bold text

In [1]:

```
import warnings
warnings.filterwarnings("ignore")
import pandas as pd
import sqlite3
import csv
import matplotlib.pyplot as plt
import seaborn as sns
import numpy as np
from wordcloud import WordCloud
import re
import os
from sqlalchemy import create_engine # database connection
import datetime as dt
from nltk.corpus import stopwords
from nltk.tokenize import word_tokenize
from nltk.stem.snowball import SnowballStemmer
from sklearn.feature_extraction.text import CountVectorizer
from sklearn.feature_extraction.text import TfidfVectorizer
from sklearn.multiclass import OneVsRestClassifier
from sklearn.linear_model import SGDClassifier
from sklearn import metrics
from sklearn.metrics import f1_score,precision_score,recall_score
from sklearn import svm
from sklearn.linear_model import LogisticRegression
from skmultilearn.adapt import mlknn
from skmultilearn.problem_transform import ClassifierChain
from skmultilearn.problem_transform import BinaryRelevance
from skmultilearn.problem_transform import LabelPowerset
from sklearn.naive_bayes import GaussianNB
from datetime import datetime
```

Stack Overflow: Tag Prediction

1. Business Problem

1.1 Description

Description

Stack Overflow is the largest, most trusted online community for developers to learn, share their programming knowledge, and build their careers.

Stack Overflow is something which every programmer use one way or another. Each month, over 50 million developers come to Stack Overflow to learn, share their knowledge, and build their careers. It features questions and answers on a wide range of topics in computer programming. The website serves as a platform for users to ask and answer questions, and, through membership and active participation, to vote questions and answers up or down and edit questions and answers in a fashion similar to a wiki or Digg. As of April 2014 Stack Overflow has over 4,000,000 registered users, and it exceeded 10,000,000 questions in late August 2015. Based on the type of tags assigned to questions, the top eight most discussed topics on the site are: Java, JavaScript, C#, PHP, Android, jQuery, Python and HTML.

Problem Statemtent

Suggest the tags based on the content that was there in the question posted on Stackoverflow.

Source: https://www.kaggle.com/c/facebook-recruiting-iii-keyword-extraction/

1.2 Source / useful links

Data Source : https://www.kaggle.com/c/facebook-recruiting-iii-keyword-extraction/data (https://www.kaggle.com/c/facebook-recruiting-iii-keyword-extraction/data)
Youtube : https://youtu.be/nNDqbUhtIRg (https://youtu.be/nNDqbUhtIRg)
Research paper : https://www.microsoft.com/en-us/research/wp-content/uploads/2016/02/tagging-1.pdf (https://www.microsoft.com/en-us/research/wp-content/uploads/2016/02/tagging-1.pdf)
Research paper : https://dl.acm.org/citation.cfm?id=2660970&dl=ACM&coll=DL (https://dl.acm.org/citation.cfm?id=2660970&dl=ACM&coll=DL)

1.3 Real World / Business Objectives and Constraints

1. Predict as many tags as possible with high precision and recall.
2. Incorrect tags could impact customer experience on StackOverflow.
3. No strict latency constraints.

2. Machine Learning problem

2.1 Data

2.1.1 Data Overview

Refer: https://www.kaggle.com/c/facebook-recruiting-iii-keyword-extraction/data (https://www.kaggle.com/c/facebook-recruiting-iii-keyword-extraction/data)
All of the data is in 2 files: Train and Test.

Train.csv contains 4 columns: Id,Title,Body,Tags.

Test.csv contains the same columns but without the Tags, which you are to predict.

Size of Train.csv - 6.75GB

Size of Test.csv - 2GB

Number of rows in Train.csv = 6034195

The questions are randomized and contains a mix of verbose text sites as well as sites related to math and programming. The number of questions from each site may vary, and no filtering has been performed on the questions (such as closed questions).

Data Field Explaination

Dataset contains 6,034,195 rows. The columns in the table are:

Id - Unique identifier for each question

Title - The question's title

Body - The body of the question

Tags - The tags associated with the question in a space-seperated format (all lowercase, should not contain tabs '\t' or ampersands '&')

2.1.2 Example Data point

Title: Implementing Boundary Value Analysis of Software Testing in a C++ program?

Body :

```
        #include<
        iostream>\n
        #include<
        stdlib.h>\n\n
        using namespace std;\n\n
        int main()\n
        {\n
                int n,a[n],x,c,u[n],m[n],e[n][4];\n
                cout<<"Enter the number of variables";\n         cin>
>n;\n\n
                cout<<"Enter the Lower, and Upper Limits of the varia
bles";\n
                for(int y=1; y<n+1; y++)\n
                {\n
                   cin>>m[y];\n
                   cin>>u[y];\n
                }\n
                for(x=1; x<n+1; x++)\n
                {\n
                   a[x] = (m[x] + u[x])/2;\n
                }\n
                c=(n*4)-4;\n
                for(int a1=1; a1<n+1; a1++)\n
                {\n\n
                   e[a1][0] = m[a1];\n
                   e[a1][1] = m[a1]+1;\n
                   e[a1][2] = u[a1]-1;\n
                   e[a1][3] = u[a1];\n
                }\n
                for(int i=1; i<n+1; i++)\n
                {\n
                   for(int l=1; l<=i; l++)\n
                   {\n
                       if(l!=1)\n
                       {\n
                           cout<<a[l]<<"\\t";\n
                       }\n
                   }\n
                   for(int j=0; j<4; j++)\n
                   {\n
                       cout<<e[i][j];\n
                       for(int k=0; k<n-(i+1); k++)\n
                       {\n
                           cout<<a[k]<<"\\t";\n
                       }\n
                       cout<<"\\n";\n
                   }\n
                }    \n\n
                system("PAUSE");\n
                return 0;    \n
```

2.2 Mapping the real-world problem to a Machine Learning Problem

2.2.1 Type of Machine Learning Problem

It is a multi-label classification problem
Multi-label Classification: Multilabel classification assigns to each sample a set of target labels. This can be thought as predicting properties of a data-point that are not mutually exclusive, such as topics that are relevant for a document. A question on Stackoverflow might be about any of C, Pointers, FileIO and/or memory-management at the same time or none of these.
__Credit__: http://scikit-learn.org/stable/modules/multiclass.html

2.2.2 Performance metric

Micro-Averaged F1-Score (Mean F Score) : The F1 score can be interpreted as a weighted average of the precision and recall, where an F1 score reaches its best value at 1 and worst score at 0. The relative contribution of precision and recall to the F1 score are equal. The formula for the F1 score is:

*F1 = 2 * (precision * recall) / (precision + recall)*

In the multi-class and multi-label case, this is the weighted average of the F1 score of each class.

'Micro f1 score':
Calculate metrics globally by counting the total true positives, false negatives and false positives. This is a better metric when we have class imbalance.

'Macro f1 score':
Calculate metrics for each label, and find their unweighted mean. This does not take label imbalance into account.

https://www.kaggle.com/wiki/MeanFScore (https://www.kaggle.com/wiki/MeanFScore)
http://scikit-learn.org/stable/modules/generated/sklearn.metrics.f1_score.html (http://scikit-learn.org/stable/modules/generated/sklearn.metrics.f1_score.html)

Hamming loss : The Hamming loss is the fraction of labels that are incorrectly predicted.
https://www.kaggle.com/wiki/HammingLoss (https://www.kaggle.com/wiki/HammingLoss)

3. Exploratory Data Analysis

3.1 Data Loading and Cleaning

3.1.1 Using Pandas with SQLite to Load the data

In [2]:

```
#Creating db file from csv
#Learn SQL: https://www.w3schools.com/sql/default.asp
if not os.path.isfile('train.db'):
    start = datetime.now()
    disk_engine = create_engine('sqlite:///train.db')
    start = dt.datetime.now()
    chunksize = 180000
    j = 0
    index_start = 1
    for df in pd.read_csv('Train.csv', names=['Id', 'Title', 'Body', 'Tags'], chunks
ize=chunksize, iterator=True, encoding='utf-8', ):
        df.index += index_start
        j+=1
        print('{} rows'.format(j*chunksize))
        df.to_sql('data', disk_engine, if_exists='append')
        index_start = df.index[-1] + 1
    print("Time taken to run this cell :", datetime.now() - start)
```

3.1.2 Counting the number of rows

In [3]:

```
if os.path.isfile('train.db'):
    start = datetime.now()
    con = sqlite3.connect('train.db')
    num_rows = pd.read_sql_query("""SELECT count(*) FROM data""", con)
    #Always remember to close the database
    print("Number of rows in the database :","\n",num_rows['count(*)'].values[0])
    con.close()
    print("Time taken to count the number of rows :", datetime.now() - start)
else:
    print("Please download the train.db file from drive or run the above cell to gen
arate train.db file")
```

```
Number of rows in the database :
 6034196
Time taken to count the number of rows : 0:05:14.063909
```

3.1.3 Checking for duplicates

In [4]:

```
#Learn SQL: https://www.w3schools.com/sql/default.asp
if os.path.isfile('train.db'):
    start = datetime.now()
    con = sqlite3.connect('train.db')
    df_no_dup = pd.read_sql_query('SELECT Title, Body, Tags, COUNT(*) as cnt_dup FRO
M data GROUP BY Title, Body, Tags', con)
    con.close()
    print("Time taken to run this cell :", datetime.now() - start)
else:
    print("Please download the train.db file from drive or run the first to genarate
train.db file")
```

```
Time taken to run this cell : 0:02:44.967777
```

In [5]:

```
df_no_dup.head()
# we can observe that there are duplicates
```

Out[5]:

	Title	Body	Tags	cnt_du
0	Implementing Boundary Value Analysis of S...	<pre> <code>#include<iostream>\n#include&...	c++ c	
1	Dynamic Datagrid Binding in Silverlight?	I should do binding for datagrid dynamicall...	c# silverlight data-binding	
2	Dynamic Datagrid Binding in Silverlight?	I should do binding for datagrid dynamicall...	c# silverlight data-binding columns	
3	java.lang.NoClassDefFoundError: javax/serv...	I followed the guide in <a href="http://sta...	jsp jstl	
4	java.sql.SQLException:[Microsoft] [ODBC Dri...	I use the following code \n\n<pre> <code>...	java jdbc	

In [6]:

```
print("number of duplicate questions :", num_rows['count(*)'].values[0]- df_no_dup.s
hape[0], "(",(1-((df_no_dup.shape[0])/(num_rows['count(*)'].values[0])))*100,"% )")
```

```
number of duplicate questions : 1827881 ( 30.292038906260256 % )
```

In [7]:

```
# number of times each question appeared in our database
df_no_dup.cnt_dup.value_counts()
```

Out[7]:

```
1    2656284
2    1272336
3     277575
4         90
5         25
6          5
Name: cnt_dup, dtype: int64
```

In [8]:

```
start = datetime.now()
df_no_dup["tag_count"] = df_no_dup["Tags"].astype('str').apply(lambda text: len(text
.split(" ")))
# adding a new feature number of tags per question
print("Time taken to run this cell :", datetime.now() - start)
df_no_dup.head()
```

```
Time taken to run this cell : 0:00:03.335373
```

Out[8]:

	Title	Body	Tags	cnt_du
0	Implementing Boundary Value Analysis of S...	<pre> <code>#include<iostream>\n#include&...	c++ c	
1	Dynamic Datagrid Binding in Silverlight?	I should do binding for datagrid dynamicall...	c# silverlight data-binding	
2	Dynamic Datagrid Binding in Silverlight?	I should do binding for datagrid dynamicall...	c# silverlight data-binding columns	
3	java.lang.NoClassDefFoundError: javax/serv...	I followed the guide in <a href="http://sta...	jsp jstl	
4	java.sql.SQLException:[Microsoft] [ODBC Dri...	I use the following code \n\n<pre> <code>...	java jdbc	

In [9]:

```
# distribution of number of tags per question
df_no_dup.tag_count.value_counts()
```

Out[9]:

```
3    1206157
2    1111706
4     814996
1     568298
5     505158
Name: tag_count, dtype: int64
```

In [10]:

```
#Creating a new database with no duplicates
if not os.path.isfile('train_no_dup.db'):
    disk_dup = create_engine("sqlite:///train_no_dup.db")
    no_dup = pd.DataFrame(df_no_dup, columns=['Title', 'Body', 'Tags'])
    no_dup.to_sql('no_dup_train',disk_dup)
```

In [11]:

```
#This method seems more appropriate to work with this much data.
#creating the connection with database file.
if os.path.isfile('train_no_dup.db'):
    start = datetime.now()
    con = sqlite3.connect('train_no_dup.db')
    tag_data = pd.read_sql_query("""SELECT Tags FROM no_dup_train""", con)
    #Always remember to close the database
    con.close()

    # Let's now drop unwanted column.
    tag_data.drop(tag_data.index[0], inplace=True)
    #Printing first 5 columns from our data frame
    tag_data.head()
    print("Time taken to run this cell :", datetime.now() - start)
else:
    print("Please download the train.db file from drive or run the above cells to ge
narate train.db file")
```

```
Time taken to run this cell : 0:00:54.166267
```

3.2 Analysis of Tags

3.2.1 Total number of unique tags

In [12]:

```
# Importing & Initializing the "CountVectorizer" object, which
#is scikit-learn's bag of words tool.

#by default 'split()' will tokenize each tag using space.
vectorizer = CountVectorizer(tokenizer = lambda x: x.split())
# fit_transform() does two functions: First, it fits the model
# and learns the vocabulary; second, it transforms our training data
# into feature vectors. The input to fit_transform should be a list of strings.
tag_dtm = vectorizer.fit_transform(tag_data['Tags'])
```

In [13]:

```
print("Number of data points :", tag_dtm.shape[0])
print("Number of unique tags :", tag_dtm.shape[1])
```

```
Number of data points : 4206314
Number of unique tags : 42048
```

In [14]:

```
#'get_feature_name()' gives us the vocabulary.
tags = vectorizer.get_feature_names()
#Lets look at the tags we have.
print("Some of the tags we have :", tags[:10])
```

```
Some of the tags we have : ['.a', '.app', '.asp.net-mvc', '.aspxauth',
'.bash-profile', '.class-file', '.cs-file', '.doc', '.drv', '.ds-store']
```

3.2.3 Number of times a tag appeared

In [15]:

```
# https://stackoverflow.com/questions/15115765/how-to-access-sparse-matrix-elements
#Lets now store the document term matrix in a dictionary.
freqs = tag_dtm.sum(axis=0).A1
result = dict(zip(tags, freqs))
```

In [16]:

```
#Saving this dictionary to csv files.
if not os.path.isfile('tag_counts_dict_dtm.csv'):
    with open('tag_counts_dict_dtm.csv', 'w') as csv_file:
        writer = csv.writer(csv_file)
        for key, value in result.items():
            writer.writerow([key, value])
tag_df = pd.read_csv("tag_counts_dict_dtm.csv", names=['Tags', 'Counts'])
tag_df.head()
```

