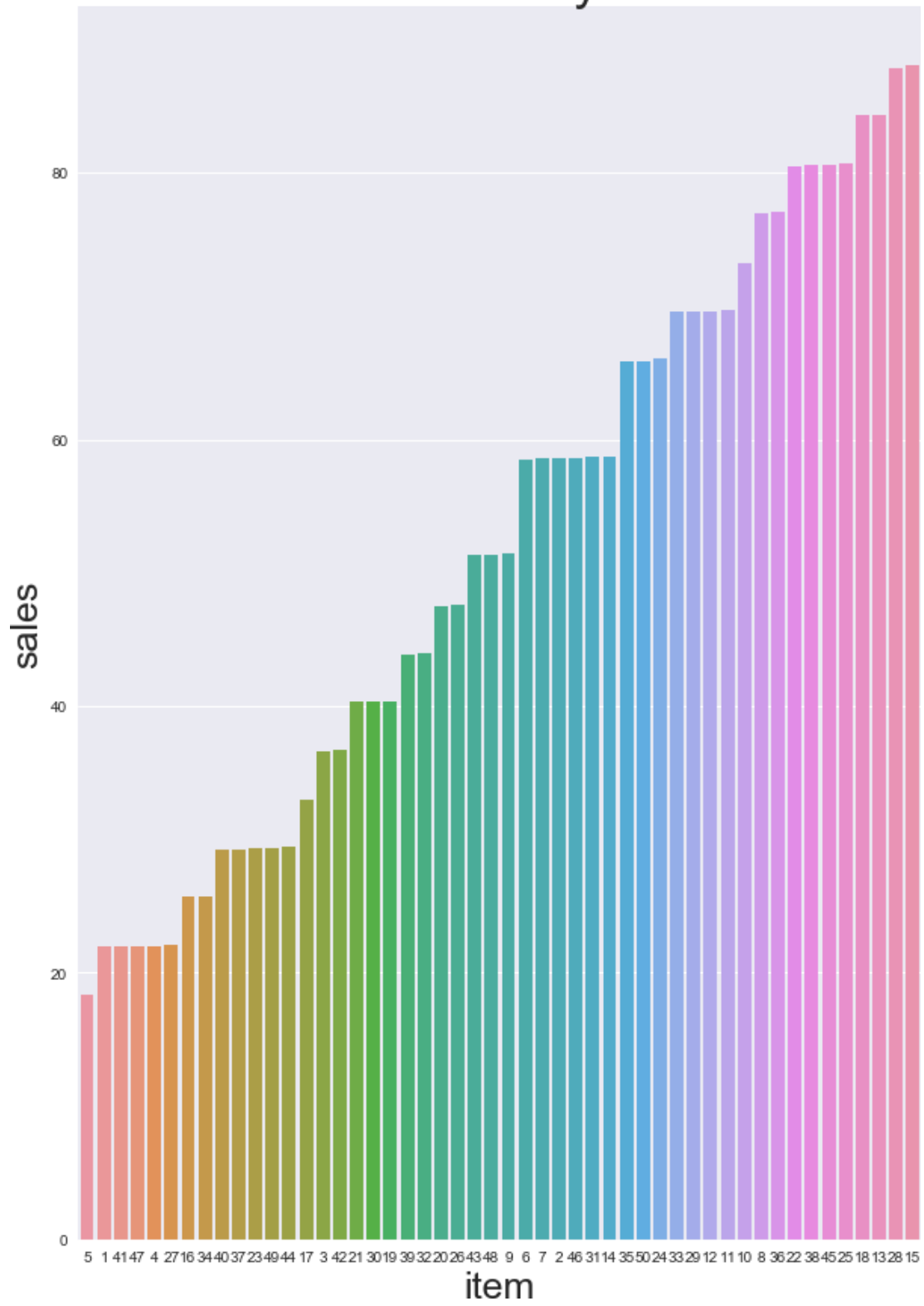
In [33]: item_df.head(11)

Out[33]:
store    sales
item
5        5.5  18.358708
1        5.5  21.981599
41       5.5  22.002136
47       5.5  22.003341
4        5.5  22.010241
27       5.5  22.049726
16       5.5  25.656079
34       5.5  25.735761
40       5.5  29.249398
37       5.5  29.258379
23       5.5  29.297864

In [34]: plt.close('all')
         item_df=train.groupby(['item']).mean()
         item_df.sort_values('sales',ascending=True,inplace=True)
         x=item_df.index
         y=item_df.sales
         plt.figure(figsize=(10,15))
         sns.barplot(x=x,y=y,order=x)
         plt.xlabel('item',fontsize=25)
         plt.ylabel('sales',fontsize=25)
         plt.title("mean sales by items",fontsize=35)
         plt.show()

```

mean sales by items



```
In [35]: #dummies features
         r=pd.get_dummies(train,columns=['store','item'])
```

```
In [36]: r.head(10)
```

```
Out[36]: date  sales  store_1  store_2  store_3  store_4  store_5  store_6  \
0  2013-01-01    13         1         0         0         0         0
1  2013-01-02    11         1         0         0         0         0
2  2013-01-03    14         1         0         0         0         0
3  2013-01-04    13         1         0         0         0         0
4  2013-01-05    10         1         0         0         0         0
5  2013-01-06    12         1         0         0         0         0
6  2013-01-07    10         1         0         0         0         0
7  2013-01-08     9         1         0         0         0         0
8  2013-01-09    12         1         0         0         0         0
9  2013-01-10     9         1         0         0         0         0

      store_7  store_8  ...  item_41  item_42  item_43  item_44  item_45
0           0         0  ...         0         0         0         0
1           0         0  ...         0         0         0         0
2           0         0  ...         0         0         0         0
3           0         0  ...         0         0         0         0
4           0         0  ...         0         0         0         0
5           0         0  ...         0         0         0         0
6           0         0  ...         0         0         0         0
7           0         0  ...         0         0         0         0
8           0         0  ...         0         0         0         0
9           0         0  ...         0         0         0         0

      item_46  item_47  item_48  item_49  item_50
0           0         0         0         0         0
1           0         0         0         0         0
2           0         0         0         0         0
3           0         0         0         0         0
4           0         0         0         0         0
5           0         0         0         0         0
6           0         0         0         0         0
7           0         0         0         0         0
8           0         0         0         0         0
9           0         0         0         0         0

[10 rows x 62 columns]
```

```
In [37]: m=np.random.rand(len(r))<0.05
         r_train=r[m]
         r_val=r[~m]
```



```
print("train shape:",r_train.shape)
print("validation shape:",r_val.shape)
```

```
train shape: (45479, 62)
validation shape: (867521, 62)
```

```
In [38]: r_train.drop('date',axis=1,inplace= True)
         r_val.drop('date',axis=1,inplace=True)
         y_train=r_train['sales'].values
         y_test=r_val['sales'].values
         X_train=r_train.drop('sales', axis=1).values
         X_test=r_val.drop('sales', axis=1).values
```

```
C:\Users\basit\Anaconda3\lib\site-packages\ipykernel\_main__.py:1: SettingWithCop
A value is trying to be set on a copy of a slice from a DataFrame
```

```
See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/
if __name__ == '__main__':
C:\Users\basit\Anaconda3\lib\site-packages\ipykernel\_main__.py:2: SettingWithCop
A value is trying to be set on a copy of a slice from a DataFrame
```

```
See the caveats in the documentation: http://pandas.pydata.org/pandas-docs/stable/
from ipykernel import kernelapp as app
```

```
In [39]: import lightgbm as lgb
         from sklearn.metrics import mean_squared_error

         lgb_train=lgb.Dataset(X_train,y_train)
         lgb_eval=lgb.Dataset(X_test,y_test,reference=lgb_train)
         params={'task':'train','boosting_type':'gbdt','objective':'regression',
                 'metric':{'rmse'},'num_leaves':10,'learning_rate':0.05,
                 'feature_fraction':0.8,'max_depth':5,'verbose':0,
                 'num_boost_round':15000,'early_stopping_rounds':100,'nthread':1}
         gbm=lgb.train(params,
                        lgb_train,
                        num_boost_round=20,
                        valid_sets=lgb_eval,
                        early_stopping_rounds=5)
```

```
C:\Users\basit\Anaconda3\lib\site-packages\lightgbm\engine.py:118: UserWarning: Fo
warnings.warn("Found `{}` in params. Will use it instead of argument".format(ali
C:\Users\basit\Anaconda3\lib\site-packages\lightgbm\engine.py:123: UserWarning: Fo
warnings.warn("Found `{}` in params. Will use it instead of argument".format(ali
```

```
[1]          valid_0's rmse: 28.5783
Training until validation scores don't improve for 100 rounds.
```

[2] valid_0's rmse: 28.3693
[3] valid_0's rmse: 28.1913
[4] valid_0's rmse: 27.9942
[5] valid_0's rmse: 27.8366
[6] valid_0's rmse: 27.6564
[7] valid_0's rmse: 27.486
[8] valid_0's rmse: 27.3202
[9] valid_0's rmse: 27.159
[10] valid_0's rmse: 26.9997
[11] valid_0's rmse: 26.8385
[12] valid_0's rmse: 26.7015
[13] valid_0's rmse: 26.5511
[14] valid_0's rmse: 26.4063
[15] valid_0's rmse: 26.2658
[16] valid_0's rmse: 26.12
[17] valid_0's rmse: 26.0021
[18] valid_0's rmse: 25.8677
[19] valid_0's rmse: 25.7398
[20] valid_0's rmse: 25.6072
[21] valid_0's rmse: 25.4809
[22] valid_0's rmse: 25.359
[23] valid_0's rmse: 25.2409
[24] valid_0's rmse: 25.1181
[25] valid_0's rmse: 24.9992
[26] valid_0's rmse: 24.9035
[27] valid_0's rmse: 24.7837
[28] valid_0's rmse: 24.6703
[29] valid_0's rmse: 24.5593
[30] valid_0's rmse: 24.4549
[31] valid_0's rmse: 24.3478
[32] valid_0's rmse: 24.2599
[33] valid_0's rmse: 24.1518
[34] valid_0's rmse: 24.0496
[35] valid_0's rmse: 23.95
[36] valid_0's rmse: 23.8531
[37] valid_0's rmse: 23.7569
[38] valid_0's rmse: 23.6584
[39] valid_0's rmse: 23.5597
[40] valid_0's rmse: 23.4677
[41] valid_0's rmse: 23.3909
[42] valid_0's rmse: 23.3027
[43] valid_0's rmse: 23.2125
[44] valid_0's rmse: 23.1246
[45] valid_0's rmse: 23.0394
[46] valid_0's rmse: 22.9555
[47] valid_0's rmse: 22.867
[48] valid_0's rmse: 22.7863
[49] valid_0's rmse: 22.7041

[50] valid_0's rmse: 22.6379
[51] valid_0's rmse: 22.558
[52] valid_0's rmse: 22.4813
[53] valid_0's rmse: 22.4045
[54] valid_0's rmse: 22.3304
[55] valid_0's rmse: 22.2546
[56] valid_0's rmse: 22.1802
[57] valid_0's rmse: 22.1089
[58] valid_0's rmse: 22.0506
[59] valid_0's rmse: 21.9812
[60] valid_0's rmse: 21.9064
[61] valid_0's rmse: 21.836
[62] valid_0's rmse: 21.767
[63] valid_0's rmse: 21.7002
[64] valid_0's rmse: 21.6343
[65] valid_0's rmse: 21.5702
[66] valid_0's rmse: 21.5012
[67] valid_0's rmse: 21.4398
[68] valid_0's rmse: 21.3756
[69] valid_0's rmse: 21.3139
[70] valid_0's rmse: 21.2621
[71] valid_0's rmse: 21.203
[72] valid_0's rmse: 21.1415
[73] valid_0's rmse: 21.0791
[74] valid_0's rmse: 21.0222
[75] valid_0's rmse: 20.9656
[76] valid_0's rmse: 20.9094
[77] valid_0's rmse: 20.8552
[78] valid_0's rmse: 20.7983
[79] valid_0's rmse: 20.7427
[80] valid_0's rmse: 20.6855
[81] valid_0's rmse: 20.6401
[82] valid_0's rmse: 20.5891
[83] valid_0's rmse: 20.5363
[84] valid_0's rmse: 20.4848
[85] valid_0's rmse: 20.4336
[86] valid_0's rmse: 20.3817
[87] valid_0's rmse: 20.3319
[88] valid_0's rmse: 20.2848
[89] valid_0's rmse: 20.2328
[90] valid_0's rmse: 20.187
[91] valid_0's rmse: 20.1388
[92] valid_0's rmse: 20.0917
[93] valid_0's rmse: 20.046
[94] valid_0's rmse: 20.0081
[95] valid_0's rmse: 19.9645
[96] valid_0's rmse: 19.917
[97] valid_0's rmse: 19.873

[98] valid_0's rmse: 19.829
[99] valid_0's rmse: 19.789
[100] valid_0's rmse: 19.7461
[101] valid_0's rmse: 19.7014
[102] valid_0's rmse: 19.6603
[103] valid_0's rmse: 19.6211
[104] valid_0's rmse: 19.5826
[105] valid_0's rmse: 19.543
[106] valid_0's rmse: 19.503
[107] valid_0's rmse: 19.4692
[108] valid_0's rmse: 19.4308
[109] valid_0's rmse: 19.3942
[110] valid_0's rmse: 19.3566
[111] valid_0's rmse: 19.3208
[112] valid_0's rmse: 19.2836
[113] valid_0's rmse: 19.2439
[114] valid_0's rmse: 19.2104
[115] valid_0's rmse: 19.1739
[116] valid_0's rmse: 19.1389
[117] valid_0's rmse: 19.1048
[118] valid_0's rmse: 19.0711
[119] valid_0's rmse: 19.034
[120] valid_0's rmse: 19.0056
[121] valid_0's rmse: 18.9734
[122] valid_0's rmse: 18.9427
[123] valid_0's rmse: 18.9089
[124] valid_0's rmse: 18.8769
[125] valid_0's rmse: 18.8452
[126] valid_0's rmse: 18.8144
[127] valid_0's rmse: 18.7824
[128] valid_0's rmse: 18.7527
[129] valid_0's rmse: 18.7244
[130] valid_0's rmse: 18.6922
[131] valid_0's rmse: 18.6681
[132] valid_0's rmse: 18.6394
[133] valid_0's rmse: 18.6098
[134] valid_0's rmse: 18.5816
[135] valid_0's rmse: 18.5547
[136] valid_0's rmse: 18.5282
[137] valid_0's rmse: 18.4989
[138] valid_0's rmse: 18.47
[139] valid_0's rmse: 18.4449
[140] valid_0's rmse: 18.4194
[141] valid_0's rmse: 18.3953
[142] valid_0's rmse: 18.3691
[143] valid_0's rmse: 18.345
[144] valid_0's rmse: 18.3175
[145] valid_0's rmse: 18.2935

[146] valid_0's rmse: 18.2704
[147] valid_0's rmse: 18.2478
[148] valid_0's rmse: 18.2213
[149] valid_0's rmse: 18.198
[150] valid_0's rmse: 18.1735
[151] valid_0's rmse: 18.1512
[152] valid_0's rmse: 18.1289
[153] valid_0's rmse: 18.1075
[154] valid_0's rmse: 18.0867
[155] valid_0's rmse: 18.0651
[156] valid_0's rmse: 18.0411
[157] valid_0's rmse: 18.0177
[158] valid_0's rmse: 17.9952
[159] valid_0's rmse: 17.9749
[160] valid_0's rmse: 17.9536
[161] valid_0's rmse: 17.934
[162] valid_0's rmse: 17.9138
[163] valid_0's rmse: 17.8946
[164] valid_0's rmse: 17.8762
[165] valid_0's rmse: 17.8573
[166] valid_0's rmse: 17.8386
[167] valid_0's rmse: 17.8167
[168] valid_0's rmse: 17.7983
[169] valid_0's rmse: 17.7811
[170] valid_0's rmse: 17.7628
[171] valid_0's rmse: 17.7453
[172] valid_0's rmse: 17.7291
[173] valid_0's rmse: 17.7095
[174] valid_0's rmse: 17.6921
[175] valid_0's rmse: 17.6751
[176] valid_0's rmse: 17.6588
[177] valid_0's rmse: 17.6426
[178] valid_0's rmse: 17.6262
[179] valid_0's rmse: 17.6102
[180] valid_0's rmse: 17.5929
[181] valid_0's rmse: 17.5762
[182] valid_0's rmse: 17.5594
[183] valid_0's rmse: 17.5446
[184] valid_0's rmse: 17.5284
[185] valid_0's rmse: 17.5134
[186] valid_0's rmse: 17.4986
[187] valid_0's rmse: 17.4839
[188] valid_0's rmse: 17.4679
[189] valid_0's rmse: 17.4544
[190] valid_0's rmse: 17.4381
[191] valid_0's rmse: 17.4247
[192] valid_0's rmse: 17.4106
[193] valid_0's rmse: 17.397

[194]	valid_0's rmse: 17.3825
[195]	valid_0's rmse: 17.3674
[196]	valid_0's rmse: 17.3541
[197]	valid_0's rmse: 17.342
[198]	valid_0's rmse: 17.3284
[199]	valid_0's rmse: 17.3154
[200]	valid_0's rmse: 17.3038
[201]	valid_0's rmse: 17.2899
[202]	valid_0's rmse: 17.2766
[203]	valid_0's rmse: 17.2633
[204]	valid_0's rmse: 17.2511
[205]	valid_0's rmse: 17.2397
[206]	valid_0's rmse: 17.2282
[207]	valid_0's rmse: 17.2164
[208]	valid_0's rmse: 17.2052
[209]	valid_0's rmse: 17.1922
[210]	valid_0's rmse: 17.181
[211]	valid_0's rmse: 17.17
[212]	valid_0's rmse: 17.1574
[213]	valid_0's rmse: 17.1467
[214]	valid_0's rmse: 17.1348
[215]	valid_0's rmse: 17.1246
[216]	valid_0's rmse: 17.1134
[217]	valid_0's rmse: 17.1019
[218]	valid_0's rmse: 17.0905
[219]	valid_0's rmse: 17.08
[220]	valid_0's rmse: 17.0701
[221]	valid_0's rmse: 17.0602
[222]	valid_0's rmse: 17.051
[223]	valid_0's rmse: 17.0389
[224]	valid_0's rmse: 17.03
[225]	valid_0's rmse: 17.0203
[226]	valid_0's rmse: 17.0102
[227]	valid_0's rmse: 17.0008
[228]	valid_0's rmse: 16.9917
[229]	valid_0's rmse: 16.9826
[230]	valid_0's rmse: 16.9723
[231]	valid_0's rmse: 16.9621
[232]	valid_0's rmse: 16.9538
[233]	valid_0's rmse: 16.945
[234]	valid_0's rmse: 16.9363
[235]	valid_0's rmse: 16.9279
[236]	valid_0's rmse: 16.9202
[237]	valid_0's rmse: 16.9123
[238]	valid_0's rmse: 16.9043
[239]	valid_0's rmse: 16.8953
[240]	valid_0's rmse: 16.887
[241]	valid_0's rmse: 16.8767

[242] valid_0's rmse: 16.8674
[243] valid_0's rmse: 16.8591
[244] valid_0's rmse: 16.8504
[245] valid_0's rmse: 16.8428
[246] valid_0's rmse: 16.8341
[247] valid_0's rmse: 16.8263
[248] valid_0's rmse: 16.8178
[249] valid_0's rmse: 16.8103
[250] valid_0's rmse: 16.8019
[251] valid_0's rmse: 16.7945
[252] valid_0's rmse: 16.7865
[253] valid_0's rmse: 16.7775
[254] valid_0's rmse: 16.7699
[255] valid_0's rmse: 16.7627
[256] valid_0's rmse: 16.7564
[257] valid_0's rmse: 16.7492
[258] valid_0's rmse: 16.741
[259] valid_0's rmse: 16.7341
[260] valid_0's rmse: 16.7269
[261] valid_0's rmse: 16.7201
[262] valid_0's rmse: 16.7126
[263] valid_0's rmse: 16.7055
[264] valid_0's rmse: 16.6978
[265] valid_0's rmse: 16.6916
[266] valid_0's rmse: 16.6844
[267] valid_0's rmse: 16.6784
[268] valid_0's rmse: 16.6724
[269] valid_0's rmse: 16.6656
[270] valid_0's rmse: 16.6596
[271] valid_0's rmse: 16.6534
[272] valid_0's rmse: 16.6466
[273] valid_0's rmse: 16.6407
[274] valid_0's rmse: 16.6339
[275] valid_0's rmse: 16.6285
[276] valid_0's rmse: 16.623
[277] valid_0's rmse: 16.6168
[278] valid_0's rmse: 16.6111
[279] valid_0's rmse: 16.6053
[280] valid_0's rmse: 16.5991
[281] valid_0's rmse: 16.5936
[282] valid_0's rmse: 16.588
[283] valid_0's rmse: 16.5823
[284] valid_0's rmse: 16.5767
[285] valid_0's rmse: 16.5708
[286] valid_0's rmse: 16.5649
[287] valid_0's rmse: 16.56
[288] valid_0's rmse: 16.5548
[289] valid_0's rmse: 16.5498

[290] valid_0's rmse: 16.5451
[291] valid_0's rmse: 16.5407
[292] valid_0's rmse: 16.5351
[293] valid_0's rmse: 16.5302
[294] valid_0's rmse: 16.5241
[295] valid_0's rmse: 16.5191
[296] valid_0's rmse: 16.5145
[297] valid_0's rmse: 16.5102
[298] valid_0's rmse: 16.5058
[299] valid_0's rmse: 16.5015
[300] valid_0's rmse: 16.4972
[301] valid_0's rmse: 16.4922
[302] valid_0's rmse: 16.4879
[303] valid_0's rmse: 16.4827
[304] valid_0's rmse: 16.4777
[305] valid_0's rmse: 16.4731
[306] valid_0's rmse: 16.4683
[307] valid_0's rmse: 16.4641
[308] valid_0's rmse: 16.4595
[309] valid_0's rmse: 16.4554
[310] valid_0's rmse: 16.4506
[311] valid_0's rmse: 16.4457
[312] valid_0's rmse: 16.4417
[313] valid_0's rmse: 16.438
[314] valid_0's rmse: 16.4332
[315] valid_0's rmse: 16.4289
[316] valid_0's rmse: 16.4249
[317] valid_0's rmse: 16.4212
[318] valid_0's rmse: 16.4178
[319] valid_0's rmse: 16.4142
[320] valid_0's rmse: 16.4105
[321] valid_0's rmse: 16.4069
[322] valid_0's rmse: 16.4029
[323] valid_0's rmse: 16.3989
[324] valid_0's rmse: 16.3949
[325] valid_0's rmse: 16.3916
[326] valid_0's rmse: 16.3882
[327] valid_0's rmse: 16.3844
[328] valid_0's rmse: 16.3811
[329] valid_0's rmse: 16.3774
[330] valid_0's rmse: 16.3736
[331] valid_0's rmse: 16.3701
[332] valid_0's rmse: 16.3667
[333] valid_0's rmse: 16.3636
[334] valid_0's rmse: 16.3606
[335] valid_0's rmse: 16.3571
[336] valid_0's rmse: 16.3543
[337] valid_0's rmse: 16.3511

[338] valid_0's rmse: 16.3477
[339] valid_0's rmse: 16.3438
[340] valid_0's rmse: 16.3404
[341] valid_0's rmse: 16.3373
[342] valid_0's rmse: 16.3345
[343] valid_0's rmse: 16.3313
[344] valid_0's rmse: 16.3279
[345] valid_0's rmse: 16.3249
[346] valid_0's rmse: 16.3221
[347] valid_0's rmse: 16.3195
[348] valid_0's rmse: 16.3165
[349] valid_0's rmse: 16.3141
[350] valid_0's rmse: 16.3114
[351] valid_0's rmse: 16.3087