Out[16]:

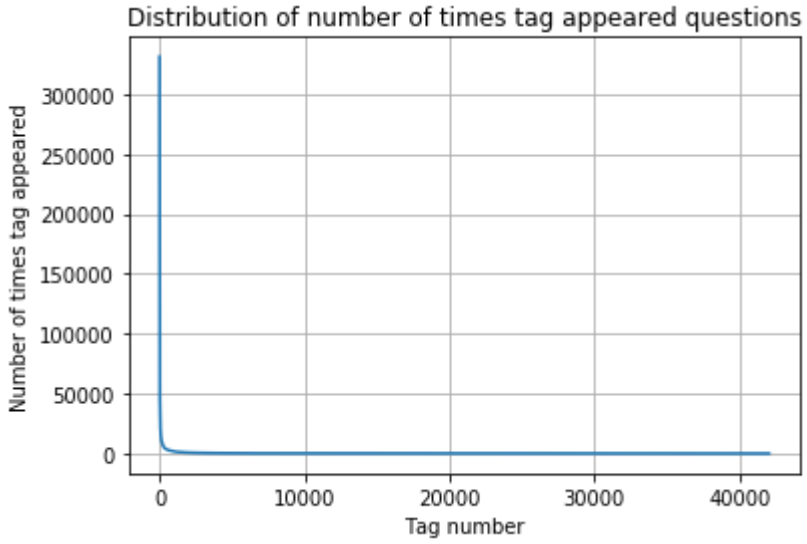
	Tags	Counts
0	.a	18
1	.app	37
2	.asp.net-mvc	1
3	.aspxauth	21
4	.bash-profile	138

In [17]:

```
tag_df_sorted = tag_df.sort_values(['Counts'], ascending=False)
tag_counts = tag_df_sorted['Counts'].values
```

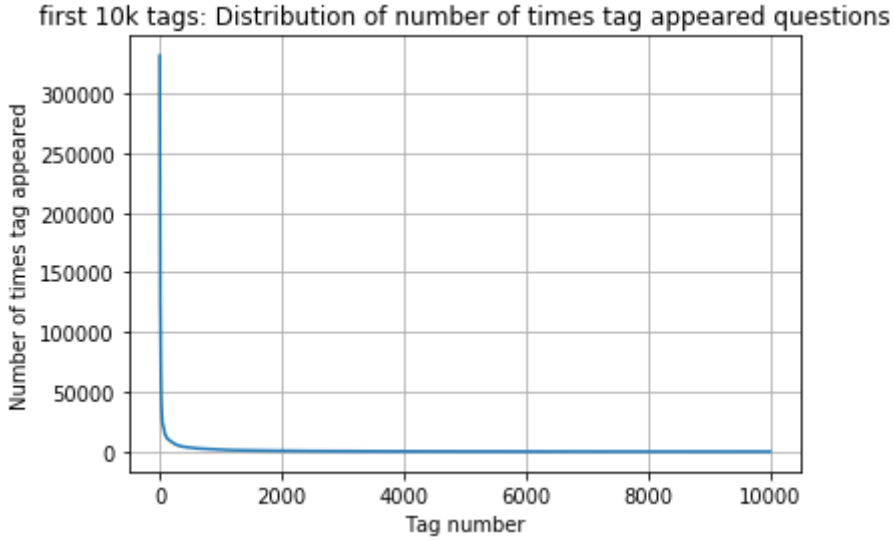
In [18]:

```
plt.plot(tag_counts)
plt.title("Distribution of number of times tag appeared questions")
plt.grid()
plt.xlabel("Tag number")
plt.ylabel("Number of times tag appeared")
plt.show()
```



In [19]:

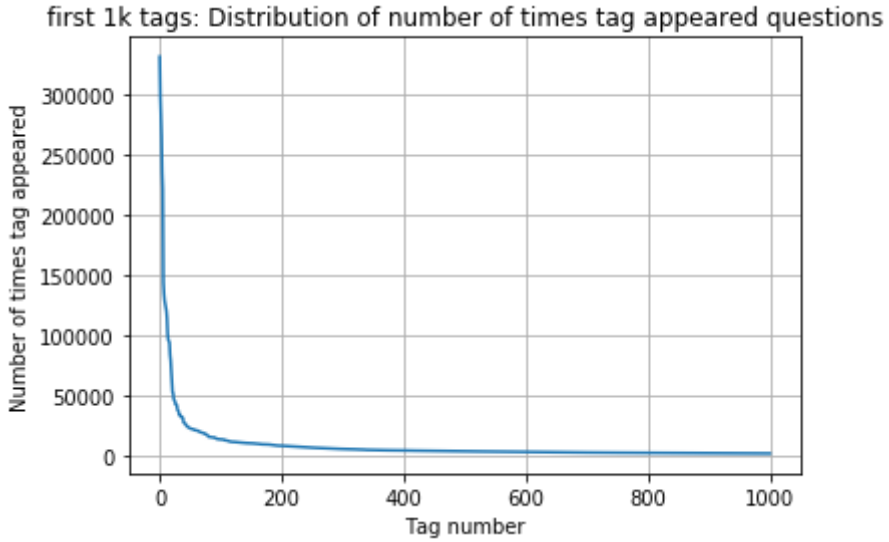
```
plt.plot(tag_counts[0:10000])
plt.title('first 10k tags: Distribution of number of times tag appeared questions')
plt.grid()
plt.xlabel("Tag number")
plt.ylabel("Number of times tag appeared")
plt.show()
print(len(tag_counts[0:10000:25]), tag_counts[0:10000:25])
```


first 10k tags: Distribution of number of times tag appeared questions
Number of times tag appeared
300000
250000
200000
150000
100000
50000
0
0
2000
4000
6000
8000
10000
Tag number

```
400 [331505  44829  22429  17728  13364  11162  10029   9148   8054   71
51
   6466   5865   5370   4983   4526   4281   4144   3929   3750   3593
   3453   3299   3123   2989   2891   2738   2647   2527   2431   2331
   2259   2186   2097   2020   1959   1900   1828   1770   1723   1673
   1631   1574   1532   1479   1448   1406   1365   1328   1300   1266
   1245   1222   1197   1181   1158   1139   1121   1101   1076   1056
   1038   1023   1006    983    966    952    938    926    911    891
    882    869    856    841    830    816    804    789    779    770
    752    743    733    725    712    702    688    678    671    658
    650    643    634    627    616    607    598    589    583    577
    568    559    552    545    540    533    526    518    512    506
    500    495    490    485    480    477    469    465    457    450
    447    442    437    432    426    422    418    413    408    403
    398    393    388    385    381    378    374    370    367    365
    361    357    354    350    347    344    342    339    336    332
    330    326    323    319    315    312    309    307    304    301
    299    296    293    291    289    286    284    281    278    276
    275    272    270    268    265    262    260    258    256    254
    252    250    249    247    245    243    241    239    238    236
    234    233    232    230    228    226    224    222    220    219
    217    215    214    212    210    209    207    205    204    203
    201    200    199    198    196    194    193    192    191    189
    188    186    185    183    182    181    180    179    178    177
    175    174    172    171    170    169    168    167    166    165
    164    162    161    160    159    158    157    156    156    155
    154    153    152    151    150    149    149    148    147    146
    145    144    143    142    142    141    140    139    138    137
    137    136    135    134    134    133    132    131    130    130
    129    128    128    127    126    126    125    124    124    123
    123    122    122    121    120    120    119    118    118    117
    117    116    116    115    115    114    113    113    112    111
    111    110    109    109    108    108    107    106    106    106
    105    105    104    104    103    103    102    102    101    101
    100    100     99     99     98     98     97     97     96     96
     95     95     94     94     93     93     93     92     92     91
     91     90     90     89     89     88     88     87     87     86
     86     86     85     85     84     84     83     83     83     82
     82     82     81     81     80     80     80     79     79     78
     78     78     78     77     77     76     76     76     75     75
     75     74     74     74     73     73     73     73     72     72]
```

In [20]:

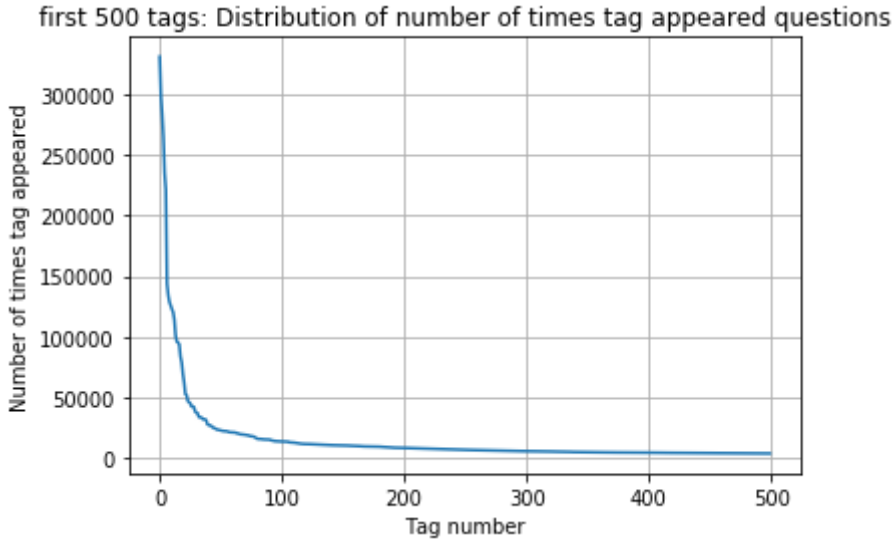
```
plt.plot(tag_counts[0:1000])
plt.title('first 1k tags: Distribution of number of times tag appeared questions')
plt.grid()
plt.xlabel("Tag number")
plt.ylabel("Number of times tag appeared")
plt.show()
print(len(tag_counts[0:1000:5]), tag_counts[0:1000:5])
```




```
200 [331505 221533 122769  95160  62023  44829  37170  31897  26925  245
37
  22429  21820  20957  19758  18905  17728  15533  15097  14884  13703
  13364  13157  12407  11658  11228  11162  10863  10600  10350  10224
  10029   9884   9719   9411   9252   9148   9040   8617   8361   8163
   8054   7867   7702   7564   7274   7151   7052   6847   6656   6553
   6466   6291   6183   6093   5971   5865   5760   5577   5490   5411
   5370   5283   5207   5107   5066   4983   4891   4785   4658   4549
   4526   4487   4429   4335   4310   4281   4239   4228   4195   4159
   4144   4088   4050   4002   3957   3929   3874   3849   3818   3797
   3750   3703   3685   3658   3615   3593   3564   3521   3505   3483
   3453   3427   3396   3363   3326   3299   3272   3232   3196   3168
   3123   3094   3073   3050   3012   2989   2984   2953   2934   2903
   2891   2844   2819   2784   2754   2738   2726   2708   2681   2669
   2647   2621   2604   2594   2556   2527   2510   2482   2460   2444
   2431   2409   2395   2380   2363   2331   2312   2297   2290   2281
   2259   2246   2222   2211   2198   2186   2162   2142   2132   2107
   2097   2078   2057   2045   2036   2020   2011   1994   1971   1965
   1959   1952   1940   1932   1912   1900   1879   1865   1855   1841
   1828   1821   1813   1801   1782   1770   1760   1747   1741   1734
   1723   1707   1697   1688   1683   1673   1665   1656   1646   1639]
```

In [21]:

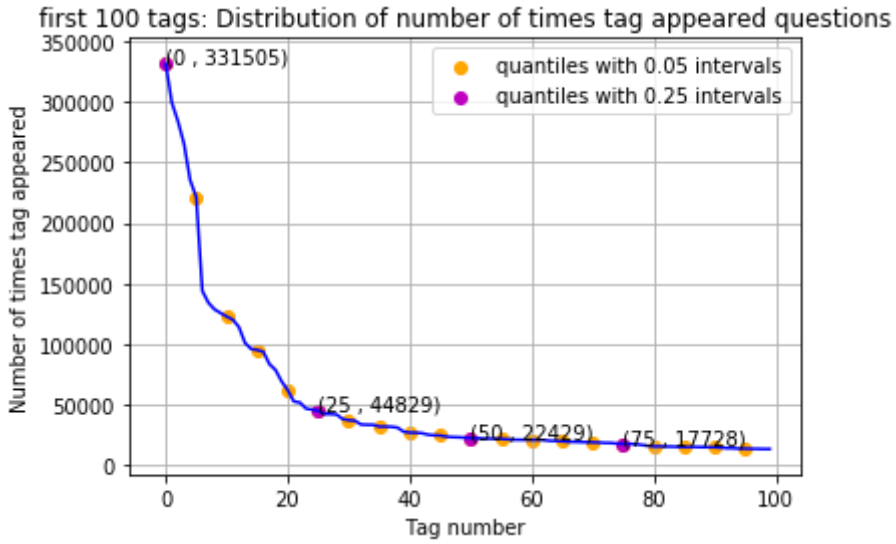
```
plt.plot(tag_counts[0:500])
plt.title('first 500 tags: Distribution of number of times tag appeared questions')
plt.grid()
plt.xlabel("Tag number")
plt.ylabel("Number of times tag appeared")
plt.show()
print(len(tag_counts[0:500:5]), tag_counts[0:500:5])
```




```
100 [331505 221533 122769  95160  62023  44829  37170  31897  26925  245
37
  22429  21820  20957  19758  18905  17728  15533  15097  14884  13703
  13364  13157  12407  11658  11228  11162  10863  10600  10350  10224
  10029   9884   9719   9411   9252   9148   9040   8617   8361   8163
   8054   7867   7702   7564   7274   7151   7052   6847   6656   6553
   6466   6291   6183   6093   5971   5865   5760   5577   5490   5411
   5370   5283   5207   5107   5066   4983   4891   4785   4658   4549
   4526   4487   4429   4335   4310   4281   4239   4228   4195   4159
   4144   4088   4050   4002   3957   3929   3874   3849   3818   3797
   3750   3703   3685   3658   3615   3593   3564   3521   3505   3483]
```

In [22]:

```
plt.plot(tag_counts[0:100], c='b')
plt.scatter(x=list(range(0,100,5)), y=tag_counts[0:100:5], c='orange', label="quanti
les with 0.05 intervals")
# quantiles with 0.25 difference
plt.scatter(x=list(range(0,100,25)), y=tag_counts[0:100:25], c='m', label = "quantil
es with 0.25 intervals")

for x,y in zip(list(range(0,100,25)), tag_counts[0:100:25]):
    plt.annotate(s="({} , {})".format(x,y), xy=(x,y), xytext=(x-0.05, y+500))

plt.title('first 100 tags: Distribution of number of times tag appeared questions')
plt.grid()
plt.xlabel("Tag number")
plt.ylabel("Number of times tag appeared")
plt.legend()
plt.show()
print(len(tag_counts[0:100:5]), tag_counts[0:100:5])
```




```
20 [331505 221533 122769  95160  62023  44829  37170  31897  26925  2453
7
  22429  21820  20957  19758  18905  17728  15533  15097  14884  13703]
```

In [23]:

```
# Store tags greater than 10K in one list
lst_tags_gt_10k = tag_df[tag_df.Counts>10000].Tags
#Print the length of the list
print ('{} Tags are used more than 10000 times'.format(len(lst_tags_gt_10k)))
# Store tags greater than 100K in one list
lst_tags_gt_100k = tag_df[tag_df.Counts>100000].Tags
#Print the length of the list.
print ('{} Tags are used more than 100000 times'.format(len(lst_tags_gt_100k)))
```

```
153 Tags are used more than 10000 times
14 Tags are used more than 100000 times
```

Observations:

1. There are total 153 tags which are used more than 10000 times.
2. 14 tags are used more than 100000 times.
3. Most frequent tag (i.e. c#) is used 331505 times.
4. Since some tags occur much more frequenctly than others, Micro-averaged F1-score is the appropriate metric for this probelm.