[352] valid_0's rmse: 16.3058
[353] valid_0's rmse: 16.3031
[354] valid_0's rmse: 16.2999
[355] valid_0's rmse: 16.2971
[356] valid_0's rmse: 16.2939
[357] valid_0's rmse: 16.2917
[358] valid_0's rmse: 16.2893
[359] valid_0's rmse: 16.2867
[360] valid_0's rmse: 16.2842
[361] valid_0's rmse: 16.2813
[362] valid_0's rmse: 16.2792
[363] valid_0's rmse: 16.2763
[364] valid_0's rmse: 16.2738
[365] valid_0's rmse: 16.2715
[366] valid_0's rmse: 16.2693
[367] valid_0's rmse: 16.267
[368] valid_0's rmse: 16.2648
[369] valid_0's rmse: 16.2622
[370] valid_0's rmse: 16.2597
[371] valid_0's rmse: 16.2576
[372] valid_0's rmse: 16.2555
[373] valid_0's rmse: 16.2531
[374] valid_0's rmse: 16.251
[375] valid_0's rmse: 16.2488
[376] valid_0's rmse: 16.2466
[377] valid_0's rmse: 16.244
[378] valid_0's rmse: 16.2416
[379] valid_0's rmse: 16.2396
[380] valid_0's rmse: 16.2376
[381] valid_0's rmse: 16.2354
[382] valid_0's rmse: 16.2336
[383] valid_0's rmse: 16.2314
[384] valid_0's rmse: 16.2294
[385] valid_0's rmse: 16.227

[386] valid_0's rmse: 16.2248
[387] valid_0's rmse: 16.2227
[388] valid_0's rmse: 16.221
[389] valid_0's rmse: 16.2192
[390] valid_0's rmse: 16.2172
[391] valid_0's rmse: 16.2153
[392] valid_0's rmse: 16.2133
[393] valid_0's rmse: 16.2115
[394] valid_0's rmse: 16.2095
[395] valid_0's rmse: 16.2077
[396] valid_0's rmse: 16.2062
[397] valid_0's rmse: 16.2043
[398] valid_0's rmse: 16.2028
[399] valid_0's rmse: 16.2011
[400] valid_0's rmse: 16.199
[401] valid_0's rmse: 16.1972
[402] valid_0's rmse: 16.1955
[403] valid_0's rmse: 16.1936
[404] valid_0's rmse: 16.1923
[405] valid_0's rmse: 16.1906
[406] valid_0's rmse: 16.1888
[407] valid_0's rmse: 16.1868
[408] valid_0's rmse: 16.1848
[409] valid_0's rmse: 16.1835
[410] valid_0's rmse: 16.182
[411] valid_0's rmse: 16.1804
[412] valid_0's rmse: 16.1789
[413] valid_0's rmse: 16.1771
[414] valid_0's rmse: 16.1758
[415] valid_0's rmse: 16.1742
[416] valid_0's rmse: 16.1728
[417] valid_0's rmse: 16.1712
[418] valid_0's rmse: 16.1696
[419] valid_0's rmse: 16.1679
[420] valid_0's rmse: 16.1667
[421] valid_0's rmse: 16.1654
[422] valid_0's rmse: 16.1641
[423] valid_0's rmse: 16.1624
[424] valid_0's rmse: 16.1609
[425] valid_0's rmse: 16.1597
[426] valid_0's rmse: 16.158
[427] valid_0's rmse: 16.1566
[428] valid_0's rmse: 16.1553
[429] valid_0's rmse: 16.1542
[430] valid_0's rmse: 16.153
[431] valid_0's rmse: 16.1518
[432] valid_0's rmse: 16.1502
[433] valid_0's rmse: 16.149

[434] valid_0's rmse: 16.1476
[435] valid_0's rmse: 16.1463
[436] valid_0's rmse: 16.1452
[437] valid_0's rmse: 16.1435
[438] valid_0's rmse: 16.1425
[439] valid_0's rmse: 16.1413
[440] valid_0's rmse: 16.1403
[441] valid_0's rmse: 16.1389
[442] valid_0's rmse: 16.1377
[443] valid_0's rmse: 16.1365
[444] valid_0's rmse: 16.1354
[445] valid_0's rmse: 16.1341
[446] valid_0's rmse: 16.1331
[447] valid_0's rmse: 16.1319
[448] valid_0's rmse: 16.1307
[449] valid_0's rmse: 16.1295
[450] valid_0's rmse: 16.1285
[451] valid_0's rmse: 16.1274
[452] valid_0's rmse: 16.1266
[453] valid_0's rmse: 16.1253
[454] valid_0's rmse: 16.1242
[455] valid_0's rmse: 16.1229
[456] valid_0's rmse: 16.122
[457] valid_0's rmse: 16.1212
[458] valid_0's rmse: 16.1201
[459] valid_0's rmse: 16.119
[460] valid_0's rmse: 16.1182
[461] valid_0's rmse: 16.1171
[462] valid_0's rmse: 16.1157
[463] valid_0's rmse: 16.1147
[464] valid_0's rmse: 16.1136
[465] valid_0's rmse: 16.1126
[466] valid_0's rmse: 16.1118
[467] valid_0's rmse: 16.111
[468] valid_0's rmse: 16.1098
[469] valid_0's rmse: 16.1086
[470] valid_0's rmse: 16.1074
[471] valid_0's rmse: 16.1066
[472] valid_0's rmse: 16.1058
[473] valid_0's rmse: 16.1053
[474] valid_0's rmse: 16.1044
[475] valid_0's rmse: 16.1034
[476] valid_0's rmse: 16.1023
[477] valid_0's rmse: 16.1013
[478] valid_0's rmse: 16.1004
[479] valid_0's rmse: 16.0995
[480] valid_0's rmse: 16.0988
[481] valid_0's rmse: 16.098

[482] valid_0's rmse: 16.097
[483] valid_0's rmse: 16.0963
[484] valid_0's rmse: 16.0954
[485] valid_0's rmse: 16.0946
[486] valid_0's rmse: 16.0938
[487] valid_0's rmse: 16.0934
[488] valid_0's rmse: 16.0926
[489] valid_0's rmse: 16.0918
[490] valid_0's rmse: 16.0909
[491] valid_0's rmse: 16.0901
[492] valid_0's rmse: 16.0896
[493] valid_0's rmse: 16.0888
[494] valid_0's rmse: 16.088
[495] valid_0's rmse: 16.0874
[496] valid_0's rmse: 16.0866
[497] valid_0's rmse: 16.0861
[498] valid_0's rmse: 16.0852
[499] valid_0's rmse: 16.0843
[500] valid_0's rmse: 16.0835
[501] valid_0's rmse: 16.0827
[502] valid_0's rmse: 16.0822
[503] valid_0's rmse: 16.0813
[504] valid_0's rmse: 16.0806
[505] valid_0's rmse: 16.0798
[506] valid_0's rmse: 16.0794
[507] valid_0's rmse: 16.0787
[508] valid_0's rmse: 16.0782
[509] valid_0's rmse: 16.0776
[510] valid_0's rmse: 16.0768
[511] valid_0's rmse: 16.0763
[512] valid_0's rmse: 16.0757
[513] valid_0's rmse: 16.075
[514] valid_0's rmse: 16.0741
[515] valid_0's rmse: 16.0733
[516] valid_0's rmse: 16.0727
[517] valid_0's rmse: 16.0722
[518] valid_0's rmse: 16.0716
[519] valid_0's rmse: 16.0711
[520] valid_0's rmse: 16.0705
[521] valid_0's rmse: 16.0699
[522] valid_0's rmse: 16.0695
[523] valid_0's rmse: 16.069
[524] valid_0's rmse: 16.0684
[525] valid_0's rmse: 16.0678
[526] valid_0's rmse: 16.0671
[527] valid_0's rmse: 16.0665
[528] valid_0's rmse: 16.066
[529] valid_0's rmse: 16.0654

[530] valid_0's rmse: 16.0646
[531] valid_0's rmse: 16.064
[532] valid_0's rmse: 16.0636
[533] valid_0's rmse: 16.0631
[534] valid_0's rmse: 16.0625
[535] valid_0's rmse: 16.0621
[536] valid_0's rmse: 16.0615
[537] valid_0's rmse: 16.0609
[538] valid_0's rmse: 16.0603
[539] valid_0's rmse: 16.0599
[540] valid_0's rmse: 16.0592
[541] valid_0's rmse: 16.0587
[542] valid_0's rmse: 16.0584
[543] valid_0's rmse: 16.0578
[544] valid_0's rmse: 16.0573
[545] valid_0's rmse: 16.0567
[546] valid_0's rmse: 16.0561
[547] valid_0's rmse: 16.0555
[548] valid_0's rmse: 16.0552
[549] valid_0's rmse: 16.0546
[550] valid_0's rmse: 16.0544
[551] valid_0's rmse: 16.054
[552] valid_0's rmse: 16.0534
[553] valid_0's rmse: 16.053
[554] valid_0's rmse: 16.0525
[555] valid_0's rmse: 16.052
[556] valid_0's rmse: 16.0516
[557] valid_0's rmse: 16.0511
[558] valid_0's rmse: 16.0507
[559] valid_0's rmse: 16.0499
[560] valid_0's rmse: 16.0495
[561] valid_0's rmse: 16.049
[562] valid_0's rmse: 16.0487
[563] valid_0's rmse: 16.0483
[564] valid_0's rmse: 16.0479
[565] valid_0's rmse: 16.0477
[566] valid_0's rmse: 16.0473
[567] valid_0's rmse: 16.0471
[568] valid_0's rmse: 16.0467
[569] valid_0's rmse: 16.0462
[570] valid_0's rmse: 16.0458
[571] valid_0's rmse: 16.0454
[572] valid_0's rmse: 16.0452
[573] valid_0's rmse: 16.0448
[574] valid_0's rmse: 16.0442
[575] valid_0's rmse: 16.0436
[576] valid_0's rmse: 16.0433
[577] valid_0's rmse: 16.043

[578] valid_0's rmse: 16.0427
[579] valid_0's rmse: 16.0422
[580] valid_0's rmse: 16.0419
[581] valid_0's rmse: 16.0416
[582] valid_0's rmse: 16.0412
[583] valid_0's rmse: 16.0407
[584] valid_0's rmse: 16.0405
[585] valid_0's rmse: 16.0401
[586] valid_0's rmse: 16.0395
[587] valid_0's rmse: 16.0392
[588] valid_0's rmse: 16.0388
[589] valid_0's rmse: 16.0384
[590] valid_0's rmse: 16.0378
[591] valid_0's rmse: 16.0373
[592] valid_0's rmse: 16.0368
[593] valid_0's rmse: 16.0362
[594] valid_0's rmse: 16.0359
[595] valid_0's rmse: 16.0358
[596] valid_0's rmse: 16.0355
[597] valid_0's rmse: 16.0352
[598] valid_0's rmse: 16.0346
[599] valid_0's rmse: 16.0343
[600] valid_0's rmse: 16.0339
[601] valid_0's rmse: 16.0336
[602] valid_0's rmse: 16.0333
[603] valid_0's rmse: 16.0327
[604] valid_0's rmse: 16.0325
[605] valid_0's rmse: 16.0322
[606] valid_0's rmse: 16.0319
[607] valid_0's rmse: 16.0315
[608] valid_0's rmse: 16.0311
[609] valid_0's rmse: 16.0307
[610] valid_0's rmse: 16.0305
[611] valid_0's rmse: 16.0302
[612] valid_0's rmse: 16.03
[613] valid_0's rmse: 16.0294
[614] valid_0's rmse: 16.0291
[615] valid_0's rmse: 16.0286
[616] valid_0's rmse: 16.0284
[617] valid_0's rmse: 16.028
[618] valid_0's rmse: 16.0277
[619] valid_0's rmse: 16.0273
[620] valid_0's rmse: 16.0272
[621] valid_0's rmse: 16.0269
[622] valid_0's rmse: 16.0266
[623] valid_0's rmse: 16.0263
[624] valid_0's rmse: 16.0259
[625] valid_0's rmse: 16.0255

[626] valid_0's rmse: 16.0252
[627] valid_0's rmse: 16.0247
[628] valid_0's rmse: 16.0245
[629] valid_0's rmse: 16.0244
[630] valid_0's rmse: 16.0242
[631] valid_0's rmse: 16.024
[632] valid_0's rmse: 16.0238
[633] valid_0's rmse: 16.0233
[634] valid_0's rmse: 16.023
[635] valid_0's rmse: 16.0229
[636] valid_0's rmse: 16.0226
[637] valid_0's rmse: 16.0224
[638] valid_0's rmse: 16.022
[639] valid_0's rmse: 16.0214
[640] valid_0's rmse: 16.021
[641] valid_0's rmse: 16.0207
[642] valid_0's rmse: 16.0202
[643] valid_0's rmse: 16.0199
[644] valid_0's rmse: 16.0197
[645] valid_0's rmse: 16.0194
[646] valid_0's rmse: 16.0192
[647] valid_0's rmse: 16.0189
[648] valid_0's rmse: 16.0186
[649] valid_0's rmse: 16.0183
[650] valid_0's rmse: 16.0182
[651] valid_0's rmse: 16.0177
[652] valid_0's rmse: 16.0173
[653] valid_0's rmse: 16.017
[654] valid_0's rmse: 16.0169
[655] valid_0's rmse: 16.0167
[656] valid_0's rmse: 16.0163
[657] valid_0's rmse: 16.0161
[658] valid_0's rmse: 16.016
[659] valid_0's rmse: 16.0158
[660] valid_0's rmse: 16.0156
[661] valid_0's rmse: 16.0152
[662] valid_0's rmse: 16.0147
[663] valid_0's rmse: 16.0144
[664] valid_0's rmse: 16.0142
[665] valid_0's rmse: 16.0139
[666] valid_0's rmse: 16.0136
[667] valid_0's rmse: 16.0135
[668] valid_0's rmse: 16.0134
[669] valid_0's rmse: 16.0133
[670] valid_0's rmse: 16.0131
[671] valid_0's rmse: 16.0129
[672] valid_0's rmse: 16.0126
[673] valid_0's rmse: 16.0122

[674] valid_0's rmse: 16.0119
[675] valid_0's rmse: 16.0118
[676] valid_0's rmse: 16.0117
[677] valid_0's rmse: 16.0114
[678] valid_0's rmse: 16.0111
[679] valid_0's rmse: 16.0105
[680] valid_0's rmse: 16.0101
[681] valid_0's rmse: 16.0098
[682] valid_0's rmse: 16.0094
[683] valid_0's rmse: 16.0093
[684] valid_0's rmse: 16.0091
[685] valid_0's rmse: 16.0086
[686] valid_0's rmse: 16.0085
[687] valid_0's rmse: 16.0081
[688] valid_0's rmse: 16.0078
[689] valid_0's rmse: 16.0077
[690] valid_0's rmse: 16.0075
[691] valid_0's rmse: 16.0072
[692] valid_0's rmse: 16.007
[693] valid_0's rmse: 16.0067
[694] valid_0's rmse: 16.0066
[695] valid_0's rmse: 16.0064
[696] valid_0's rmse: 16.0062
[697] valid_0's rmse: 16.0061
[698] valid_0's rmse: 16.0058
[699] valid_0's rmse: 16.0054
[700] valid_0's rmse: 16.0052
[701] valid_0's rmse: 16.005
[702] valid_0's rmse: 16.0045
[703] valid_0's rmse: 16.0041
[704] valid_0's rmse: 16.0037
[705] valid_0's rmse: 16.0035
[706] valid_0's rmse: 16.0031
[707] valid_0's rmse: 16.0029
[708] valid_0's rmse: 16.0028
[709] valid_0's rmse: 16.0027
[710] valid_0's rmse: 16.0022
[711] valid_0's rmse: 16.002
[712] valid_0's rmse: 16.0018
[713] valid_0's rmse: 16.0014
[714] valid_0's rmse: 16.0013
[715] valid_0's rmse: 16.0013
[716] valid_0's rmse: 16.001
[717] valid_0's rmse: 16.0008
[718] valid_0's rmse: 16.0007
[719] valid_0's rmse: 16.0003
[720] valid_0's rmse: 16.0001
[721] valid_0's rmse: 15.9998

[722] valid_0's rmse: 15.9996
[723] valid_0's rmse: 15.9994
[724] valid_0's rmse: 15.9992
[725] valid_0's rmse: 15.9991
[726] valid_0's rmse: 15.9989
[727] valid_0's rmse: 15.9988
[728] valid_0's rmse: 15.9986
[729] valid_0's rmse: 15.9985
[730] valid_0's rmse: 15.9984
[731] valid_0's rmse: 15.9982
[732] valid_0's rmse: 15.9979
[733] valid_0's rmse: 15.9975
[734] valid_0's rmse: 15.9972
[735] valid_0's rmse: 15.9969
[736] valid_0's rmse: 15.9967
[737] valid_0's rmse: 15.9962
[738] valid_0's rmse: 15.9961
[739] valid_0's rmse: 15.9959
[740] valid_0's rmse: 15.9955
[741] valid_0's rmse: 15.9954
[742] valid_0's rmse: 15.9953
[743] valid_0's rmse: 15.9952
[744] valid_0's rmse: 15.9949
[745] valid_0's rmse: 15.9947
[746] valid_0's rmse: 15.9945
[747] valid_0's rmse: 15.9942
[748] valid_0's rmse: 15.9941
[749] valid_0's rmse: 15.9941
[750] valid_0's rmse: 15.9938
[751] valid_0's rmse: 15.9937
[752] valid_0's rmse: 15.9936
[753] valid_0's rmse: 15.9934
[754] valid_0's rmse: 15.9933
[755] valid_0's rmse: 15.9932
[756] valid_0's rmse: 15.9931
[757] valid_0's rmse: 15.993
[758] valid_0's rmse: 15.9928
[759] valid_0's rmse: 15.9927
[760] valid_0's rmse: 15.9924
[761] valid_0's rmse: 15.9921
[762] valid_0's rmse: 15.992
[763] valid_0's rmse: 15.9919
[764] valid_0's rmse: 15.9918
[765] valid_0's rmse: 15.9916
[766] valid_0's rmse: 15.9914
[767] valid_0's rmse: 15.9912
[768] valid_0's rmse: 15.9907
[769] valid_0's rmse: 15.9905

[770] valid_0's rmse: 15.9901
[771] valid_0's rmse: 15.9899
[772] valid_0's rmse: 15.9896
[773] valid_0's rmse: 15.9897
[774] valid_0's rmse: 15.9895
[775] valid_0's rmse: 15.9894
[776] valid_0's rmse: 15.9892
[777] valid_0's rmse: 15.9891
[778] valid_0's rmse: 15.9889
[779] valid_0's rmse: 15.9888
[780] valid_0's rmse: 15.9888
[781] valid_0's rmse: 15.9887
[782] valid_0's rmse: 15.9885
[783] valid_0's rmse: 15.9882
[784] valid_0's rmse: 15.9881
[785] valid_0's rmse: 15.9881
[786] valid_0's rmse: 15.9879
[787] valid_0's rmse: 15.9877
[788] valid_0's rmse: 15.9875
[789] valid_0's rmse: 15.9874
[790] valid_0's rmse: 15.9872
[791] valid_0's rmse: 15.9872
[792] valid_0's rmse: 15.987
[793] valid_0's rmse: 15.9869
[794] valid_0's rmse: 15.9866
[795] valid_0's rmse: 15.9865
[796] valid_0's rmse: 15.9864
[797] valid_0's rmse: 15.9864
[798] valid_0's rmse: 15.9863
[799] valid_0's rmse: 15.986
[800] valid_0's rmse: 15.986
[801] valid_0's rmse: 15.9859
[802] valid_0's rmse: 15.9856
[803] valid_0's rmse: 15.9856
[804] valid_0's rmse: 15.9854
[805] valid_0's rmse: 15.9854
[806] valid_0's rmse: 15.9852
[807] valid_0's rmse: 15.9851
[808] valid_0's rmse: 15.985
[809] valid_0's rmse: 15.9847
[810] valid_0's rmse: 15.9845
[811] valid_0's rmse: 15.9843
[812] valid_0's rmse: 15.9841
[813] valid_0's rmse: 15.9838
[814] valid_0's rmse: 15.9836
[815] valid_0's rmse: 15.9836
[816] valid_0's rmse: 15.9835
[817] valid_0's rmse: 15.9834

[818] valid_0's rmse: 15.9831
[819] valid_0's rmse: 15.983
[820] valid_0's rmse: 15.9828
[821] valid_0's rmse: 15.9826
[822] valid_0's rmse: 15.9826
[823] valid_0's rmse: 15.9824
[824] valid_0's rmse: 15.9823
[825] valid_0's rmse: 15.9819
[826] valid_0's rmse: 15.9818
[827] valid_0's rmse: 15.9816
[828] valid_0's rmse: 15.9816
[829] valid_0's rmse: 15.9812
[830] valid_0's rmse: 15.9812
[831] valid_0's rmse: 15.9812
[832] valid_0's rmse: 15.981
[833] valid_0's rmse: 15.9808
[834] valid_0's rmse: 15.9807
[835] valid_0's rmse: 15.9805
[836] valid_0's rmse: 15.9804
[837] valid_0's rmse: 15.9802
[838] valid_0's rmse: 15.9802
[839] valid_0's rmse: 15.98
[840] valid_0's rmse: 15.9798
[841] valid_0's rmse: 15.9798
[842] valid_0's rmse: 15.9796
[843] valid_0's rmse: 15.9795
[844] valid_0's rmse: 15.9792
[845] valid_0's rmse: 15.9789
[846] valid_0's rmse: 15.9788
[847] valid_0's rmse: 15.9785
[848] valid_0's rmse: 15.9784
[849] valid_0's rmse: 15.9783
[850] valid_0's rmse: 15.9783
[851] valid_0's rmse: 15.9781
[852] valid_0's rmse: 15.978
[853] valid_0's rmse: 15.9779
[854] valid_0's rmse: 15.9778
[855] valid_0's rmse: 15.9777
[856] valid_0's rmse: 15.9777
[857] valid_0's rmse: 15.9777
[858] valid_0's rmse: 15.9776
[859] valid_0's rmse: 15.9774
[860] valid_0's rmse: 15.9774
[861] valid_0's rmse: 15.9773
[862] valid_0's rmse: 15.9771
[863] valid_0's rmse: 15.9769
[864] valid_0's rmse: 15.9769
[865] valid_0's rmse: 15.977

[866] valid_0's rmse: 15.9769
[867] valid_0's rmse: 15.9769
[868] valid_0's rmse: 15.9767
[869] valid_0's rmse: 15.9766
[870] valid_0's rmse: 15.9765
[871] valid_0's rmse: 15.9765
[872] valid_0's rmse: 15.9763
[873] valid_0's rmse: 15.9762
[874] valid_0's rmse: 15.9761
[875] valid_0's rmse: 15.9759
[876] valid_0's rmse: 15.9759
[877] valid_0's rmse: 15.9756
[878] valid_0's rmse: 15.9754
[879] valid_0's rmse: 15.9753
[880] valid_0's rmse: 15.9752
[881] valid_0's rmse: 15.9751
[882] valid_0's rmse: 15.9749
[883] valid_0's rmse: 15.9748
[884] valid_0's rmse: 15.9748
[885] valid_0's rmse: 15.9747
[886] valid_0's rmse: 15.9746
[887] valid_0's rmse: 15.9745
[888] valid_0's rmse: 15.9744
[889] valid_0's rmse: 15.9744
[890] valid_0's rmse: 15.9743
[891] valid_0's rmse: 15.9741
[892] valid_0's rmse: 15.9741
[893] valid_0's rmse: 15.9741
[894] valid_0's rmse: 15.9739
[895] valid_0's rmse: 15.9738
[896] valid_0's rmse: 15.9737
[897] valid_0's rmse: 15.9734
[898] valid_0's rmse: 15.9734
[899] valid_0's rmse: 15.9732
[900] valid_0's rmse: 15.9731
[901] valid_0's rmse: 15.9728
[902] valid_0's rmse: 15.9727
[903] valid_0's rmse: 15.9725
[904] valid_0's rmse: 15.9723
[905] valid_0's rmse: 15.9722
[906] valid_0's rmse: 15.9722
[907] valid_0's rmse: 15.9721
[908] valid_0's rmse: 15.972
[909] valid_0's rmse: 15.972
[910] valid_0's rmse: 15.9719
[911] valid_0's rmse: 15.9717
[912] valid_0's rmse: 15.9718
[913] valid_0's rmse: 15.9717

[914] valid_0's rmse: 15.9716
[915] valid_0's rmse: 15.9714
[916] valid_0's rmse: 15.9713
[917] valid_0's rmse: 15.9712
[918] valid_0's rmse: 15.971
[919] valid_0's rmse: 15.971
[920] valid_0's rmse: 15.971
[921] valid_0's rmse: 15.9709
[922] valid_0's rmse: 15.9709
[923] valid_0's rmse: 15.9708
[924] valid_0's rmse: 15.9707
[925] valid_0's rmse: 15.9706
[926] valid_0's rmse: 15.9705
[927] valid_0's rmse: 15.9703
[928] valid_0's rmse: 15.9702
[929] valid_0's rmse: 15.9702
[930] valid_0's rmse: 15.9701
[931] valid_0's rmse: 15.97
[932] valid_0's rmse: 15.97
[933] valid_0's rmse: 15.97
[934] valid_0's rmse: 15.9699
[935] valid_0's rmse: 15.9699
[936] valid_0's rmse: 15.9698
[937] valid_0's rmse: 15.9697
[938] valid_0's rmse: 15.9696
[939] valid_0's rmse: 15.9695
[940] valid_0's rmse: 15.9694
[941] valid_0's rmse: 15.9693
[942] valid_0's rmse: 15.9692
[943] valid_0's rmse: 15.9691
[944] valid_0's rmse: 15.9691
[945] valid_0's rmse: 15.9691
[946] valid_0's rmse: 15.9689
[947] valid_0's rmse: 15.9689
[948] valid_0's rmse: 15.9688
[949] valid_0's rmse: 15.9686
[950] valid_0's rmse: 15.9686
[951] valid_0's rmse: 15.9686
[952] valid_0's rmse: 15.9684
[953] valid_0's rmse: 15.9683
[954] valid_0's rmse: 15.9682
[955] valid_0's rmse: 15.9681
[956] valid_0's rmse: 15.968
[957] valid_0's rmse: 15.968
[958] valid_0's rmse: 15.9678
[959] valid_0's rmse: 15.9678
[960] valid_0's rmse: 15.9677
[961] valid_0's rmse: 15.9676

[962] valid_0's rmse: 15.9675
[963] valid_0's rmse: 15.9675
[964] valid_0's rmse: 15.9674
[965] valid_0's rmse: 15.9674
[966] valid_0's rmse: 15.9673
[967] valid_0's rmse: 15.9673
[968] valid_0's rmse: 15.9671
[969] valid_0's rmse: 15.9671
[970] valid_0's rmse: 15.967
[971] valid_0's rmse: 15.9669
[972] valid_0's rmse: 15.9669
[973] valid_0's rmse: 15.9669
[974] valid_0's rmse: 15.9668
[975] valid_0's rmse: 15.9667
[976] valid_0's rmse: 15.9667
[977] valid_0's rmse: 15.9666
[978] valid_0's rmse: 15.9665
[979] valid_0's rmse: 15.9665
[980] valid_0's rmse: 15.9664
[981] valid_0's rmse: 15.9663
[982] valid_0's rmse: 15.9662
[983] valid_0's rmse: 15.9661
[984] valid_0's rmse: 15.966
[985] valid_0's rmse: 15.9657
[986] valid_0's rmse: 15.9657
[987] valid_0's rmse: 15.9656
[988] valid_0's rmse: 15.9655
[989] valid_0's rmse: 15.9654
[990] valid_0's rmse: 15.9654
[991] valid_0's rmse: 15.9652
[992] valid_0's rmse: 15.9652
[993] valid_0's rmse: 15.9651
[994] valid_0's rmse: 15.9651
[995] valid_0's rmse: 15.965
[996] valid_0's rmse: 15.9649
[997] valid_0's rmse: 15.9647
[998] valid_0's rmse: 15.9647
[999] valid_0's rmse: 15.9647
[1000] valid_0's rmse: 15.9646
[1001] valid_0's rmse: 15.9646
[1002] valid_0's rmse: 15.9645
[1003] valid_0's rmse: 15.9645
[1004] valid_0's rmse: 15.9645
[1005] valid_0's rmse: 15.9644
[1006] valid_0's rmse: 15.9644
[1007] valid_0's rmse: 15.9643
[1008] valid_0's rmse: 15.9641
[1009] valid_0's rmse: 15.9639

[1010] valid_0's rmse: 15.9638
[1011] valid_0's rmse: 15.9637
[1012] valid_0's rmse: 15.9636
[1013] valid_0's rmse: 15.9635
[1014] valid_0's rmse: 15.9635
[1015] valid_0's rmse: 15.9635
[1016] valid_0's rmse: 15.9634
[1017] valid_0's rmse: 15.9633
[1018] valid_0's rmse: 15.9633
[1019] valid_0's rmse: 15.9631
[1020] valid_0's rmse: 15.963
[1021] valid_0's rmse: 15.963
[1022] valid_0's rmse: 15.9629
[1023] valid_0's rmse: 15.9628
[1024] valid_0's rmse: 15.9628
[1025] valid_0's rmse: 15.9626
[1026] valid_0's rmse: 15.9626
[1027] valid_0's rmse: 15.9624
[1028] valid_0's rmse: 15.9624
[1029] valid_0's rmse: 15.9621
[1030] valid_0's rmse: 15.9621
[1031] valid_0's rmse: 15.962
[1032] valid_0's rmse: 15.9621
[1033] valid_0's rmse: 15.9619
[1034] valid_0's rmse: 15.9618
[1035] valid_0's rmse: 15.9615
[1036] valid_0's rmse: 15.9615
[1037] valid_0's rmse: 15.9614
[1038] valid_0's rmse: 15.9614
[1039] valid_0's rmse: 15.9613
[1040] valid_0's rmse: 15.9613
[1041] valid_0's rmse: 15.9613
[1042] valid_0's rmse: 15.9612
[1043] valid_0's rmse: 15.9611
[1044] valid_0's rmse: 15.961
[1045] valid_0's rmse: 15.9609
[1046] valid_0's rmse: 15.9607
[1047] valid_0's rmse: 15.9607
[1048] valid_0's rmse: 15.9607
[1049] valid_0's rmse: 15.9604
[1050] valid_0's rmse: 15.9603