3.2.4 Tags Per Question

In [24]:

```
#Storing the count of tag in each question in list 'tag_count'
tag_quest_count = tag_dtm.sum(axis=1).tolist()
#Converting list of lists into single list, we will get [[3], [4], [2], [2], [3]] an
d we are converting this to [3, 4, 2, 2, 3]
tag_quest_count=[int(j) for i in tag_quest_count for j in i]
print ('We have total {} datapoints.'.format(len(tag_quest_count)))

print(tag_quest_count[:5])
```

```
We have total 4206314 datapoints.
[3, 4, 2, 2, 3]
```

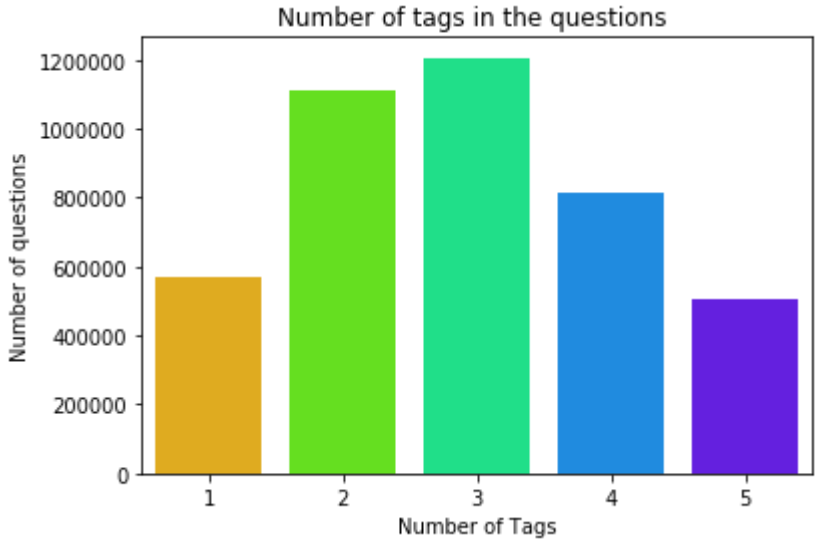
In [25]:

```
print( "Maximum number of tags per question: %d"%max(tag_quest_count))
print( "Minimum number of tags per question: %d"%min(tag_quest_count))
print( "Avg. number of tags per question: %f"% ((sum(tag_quest_count)*1.0)/len(tag_q
uest_count)))
```

```
Maximum number of tags per question: 5
Minimum number of tags per question: 1
Avg. number of tags per question: 2.899440
```

In [26]:

```
sns.countplot(tag_quest_count, palette='gist_rainbow')
plt.title("Number of tags in the questions ")
plt.xlabel("Number of Tags")
plt.ylabel("Number of questions")
plt.show()
```



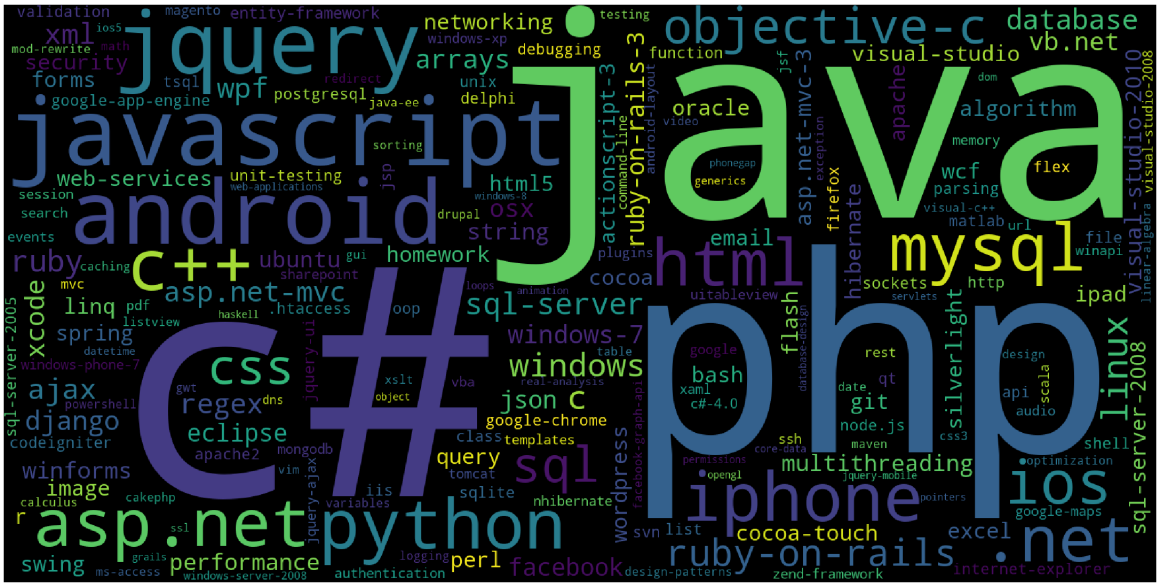
Observations:

1. Maximum number of tags per question: 5
2. Minimum number of tags per question: 1
3. Avg. number of tags per question: 2.899
4. Most of the questions are having 2 or 3 tags

3.2.5 Most Frequent Tags

In [27]:

```
# Ploting word cloud
start = datetime.now()

# Lets first convert the 'result' dictionary to 'list of tuples'
tup = dict(result.items())
#Initializing WordCloud using frequencies of tags.
wordcloud = WordCloud(    background_color='black',
                          width=1600,
                          height=800,
                    ).generate_from_frequencies(tup)

fig = plt.figure(figsize=(30,20))
plt.imshow(wordcloud)
plt.axis('off')
plt.tight_layout(pad=0)
fig.savefig("tag.png")
plt.show()
print("Time taken to run this cell :", datetime.now() - start)
```



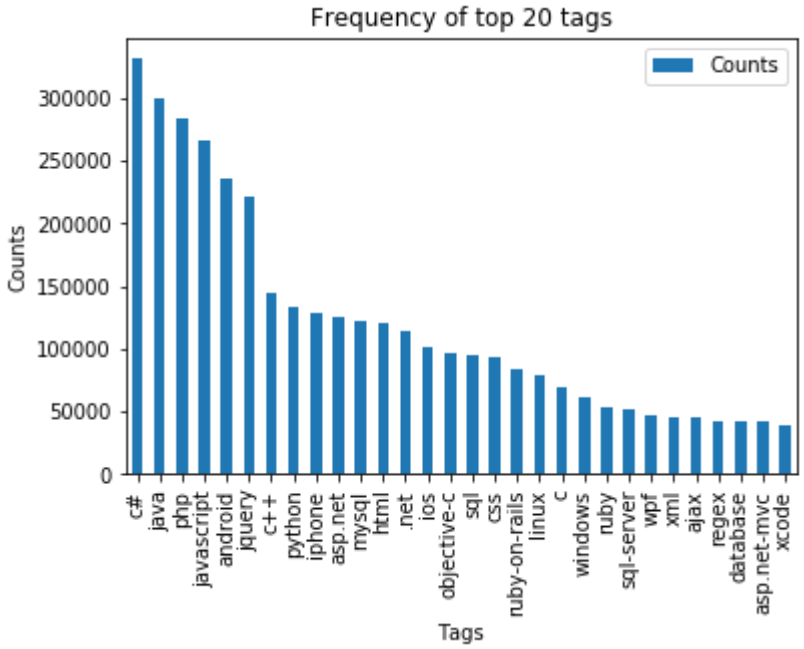
Time taken to run this cell : 0:00:03.537447

Observations:
A look at the word cloud shows that "c#", "java", "php", "asp.net", "javascript", "c++" are some of the most frequent tags.

3.2.6 The top 20 tags

In [28]:

```
i=np.arange(30)
tag_df_sorted.head(30).plot(kind='bar')
plt.title('Frequency of top 20 tags')
plt.xticks(i, tag_df_sorted['Tags'])
plt.xlabel('Tags')
plt.ylabel('Counts')
plt.show()
```



Observations:

1. Majority of the most frequent tags are programming language.
2. C# is the top most frequent programming language.
3. Android, IOS, Linux and windows are among the top most frequent operating systems.

3.3 Cleaning and preprocessing of Questions

3.3.1 Preprocessing

1. Sample 1M data points
2. Separate out code-snippets from Body
3. Remove Spcial characters from Question title and description (not in code)
4. Remove stop words (Except 'C')
5. Remove HTML Tags
6. Convert all the characters into small letters
7. Use SnowballStemmer to stem the words

In [29]:

```
import nltk
nltk.download('stopwords')
```

```
[nltk_data] Downloading package stopwords to
[nltk_data]     /home/shalini3316/nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
```

Out[29]:

```
True
```

In [30]:

```
def striphtml(data):
    cleanr = re.compile('<.*?>')
    cleantext = re.sub(cleanr, ' ', str(data))
    return cleantext
stop_words = set(stopwords.words('english'))
stemmer = SnowballStemmer("english")
```

In [31]:

```
#http://www.sqlitetutorial.net/sqlite-python/create-tables/
def create_connection(db_file):
    """ create a database connection to the SQLite database
        specified by db_file
    :param db_file: database file
    :return: Connection object or None
    """
    try:
        conn = sqlite3.connect(db_file)
        return conn
    except Error as e:
        print(e)

    return None

def create_table(conn, create_table_sql):
    """ create a table from the create_table_sql statement
    :param conn: Connection object
    :param create_table_sql: a CREATE TABLE statement
    :return:
    """
    try:
        c = conn.cursor()
        c.execute(create_table_sql)
    except Error as e:
        print(e)

def checkTableExists(dbcon):
    cursr = dbcon.cursor()
    str = "select name from sqlite_master where type='table'"
    table_names = cursr.execute(str)
    print("Tables in the databse:")
    tables =table_names.fetchall()
    print(tables[0][0])
    return(len(tables))

def create_database_table(database, query):
    conn = create_connection(database)
    if conn is not None:
        create_table(conn, query)
        checkTableExists(conn)
    else:
        print("Error! cannot create the database connection.")
    conn.close()

sql_create_table = """CREATE TABLE IF NOT EXISTS QuestionsProcessed (question text N
OT NULL, code text, tags text, words_pre integer, words_post integer, is_code intege
r);"""
create_database_table("Processed.db", sql_create_table)
```

```
Tables in the databse:
QuestionsProcessed
```

In [32]:

```
# http://www.sqlitetutorial.net/sqlite-delete/
# https://stackoverflow.com/questions/2279706/select-random-row-from-a-sqlite-table
start = datetime.now()
read_db = 'train_no_dup.db'
write_db = 'Processed.db'
if os.path.isfile(read_db):
    conn_r = create_connection(read_db)
    if conn_r is not None:
        reader =conn_r.cursor()
        reader.execute("SELECT Title, Body, Tags From no_dup_train ORDER BY RANDOM()
LIMIT 1000000;")

if os.path.isfile(write_db):
    conn_w = create_connection(write_db)
    if conn_w is not None:
        tables = checkTableExists(conn_w)
        writer =conn_w.cursor()
        if tables != 0:
            writer.execute("DELETE FROM QuestionsProcessed WHERE 1")
            print("Cleared All the rows")
print("Time taken to run this cell :", datetime.now() - start)
```

```
Tables in the databse:
QuestionsProcessed
Cleared All the rows
Time taken to run this cell : 0:02:53.398210
```

In [33]:

```
nltk.download('punkt')
```

```
[nltk_data] Downloading package punkt to
[nltk_data]     /home/shalini3316/nltk_data...
[nltk_data]   Package punkt is already up-to-date!
```

Out[33]:

```
True
```

we create a new data base to store the sampled and preprocessed questions

In [34]:

```
#http://www.bernzilla.com/2008/05/13/selecting-a-random-row-from-an-sqlite-table/

start = datetime.now()
preprocessed_data_list=[]
reader.fetchone()
questions_with_code=0
len_pre=0
len_post=0
questions_proccesed = 0
for row in reader:

    is_code = 0

    title, question, tags = row[0], row[1], row[2]

    if '<code>' in question:
        questions_with_code+=1
        is_code = 1
    x = len(question)+len(title)
    len_pre+=x

    code = str(re.findall(r'<code>(.*?)</code>', question, flags=re.DOTALL))

    question=re.sub('<code>(.*?)</code>', '', question, flags=re.MULTILINE|re.DOTALL
)
    question=striphtml(question.encode('utf-8'))

    title=title.encode('utf-8')

    question=str(title)+" "+str(question)
    question=re.sub(r'[^A-Za-z]+',' ',question)
    words=word_tokenize(str(question.lower()))

    #Removing all single letter and and stopwords from question exceptt for the lett
er 'c'
    question=' '.join(str(stemmer.stem(j)) for j in words if j not in stop_words and
(len(j)!=1 or j=='c'))

    len_post+=len(question)
    tup = (question,code,tags,x,len(question),is_code)
    questions_proccesed += 1
    writer.execute("insert into QuestionsProcessed(question,code,tags,words_pre,word
s_post,is_code) values (?,?,?,?,?,?)",tup)
    if (questions_proccesed%100000==0):
        print("number of questions completed=",questions_proccesed)

no_dup_avg_len_pre=(len_pre*1.0)/questions_proccesed
no_dup_avg_len_post=(len_post*1.0)/questions_proccesed

print( "Avg. length of questions(Title+Body) before processing: %d"%no_dup_avg_len_p
re)
print( "Avg. length of questions(Title+Body) after processing: %d"%no_dup_avg_len_po
st)
print ("Percent of questions containing code: %d"%((questions_with_code*100.0)/quest
ions_proccesed))

print("Time taken to run this cell :", datetime.now() - start)
```

```
number of questions completed= 100000
number of questions completed= 200000
number of questions completed= 300000
number of questions completed= 400000
number of questions completed= 500000
number of questions completed= 600000
number of questions completed= 700000
number of questions completed= 800000
number of questions completed= 900000
Avg. length of questions(Title+Body) before processing: 1172
Avg. length of questions(Title+Body) after processing: 326
Percent of questions containing code: 57
Time taken to run this cell : 0:24:02.585513
```