[1051] valid_0's rmse: 15.9604
[1052] valid_0's rmse: 15.9603
[1053] valid_0's rmse: 15.9602
[1054] valid_0's rmse: 15.9601
[1055] valid_0's rmse: 15.9598
[1056] valid_0's rmse: 15.9597
[1057] valid_0's rmse: 15.9597

[1058] valid_0's rmse: 15.9595
[1059] valid_0's rmse: 15.9595
[1060] valid_0's rmse: 15.9594
[1061] valid_0's rmse: 15.9594
[1062] valid_0's rmse: 15.9594
[1063] valid_0's rmse: 15.9593
[1064] valid_0's rmse: 15.9594
[1065] valid_0's rmse: 15.9592
[1066] valid_0's rmse: 15.9593
[1067] valid_0's rmse: 15.9592
[1068] valid_0's rmse: 15.9591
[1069] valid_0's rmse: 15.9591
[1070] valid_0's rmse: 15.9589
[1071] valid_0's rmse: 15.9588
[1072] valid_0's rmse: 15.9588
[1073] valid_0's rmse: 15.9587
[1074] valid_0's rmse: 15.9587
[1075] valid_0's rmse: 15.9587
[1076] valid_0's rmse: 15.9586
[1077] valid_0's rmse: 15.9584
[1078] valid_0's rmse: 15.9582
[1079] valid_0's rmse: 15.9582
[1080] valid_0's rmse: 15.9582
[1081] valid_0's rmse: 15.9581
[1082] valid_0's rmse: 15.9581
[1083] valid_0's rmse: 15.958
[1084] valid_0's rmse: 15.958
[1085] valid_0's rmse: 15.9579
[1086] valid_0's rmse: 15.9579
[1087] valid_0's rmse: 15.9579
[1088] valid_0's rmse: 15.9578
[1089] valid_0's rmse: 15.9578
[1090] valid_0's rmse: 15.9577
[1091] valid_0's rmse: 15.9576
[1092] valid_0's rmse: 15.9576
[1093] valid_0's rmse: 15.9576
[1094] valid_0's rmse: 15.9575
[1095] valid_0's rmse: 15.9575
[1096] valid_0's rmse: 15.9573
[1097] valid_0's rmse: 15.9573
[1098] valid_0's rmse: 15.9573
[1099] valid_0's rmse: 15.9572
[1100] valid_0's rmse: 15.9572
[1101] valid_0's rmse: 15.9572
[1102] valid_0's rmse: 15.9572
[1103] valid_0's rmse: 15.9572
[1104] valid_0's rmse: 15.9572
[1105] valid_0's rmse: 15.9572

[1106] valid_0's rmse: 15.9572
[1107] valid_0's rmse: 15.9571
[1108] valid_0's rmse: 15.957
[1109] valid_0's rmse: 15.957
[1110] valid_0's rmse: 15.9568
[1111] valid_0's rmse: 15.9567
[1112] valid_0's rmse: 15.9567
[1113] valid_0's rmse: 15.9567
[1114] valid_0's rmse: 15.9566
[1115] valid_0's rmse: 15.9566
[1116] valid_0's rmse: 15.9565
[1117] valid_0's rmse: 15.9564
[1118] valid_0's rmse: 15.9563
[1119] valid_0's rmse: 15.9562
[1120] valid_0's rmse: 15.9561
[1121] valid_0's rmse: 15.9561
[1122] valid_0's rmse: 15.9561
[1123] valid_0's rmse: 15.9561
[1124] valid_0's rmse: 15.956
[1125] valid_0's rmse: 15.956
[1126] valid_0's rmse: 15.956
[1127] valid_0's rmse: 15.956
[1128] valid_0's rmse: 15.956
[1129] valid_0's rmse: 15.956
[1130] valid_0's rmse: 15.9559
[1131] valid_0's rmse: 15.9559
[1132] valid_0's rmse: 15.9558
[1133] valid_0's rmse: 15.9557
[1134] valid_0's rmse: 15.9556
[1135] valid_0's rmse: 15.9556
[1136] valid_0's rmse: 15.9555
[1137] valid_0's rmse: 15.9555
[1138] valid_0's rmse: 15.9554
[1139] valid_0's rmse: 15.9554
[1140] valid_0's rmse: 15.9553
[1141] valid_0's rmse: 15.9552
[1142] valid_0's rmse: 15.9552
[1143] valid_0's rmse: 15.9551
[1144] valid_0's rmse: 15.9551
[1145] valid_0's rmse: 15.9551
[1146] valid_0's rmse: 15.9551
[1147] valid_0's rmse: 15.9551
[1148] valid_0's rmse: 15.9549
[1149] valid_0's rmse: 15.9548
[1150] valid_0's rmse: 15.9547
[1151] valid_0's rmse: 15.9546
[1152] valid_0's rmse: 15.9546
[1153] valid_0's rmse: 15.9545

[1154] valid_0's rmse: 15.9544
[1155] valid_0's rmse: 15.9544
[1156] valid_0's rmse: 15.9544
[1157] valid_0's rmse: 15.9544
[1158] valid_0's rmse: 15.9543
[1159] valid_0's rmse: 15.9543
[1160] valid_0's rmse: 15.9543
[1161] valid_0's rmse: 15.9542
[1162] valid_0's rmse: 15.9543
[1163] valid_0's rmse: 15.9542
[1164] valid_0's rmse: 15.9541
[1165] valid_0's rmse: 15.954
[1166] valid_0's rmse: 15.9541
[1167] valid_0's rmse: 15.954
[1168] valid_0's rmse: 15.954
[1169] valid_0's rmse: 15.9539
[1170] valid_0's rmse: 15.9538
[1171] valid_0's rmse: 15.9539
[1172] valid_0's rmse: 15.9538
[1173] valid_0's rmse: 15.9538
[1174] valid_0's rmse: 15.9538
[1175] valid_0's rmse: 15.9538
[1176] valid_0's rmse: 15.9538
[1177] valid_0's rmse: 15.9538
[1178] valid_0's rmse: 15.9538
[1179] valid_0's rmse: 15.9538
[1180] valid_0's rmse: 15.9537
[1181] valid_0's rmse: 15.9537
[1182] valid_0's rmse: 15.9536
[1183] valid_0's rmse: 15.9535
[1184] valid_0's rmse: 15.9534
[1185] valid_0's rmse: 15.9534
[1186] valid_0's rmse: 15.9534
[1187] valid_0's rmse: 15.9532
[1188] valid_0's rmse: 15.9532
[1189] valid_0's rmse: 15.9533
[1190] valid_0's rmse: 15.9531
[1191] valid_0's rmse: 15.953
[1192] valid_0's rmse: 15.9529
[1193] valid_0's rmse: 15.9528
[1194] valid_0's rmse: 15.9528
[1195] valid_0's rmse: 15.9528
[1196] valid_0's rmse: 15.9528
[1197] valid_0's rmse: 15.9528
[1198] valid_0's rmse: 15.9526
[1199] valid_0's rmse: 15.9526
[1200] valid_0's rmse: 15.9526
[1201] valid_0's rmse: 15.9525

[1202]	valid_0's rmse: 15.9525
[1203]	valid_0's rmse: 15.9525
[1204]	valid_0's rmse: 15.9525
[1205]	valid_0's rmse: 15.9525
[1206]	valid_0's rmse: 15.9525
[1207]	valid_0's rmse: 15.9525
[1208]	valid_0's rmse: 15.9525
[1209]	valid_0's rmse: 15.9524
[1210]	valid_0's rmse: 15.9524
[1211]	valid_0's rmse: 15.9523
[1212]	valid_0's rmse: 15.9523
[1213]	valid_0's rmse: 15.9523
[1214]	valid_0's rmse: 15.9523
[1215]	valid_0's rmse: 15.9523
[1216]	valid_0's rmse: 15.9521
[1217]	valid_0's rmse: 15.9522
[1218]	valid_0's rmse: 15.9522
[1219]	valid_0's rmse: 15.9521
[1220]	valid_0's rmse: 15.9521
[1221]	valid_0's rmse: 15.952
[1222]	valid_0's rmse: 15.9519
[1223]	valid_0's rmse: 15.9519
[1224]	valid_0's rmse: 15.9519
[1225]	valid_0's rmse: 15.9518
[1226]	valid_0's rmse: 15.9518
[1227]	valid_0's rmse: 15.9517
[1228]	valid_0's rmse: 15.9517
[1229]	valid_0's rmse: 15.9517
[1230]	valid_0's rmse: 15.9517
[1231]	valid_0's rmse: 15.9516
[1232]	valid_0's rmse: 15.9514
[1233]	valid_0's rmse: 15.9514
[1234]	valid_0's rmse: 15.9514
[1235]	valid_0's rmse: 15.9514
[1236]	valid_0's rmse: 15.9514
[1237]	valid_0's rmse: 15.9514
[1238]	valid_0's rmse: 15.9513
[1239]	valid_0's rmse: 15.9512
[1240]	valid_0's rmse: 15.9512
[1241]	valid_0's rmse: 15.9511
[1242]	valid_0's rmse: 15.9511
[1243]	valid_0's rmse: 15.951
[1244]	valid_0's rmse: 15.9509
[1245]	valid_0's rmse: 15.9509
[1246]	valid_0's rmse: 15.9509
[1247]	valid_0's rmse: 15.9509
[1248]	valid_0's rmse: 15.9509
[1249]	valid_0's rmse: 15.9508

[1250] valid_0's rmse: 15.9508
[1251] valid_0's rmse: 15.9508
[1252] valid_0's rmse: 15.9508
[1253] valid_0's rmse: 15.9508
[1254] valid_0's rmse: 15.9508
[1255] valid_0's rmse: 15.9508
[1256] valid_0's rmse: 15.9508
[1257] valid_0's rmse: 15.9508
[1258] valid_0's rmse: 15.9507
[1259] valid_0's rmse: 15.9507
[1260] valid_0's rmse: 15.9507
[1261] valid_0's rmse: 15.9507
[1262] valid_0's rmse: 15.9507
[1263] valid_0's rmse: 15.9507
[1264] valid_0's rmse: 15.9506
[1265] valid_0's rmse: 15.9506
[1266] valid_0's rmse: 15.9506
[1267] valid_0's rmse: 15.9505
[1268] valid_0's rmse: 15.9505
[1269] valid_0's rmse: 15.9504
[1270] valid_0's rmse: 15.9504
[1271] valid_0's rmse: 15.9503
[1272] valid_0's rmse: 15.9503
[1273] valid_0's rmse: 15.9503
[1274] valid_0's rmse: 15.9502
[1275] valid_0's rmse: 15.9502
[1276] valid_0's rmse: 15.9502
[1277] valid_0's rmse: 15.9502
[1278] valid_0's rmse: 15.9502
[1279] valid_0's rmse: 15.9502
[1280] valid_0's rmse: 15.9501
[1281] valid_0's rmse: 15.9501
[1282] valid_0's rmse: 15.95
[1283] valid_0's rmse: 15.95
[1284] valid_0's rmse: 15.9499
[1285] valid_0's rmse: 15.9498
[1286] valid_0's rmse: 15.9498
[1287] valid_0's rmse: 15.9497
[1288] valid_0's rmse: 15.9498
[1289] valid_0's rmse: 15.9498
[1290] valid_0's rmse: 15.9497
[1291] valid_0's rmse: 15.9497
[1292] valid_0's rmse: 15.9497
[1293] valid_0's rmse: 15.9497
[1294] valid_0's rmse: 15.9497
[1295] valid_0's rmse: 15.9497
[1296] valid_0's rmse: 15.9498
[1297] valid_0's rmse: 15.9497

[1298]	valid_0's rmse: 15.9498
[1299]	valid_0's rmse: 15.9497
[1300]	valid_0's rmse: 15.9497
[1301]	valid_0's rmse: 15.9497
[1302]	valid_0's rmse: 15.9496
[1303]	valid_0's rmse: 15.9497
[1304]	valid_0's rmse: 15.9497
[1305]	valid_0's rmse: 15.9496
[1306]	valid_0's rmse: 15.9496
[1307]	valid_0's rmse: 15.9496
[1308]	valid_0's rmse: 15.9495
[1309]	valid_0's rmse: 15.9494
[1310]	valid_0's rmse: 15.9494
[1311]	valid_0's rmse: 15.9493
[1312]	valid_0's rmse: 15.9492
[1313]	valid_0's rmse: 15.9491
[1314]	valid_0's rmse: 15.9491
[1315]	valid_0's rmse: 15.9492
[1316]	valid_0's rmse: 15.9491
[1317]	valid_0's rmse: 15.9491
[1318]	valid_0's rmse: 15.9491
[1319]	valid_0's rmse: 15.9491
[1320]	valid_0's rmse: 15.9491
[1321]	valid_0's rmse: 15.9491
[1322]	valid_0's rmse: 15.9491
[1323]	valid_0's rmse: 15.9489
[1324]	valid_0's rmse: 15.9489
[1325]	valid_0's rmse: 15.9489
[1326]	valid_0's rmse: 15.9488
[1327]	valid_0's rmse: 15.9487
[1328]	valid_0's rmse: 15.9487
[1329]	valid_0's rmse: 15.9486
[1330]	valid_0's rmse: 15.9486
[1331]	valid_0's rmse: 15.9486
[1332]	valid_0's rmse: 15.9486
[1333]	valid_0's rmse: 15.9486
[1334]	valid_0's rmse: 15.9486
[1335]	valid_0's rmse: 15.9486
[1336]	valid_0's rmse: 15.9486
[1337]	valid_0's rmse: 15.9486
[1338]	valid_0's rmse: 15.9485
[1339]	valid_0's rmse: 15.9485
[1340]	valid_0's rmse: 15.9485
[1341]	valid_0's rmse: 15.9484
[1342]	valid_0's rmse: 15.9483
[1343]	valid_0's rmse: 15.9483
[1344]	valid_0's rmse: 15.9483
[1345]	valid_0's rmse: 15.9483

[1346] valid_0's rmse: 15.9483
[1347] valid_0's rmse: 15.9483
[1348] valid_0's rmse: 15.9483
[1349] valid_0's rmse: 15.9483
[1350] valid_0's rmse: 15.9483
[1351] valid_0's rmse: 15.9482
[1352] valid_0's rmse: 15.9482
[1353] valid_0's rmse: 15.9483
[1354] valid_0's rmse: 15.9483
[1355] valid_0's rmse: 15.9483
[1356] valid_0's rmse: 15.9482
[1357] valid_0's rmse: 15.9483
[1358] valid_0's rmse: 15.9482
[1359] valid_0's rmse: 15.9482
[1360] valid_0's rmse: 15.9482
[1361] valid_0's rmse: 15.9482
[1362] valid_0's rmse: 15.9481
[1363] valid_0's rmse: 15.9482
[1364] valid_0's rmse: 15.9481
[1365] valid_0's rmse: 15.9481
[1366] valid_0's rmse: 15.9481
[1367] valid_0's rmse: 15.9482
[1368] valid_0's rmse: 15.9481
[1369] valid_0's rmse: 15.9481
[1370] valid_0's rmse: 15.9481
[1371] valid_0's rmse: 15.948
[1372] valid_0's rmse: 15.948
[1373] valid_0's rmse: 15.948
[1374] valid_0's rmse: 15.948
[1375] valid_0's rmse: 15.948
[1376] valid_0's rmse: 15.948
[1377] valid_0's rmse: 15.948
[1378] valid_0's rmse: 15.9479
[1379] valid_0's rmse: 15.9479
[1380] valid_0's rmse: 15.9478
[1381] valid_0's rmse: 15.9478
[1382] valid_0's rmse: 15.9478
[1383] valid_0's rmse: 15.9478
[1384] valid_0's rmse: 15.9478
[1385] valid_0's rmse: 15.9478
[1386] valid_0's rmse: 15.9477
[1387] valid_0's rmse: 15.9477
[1388] valid_0's rmse: 15.9477
[1389] valid_0's rmse: 15.9477
[1390] valid_0's rmse: 15.9477
[1391] valid_0's rmse: 15.9476
[1392] valid_0's rmse: 15.9476
[1393] valid_0's rmse: 15.9477

[1394] valid_0's rmse: 15.9476
[1395] valid_0's rmse: 15.9476
[1396] valid_0's rmse: 15.9475
[1397] valid_0's rmse: 15.9475
[1398] valid_0's rmse: 15.9474
[1399] valid_0's rmse: 15.9475
[1400] valid_0's rmse: 15.9474
[1401] valid_0's rmse: 15.9475
[1402] valid_0's rmse: 15.9474
[1403] valid_0's rmse: 15.9474
[1404] valid_0's rmse: 15.9474
[1405] valid_0's rmse: 15.9474
[1406] valid_0's rmse: 15.9474
[1407] valid_0's rmse: 15.9474
[1408] valid_0's rmse: 15.9474
[1409] valid_0's rmse: 15.9474
[1410] valid_0's rmse: 15.9473
[1411] valid_0's rmse: 15.9474
[1412] valid_0's rmse: 15.9473
[1413] valid_0's rmse: 15.9473
[1414] valid_0's rmse: 15.9473
[1415] valid_0's rmse: 15.9473
[1416] valid_0's rmse: 15.9472
[1417] valid_0's rmse: 15.9472
[1418] valid_0's rmse: 15.9472
[1419] valid_0's rmse: 15.9472
[1420] valid_0's rmse: 15.9472
[1421] valid_0's rmse: 15.9472
[1422] valid_0's rmse: 15.9471
[1423] valid_0's rmse: 15.9472
[1424] valid_0's rmse: 15.9472
[1425] valid_0's rmse: 15.9472
[1426] valid_0's rmse: 15.9472
[1427] valid_0's rmse: 15.9471
[1428] valid_0's rmse: 15.9471
[1429] valid_0's rmse: 15.9471
[1430] valid_0's rmse: 15.9471
[1431] valid_0's rmse: 15.947
[1432] valid_0's rmse: 15.9471
[1433] valid_0's rmse: 15.947
[1434] valid_0's rmse: 15.947
[1435] valid_0's rmse: 15.947
[1436] valid_0's rmse: 15.947
[1437] valid_0's rmse: 15.947
[1438] valid_0's rmse: 15.947
[1439] valid_0's rmse: 15.9469
[1440] valid_0's rmse: 15.9469
[1441] valid_0's rmse: 15.9469

[1442] valid_0's rmse: 15.9468
[1443] valid_0's rmse: 15.9469
[1444] valid_0's rmse: 15.9469
[1445] valid_0's rmse: 15.9469
[1446] valid_0's rmse: 15.9468
[1447] valid_0's rmse: 15.9469
[1448] valid_0's rmse: 15.9469
[1449] valid_0's rmse: 15.9468
[1450] valid_0's rmse: 15.9468
[1451] valid_0's rmse: 15.9468
[1452] valid_0's rmse: 15.9469
[1453] valid_0's rmse: 15.9468
[1454] valid_0's rmse: 15.9468
[1455] valid_0's rmse: 15.9468
[1456] valid_0's rmse: 15.9468
[1457] valid_0's rmse: 15.9468
[1458] valid_0's rmse: 15.9468
[1459] valid_0's rmse: 15.9467
[1460] valid_0's rmse: 15.9467
[1461] valid_0's rmse: 15.9467
[1462] valid_0's rmse: 15.9467
[1463] valid_0's rmse: 15.9467
[1464] valid_0's rmse: 15.9467
[1465] valid_0's rmse: 15.9467
[1466] valid_0's rmse: 15.9467
[1467] valid_0's rmse: 15.9467
[1468] valid_0's rmse: 15.9467
[1469] valid_0's rmse: 15.9466
[1470] valid_0's rmse: 15.9467
[1471] valid_0's rmse: 15.9466
[1472] valid_0's rmse: 15.9466
[1473] valid_0's rmse: 15.9466
[1474] valid_0's rmse: 15.9466
[1475] valid_0's rmse: 15.9466
[1476] valid_0's rmse: 15.9466
[1477] valid_0's rmse: 15.9466
[1478] valid_0's rmse: 15.9466
[1479] valid_0's rmse: 15.9465
[1480] valid_0's rmse: 15.9465
[1481] valid_0's rmse: 15.9465
[1482] valid_0's rmse: 15.9464
[1483] valid_0's rmse: 15.9464
[1484] valid_0's rmse: 15.9464
[1485] valid_0's rmse: 15.9464
[1486] valid_0's rmse: 15.9464
[1487] valid_0's rmse: 15.9463
[1488] valid_0's rmse: 15.9464
[1489] valid_0's rmse: 15.9464

[1490] valid_0's rmse: 15.9463
[1491] valid_0's rmse: 15.9463
[1492] valid_0's rmse: 15.9463
[1493] valid_0's rmse: 15.9463
[1494] valid_0's rmse: 15.9464
[1495] valid_0's rmse: 15.9464
[1496] valid_0's rmse: 15.9464
[1497] valid_0's rmse: 15.9463
[1498] valid_0's rmse: 15.9463
[1499] valid_0's rmse: 15.9462
[1500] valid_0's rmse: 15.9463
[1501] valid_0's rmse: 15.9462
[1502] valid_0's rmse: 15.9462
[1503] valid_0's rmse: 15.9462
[1504] valid_0's rmse: 15.9461
[1505] valid_0's rmse: 15.9461
[1506] valid_0's rmse: 15.9461
[1507] valid_0's rmse: 15.946
[1508] valid_0's rmse: 15.946
[1509] valid_0's rmse: 15.9459
[1510] valid_0's rmse: 15.9459
[1511] valid_0's rmse: 15.9459
[1512] valid_0's rmse: 15.9459
[1513] valid_0's rmse: 15.9459
[1514] valid_0's rmse: 15.946
[1515] valid_0's rmse: 15.9459
[1516] valid_0's rmse: 15.9459
[1517] valid_0's rmse: 15.9459
[1518] valid_0's rmse: 15.9459
[1519] valid_0's rmse: 15.9458
[1520] valid_0's rmse: 15.9458
[1521] valid_0's rmse: 15.9457
[1522] valid_0's rmse: 15.9457
[1523] valid_0's rmse: 15.9457
[1524] valid_0's rmse: 15.9457
[1525] valid_0's rmse: 15.9456
[1526] valid_0's rmse: 15.9456
[1527] valid_0's rmse: 15.9456
[1528] valid_0's rmse: 15.9455
[1529] valid_0's rmse: 15.9455
[1530] valid_0's rmse: 15.9455
[1531] valid_0's rmse: 15.9455
[1532] valid_0's rmse: 15.9455
[1533] valid_0's rmse: 15.9455
[1534] valid_0's rmse: 15.9455
[1535] valid_0's rmse: 15.9455
[1536] valid_0's rmse: 15.9455
[1537] valid_0's rmse: 15.9455

[1538] valid_0's rmse: 15.9455
[1539] valid_0's rmse: 15.9454
[1540] valid_0's rmse: 15.9454
[1541] valid_0's rmse: 15.9454
[1542] valid_0's rmse: 15.9454
[1543] valid_0's rmse: 15.9454
[1544] valid_0's rmse: 15.9454
[1545] valid_0's rmse: 15.9453
[1546] valid_0's rmse: 15.9453
[1547] valid_0's rmse: 15.9453
[1548] valid_0's rmse: 15.9453
[1549] valid_0's rmse: 15.9453
[1550] valid_0's rmse: 15.9453
[1551] valid_0's rmse: 15.9453
[1552] valid_0's rmse: 15.9452
[1553] valid_0's rmse: 15.9452
[1554] valid_0's rmse: 15.9452
[1555] valid_0's rmse: 15.9452
[1556] valid_0's rmse: 15.9452
[1557] valid_0's rmse: 15.9451
[1558] valid_0's rmse: 15.9451
[1559] valid_0's rmse: 15.9451
[1560] valid_0's rmse: 15.9451
[1561] valid_0's rmse: 15.9451
[1562] valid_0's rmse: 15.945
[1563] valid_0's rmse: 15.9451
[1564] valid_0's rmse: 15.9451
[1565] valid_0's rmse: 15.9451
[1566] valid_0's rmse: 15.9451
[1567] valid_0's rmse: 15.9451
[1568] valid_0's rmse: 15.9452
[1569] valid_0's rmse: 15.9451
[1570] valid_0's rmse: 15.9452
[1571] valid_0's rmse: 15.9451
[1572] valid_0's rmse: 15.9451
[1573] valid_0's rmse: 15.9451
[1574] valid_0's rmse: 15.9451
[1575] valid_0's rmse: 15.945
[1576] valid_0's rmse: 15.945
[1577] valid_0's rmse: 15.945
[1578] valid_0's rmse: 15.945
[1579] valid_0's rmse: 15.945
[1580] valid_0's rmse: 15.9449
[1581] valid_0's rmse: 15.9449
[1582] valid_0's rmse: 15.9449
[1583] valid_0's rmse: 15.9449
[1584] valid_0's rmse: 15.9449
[1585] valid_0's rmse: 15.9449

[1586] valid_0's rmse: 15.9449
[1587] valid_0's rmse: 15.9449
[1588] valid_0's rmse: 15.9448
[1589] valid_0's rmse: 15.9448
[1590] valid_0's rmse: 15.9447
[1591] valid_0's rmse: 15.9447
[1592] valid_0's rmse: 15.9447
[1593] valid_0's rmse: 15.9447
[1594] valid_0's rmse: 15.9447
[1595] valid_0's rmse: 15.9446
[1596] valid_0's rmse: 15.9446
[1597] valid_0's rmse: 15.9447
[1598] valid_0's rmse: 15.9446
[1599] valid_0's rmse: 15.9446
[1600] valid_0's rmse: 15.9446
[1601] valid_0's rmse: 15.9446
[1602] valid_0's rmse: 15.9446
[1603] valid_0's rmse: 15.9446
[1604] valid_0's rmse: 15.9446
[1605] valid_0's rmse: 15.9446
[1606] valid_0's rmse: 15.9445
[1607] valid_0's rmse: 15.9445
[1608] valid_0's rmse: 15.9445
[1609] valid_0's rmse: 15.9445
[1610] valid_0's rmse: 15.9445
[1611] valid_0's rmse: 15.9444
[1612] valid_0's rmse: 15.9444
[1613] valid_0's rmse: 15.9444
[1614] valid_0's rmse: 15.9444
[1615] valid_0's rmse: 15.9444
[1616] valid_0's rmse: 15.9443
[1617] valid_0's rmse: 15.9443
[1618] valid_0's rmse: 15.9443
[1619] valid_0's rmse: 15.9443
[1620] valid_0's rmse: 15.9443
[1621] valid_0's rmse: 15.9444
[1622] valid_0's rmse: 15.9443
[1623] valid_0's rmse: 15.9443
[1624] valid_0's rmse: 15.9444
[1625] valid_0's rmse: 15.9444
[1626] valid_0's rmse: 15.9444
[1627] valid_0's rmse: 15.9443
[1628] valid_0's rmse: 15.9443
[1629] valid_0's rmse: 15.9443
[1630] valid_0's rmse: 15.9443
[1631] valid_0's rmse: 15.9443
[1632] valid_0's rmse: 15.9443
[1633] valid_0's rmse: 15.9442

[1634] valid_0's rmse: 15.9442
[1635] valid_0's rmse: 15.9442
[1636] valid_0's rmse: 15.9442
[1637] valid_0's rmse: 15.9441
[1638] valid_0's rmse: 15.9441
[1639] valid_0's rmse: 15.9441
[1640] valid_0's rmse: 15.9441
[1641] valid_0's rmse: 15.9441
[1642] valid_0's rmse: 15.9441
[1643] valid_0's rmse: 15.9441
[1644] valid_0's rmse: 15.9441
[1645] valid_0's rmse: 15.9441
[1646] valid_0's rmse: 15.9441
[1647] valid_0's rmse: 15.9441
[1648] valid_0's rmse: 15.9441
[1649] valid_0's rmse: 15.9441
[1650] valid_0's rmse: 15.9441
[1651] valid_0's rmse: 15.9441
[1652] valid_0's rmse: 15.9441
[1653] valid_0's rmse: 15.9441
[1654] valid_0's rmse: 15.944
[1655] valid_0's rmse: 15.944
[1656] valid_0's rmse: 15.944
[1657] valid_0's rmse: 15.944
[1658] valid_0's rmse: 15.944
[1659] valid_0's rmse: 15.9439
[1660] valid_0's rmse: 15.9439
[1661] valid_0's rmse: 15.9439
[1662] valid_0's rmse: 15.9439
[1663] valid_0's rmse: 15.9439
[1664] valid_0's rmse: 15.9439
[1665] valid_0's rmse: 15.9439
[1666] valid_0's rmse: 15.9438
[1667] valid_0's rmse: 15.9438
[1668] valid_0's rmse: 15.9438
[1669] valid_0's rmse: 15.9438
[1670] valid_0's rmse: 15.9438
[1671] valid_0's rmse: 15.9438
[1672] valid_0's rmse: 15.9438
[1673] valid_0's rmse: 15.9438
[1674] valid_0's rmse: 15.9438
[1675] valid_0's rmse: 15.9438
[1676] valid_0's rmse: 15.9438
[1677] valid_0's rmse: 15.9437
[1678] valid_0's rmse: 15.9437
[1679] valid_0's rmse: 15.9437
[1680] valid_0's rmse: 15.9437
[1681] valid_0's rmse: 15.9437

[1682] valid_0's rmse: 15.9437
[1683] valid_0's rmse: 15.9436
[1684] valid_0's rmse: 15.9436
[1685] valid_0's rmse: 15.9436
[1686] valid_0's rmse: 15.9436
[1687] valid_0's rmse: 15.9436
[1688] valid_0's rmse: 15.9436
[1689] valid_0's rmse: 15.9437
[1690] valid_0's rmse: 15.9437
[1691] valid_0's rmse: 15.9437
[1692] valid_0's rmse: 15.9437
[1693] valid_0's rmse: 15.9436
[1694] valid_0's rmse: 15.9436
[1695] valid_0's rmse: 15.9436
[1696] valid_0's rmse: 15.9436
[1697] valid_0's rmse: 15.9435
[1698] valid_0's rmse: 15.9435
[1699] valid_0's rmse: 15.9435
[1700] valid_0's rmse: 15.9435
[1701] valid_0's rmse: 15.9435
[1702] valid_0's rmse: 15.9435
[1703] valid_0's rmse: 15.9435
[1704] valid_0's rmse: 15.9435
[1705] valid_0's rmse: 15.9435
[1706] valid_0's rmse: 15.9435
[1707] valid_0's rmse: 15.9435
[1708] valid_0's rmse: 15.9435
[1709] valid_0's rmse: 15.9435
[1710] valid_0's rmse: 15.9434
[1711] valid_0's rmse: 15.9434
[1712] valid_0's rmse: 15.9434
[1713] valid_0's rmse: 15.9434
[1714] valid_0's rmse: 15.9433
[1715] valid_0's rmse: 15.9434
[1716] valid_0's rmse: 15.9434
[1717] valid_0's rmse: 15.9433
[1718] valid_0's rmse: 15.9433
[1719] valid_0's rmse: 15.9433
[1720] valid_0's rmse: 15.9433
[1721] valid_0's rmse: 15.9433
[1722] valid_0's rmse: 15.9433
[1723] valid_0's rmse: 15.9433
[1724] valid_0's rmse: 15.9434
[1725] valid_0's rmse: 15.9434
[1726] valid_0's rmse: 15.9434