In [35]:

```
# dont forget to close the connections, or else you will end up with locks
conn_r.commit()
conn_w.commit()
conn_r.close()
conn_w.close()
```

In [36]:

```
if os.path.isfile(write_db):
    conn_r = create_connection(write_db)
    if conn_r is not None:
        reader =conn_r.cursor()
        reader.execute("SELECT question From QuestionsProcessed LIMIT 10")
        print("Questions after preprocessed")
        print('='*100)
        reader.fetchone()
        for row in reader:
            print(row)
            print('-'*100)
conn_r.commit()
conn_r.close()
```

```
Questions after preprocessed
==========================================================================
============================
('advantag disadvantag paramet return type declar languag type infer wou
ld like know opinion declar hand paramet return type languag type infer
like scala reason compil infer type',)
--------------------------------------------------------------------------
----------------------------
('want close statement automat want close statement automat want achiev
use technolog follow packag java spring framework seem close statement a
utomat default set though think transact manag spring automat shut state
ment want call statement much possibl method maintain method ensur state
ment close nthe amount code increas come method call close statement pro
blem possibl omiss generat goe moreov make framework want make restrict
much possibl reason make littl method moreov offici site document show r
eason close method ni japanes pleas explain use simpl statement',)
--------------------------------------------------------------------------
----------------------------
('creat ado net entiti primari key less view store procedur use either v
iew store procedur return result execut mdx queri sql analysi servic use
openrowset link ssas server sql unfortun resultset includ pk field matte
r even column could act pk hack model anyon think hacktacular trick use
add field result insert auto increment valu act pk candid somehow set fi
eld pk easili build entiti sure answer point alreadi get data back ssas
use ssrs report odata render creat type manual use play linq someon nail
amp may potenti better way access data sinc model would creat type entit
i thank',)
--------------------------------------------------------------------------
----------------------------
('get process belong particular session want get process meant particula
r session ni two person use web applic want get process use user process
use user anyon pleas help',)
--------------------------------------------------------------------------
----------------------------
('custom rule browser dictionari mani compani organ combin two word capi
t form name ex superus stackexchang word individu spell correct howev sp
ace browser get confus underlin let us know think misspel get googl chro
me mozilla firefox even microsoft internet explor microsoft offic recogn
capit letter middl word begin new word therefor mark word misspel unless
nd word misspel ex superusr',)
--------------------------------------------------------------------------
----------------------------
('possibl authent activ directori user expir password web form use ad au
thent user want abl authent user expir password redirect password chang
page authent instanc site admin reset user password use method make user
reset password next logon make user password expir user tri logon new pa
ssword authent fail logon failur unknown usernam bad password auth metho
d way around thank help',)
--------------------------------------------------------------------------
----------------------------
('initi memcach jdbc resourc jax rs servlet servic want maintain data pe
rsist mysql db use jdbc experi build jdbc app jax rs app isol never comb
in two question build tear requir jdbc type stuff go ordinarili put buil
d static block constructor id cleanup method get call final doesnt seem
work jax rs framework constructor get call everi invoc place knowledg pu
t clean method unfortun spars exampl combin two technolog onlin someth f
ind surpris guy help',)
--------------------------------------------------------------------------
----------------------------
('onnewint lifecycl regist listen use singletop activ receiv intent sear
ch dialog via notic call afterward call visual search dialog initi searc
```

```
h intent fire activ problem listen regist get remov need insid call stan
dard way make listen avail',)
------------------------------------------------------------------------
----------------------------
('wrong url redirect index page type xyz com jargon take xyz com index p
hp use apach mod rewrit rule index page even default page setup director
yindex puzzl takesto index page',)
------------------------------------------------------------------------
----------------------------
```

In [37]:

```
#Taking 1 Million entries to a dataframe.
write_db = 'Processed.db'
if os.path.isfile(write_db):
    conn_r = create_connection(write_db)
    if conn_r is not None:
        preprocessed_data = pd.read_sql_query("""SELECT question, Tags FROM Question
sProcessed""", conn_r)
conn_r.commit()
conn_r.close()
```

In [38]:

```
preprocessed_data.head()
```

Out[38]:

	question	tags
0	fail call design initi nsmanagedobject class b...	objective-c ios xcode parsing xcode4
1	advantag disadvantag paramet return type decla...	programming-languages
2	want close statement automat want close statem...	java spring statement
3	creat ado net entiti primari key less view sto...	sql sql-server wcf ssas ado.net-entity-data-model
4	get process belong particular session want get...	c# asp.net session process

In [39]:

```
print("number of data points in sample :", preprocessed_data.shape[0])
print("number of dimensions :", preprocessed_data.shape[1])
```

```
number of data points in sample : 999999
number of dimensions : 2
```

4. Machine Learning Models

4.1 Converting tags for multilabel problems

X	y1	y2	y3	y4
x1	0	1	1	0
x1	1	0	0	0
x1	0	1	0	0

In [40]:

```
# binary='true' will give a binary vectorizer
vectorizer = CountVectorizer(tokenizer = lambda x: x.split(), binary='true')
multilabel_y = vectorizer.fit_transform(preprocessed_data['tags'])
```

We will sample the number of tags instead considering all of them (due to limitation of computing power)

In [41]:

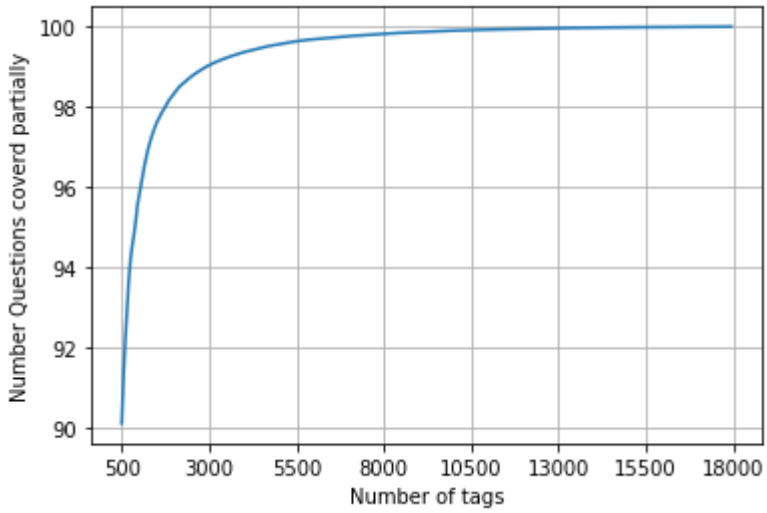
```
def tags_to_choose(n):
    t = multilabel_y.sum(axis=0).tolist()[0]
    sorted_tags_i = sorted(range(len(t)), key=lambda i: t[i], reverse=True)
    multilabel_yn=multilabel_y[:,sorted_tags_i[:n]]
    return multilabel_yn

def questions_explained_fn(n):
    multilabel_yn = tags_to_choose(n)
    x= multilabel_yn.sum(axis=1)
    return (np.count_nonzero(x==0))
```

In [42]:

```
questions_explained = []
total_tags=multilabel_y.shape[1]
total_qs=preprocessed_data.shape[0]
for i in range(500, total_tags, 100):
    questions_explained.append(np.round(((total_qs-questions_explained_fn(i))/total_
qs)*100,3))
```

In [43]:

```
fig, ax = plt.subplots()
ax.plot(questions_explained)
xlabel = list(500+np.array(range(-50,450,50))*50)
ax.set_xticklabels(xlabel)
plt.xlabel("Number of tags")
plt.ylabel("Number Questions coverd partially")
plt.grid()
plt.show()
# you can choose any number of tags based on your computing power, minimun is 50(it
 covers 90% of the tags)
print("with ",5500,"tags we are covering ",questions_explained[50],"% of questions")
```




```
with  5500 tags we are covering  99.035 % of questions
```

In [44]:

```
multilabel_yx = tags_to_choose(5500)
print("number of questions that are not covered :", questions_explained_fn(5500),"ou
t of ", total_qs)
```

```
number of questions that are not covered : 9645 out of  999999
```

In [45]:

```
print("Number of tags in sample :", multilabel_y.shape[1])
print("number of tags taken :", multilabel_yx.shape[1],"(",(multilabel_yx.shape[1]/m
ultilabel_y.shape[1])*100,"%)")
```

```
Number of tags in sample : 35455
number of tags taken : 5500 ( 15.512621633055987 %)
```

We consider top 15% tags which covers 99% of the questions

4.2 Split the data into test and train (80:20)

In [46]:

```
total_size=preprocessed_data.shape[0]
train_size=int(0.80*total_size)

x_train=preprocessed_data.head(train_size)
x_test=preprocessed_data.tail(total_size - train_size)

y_train = multilabel_yx[0:train_size,:]
y_test = multilabel_yx[train_size:total_size,:]
```

In [47]:

```
print("Number of data points in train data :", y_train.shape)
print("Number of data points in test data :", y_test.shape)
```

```
Number of data points in train data : (799999, 5500)
Number of data points in test data : (200000, 5500)
```

In [48]:

```
x_train = x_train[:200000]
x_test = x_test[:40000]
y_train = y_train[:200000]
y_test = y_test[:40000]
```

4.3 Featurizing data

In [49]:

```
start = datetime.now()
vectorizer = TfidfVectorizer(min_df=0.00009, max_features=200000, smooth_idf=True, n
orm="l2", \
                             tokenizer = lambda x: x.split(), sublinear_tf=False, ng
ram_range=(1,3))
x_train_multilabel = vectorizer.fit_transform(x_train['question'])
x_test_multilabel = vectorizer.transform(x_test['question'])
print("Time taken to run this cell :", datetime.now() - start)
```

```
Time taken to run this cell : 0:01:55.017595
```

In [50]:

```
print("Dimensions of train data X:",x_train_multilabel.shape, "Y :",y_train.shape)
print("Dimensions of test data X:",x_test_multilabel.shape,"Y:",y_test.shape)
```

```
Dimensions of train data X: (200000, 92365) Y : (200000, 5500)
Dimensions of test data X: (40000, 92365) Y: (40000, 5500)
```

In [51]:

```
# https://www.analyticsvidhya.com/blog/2017/08/introduction-to-multi-label-classification/
#https://stats.stackexchange.com/questions/117796/scikit-multi-label-classification
# classifier = LabelPowerset(GaussianNB())
"""
from skmultilearn.adapt import MLkNN
classifier = MLkNN(k=21)

# train
classifier.fit(x_train_multilabel, y_train)

# predict
predictions = classifier.predict(x_test_multilabel)
print(accuracy_score(y_test,predictions))
print(metrics.f1_score(y_test, predictions, average = 'macro'))
print(metrics.f1_score(y_test, predictions, average = 'micro'))
print(metrics.hamming_loss(y_test,predictions))

"""
# we are getting memory error because the multilearn package
# is trying to convert the data into dense matrix
# ----------------------------------------------------------------------------
#MemoryError                               Traceback (most recent call last)
#<ipython-input-170-f0e7c7f3e0be> in <module>()
#----> classifier.fit(x_train_multilabel, y_train)
```

Out[51]:

```
"\nfrom skmultilearn.adapt import MLkNN\nclassifier = MLkNN(k=21)\n\n# t
rain\nclassifier.fit(x_train_multilabel, y_train)\n\n# predict\npredicti
ons = classifier.predict(x_test_multilabel)\nprint(accuracy_score(y_tes
t,predictions))\nprint(metrics.f1_score(y_test, predictions, average =
'macro'))\nprint(metrics.f1_score(y_test, predictions, average = 'micr
o'))\nprint(metrics.hamming_loss(y_test,predictions))\n\n"
```

4.4 Applying Logistic Regression with OneVsRest Classifier

In [52]:

```
# this will be taking so much time try not to run it, download the lr_with_equal_wei
ght.pkl file and use to predict
# This takes about 6-7 hours to run.
classifier = OneVsRestClassifier(SGDClassifier(loss='log', alpha=0.00001, penalty='l
1'), n_jobs=-1)
classifier.fit(x_train_multilabel, y_train)
predictions = classifier.predict(x_test_multilabel)

print("accuracy :",metrics.accuracy_score(y_test,predictions))
print("macro f1 score :",metrics.f1_score(y_test, predictions, average = 'macro'))
print("micro f1 scoore :",metrics.f1_score(y_test, predictions, average = 'micro'))
print("hamming loss :",metrics.hamming_loss(y_test,predictions))
print("Precision recall report :\n",metrics.classification_report(y_test, prediction
s))
```

```
accuracy : 0.0803
macro f1 score : 0.08432376291016838
micro f1 scoore : 0.37235972797407163
hamming loss : 0.00041195454545454543
Precision recall report :
```

	precision	recall	f1-score	support
0	0.63	0.23	0.34	3208
1	0.79	0.44	0.57	2833
2	0.82	0.56	0.66	2755
3	0.76	0.43	0.55	2611
4	0.94	0.75	0.83	2215
5	0.85	0.63	0.73	2096
6	0.67	0.30	0.42	1346
7	0.88	0.60	0.71	1256
8	0.69	0.42	0.52	1179
9	0.81	0.44	0.57	1188
10	0.85	0.61	0.71	1239
11	0.53	0.15	0.24	1110
12	0.48	0.09	0.16	1089
13	0.63	0.28	0.39	947
14	0.59	0.28	0.38	965
15	0.60	0.21	0.31	896
16	0.76	0.53	0.62	879
17	0.79	0.54	0.64	758
18	0.62	0.24	0.35	742
19	0.57	0.16	0.25	644
20	0.35	0.05	0.09	625
21	0.84	0.37	0.52	510
22	0.59	0.25	0.35	523
23	0.84	0.59	0.70	430
24	0.64	0.42	0.50	428
25	0.68	0.34	0.45	441
26	0.86	0.67	0.76	406
27	0.25	0.04	0.07	418
28	0.62	0.26	0.37	423
29	0.69	0.24	0.35	372
30	0.93	0.76	0.84	343
31	0.49	0.25	0.34	375
32	0.56	0.23	0.33	328
33	0.42	0.12	0.19	328
34	0.80	0.29	0.43	330
35	0.74	0.52	0.61	291
36	0.75	0.52	0.62	300
37	0.76	0.61	0.68	318
38	0.35	0.13	0.19	264
39	0.47	0.16	0.24	297
40	0.66	0.38	0.48	254
41	0.41	0.10	0.16	236
42	0.67	0.29	0.40	245
43	0.42	0.08	0.14	246
44	0.44	0.13	0.20	237
45	0.65	0.31	0.42	236
46	0.30	0.08	0.13	223
47	0.50	0.02	0.04	243
48	0.56	0.18	0.27	234
49	0.57	0.10	0.17	228
50	0.56	0.16	0.25	225
51	0.65	0.32	0.43	222
52	0.79	0.49	0.61	210
53	0.48	0.10	0.17	222