[1727] valid_0's rmse: 15.9434
[1728] valid_0's rmse: 15.9433
[1729] valid_0's rmse: 15.9434

[1730] valid_0's rmse: 15.9434
[1731] valid_0's rmse: 15.9434
[1732] valid_0's rmse: 15.9433
[1733] valid_0's rmse: 15.9434
[1734] valid_0's rmse: 15.9434
[1735] valid_0's rmse: 15.9434
[1736] valid_0's rmse: 15.9434
[1737] valid_0's rmse: 15.9434
[1738] valid_0's rmse: 15.9433
[1739] valid_0's rmse: 15.9433
[1740] valid_0's rmse: 15.9433
[1741] valid_0's rmse: 15.9433
[1742] valid_0's rmse: 15.9433
[1743] valid_0's rmse: 15.9433
[1744] valid_0's rmse: 15.9433
[1745] valid_0's rmse: 15.9433
[1746] valid_0's rmse: 15.9433
[1747] valid_0's rmse: 15.9433
[1748] valid_0's rmse: 15.9433
[1749] valid_0's rmse: 15.9432
[1750] valid_0's rmse: 15.9432
[1751] valid_0's rmse: 15.9432
[1752] valid_0's rmse: 15.9432
[1753] valid_0's rmse: 15.9433
[1754] valid_0's rmse: 15.9433
[1755] valid_0's rmse: 15.9432
[1756] valid_0's rmse: 15.9432
[1757] valid_0's rmse: 15.9432
[1758] valid_0's rmse: 15.9432
[1759] valid_0's rmse: 15.9432
[1760] valid_0's rmse: 15.9432
[1761] valid_0's rmse: 15.9432
[1762] valid_0's rmse: 15.9432
[1763] valid_0's rmse: 15.9432
[1764] valid_0's rmse: 15.9431
[1765] valid_0's rmse: 15.9431
[1766] valid_0's rmse: 15.9431
[1767] valid_0's rmse: 15.9431
[1768] valid_0's rmse: 15.9431
[1769] valid_0's rmse: 15.9431
[1770] valid_0's rmse: 15.9431
[1771] valid_0's rmse: 15.9432
[1772] valid_0's rmse: 15.9432
[1773] valid_0's rmse: 15.9431
[1774] valid_0's rmse: 15.9432
[1775] valid_0's rmse: 15.9432
[1776] valid_0's rmse: 15.9431
[1777] valid_0's rmse: 15.9431

[1778] valid_0's rmse: 15.9431
[1779] valid_0's rmse: 15.9431
[1780] valid_0's rmse: 15.9431
[1781] valid_0's rmse: 15.943
[1782] valid_0's rmse: 15.9431
[1783] valid_0's rmse: 15.9431
[1784] valid_0's rmse: 15.943
[1785] valid_0's rmse: 15.943
[1786] valid_0's rmse: 15.943
[1787] valid_0's rmse: 15.943
[1788] valid_0's rmse: 15.943
[1789] valid_0's rmse: 15.943
[1790] valid_0's rmse: 15.943
[1791] valid_0's rmse: 15.943
[1792] valid_0's rmse: 15.943
[1793] valid_0's rmse: 15.943
[1794] valid_0's rmse: 15.943
[1795] valid_0's rmse: 15.943
[1796] valid_0's rmse: 15.943
[1797] valid_0's rmse: 15.943
[1798] valid_0's rmse: 15.943
[1799] valid_0's rmse: 15.943
[1800] valid_0's rmse: 15.943
[1801] valid_0's rmse: 15.943
[1802] valid_0's rmse: 15.9429
[1803] valid_0's rmse: 15.9429
[1804] valid_0's rmse: 15.9429
[1805] valid_0's rmse: 15.9429
[1806] valid_0's rmse: 15.9429
[1807] valid_0's rmse: 15.9429
[1808] valid_0's rmse: 15.9429
[1809] valid_0's rmse: 15.9429
[1810] valid_0's rmse: 15.9429
[1811] valid_0's rmse: 15.9429
[1812] valid_0's rmse: 15.9429
[1813] valid_0's rmse: 15.9429
[1814] valid_0's rmse: 15.9429
[1815] valid_0's rmse: 15.9429
[1816] valid_0's rmse: 15.943
[1817] valid_0's rmse: 15.943
[1818] valid_0's rmse: 15.943
[1819] valid_0's rmse: 15.943
[1820] valid_0's rmse: 15.9429
[1821] valid_0's rmse: 15.943
[1822] valid_0's rmse: 15.9429
[1823] valid_0's rmse: 15.943
[1824] valid_0's rmse: 15.943
[1825] valid_0's rmse: 15.943

[1826] valid_0's rmse: 15.9429
[1827] valid_0's rmse: 15.943
[1828] valid_0's rmse: 15.9429
[1829] valid_0's rmse: 15.9429
[1830] valid_0's rmse: 15.9429
[1831] valid_0's rmse: 15.9429
[1832] valid_0's rmse: 15.9429
[1833] valid_0's rmse: 15.9429
[1834] valid_0's rmse: 15.9429
[1835] valid_0's rmse: 15.9429
[1836] valid_0's rmse: 15.9429
[1837] valid_0's rmse: 15.9429
[1838] valid_0's rmse: 15.9429
[1839] valid_0's rmse: 15.9429
[1840] valid_0's rmse: 15.9429
[1841] valid_0's rmse: 15.9429
[1842] valid_0's rmse: 15.9429
[1843] valid_0's rmse: 15.9429
[1844] valid_0's rmse: 15.9428
[1845] valid_0's rmse: 15.9428
[1846] valid_0's rmse: 15.9428
[1847] valid_0's rmse: 15.9428
[1848] valid_0's rmse: 15.9428
[1849] valid_0's rmse: 15.9428
[1850] valid_0's rmse: 15.9428
[1851] valid_0's rmse: 15.9428
[1852] valid_0's rmse: 15.9428
[1853] valid_0's rmse: 15.9428
[1854] valid_0's rmse: 15.9428
[1855] valid_0's rmse: 15.9428
[1856] valid_0's rmse: 15.9428
[1857] valid_0's rmse: 15.9428
[1858] valid_0's rmse: 15.9428
[1859] valid_0's rmse: 15.9428
[1860] valid_0's rmse: 15.9428
[1861] valid_0's rmse: 15.9427
[1862] valid_0's rmse: 15.9428
[1863] valid_0's rmse: 15.9427
[1864] valid_0's rmse: 15.9428
[1865] valid_0's rmse: 15.9427
[1866] valid_0's rmse: 15.9428
[1867] valid_0's rmse: 15.9427
[1868] valid_0's rmse: 15.9427
[1869] valid_0's rmse: 15.9427
[1870] valid_0's rmse: 15.9427
[1871] valid_0's rmse: 15.9427
[1872] valid_0's rmse: 15.9427
[1873] valid_0's rmse: 15.9427

[1874]	valid_0's rmse: 15.9427
[1875]	valid_0's rmse: 15.9426
[1876]	valid_0's rmse: 15.9426
[1877]	valid_0's rmse: 15.9426
[1878]	valid_0's rmse: 15.9426
[1879]	valid_0's rmse: 15.9427
[1880]	valid_0's rmse: 15.9427
[1881]	valid_0's rmse: 15.9426
[1882]	valid_0's rmse: 15.9426
[1883]	valid_0's rmse: 15.9427
[1884]	valid_0's rmse: 15.9427
[1885]	valid_0's rmse: 15.9428
[1886]	valid_0's rmse: 15.9428
[1887]	valid_0's rmse: 15.9427
[1888]	valid_0's rmse: 15.9427
[1889]	valid_0's rmse: 15.9427
[1890]	valid_0's rmse: 15.9427
[1891]	valid_0's rmse: 15.9427
[1892]	valid_0's rmse: 15.9427
[1893]	valid_0's rmse: 15.9427
[1894]	valid_0's rmse: 15.9427
[1895]	valid_0's rmse: 15.9427
[1896]	valid_0's rmse: 15.9427
[1897]	valid_0's rmse: 15.9426
[1898]	valid_0's rmse: 15.9426
[1899]	valid_0's rmse: 15.9426
[1900]	valid_0's rmse: 15.9426
[1901]	valid_0's rmse: 15.9426
[1902]	valid_0's rmse: 15.9426
[1903]	valid_0's rmse: 15.9426
[1904]	valid_0's rmse: 15.9426
[1905]	valid_0's rmse: 15.9426
[1906]	valid_0's rmse: 15.9427
[1907]	valid_0's rmse: 15.9426
[1908]	valid_0's rmse: 15.9426
[1909]	valid_0's rmse: 15.9427
[1910]	valid_0's rmse: 15.9427
[1911]	valid_0's rmse: 15.9427
[1912]	valid_0's rmse: 15.9426
[1913]	valid_0's rmse: 15.9426
[1914]	valid_0's rmse: 15.9426
[1915]	valid_0's rmse: 15.9426
[1916]	valid_0's rmse: 15.9426
[1917]	valid_0's rmse: 15.9426
[1918]	valid_0's rmse: 15.9426
[1919]	valid_0's rmse: 15.9426
[1920]	valid_0's rmse: 15.9426
[1921]	valid_0's rmse: 15.9426

[1922]	valid_0's rmse: 15.9426
[1923]	valid_0's rmse: 15.9426
[1924]	valid_0's rmse: 15.9426
[1925]	valid_0's rmse: 15.9427
[1926]	valid_0's rmse: 15.9427
[1927]	valid_0's rmse: 15.9427
[1928]	valid_0's rmse: 15.9427
[1929]	valid_0's rmse: 15.9426
[1930]	valid_0's rmse: 15.9427
[1931]	valid_0's rmse: 15.9427
[1932]	valid_0's rmse: 15.9427
[1933]	valid_0's rmse: 15.9426
[1934]	valid_0's rmse: 15.9426
[1935]	valid_0's rmse: 15.9426
[1936]	valid_0's rmse: 15.9426
[1937]	valid_0's rmse: 15.9426
[1938]	valid_0's rmse: 15.9426
[1939]	valid_0's rmse: 15.9425
[1940]	valid_0's rmse: 15.9425
[1941]	valid_0's rmse: 15.9425
[1942]	valid_0's rmse: 15.9425
[1943]	valid_0's rmse: 15.9425
[1944]	valid_0's rmse: 15.9425
[1945]	valid_0's rmse: 15.9425
[1946]	valid_0's rmse: 15.9425
[1947]	valid_0's rmse: 15.9425
[1948]	valid_0's rmse: 15.9425
[1949]	valid_0's rmse: 15.9425
[1950]	valid_0's rmse: 15.9425
[1951]	valid_0's rmse: 15.9425
[1952]	valid_0's rmse: 15.9425
[1953]	valid_0's rmse: 15.9425
[1954]	valid_0's rmse: 15.9425
[1955]	valid_0's rmse: 15.9425
[1956]	valid_0's rmse: 15.9425
[1957]	valid_0's rmse: 15.9425
[1958]	valid_0's rmse: 15.9425
[1959]	valid_0's rmse: 15.9425
[1960]	valid_0's rmse: 15.9425
[1961]	valid_0's rmse: 15.9425
[1962]	valid_0's rmse: 15.9425
[1963]	valid_0's rmse: 15.9425
[1964]	valid_0's rmse: 15.9425
[1965]	valid_0's rmse: 15.9425
[1966]	valid_0's rmse: 15.9425
[1967]	valid_0's rmse: 15.9425
[1968]	valid_0's rmse: 15.9425
[1969]	valid_0's rmse: 15.9425

[1970]	valid_0's rmse: 15.9425
[1971]	valid_0's rmse: 15.9425
[1972]	valid_0's rmse: 15.9425
[1973]	valid_0's rmse: 15.9425
[1974]	valid_0's rmse: 15.9425
[1975]	valid_0's rmse: 15.9425
[1976]	valid_0's rmse: 15.9425
[1977]	valid_0's rmse: 15.9425
[1978]	valid_0's rmse: 15.9425
[1979]	valid_0's rmse: 15.9425
[1980]	valid_0's rmse: 15.9425
[1981]	valid_0's rmse: 15.9425
[1982]	valid_0's rmse: 15.9425
[1983]	valid_0's rmse: 15.9425
[1984]	valid_0's rmse: 15.9424
[1985]	valid_0's rmse: 15.9424
[1986]	valid_0's rmse: 15.9424
[1987]	valid_0's rmse: 15.9424
[1988]	valid_0's rmse: 15.9424
[1989]	valid_0's rmse: 15.9424
[1990]	valid_0's rmse: 15.9424
[1991]	valid_0's rmse: 15.9424
[1992]	valid_0's rmse: 15.9424
[1993]	valid_0's rmse: 15.9424
[1994]	valid_0's rmse: 15.9424
[1995]	valid_0's rmse: 15.9424
[1996]	valid_0's rmse: 15.9424
[1997]	valid_0's rmse: 15.9425
[1998]	valid_0's rmse: 15.9424
[1999]	valid_0's rmse: 15.9425
[2000]	valid_0's rmse: 15.9424
[2001]	valid_0's rmse: 15.9425
[2002]	valid_0's rmse: 15.9425
[2003]	valid_0's rmse: 15.9425
[2004]	valid_0's rmse: 15.9425
[2005]	valid_0's rmse: 15.9425
[2006]	valid_0's rmse: 15.9425
[2007]	valid_0's rmse: 15.9425
[2008]	valid_0's rmse: 15.9425
[2009]	valid_0's rmse: 15.9425
[2010]	valid_0's rmse: 15.9425
[2011]	valid_0's rmse: 15.9425
[2012]	valid_0's rmse: 15.9425
[2013]	valid_0's rmse: 15.9425
[2014]	valid_0's rmse: 15.9425
[2015]	valid_0's rmse: 15.9425
[2016]	valid_0's rmse: 15.9425
[2017]	valid_0's rmse: 15.9425

[2018]	valid_0's rmse: 15.9425
[2019]	valid_0's rmse: 15.9426
[2020]	valid_0's rmse: 15.9426
[2021]	valid_0's rmse: 15.9425
[2022]	valid_0's rmse: 15.9425
[2023]	valid_0's rmse: 15.9425
[2024]	valid_0's rmse: 15.9425
[2025]	valid_0's rmse: 15.9425
[2026]	valid_0's rmse: 15.9425
[2027]	valid_0's rmse: 15.9425
[2028]	valid_0's rmse: 15.9425
[2029]	valid_0's rmse: 15.9425
[2030]	valid_0's rmse: 15.9425
[2031]	valid_0's rmse: 15.9425
[2032]	valid_0's rmse: 15.9425
[2033]	valid_0's rmse: 15.9425
[2034]	valid_0's rmse: 15.9425
[2035]	valid_0's rmse: 15.9425
[2036]	valid_0's rmse: 15.9425
[2037]	valid_0's rmse: 15.9425
[2038]	valid_0's rmse: 15.9425
[2039]	valid_0's rmse: 15.9426
[2040]	valid_0's rmse: 15.9425
[2041]	valid_0's rmse: 15.9426
[2042]	valid_0's rmse: 15.9426
[2043]	valid_0's rmse: 15.9426
[2044]	valid_0's rmse: 15.9426
[2045]	valid_0's rmse: 15.9426
[2046]	valid_0's rmse: 15.9426
[2047]	valid_0's rmse: 15.9426
[2048]	valid_0's rmse: 15.9426
[2049]	valid_0's rmse: 15.9426
[2050]	valid_0's rmse: 15.9426
[2051]	valid_0's rmse: 15.9426
[2052]	valid_0's rmse: 15.9426
[2053]	valid_0's rmse: 15.9426
[2054]	valid_0's rmse: 15.9426
[2055]	valid_0's rmse: 15.9426
[2056]	valid_0's rmse: 15.9426
[2057]	valid_0's rmse: 15.9426
[2058]	valid_0's rmse: 15.9427
[2059]	valid_0's rmse: 15.9427
[2060]	valid_0's rmse: 15.9427
[2061]	valid_0's rmse: 15.9427
[2062]	valid_0's rmse: 15.9427
[2063]	valid_0's rmse: 15.9427
[2064]	valid_0's rmse: 15.9427
[2065]	valid_0's rmse: 15.9427