54	0.58	0.18	0.28	230
55	0.68	0.39	0.50	218
56	0.39	0.12	0.18	180
57	0.85	0.72	0.78	210
58	0.79	0.51	0.62	203
59	0.37	0.07	0.11	222
60	0.10	0.01	0.02	200
61	0.80	0.44	0.57	208
62	0.89	0.74	0.81	190
63	0.93	0.61	0.74	198
64	0.70	0.49	0.58	159
65	0.78	0.19	0.31	197
66	0.71	0.37	0.48	188
67	0.43	0.14	0.21	205
68	0.51	0.14	0.22	182
69	0.72	0.25	0.37	190
70	0.77	0.45	0.57	172
71	0.82	0.39	0.53	180
72	0.75	0.19	0.30	161
73	0.75	0.02	0.03	182
74	0.52	0.35	0.42	156
75	0.89	0.57	0.69	148
76	0.54	0.23	0.33	209
77	0.71	0.45	0.55	175
78	0.25	0.01	0.01	162
79	0.48	0.09	0.15	166
80	0.74	0.30	0.42	152
81	0.24	0.05	0.08	158
82	0.60	0.24	0.35	139
83	0.49	0.23	0.31	134
84	0.93	0.60	0.73	146
85	0.82	0.40	0.54	141
86	0.91	0.59	0.72	147
87	0.47	0.24	0.32	126
88	0.79	0.58	0.67	150
89	0.89	0.49	0.63	148
90	0.73	0.43	0.54	169
91	0.53	0.06	0.10	138
92	0.67	0.50	0.57	122
93	0.58	0.37	0.45	130
94	0.32	0.08	0.12	130
95	0.94	0.67	0.78	140
96	0.65	0.32	0.43	143
97	0.89	0.53	0.66	144
98	0.93	0.70	0.80	138
99	0.65	0.10	0.17	135
100	0.95	0.71	0.81	124
101	0.31	0.03	0.05	140
102	0.59	0.20	0.30	129
103	0.84	0.58	0.69	124
104	0.16	0.03	0.04	115
105	0.53	0.07	0.13	120
106	0.33	0.12	0.17	103
107	0.47	0.23	0.31	137
108	0.29	0.04	0.06	111
109	0.74	0.37	0.49	121
110	0.67	0.06	0.11	100
111	0.51	0.19	0.27	123
112	0.69	0.40	0.50	116
113	0.73	0.34	0.46	118
114	0.54	0.28	0.37	89

115	0.61	0.26	0.36	108
116	0.50	0.18	0.27	126
117	0.94	0.62	0.75	126
118	0.68	0.25	0.36	106
119	0.91	0.64	0.75	99
120	0.86	0.49	0.62	113
121	0.40	0.18	0.25	93
122	0.55	0.24	0.33	101
123	0.37	0.13	0.19	115
124	0.15	0.03	0.05	93
125	0.42	0.09	0.15	106
126	0.71	0.48	0.57	117
127	0.59	0.27	0.37	86
128	0.99	0.81	0.89	115
129	0.28	0.10	0.15	88
130	0.20	0.02	0.03	113
131	0.46	0.11	0.18	98
132	0.24	0.06	0.09	90
133	0.39	0.11	0.17	104
134	0.55	0.39	0.46	94
135	0.69	0.52	0.59	89
136	0.66	0.38	0.48	104
137	0.21	0.04	0.07	101
138	0.21	0.06	0.09	99
139	0.51	0.30	0.38	105
140	0.51	0.25	0.34	99
141	0.76	0.60	0.68	86
142	0.78	0.47	0.59	108
143	0.65	0.43	0.52	84
144	0.52	0.24	0.33	98
145	0.62	0.25	0.36	102
146	0.27	0.04	0.07	105
147	0.00	0.00	0.00	97
148	0.48	0.13	0.20	86
149	0.62	0.21	0.31	96
150	0.25	0.02	0.04	104
151	0.30	0.08	0.12	93
152	0.14	0.04	0.06	100
153	0.55	0.07	0.13	82
154	0.93	0.57	0.71	74
155	0.86	0.56	0.68	114
156	0.08	0.01	0.02	81
157	0.31	0.06	0.10	86
158	0.59	0.12	0.20	111
159	0.32	0.15	0.20	94
160	0.38	0.14	0.21	77
161	0.92	0.60	0.72	109
162	0.46	0.31	0.37	77
163	0.74	0.23	0.35	108
164	0.47	0.09	0.16	95
165	0.10	0.02	0.04	86
166	0.50	0.02	0.04	87
167	0.78	0.22	0.34	82
168	0.58	0.23	0.33	97
169	0.52	0.16	0.25	93
170	0.89	0.54	0.67	78
171	0.53	0.12	0.19	76
172	0.86	0.49	0.63	87
173	0.55	0.13	0.22	82
174	0.86	0.60	0.71	95
175	0.46	0.19	0.27	83

176	0.73	0.41	0.52	108
177	0.91	0.64	0.75	75
178	0.64	0.46	0.54	78
179	0.51	0.25	0.34	87
180	0.43	0.07	0.12	85
181	0.53	0.34	0.42	73
182	0.43	0.11	0.18	81
183	0.44	0.10	0.16	80
184	0.70	0.52	0.59	85
185	0.14	0.01	0.02	81
186	0.00	0.00	0.00	85
187	0.29	0.06	0.10	82
188	0.50	0.01	0.02	85
189	0.64	0.29	0.40	73
190	0.53	0.10	0.16	83
191	0.92	0.57	0.71	84
192	0.88	0.51	0.65	70
193	0.46	0.23	0.31	74
194	0.36	0.18	0.24	71
195	0.73	0.37	0.49	81
196	0.77	0.53	0.62	57
197	0.55	0.37	0.44	65
198	0.89	0.56	0.69	89
199	0.14	0.04	0.06	74
200	0.54	0.25	0.34	87
201	0.00	0.00	0.00	84
202	0.91	0.49	0.63	80
203	0.25	0.01	0.03	74
204	0.74	0.38	0.50	73
205	0.62	0.27	0.37	75
206	0.65	0.39	0.49	71
207	0.39	0.10	0.15	73
208	0.44	0.09	0.15	79
209	0.72	0.39	0.51	59
210	0.21	0.04	0.07	71
211	0.33	0.03	0.05	78
212	0.22	0.03	0.06	61
213	0.25	0.04	0.07	70
214	0.48	0.18	0.27	71
215	0.79	0.40	0.53	65
216	0.89	0.73	0.80	56
217	0.37	0.10	0.15	72
218	0.70	0.53	0.60	66
219	0.42	0.12	0.18	69
220	0.79	0.40	0.53	77
221	0.93	0.67	0.78	64
222	0.63	0.39	0.48	70
223	0.96	0.71	0.81	68
224	0.74	0.29	0.41	59
225	0.37	0.18	0.24	61
226	0.54	0.33	0.41	63
227	0.41	0.12	0.18	59
228	0.41	0.19	0.26	64
229	0.33	0.03	0.06	64
230	0.69	0.38	0.49	58
231	0.64	0.15	0.24	60
232	0.30	0.05	0.08	62
233	0.69	0.46	0.55	68
234	0.00	0.00	0.00	59
235	0.44	0.10	0.16	80
236	0.69	0.38	0.49	82

237	0.00	0.00	0.00	61
238	0.50	0.08	0.14	63
239	0.60	0.37	0.46	73
240	0.19	0.05	0.07	64
241	0.81	0.57	0.67	68
242	0.53	0.34	0.42	67
243	0.77	0.44	0.56	61
244	0.40	0.12	0.19	66
245	0.50	0.11	0.18	73
246	0.33	0.22	0.26	55
247	0.35	0.10	0.16	60
248	0.71	0.33	0.45	73
249	0.64	0.32	0.43	56
250	0.20	0.02	0.03	63
251	0.81	0.48	0.60	60
252	0.52	0.18	0.26	68
253	0.25	0.03	0.06	60
254	0.89	0.53	0.66	59
255	0.20	0.02	0.03	61
256	0.40	0.11	0.17	54
257	0.79	0.15	0.26	71
258	0.33	0.05	0.09	57
259	0.72	0.40	0.51	53
260	0.89	0.50	0.64	62
261	0.18	0.03	0.05	63
262	0.85	0.65	0.74	69
263	0.33	0.02	0.04	53
264	0.00	0.00	0.00	57
265	0.25	0.04	0.06	56
266	0.00	0.00	0.00	55
267	0.62	0.36	0.46	55
268	0.79	0.25	0.38	59
269	0.25	0.02	0.03	54
270	0.29	0.03	0.06	60
271	0.18	0.03	0.06	60
272	0.49	0.24	0.32	71
273	0.64	0.47	0.54	60
274	0.84	0.55	0.67	65
275	0.45	0.25	0.33	51
276	0.65	0.22	0.33	50
277	0.75	0.33	0.46	45
278	0.39	0.14	0.21	49
279	0.98	0.75	0.85	55
280	0.56	0.26	0.35	58
281	0.67	0.04	0.07	52
282	0.00	0.00	0.00	51
283	0.44	0.24	0.31	51
284	0.33	0.02	0.04	42
285	0.69	0.47	0.56	47
286	0.29	0.08	0.13	48
287	0.84	0.67	0.74	54
288	0.50	0.02	0.03	57
289	0.27	0.07	0.11	60
290	0.41	0.14	0.21	50
291	0.15	0.04	0.07	48
292	0.48	0.23	0.31	43
293	0.00	0.00	0.00	61
294	0.11	0.02	0.03	63
295	0.29	0.05	0.09	38
296	0.89	0.53	0.67	58
297	0.33	0.04	0.07	52

298	0.81	0.56	0.66	63
299	0.62	0.08	0.14	64
300	0.17	0.02	0.04	50
301	0.33	0.06	0.11	48
302	0.52	0.21	0.30	53
303	0.00	0.00	0.00	46
304	0.58	0.17	0.26	42
305	0.78	0.12	0.21	59
306	0.64	0.13	0.22	52
307	0.90	0.72	0.80	53
308	0.33	0.09	0.14	45
309	0.00	0.00	0.00	51
310	0.00	0.00	0.00	56
311	0.50	0.18	0.26	45
312	0.81	0.54	0.64	54
313	0.50	0.12	0.20	57
314	0.77	0.24	0.37	41
315	0.62	0.27	0.37	49
316	0.00	0.00	0.00	52
317	0.43	0.22	0.29	46
318	0.71	0.35	0.47	34
319	0.29	0.12	0.17	34
320	0.57	0.07	0.12	58
321	0.53	0.17	0.26	47
322	0.46	0.13	0.20	47
323	0.12	0.02	0.04	49
324	0.52	0.23	0.32	52
325	0.50	0.27	0.35	45
326	0.12	0.02	0.03	50
327	0.27	0.07	0.12	41
328	0.00	0.00	0.00	39
329	0.14	0.03	0.05	34
330	0.57	0.33	0.42	48
331	0.20	0.02	0.04	44
332	0.00	0.00	0.00	47
333	0.56	0.29	0.38	48
334	0.37	0.16	0.23	43
335	0.38	0.19	0.25	43
336	0.10	0.02	0.03	48
337	0.50	0.10	0.16	51
338	0.84	0.36	0.50	45
339	0.71	0.33	0.45	45
340	0.00	0.00	0.00	50
341	0.71	0.33	0.45	46
342	0.47	0.21	0.29	39
343	0.69	0.35	0.47	51
344	0.65	0.28	0.39	46
345	0.60	0.06	0.11	49
346	0.36	0.14	0.20	36
347	0.53	0.21	0.30	43
348	0.83	0.42	0.56	45
349	0.69	0.22	0.33	41
350	1.00	0.03	0.06	33
351	0.20	0.04	0.07	45
352	0.10	0.03	0.05	32
353	0.76	0.44	0.56	43
354	0.59	0.25	0.35	52
355	0.00	0.00	0.00	33
356	0.29	0.05	0.09	39
357	0.30	0.15	0.20	48
358	0.45	0.12	0.20	40

359	0.93	0.68	0.79	38
360	0.90	0.44	0.59	41
361	0.54	0.17	0.26	41
362	0.29	0.06	0.09	36
363	0.12	0.03	0.05	36
364	0.10	0.02	0.04	45
365	0.65	0.45	0.53	38
366	0.91	0.56	0.69	36
367	0.38	0.05	0.10	55
368	0.42	0.20	0.27	40
369	0.71	0.43	0.53	47
370	0.92	0.58	0.71	38
371	0.50	0.19	0.28	42
372	0.00	0.00	0.00	45
373	0.60	0.11	0.18	28
374	0.62	0.18	0.28	44
375	0.48	0.24	0.32	42
376	0.80	0.08	0.15	49
377	0.76	0.25	0.38	52
378	0.60	0.47	0.53	32
379	0.30	0.08	0.13	37
380	0.00	0.00	0.00	34
381	0.18	0.05	0.08	39
382	0.67	0.04	0.07	56
383	0.30	0.09	0.13	35
384	0.90	0.64	0.75	44
385	0.25	0.07	0.11	29
386	0.22	0.05	0.09	37
387	0.33	0.03	0.05	39
388	0.50	0.03	0.05	35
389	0.83	0.44	0.58	34
390	0.50	0.04	0.07	28
391	1.00	0.04	0.08	48
392	0.00	0.00	0.00	33
393	0.23	0.07	0.11	42
394	0.94	0.31	0.47	55
395	0.48	0.21	0.29	47
396	0.25	0.09	0.13	44
397	0.73	0.32	0.45	34
398	1.00	0.43	0.60	35
399	0.67	0.45	0.54	31
400	0.27	0.07	0.11	46
401	0.24	0.10	0.14	42
402	0.46	0.31	0.37	35
403	0.14	0.02	0.04	44
404	0.74	0.54	0.62	37
405	0.00	0.00	0.00	49
406	0.00	0.00	0.00	28
407	0.50	0.03	0.06	34
408	0.56	0.12	0.20	42
409	0.33	0.10	0.16	29
410	0.58	0.32	0.42	34
411	0.54	0.19	0.28	37
412	0.00	0.00	0.00	33
413	0.65	0.43	0.52	30
414	1.00	0.03	0.05	38
415	0.50	0.05	0.09	39
416	0.00	0.00	0.00	36
417	0.00	0.00	0.00	36
418	0.42	0.15	0.22	34
419	0.20	0.02	0.04	44

420	0.36	0.14	0.20	36
421	0.00	0.00	0.00	41
422	0.43	0.09	0.14	35
423	0.76	0.44	0.56	36
424	0.23	0.06	0.09	52
425	0.35	0.21	0.26	33
426	0.86	0.38	0.52	32
427	0.70	0.33	0.45	42
428	0.20	0.03	0.05	33
429	0.00	0.00	0.00	42
430	0.75	0.32	0.45	28
431	0.36	0.17	0.23	29
432	0.88	0.51	0.65	41
433	0.57	0.16	0.25	50
434	0.50	0.18	0.27	38
435	0.00	0.00	0.00	27
436	0.33	0.05	0.09	37
437	1.00	0.51	0.68	35
438	0.86	0.14	0.24	43
439	0.50	0.07	0.12	44
440	0.33	0.03	0.05	34
441	0.40	0.17	0.24	36
442	0.67	0.17	0.27	48
443	0.40	0.10	0.16	40
444	0.41	0.17	0.24	41
445	0.00	0.00	0.00	38
446	1.00	0.03	0.06	33
447	0.73	0.24	0.36	33
448	0.47	0.21	0.29	33
449	0.00	0.00	0.00	27
450	0.79	0.31	0.45	35
451	0.00	0.00	0.00	31
452	0.20	0.03	0.05	33
453	0.27	0.15	0.19	27
454	1.00	0.54	0.70	46
455	0.78	0.48	0.60	29
456	0.00	0.00	0.00	37
457	0.50	0.38	0.43	26
458	0.00	0.00	0.00	34
459	0.33	0.07	0.11	29
460	0.38	0.08	0.13	39
461	1.00	0.04	0.08	25
462	0.78	0.55	0.64	33
463	0.52	0.36	0.43	33
464	0.21	0.10	0.14	29
465	0.50	0.19	0.27	27
466	0.92	0.40	0.56	30
467	0.89	0.46	0.61	37
468	0.00	0.00	0.00	34
469	0.50	0.18	0.27	33
470	0.10	0.03	0.05	29
471	0.56	0.31	0.40	29
472	0.18	0.06	0.10	31
473	0.57	0.28	0.37	29
474	0.65	0.44	0.53	34
475	0.56	0.40	0.47	25
476	0.48	0.30	0.37	33
477	0.81	0.55	0.66	47
478	0.00	0.00	0.00	29
479	0.79	0.46	0.58	41
480	0.67	0.40	0.50	20

481	0.64	0.25	0.36	28
482	0.94	0.53	0.68	32
483	0.38	0.06	0.11	48
484	0.00	0.00	0.00	27
485	0.56	0.14	0.22	36
486	1.00	0.39	0.57	33
487	0.72	0.67	0.69	27
488	0.88	0.50	0.64	30
489	0.00	0.00	0.00	32
490	0.50	0.40	0.44	25
491	0.00	0.00	0.00	31
492	0.00	0.00	0.00	38
493	0.17	0.03	0.06	30
494	0.00	0.00	0.00	32
495	0.00	0.00	0.00	30
496	0.25	0.03	0.05	35
497	0.50	0.27	0.35	41
498	0.71	0.14	0.23	37
499	0.67	0.24	0.36	41
500	0.44	0.20	0.27	35
501	0.17	0.02	0.04	51
502	0.50	0.16	0.24	37
503	0.68	0.51	0.58	37
504	0.88	0.51	0.65	41
505	0.33	0.10	0.15	31
506	0.50	0.03	0.05	38
507	0.00	0.00	0.00	41
508	1.00	0.47	0.64	34
509	0.58	0.21	0.31	33
510	0.77	0.57	0.66	35
511	0.90	0.72	0.80	25
512	0.29	0.06	0.10	34
513	0.31	0.20	0.24	25
514	0.29	0.05	0.09	39
515	0.93	0.50	0.65	28
516	0.23	0.10	0.14	29
517	0.00	0.00	0.00	21
518	0.67	0.19	0.29	32
519	0.30	0.10	0.15	31
520	0.85	0.47	0.61	36
521	0.50	0.15	0.23	46
522	0.95	0.60	0.74	35
523	0.38	0.10	0.16	30
524	0.57	0.16	0.25	25
525	0.57	0.17	0.27	46
526	0.88	0.58	0.70	24
527	0.87	0.28	0.43	46
528	1.00	0.48	0.65	21
529	0.71	0.15	0.24	34
530	0.36	0.12	0.19	32
531	0.71	0.50	0.59	30
532	0.00	0.00	0.00	34
533	0.67	0.30	0.41	47
534	0.75	0.21	0.33	28
535	0.00	0.00	0.00	20
536	0.70	0.23	0.34	31
537	0.90	0.30	0.45	30
538	0.00	0.00	0.00	22
539	0.75	0.09	0.17	32
540	0.00	0.00	0.00	20
541	0.00	0.00	0.00	30

542	1.00	0.29	0.45	34
543	0.00	0.00	0.00	33
544	0.33	0.09	0.14	33
545	0.50	0.06	0.11	31
546	1.00	0.13	0.23	31
547	0.86	0.65	0.74	37
548	0.75	0.15	0.26	39
549	0.60	0.16	0.25	38
550	0.00	0.00	0.00	25
551	0.44	0.11	0.18	36
552	0.80	0.11	0.20	35
553	0.53	0.38	0.44	26
554	0.59	0.32	0.42	31
555	0.56	0.19	0.28	27
556	0.56	0.14	0.22	37
557	0.43	0.11	0.18	27
558	0.33	0.18	0.24	22
559	0.00	0.00	0.00	30
560	0.79	0.33	0.47	33
561	0.50	0.10	0.16	42
562	0.36	0.14	0.20	37
563	0.14	0.04	0.06	25
564	0.00	0.00	0.00	36
565	0.40	0.09	0.15	22
566	0.50	0.09	0.15	34
567	0.33	0.07	0.11	29
568	0.73	0.31	0.44	35
569	1.00	0.30	0.46	27
570	0.00	0.00	0.00	25
571	0.22	0.07	0.11	27
572	0.85	0.50	0.63	22
573	0.44	0.12	0.19	34
574	1.00	0.24	0.38	34
575	0.66	0.40	0.49	48
576	0.00	0.00	0.00	26
577	0.00	0.00	0.00	37
578	0.56	0.24	0.33	21
579	0.77	0.34	0.48	29
580	0.60	0.19	0.29	31
581	0.00	0.00	0.00	26
582	0.82	0.42	0.56	33
583	0.30	0.15	0.20	20
584	0.59	0.27	0.37	37
585	0.75	0.53	0.62	34
586	0.40	0.15	0.22	26
587	0.80	0.22	0.34	37
588	0.75	0.25	0.38	24
589	0.95	0.55	0.70	38
590	0.18	0.09	0.12	22
591	0.29	0.08	0.13	24
592	0.50	0.15	0.23	33
593	0.25	0.12	0.17	24
594	0.74	0.39	0.51	36
595	0.56	0.24	0.33	21
596	0.00	0.00	0.00	23
597	0.00	0.00	0.00	28
598	0.50	0.17	0.25	30
599	0.57	0.17	0.27	23
600	0.62	0.31	0.41	26
601	0.00	0.00	0.00	33
602	0.00	0.00	0.00	24

603	0.44	0.12	0.20	32
604	0.44	0.18	0.26	22
605	0.00	0.00	0.00	28
606	0.00	0.00	0.00	27
607	0.33	0.05	0.09	20
608	0.00	0.00	0.00	20
609	0.54	0.30	0.39	23
610	0.00	0.00	0.00	31
611	0.17	0.03	0.05	34
612	1.00	0.41	0.58	22
613	0.14	0.07	0.10	14
614	0.87	0.57	0.68	23
615	0.00	0.00	0.00	27
616	0.00	0.00	0.00	29
617	0.69	0.30	0.42	30
618	0.57	0.14	0.22	29
619	0.83	0.15	0.26	33
620	0.47	0.35	0.40	20
621	0.00	0.00	0.00	42
622	0.59	0.43	0.50	23
623	0.89	0.62	0.73	26
624	0.17	0.03	0.05	31
625	0.33	0.08	0.12	26
626	0.33	0.09	0.14	22
627	0.73	0.34	0.47	32
628	0.80	0.16	0.27	25
629	0.73	0.28	0.40	29
630	0.89	0.64	0.74	25
631	0.17	0.05	0.08	19
632	0.77	0.50	0.61	34
633	0.80	0.18	0.30	22
634	0.75	0.11	0.19	27
635	0.94	0.48	0.64	31
636	1.00	0.26	0.41	27
637	0.20	0.06	0.10	16
638	0.92	0.50	0.65	24
639	0.00	0.00	0.00	27
640	0.72	0.45	0.55	29
641	1.00	0.55	0.71	22
642	0.43	0.14	0.21	21
643	0.00	0.00	0.00	27
644	0.46	0.19	0.27	32
645	0.67	0.34	0.45	29
646	1.00	0.04	0.07	26
647	0.21	0.11	0.15	27
648	0.38	0.12	0.18	25
649	0.33	0.25	0.29	20
650	0.33	0.07	0.12	28
651	0.60	0.10	0.17	31
652	0.33	0.04	0.07	27
653	0.71	0.17	0.27	30
654	1.00	0.03	0.06	30
655	0.50	0.05	0.09	21
656	0.50	0.14	0.22	21
657	0.92	0.52	0.67	21
658	0.50	0.12	0.19	26
659	0.14	0.03	0.05	30
660	0.00	0.00	0.00	18
661	0.79	0.46	0.58	24
662	0.43	0.20	0.27	15
663	0.83	0.52	0.64	29

664	0.83	0.42	0.56	24
665	0.00	0.00	0.00	32
666	0.86	0.23	0.36	26
667	0.12	0.04	0.06	25
668	0.14	0.05	0.07	20
669	0.00	0.00	0.00	23
670	0.00	0.00	0.00	28
671	0.12	0.06	0.08	18
672	0.81	0.43	0.57	30
673	0.00	0.00	0.00	28
674	0.00	0.00	0.00	27
675	0.33	0.04	0.07	24
676	0.00	0.00	0.00	25
677	0.50	0.24	0.32	21
678	0.00	0.00	0.00	28
679	0.50	0.30	0.37	27
680	0.00	0.00	0.00	17
681	0.50	0.09	0.15	23
682	0.00	0.00	0.00	20
683	0.71	0.26	0.38	19
684	0.00	0.00	0.00	29
685	0.38	0.09	0.14	35
686	1.00	0.12	0.22	16
687	0.00	0.00	0.00	19
688	0.53	0.31	0.39	26
689	1.00	0.05	0.10	19
690	0.00	0.00	0.00	16
691	0.00	0.00	0.00	20
692	0.00	0.00	0.00	26
693	0.25	0.16	0.19	19
694	0.00	0.00	0.00	24
695	1.00	0.04	0.07	26
696	0.29	0.06	0.10	34
697	1.00	0.05	0.09	21
698	0.00	0.00	0.00	30
699	1.00	0.19	0.32	21
700	0.50	0.08	0.14	24
701	0.50	0.04	0.07	25
702	0.67	0.27	0.39	22
703	0.59	0.50	0.54	20
704	0.20	0.05	0.07	22
705	0.50	0.21	0.29	24
706	1.00	0.05	0.10	19
707	0.00	0.00	0.00	17
708	0.00	0.00	0.00	23
709	0.00	0.00	0.00	21
710	0.33	0.08	0.13	24
711	0.20	0.07	0.11	14
712	0.12	0.05	0.07	19
713	1.00	0.53	0.69	17
714	0.00	0.00	0.00	22
715	0.29	0.14	0.19	14
716	0.80	0.15	0.25	27
717	0.17	0.05	0.08	20
718	0.25	0.05	0.08	21
719	0.54	0.33	0.41	21
720	1.00	0.09	0.17	22
721	0.50	0.04	0.08	24
722	0.47	0.25	0.33	28
723	0.44	0.18	0.26	22
724	0.00	0.00	0.00	20

725	1.00	0.36	0.53	22
726	0.40	0.17	0.24	24
727	0.00	0.00	0.00	15
728	0.75	0.24	0.36	25
729	0.00	0.00	0.00	17
730	0.93	0.67	0.78	21
731	0.56	0.24	0.33	21
732	0.00	0.00	0.00	33
733	0.57	0.24	0.33	17
734	1.00	0.31	0.48	16
735	0.40	0.08	0.13	26
736	0.00	0.00	0.00	23
737	0.40	0.19	0.26	21
738	0.59	0.39	0.47	33
739	0.75	0.19	0.30	16
740	1.00	0.50	0.67	26
741	0.83	0.43	0.57	23
742	1.00	0.05	0.10	20
743	0.60	0.16	0.25	19
744	0.55	0.33	0.41	18
745	0.50	0.04	0.08	23
746	0.33	0.09	0.14	22
747	0.80	0.17	0.29	23
748	0.60	0.12	0.19	26
749	0.00	0.00	0.00	24
750	0.00	0.00	0.00	21
751	1.00	0.26	0.41	23
752	1.00	0.38	0.55	16
753	0.20	0.09	0.13	11
754	0.00	0.00	0.00	23
755	0.00	0.00	0.00	27
756	0.75	0.14	0.24	21
757	0.38	0.18	0.24	28
758	0.25	0.05	0.08	20
759	0.50	0.04	0.08	23
760	0.00	0.00	0.00	21
761	0.33	0.11	0.17	18
762	0.14	0.05	0.07	22
763	0.50	0.03	0.06	31
764	1.00	0.21	0.35	28
765	0.50	0.12	0.20	33
766	0.43	0.13	0.20	23
767	1.00	0.19	0.32	26
768	1.00	0.32	0.48	22
769	0.67	0.19	0.30	21
770	0.22	0.08	0.12	25
771	0.86	0.26	0.40	23
772	0.33	0.10	0.15	21
773	0.00	0.00	0.00	27
774	0.50	0.05	0.10	19
775	0.50	0.17	0.25	24
776	0.00	0.00	0.00	24
777	1.00	0.47	0.64	19
778	0.67	0.13	0.22	15
779	0.50	0.06	0.11	16
780	0.25	0.12	0.17	16
781	0.80	0.22	0.35	18
782	0.00	0.00	0.00	20
783	0.71	0.19	0.30	26
784	0.00	0.00	0.00	19
785	0.00	0.00	0.00	16