```
[2066]    valid_0's rmse: 15.9427
[2067]    valid_0's rmse: 15.9427
[2068]    valid_0's rmse: 15.9427
[2069]    valid_0's rmse: 15.9427
[2070]    valid_0's rmse: 15.9427
[2071]    valid_0's rmse: 15.9427
[2072]    valid_0's rmse: 15.9427
[2073]    valid_0's rmse: 15.9427
[2074]    valid_0's rmse: 15.9427
[2075]    valid_0's rmse: 15.9427
[2076]    valid_0's rmse: 15.9427
[2077]    valid_0's rmse: 15.9427
[2078]    valid_0's rmse: 15.9427
[2079]    valid_0's rmse: 15.9427
[2080]    valid_0's rmse: 15.9427
[2081]    valid_0's rmse: 15.9427
[2082]    valid_0's rmse: 15.9427
[2083]    valid_0's rmse: 15.9427
[2084]    valid_0's rmse: 15.9427
[2085]    valid_0's rmse: 15.9427
[2086]    valid_0's rmse: 15.9427
[2087]    valid_0's rmse: 15.9427
[2088]    valid_0's rmse: 15.9427
[2089]    valid_0's rmse: 15.9427
[2090]    valid_0's rmse: 15.9427
[2091]    valid_0's rmse: 15.9427
[2092]    valid_0's rmse: 15.9427
Early stopping, best iteration is:
[1992]    valid_0's rmse: 15.9424
```

```
In [40]: #predict
         y_pred=gbm.predict(X_test,num_iteration=gbm.best_iteration)
```

```
In [41]: #eval
         print('the rmse of prediction is:',mean_squared_error(y_test,y_pred)**0.05)
```

```
the rmse of prediction is: 1.3190322606769447
```