786	0.80	0.16	0.27	25
787	0.50	0.05	0.10	19
788	0.62	0.21	0.31	24
789	0.00	0.00	0.00	21
790	0.47	0.29	0.36	24
791	0.00	0.00	0.00	29
792	0.60	0.46	0.52	13
793	0.20	0.06	0.09	18
794	0.00	0.00	0.00	17
795	0.29	0.11	0.16	18
796	0.62	0.36	0.45	14
797	0.50	0.04	0.08	23
798	0.50	0.05	0.09	20
799	0.40	0.12	0.18	17
800	0.00	0.00	0.00	16
801	0.00	0.00	0.00	17
802	0.00	0.00	0.00	17
803	0.00	0.00	0.00	12
804	0.83	0.22	0.34	23
805	0.00	0.00	0.00	23
806	0.00	0.00	0.00	24
807	0.00	0.00	0.00	18
808	0.25	0.07	0.11	14
809	0.89	0.31	0.46	26
810	0.50	0.14	0.22	14
811	0.33	0.06	0.10	17
812	0.57	0.17	0.26	24
813	0.75	0.13	0.22	23
814	0.50	0.05	0.10	19
815	0.33	0.11	0.16	19
816	1.00	0.11	0.20	18
817	0.00	0.00	0.00	22
818	0.00	0.00	0.00	17
819	0.00	0.00	0.00	19
820	0.43	0.14	0.21	21
821	1.00	0.35	0.52	17
822	0.86	0.46	0.60	13
823	0.00	0.00	0.00	18
824	0.58	0.41	0.48	17
825	1.00	0.31	0.48	16
826	0.40	0.12	0.19	16
827	0.00	0.00	0.00	16
828	1.00	0.05	0.09	22
829	0.00	0.00	0.00	22
830	0.60	0.19	0.29	16
831	0.67	0.24	0.35	17
832	0.50	0.12	0.20	16
833	0.00	0.00	0.00	20
834	0.00	0.00	0.00	18
835	0.25	0.08	0.12	12
836	0.00	0.00	0.00	20
837	0.00	0.00	0.00	14
838	1.00	0.35	0.52	17
839	0.00	0.00	0.00	24
840	0.75	0.23	0.35	13
841	0.80	0.20	0.32	20
842	0.50	0.12	0.20	16
843	0.50	0.08	0.13	13
844	0.00	0.00	0.00	25
845	0.25	0.06	0.10	17
846	0.00	0.00	0.00	16

847	0.00	0.00	0.00	22
848	1.00	0.05	0.10	20
849	1.00	0.46	0.63	24
850	0.00	0.00	0.00	17
851	0.17	0.07	0.10	14
852	0.50	0.15	0.23	20
853	0.75	0.43	0.55	14
854	1.00	0.20	0.33	15
855	0.56	0.36	0.43	14
856	0.00	0.00	0.00	12
857	0.87	0.54	0.67	24
858	0.00	0.00	0.00	13
859	0.75	0.19	0.30	16
860	0.67	0.18	0.29	22
861	0.20	0.05	0.08	20
862	0.00	0.00	0.00	15
863	0.33	0.05	0.08	21
864	0.89	0.57	0.70	14
865	0.00	0.00	0.00	17
866	0.00	0.00	0.00	14
867	0.00	0.00	0.00	21
868	1.00	0.47	0.64	17
869	0.00	0.00	0.00	21
870	0.20	0.05	0.08	21
871	0.00	0.00	0.00	15
872	0.00	0.00	0.00	17
873	0.00	0.00	0.00	21
874	0.00	0.00	0.00	15
875	1.00	0.09	0.17	11
876	1.00	0.28	0.43	18
877	0.43	0.11	0.18	27
878	1.00	0.35	0.52	23
879	0.57	0.16	0.25	25
880	0.83	0.29	0.43	17
881	0.50	0.04	0.08	23
882	0.00	0.00	0.00	15
883	0.00	0.00	0.00	21
884	0.83	0.33	0.48	15
885	0.00	0.00	0.00	18
886	1.00	0.58	0.73	19
887	1.00	0.08	0.14	13
888	0.40	0.10	0.16	20
889	0.00	0.00	0.00	26
890	0.00	0.00	0.00	18
891	0.00	0.00	0.00	21
892	0.00	0.00	0.00	20
893	1.00	0.64	0.78	14
894	0.00	0.00	0.00	24
895	0.69	0.41	0.51	22
896	0.00	0.00	0.00	14
897	0.89	0.57	0.70	14
898	0.60	0.27	0.37	22
899	0.50	0.21	0.30	19
900	0.50	0.25	0.33	8
901	0.89	0.40	0.55	20
902	0.00	0.00	0.00	20
903	0.67	0.08	0.14	26
904	0.00	0.00	0.00	18
905	0.00	0.00	0.00	17
906	0.00	0.00	0.00	17
907	0.67	0.31	0.42	13

908	0.00	0.00	0.00	11
909	0.80	0.40	0.53	20
910	1.00	0.36	0.53	11
911	0.86	0.35	0.50	17
912	0.00	0.00	0.00	13
913	0.92	0.85	0.88	13
914	0.43	0.25	0.32	12
915	0.86	0.43	0.57	14
916	0.00	0.00	0.00	19
917	1.00	0.06	0.12	16
918	0.00	0.00	0.00	14
919	0.00	0.00	0.00	13
920	1.00	0.47	0.64	17
921	0.00	0.00	0.00	17
922	0.75	0.21	0.33	14
923	0.33	0.05	0.09	19
924	0.33	0.04	0.07	24
925	0.00	0.00	0.00	16
926	0.00	0.00	0.00	18
927	0.43	0.20	0.27	15
928	0.83	0.67	0.74	15
929	0.88	0.41	0.56	17
930	0.67	0.10	0.17	21
931	0.00	0.00	0.00	13
932	1.00	0.06	0.12	16
933	0.64	0.44	0.52	16
934	0.00	0.00	0.00	20
935	0.00	0.00	0.00	14
936	0.00	0.00	0.00	13
937	0.75	0.20	0.32	15
938	0.00	0.00	0.00	11
939	1.00	0.14	0.25	14
940	0.00	0.00	0.00	18
941	0.38	0.18	0.24	17
942	0.00	0.00	0.00	14
943	0.33	0.19	0.24	16
944	0.00	0.00	0.00	15
945	1.00	0.25	0.40	16
946	0.00	0.00	0.00	20
947	0.11	0.07	0.08	15
948	0.67	0.10	0.17	20
949	0.50	0.21	0.30	14
950	0.00	0.00	0.00	14
951	1.00	0.20	0.33	15
952	1.00	0.18	0.31	11
953	1.00	0.08	0.14	13
954	0.00	0.00	0.00	13
955	0.00	0.00	0.00	15
956	0.00	0.00	0.00	16
957	1.00	0.17	0.29	12
958	0.00	0.00	0.00	17
959	0.33	0.14	0.20	14
960	0.00	0.00	0.00	16
961	0.67	0.33	0.44	6
962	0.33	0.06	0.10	17
963	0.50	0.08	0.13	13
964	0.88	0.58	0.70	12
965	0.00	0.00	0.00	12
966	1.00	0.27	0.42	15
967	0.75	0.27	0.40	11
968	0.50	0.08	0.13	13

969	0.00	0.00	0.00	13
970	0.85	0.52	0.65	21
971	0.00	0.00	0.00	16
972	0.00	0.00	0.00	17
973	1.00	0.08	0.15	12
974	0.80	0.22	0.35	18
975	1.00	0.46	0.63	24
976	0.00	0.00	0.00	24
977	0.00	0.00	0.00	18
978	0.00	0.00	0.00	12
979	0.00	0.00	0.00	16
980	1.00	0.05	0.10	19
981	0.00	0.00	0.00	27
982	1.00	0.14	0.25	14
983	0.57	0.31	0.40	13
984	0.80	0.42	0.55	19
985	0.00	0.00	0.00	16
986	0.20	0.06	0.09	17
987	1.00	0.40	0.57	10
988	0.50	0.10	0.16	21
989	0.00	0.00	0.00	15
990	0.00	0.00	0.00	18
991	0.50	0.06	0.11	16
992	0.50	0.17	0.25	12
993	0.00	0.00	0.00	15
994	0.00	0.00	0.00	15
995	0.00	0.00	0.00	13
996	1.00	0.41	0.58	17
997	0.00	0.00	0.00	17
998	0.00	0.00	0.00	16
999	0.40	0.15	0.22	13
1000	0.67	0.11	0.18	19
1001	1.00	0.25	0.40	8
1002	0.11	0.08	0.09	13
1003	0.00	0.00	0.00	16
1004	0.00	0.00	0.00	15
1005	0.00	0.00	0.00	9
1006	0.00	0.00	0.00	23
1007	0.00	0.00	0.00	11
1008	0.88	0.37	0.52	19
1009	0.00	0.00	0.00	19
1010	0.00	0.00	0.00	15
1011	0.50	0.20	0.29	10
1012	0.00	0.00	0.00	12
1013	0.00	0.00	0.00	15
1014	0.67	0.14	0.24	14
1015	1.00	0.38	0.55	16
1016	0.00	0.00	0.00	12
1017	0.50	0.19	0.27	16
1018	0.00	0.00	0.00	17
1019	1.00	0.25	0.40	12
1020	0.67	0.20	0.31	10
1021	0.75	0.23	0.35	13
1022	0.33	0.11	0.16	19
1023	0.00	0.00	0.00	11
1024	0.25	0.09	0.13	11
1025	0.00	0.00	0.00	16
1026	0.50	0.21	0.30	19
1027	0.78	0.33	0.47	21
1028	0.80	0.33	0.47	12
1029	0.00	0.00	0.00	13

1030	0.00	0.00	0.00	11
1031	1.00	0.06	0.11	17
1032	0.50	0.10	0.17	10
1033	0.67	0.14	0.24	14
1034	0.00	0.00	0.00	19
1035	0.25	0.14	0.18	7
1036	0.80	0.31	0.44	13
1037	0.33	0.06	0.10	18
1038	1.00	0.13	0.24	15
1039	0.80	0.22	0.35	18
1040	0.00	0.00	0.00	11
1041	0.00	0.00	0.00	14
1042	0.10	0.05	0.07	19
1043	0.00	0.00	0.00	11
1044	0.00	0.00	0.00	15
1045	0.00	0.00	0.00	19
1046	0.00	0.00	0.00	14
1047	0.00	0.00	0.00	16
1048	0.00	0.00	0.00	7
1049	0.00	0.00	0.00	18
1050	0.00	0.00	0.00	22
1051	0.33	0.07	0.11	15
1052	0.00	0.00	0.00	10
1053	0.83	0.29	0.43	17
1054	0.00	0.00	0.00	22
1055	0.00	0.00	0.00	18
1056	0.67	0.36	0.47	11
1057	0.62	0.29	0.40	17
1058	0.00	0.00	0.00	17
1059	0.00	0.00	0.00	19
1060	0.00	0.00	0.00	15
1061	1.00	0.50	0.67	10
1062	1.00	0.17	0.29	18
1063	0.40	0.15	0.22	13
1064	0.00	0.00	0.00	8
1065	0.50	0.06	0.10	18
1066	0.00	0.00	0.00	10
1067	0.75	0.35	0.48	17
1068	0.00	0.00	0.00	16
1069	0.71	0.31	0.43	16
1070	0.75	0.16	0.26	19
1071	0.67	0.15	0.25	13
1072	1.00	0.33	0.50	9
1073	1.00	0.07	0.12	15
1074	1.00	0.16	0.27	19
1075	0.62	0.28	0.38	18
1076	0.50	0.08	0.14	12
1077	0.90	0.47	0.62	19
1078	1.00	0.36	0.53	11
1079	0.00	0.00	0.00	16
1080	0.00	0.00	0.00	12
1081	0.00	0.00	0.00	16
1082	0.80	0.24	0.36	17
1083	0.00	0.00	0.00	16
1084	0.33	0.06	0.10	17
1085	0.00	0.00	0.00	11
1086	0.00	0.00	0.00	11
1087	0.50	0.07	0.12	15
1088	1.00	0.50	0.67	8
1089	0.00	0.00	0.00	14
1090	0.75	0.25	0.38	12

1091	1.00	0.22	0.36	9
1092	0.00	0.00	0.00	16
1093	0.20	0.08	0.11	13
1094	0.00	0.00	0.00	14
1095	1.00	0.43	0.60	14
1096	0.00	0.00	0.00	16
1097	0.00	0.00	0.00	6
1098	0.50	0.09	0.15	22
1099	0.00	0.00	0.00	16
1100	1.00	0.11	0.20	9
1101	0.00	0.00	0.00	17
1102	0.67	0.29	0.40	14
1103	1.00	0.05	0.09	22
1104	0.00	0.00	0.00	9
1105	0.00	0.00	0.00	14
1106	0.00	0.00	0.00	12
1107	0.80	0.22	0.35	18
1108	0.00	0.00	0.00	14
1109	0.20	0.07	0.10	15
1110	0.00	0.00	0.00	13
1111	0.29	0.18	0.22	11
1112	0.00	0.00	0.00	10
1113	0.00	0.00	0.00	4
1114	0.00	0.00	0.00	14
1115	0.00	0.00	0.00	14
1116	0.00	0.00	0.00	15
1117	0.00	0.00	0.00	18
1118	0.00	0.00	0.00	20
1119	1.00	0.06	0.12	16
1120	0.00	0.00	0.00	10
1121	0.00	0.00	0.00	17
1122	0.50	0.08	0.14	12
1123	0.67	0.20	0.31	10
1124	0.00	0.00	0.00	11
1125	0.50	0.17	0.25	6
1126	0.00	0.00	0.00	9
1127	0.00	0.00	0.00	12
1128	0.50	0.21	0.30	14
1129	0.60	0.38	0.46	8
1130	0.60	0.23	0.33	13
1131	0.00	0.00	0.00	12
1132	0.12	0.09	0.11	11
1133	0.00	0.00	0.00	15
1134	0.00	0.00	0.00	10
1135	0.33	0.06	0.11	16
1136	1.00	0.06	0.12	16
1137	0.00	0.00	0.00	17
1138	0.00	0.00	0.00	15
1139	1.00	0.85	0.92	13
1140	0.00	0.00	0.00	10
1141	0.14	0.12	0.13	8
1142	0.00	0.00	0.00	12
1143	0.00	0.00	0.00	8
1144	0.50	0.06	0.11	17
1145	0.00	0.00	0.00	13
1146	0.00	0.00	0.00	14
1147	1.00	0.31	0.47	13
1148	0.00	0.00	0.00	11
1149	1.00	0.12	0.22	16
1150	0.00	0.00	0.00	15
1151	0.20	0.09	0.13	11

1152	0.67	0.17	0.27	12
1153	1.00	0.25	0.40	12
1154	0.57	0.31	0.40	13
1155	0.00	0.00	0.00	13
1156	0.00	0.00	0.00	7
1157	0.00	0.00	0.00	10
1158	0.00	0.00	0.00	16
1159	0.00	0.00	0.00	16
1160	0.67	0.18	0.29	11
1161	1.00	0.44	0.62	18
1162	0.75	0.19	0.30	16
1163	0.50	0.07	0.12	14
1164	0.00	0.00	0.00	18
1165	1.00	0.62	0.76	13
1166	0.50	0.10	0.17	10
1167	0.33	0.33	0.33	6
1168	0.83	0.45	0.59	11
1169	0.67	0.22	0.33	18
1170	1.00	0.27	0.43	11
1171	0.00	0.00	0.00	14
1172	0.00	0.00	0.00	13
1173	0.67	0.50	0.57	8
1174	1.00	0.13	0.24	15
1175	0.88	0.70	0.78	10
1176	0.00	0.00	0.00	5
1177	0.75	0.40	0.52	15
1178	0.00	0.00	0.00	5
1179	1.00	0.33	0.50	12
1180	0.00	0.00	0.00	12
1181	1.00	0.15	0.27	13
1182	0.00	0.00	0.00	16
1183	0.67	0.18	0.29	11
1184	0.00	0.00	0.00	13
1185	0.00	0.00	0.00	12
1186	0.83	0.50	0.62	10
1187	0.00	0.00	0.00	14
1188	0.86	0.55	0.67	22
1189	0.00	0.00	0.00	8
1190	0.00	0.00	0.00	8
1191	1.00	0.33	0.50	9
1192	0.50	0.17	0.25	12
1193	0.00	0.00	0.00	11
1194	0.33	0.07	0.12	14
1195	0.83	0.26	0.40	19
1196	1.00	0.11	0.20	9
1197	1.00	0.04	0.08	23
1198	0.00	0.00	0.00	7
1199	1.00	0.12	0.22	8
1200	0.00	0.00	0.00	11
1201	0.67	0.13	0.22	15
1202	0.00	0.00	0.00	17
1203	0.00	0.00	0.00	10
1204	0.50	0.14	0.22	7
1205	0.67	0.36	0.47	11
1206	0.50	0.14	0.22	14
1207	1.00	0.42	0.59	12
1208	0.33	0.07	0.12	14
1209	0.00	0.00	0.00	13
1210	0.00	0.00	0.00	7
1211	0.75	0.30	0.43	10
1212	1.00	0.11	0.20	9

1213	1.00	0.56	0.71	9
1214	0.33	0.07	0.12	14
1215	0.67	0.12	0.21	16
1216	0.33	0.14	0.20	14
1217	0.25	0.08	0.12	12
1218	0.00	0.00	0.00	14
1219	0.50	0.06	0.11	16
1220	0.00	0.00	0.00	11
1221	1.00	0.27	0.43	11
1222	0.00	0.00	0.00	9
1223	0.00	0.00	0.00	12
1224	0.60	0.30	0.40	10
1225	1.00	0.17	0.29	12
1226	0.67	0.25	0.36	8
1227	0.00	0.00	0.00	12
1228	0.50	0.08	0.13	13
1229	0.00	0.00	0.00	10
1230	0.25	0.14	0.18	7
1231	0.00	0.00	0.00	11
1232	0.83	0.56	0.67	9
1233	0.33	0.07	0.11	15
1234	0.25	0.11	0.15	9
1235	0.50	0.17	0.25	6
1236	0.00	0.00	0.00	15
1237	0.00	0.00	0.00	10
1238	1.00	0.40	0.57	10
1239	0.83	0.45	0.59	11
1240	0.00	0.00	0.00	13
1241	0.00	0.00	0.00	9
1242	0.75	0.38	0.50	8
1243	1.00	0.25	0.40	12
1244	0.00	0.00	0.00	10
1245	0.00	0.00	0.00	6
1246	0.00	0.00	0.00	4
1247	0.00	0.00	0.00	13
1248	1.00	0.05	0.10	19
1249	0.00	0.00	0.00	13
1250	0.00	0.00	0.00	7
1251	0.00	0.00	0.00	5
1252	0.00	0.00	0.00	5
1253	1.00	0.13	0.24	15
1254	0.00	0.00	0.00	12
1255	1.00	0.12	0.22	8
1256	0.86	0.60	0.71	10
1257	0.00	0.00	0.00	17
1258	0.00	0.00	0.00	8
1259	0.00	0.00	0.00	6
1260	1.00	0.73	0.84	11
1261	0.00	0.00	0.00	14
1262	0.00	0.00	0.00	22
1263	0.83	0.50	0.62	10
1264	0.33	0.12	0.18	8
1265	0.00	0.00	0.00	14
1266	0.00	0.00	0.00	10
1267	0.33	0.08	0.13	12
1268	0.67	0.29	0.40	7
1269	1.00	0.17	0.29	12
1270	0.00	0.00	0.00	12
1271	0.00	0.00	0.00	13
1272	0.67	0.12	0.20	17
1273	0.75	0.20	0.32	15

1274	0.00	0.00	0.00	17
1275	0.00	0.00	0.00	9
1276	0.00	0.00	0.00	9
1277	0.00	0.00	0.00	14
1278	0.00	0.00	0.00	14
1279	0.00	0.00	0.00	6
1280	0.00	0.00	0.00	9
1281	0.50	0.29	0.36	7
1282	0.00	0.00	0.00	10
1283	0.50	0.15	0.24	13
1284	0.00	0.00	0.00	9
1285	1.00	0.09	0.17	11
1286	0.00	0.00	0.00	7
1287	0.33	0.10	0.15	10
1288	0.33	0.14	0.20	7
1289	0.50	0.18	0.27	11
1290	0.00	0.00	0.00	18
1291	0.00	0.00	0.00	11
1292	0.00	0.00	0.00	7
1293	0.00	0.00	0.00	12
1294	0.00	0.00	0.00	11
1295	0.00	0.00	0.00	13
1296	1.00	0.08	0.15	12
1297	0.00	0.00	0.00	16
1298	1.00	0.08	0.15	12
1299	0.00	0.00	0.00	8
1300	0.67	0.12	0.21	16
1301	1.00	0.44	0.61	16
1302	0.50	0.11	0.18	9
1303	1.00	0.45	0.62	11
1304	0.00	0.00	0.00	10
1305	1.00	0.25	0.40	8
1306	1.00	0.08	0.14	13
1307	0.50	0.20	0.29	10
1308	0.00	0.00	0.00	16
1309	0.50	0.06	0.11	16
1310	0.00	0.00	0.00	15
1311	1.00	0.25	0.40	16
1312	0.00	0.00	0.00	15
1313	1.00	0.30	0.46	10
1314	0.00	0.00	0.00	9
1315	0.00	0.00	0.00	12
1316	0.00	0.00	0.00	12
1317	0.00	0.00	0.00	14
1318	1.00	0.11	0.20	9
1319	0.00	0.00	0.00	15
1320	1.00	0.45	0.62	11
1321	0.70	0.54	0.61	13
1322	0.00	0.00	0.00	12
1323	0.00	0.00	0.00	11
1324	0.00	0.00	0.00	17
1325	1.00	0.19	0.32	16
1326	0.00	0.00	0.00	14
1327	1.00	0.67	0.80	9
1328	0.00	0.00	0.00	8
1329	0.00	0.00	0.00	10
1330	0.00	0.00	0.00	8
1331	1.00	0.17	0.29	18
1332	0.50	0.20	0.29	10
1333	0.00	0.00	0.00	10
1334	0.00	0.00	0.00	10

1335	0.25	0.08	0.12	12
1336	0.00	0.00	0.00	8
1337	0.50	0.11	0.18	9
1338	0.00	0.00	0.00	15
1339	1.00	0.25	0.40	12
1340	0.00	0.00	0.00	11
1341	0.00	0.00	0.00	10
1342	0.00	0.00	0.00	17
1343	0.50	0.50	0.50	6
1344	0.57	0.33	0.42	12
1345	0.50	0.12	0.20	8
1346	1.00	0.08	0.14	13
1347	0.00	0.00	0.00	10
1348	0.00	0.00	0.00	10
1349	0.75	0.40	0.52	15
1350	1.00	0.08	0.14	13
1351	0.00	0.00	0.00	7
1352	1.00	0.47	0.64	15
1353	0.00	0.00	0.00	8
1354	1.00	0.10	0.18	10
1355	0.00	0.00	0.00	9
1356	1.00	0.10	0.18	10
1357	0.50	0.31	0.38	13
1358	0.00	0.00	0.00	9
1359	0.67	0.25	0.36	8
1360	0.00	0.00	0.00	9
1361	0.00	0.00	0.00	8
1362	1.00	0.08	0.14	13
1363	1.00	0.10	0.18	10
1364	0.50	0.08	0.13	13
1365	0.00	0.00	0.00	9
1366	1.00	0.09	0.17	11
1367	1.00	0.36	0.53	11
1368	0.00	0.00	0.00	6
1369	0.00	0.00	0.00	6
1370	1.00	0.09	0.17	11
1371	0.00	0.00	0.00	14
1372	0.00	0.00	0.00	9
1373	1.00	0.08	0.15	12
1374	0.00	0.00	0.00	6
1375	0.00	0.00	0.00	12
1376	0.67	0.18	0.29	11
1377	0.00	0.00	0.00	13
1378	0.00	0.00	0.00	10
1379	0.50	0.07	0.12	14
1380	0.00	0.00	0.00	15
1381	0.00	0.00	0.00	12
1382	0.00	0.00	0.00	11
1383	1.00	0.57	0.73	14
1384	0.00	0.00	0.00	3
1385	0.00	0.00	0.00	15
1386	0.00	0.00	0.00	15
1387	0.00	0.00	0.00	5
1388	0.00	0.00	0.00	15
1389	0.00	0.00	0.00	13
1390	0.50	0.08	0.14	12
1391	0.00	0.00	0.00	11
1392	0.00	0.00	0.00	14
1393	1.00	0.11	0.20	9
1394	1.00	0.09	0.17	11
1395	1.00	0.21	0.35	19

1396	0.00	0.00	0.00	11
1397	0.00	0.00	0.00	6
1398	0.00	0.00	0.00	10
1399	0.25	0.10	0.14	10
1400	0.00	0.00	0.00	15
1401	0.00	0.00	0.00	7
1402	0.00	0.00	0.00	12
1403	1.00	0.33	0.50	6
1404	0.00	0.00	0.00	4
1405	0.00	0.00	0.00	6
1406	0.75	0.43	0.55	7
1407	0.00	0.00	0.00	9
1408	0.00	0.00	0.00	10
1409	0.25	0.20	0.22	5
1410	0.00	0.00	0.00	11
1411	0.00	0.00	0.00	7
1412	1.00	0.36	0.53	11
1413	0.67	0.25	0.36	8
1414	0.67	0.12	0.20	17
1415	1.00	0.38	0.56	13
1416	1.00	0.12	0.22	16
1417	0.25	0.09	0.13	11
1418	0.00	0.00	0.00	11
1419	0.00	0.00	0.00	15
1420	0.00	0.00	0.00	9
1421	0.00	0.00	0.00	10
1422	0.50	0.14	0.22	7
1423	0.00	0.00	0.00	17
1424	0.00	0.00	0.00	13
1425	0.00	0.00	0.00	14
1426	0.00	0.00	0.00	16
1427	0.00	0.00	0.00	8
1428	1.00	0.06	0.12	16
1429	0.00	0.00	0.00	14
1430	0.00	0.00	0.00	10
1431	0.00	0.00	0.00	13
1432	0.00	0.00	0.00	8
1433	0.88	0.47	0.61	15
1434	0.50	0.12	0.19	17
1435	0.00	0.00	0.00	5
1436	0.00	0.00	0.00	7
1437	0.00	0.00	0.00	9
1438	0.00	0.00	0.00	3
1439	1.00	0.12	0.22	8
1440	0.50	0.17	0.25	12
1441	0.00	0.00	0.00	13
1442	1.00	0.29	0.44	7
1443	0.50	0.10	0.17	10
1444	0.00	0.00	0.00	9
1445	1.00	0.18	0.30	17
1446	0.50	0.10	0.16	21
1447	0.00	0.00	0.00	6
1448	0.00	0.00	0.00	8
1449	0.00	0.00	0.00	8
1450	1.00	0.10	0.18	10
1451	1.00	0.13	0.24	15
1452	0.00	0.00	0.00	15
1453	0.00	0.00	0.00	7
1454	0.00	0.00	0.00	14
1455	0.00	0.00	0.00	17
1456	1.00	0.33	0.50	9

1457	0.33	0.08	0.13	12
1458	0.80	0.36	0.50	11
1459	0.00	0.00	0.00	7
1460	1.00	0.25	0.40	4
1461	0.00	0.00	0.00	11
1462	0.00	0.00	0.00	6
1463	0.50	0.12	0.20	8
1464	0.00	0.00	0.00	8
1465	0.00	0.00	0.00	12
1466	0.00	0.00	0.00	9
1467	0.50	0.11	0.18	9
1468	0.00	0.00	0.00	13
1469	0.00	0.00	0.00	8
1470	0.00	0.00	0.00	9
1471	1.00	0.27	0.42	15
1472	0.50	0.20	0.29	10
1473	1.00	0.38	0.55	8
1474	0.00	0.00	0.00	12
1475	0.00	0.00	0.00	13
1476	0.00	0.00	0.00	11
1477	0.00	0.00	0.00	9
1478	0.00	0.00	0.00	13
1479	1.00	0.44	0.62	9
1480	1.00	0.08	0.14	13
1481	0.00	0.00	0.00	9
1482	0.00	0.00	0.00	7
1483	1.00	0.75	0.86	4
1484	0.86	0.40	0.55	15
1485	0.00	0.00	0.00	16
1486	0.00	0.00	0.00	10
1487	1.00	0.18	0.31	11
1488	0.00	0.00	0.00	16
1489	0.00	0.00	0.00	11
1490	0.50	0.10	0.17	10
1491	0.00	0.00	0.00	7
1492	0.00	0.00	0.00	9
1493	1.00	0.29	0.44	7
1494	0.50	0.33	0.40	6
1495	0.33	0.25	0.29	8
1496	0.00	0.00	0.00	14
1497	1.00	0.20	0.33	10
1498	1.00	0.36	0.53	14
1499	1.00	0.17	0.29	6
1500	0.00	0.00	0.00	9
1501	0.00	0.00	0.00	13
1502	0.00	0.00	0.00	5
1503	0.00	0.00	0.00	8
1504	0.00	0.00	0.00	7
1505	0.00	0.00	0.00	9
1506	0.00	0.00	0.00	8
1507	0.00	0.00	0.00	6
1508	0.50	0.10	0.17	10
1509	0.00	0.00	0.00	7
1510	0.64	0.58	0.61	12
1511	0.50	0.10	0.17	10
1512	0.00	0.00	0.00	8
1513	1.00	0.38	0.55	8
1514	0.00	0.00	0.00	12
1515	0.00	0.00	0.00	9
1516	1.00	0.29	0.44	7
1517	0.00	0.00	0.00	10

1518	0.00	0.00	0.00	10
1519	0.00	0.00	0.00	9
1520	1.00	0.11	0.20	9
1521	0.00	0.00	0.00	8
1522	0.50	0.08	0.13	13
1523	0.00	0.00	0.00	14
1524	0.00	0.00	0.00	8
1525	0.00	0.00	0.00	12
1526	1.00	0.40	0.57	5
1527	0.00	0.00	0.00	12
1528	0.00	0.00	0.00	8
1529	0.67	0.33	0.44	6
1530	0.75	0.33	0.46	9
1531	1.00	0.30	0.46	10
1532	1.00	0.12	0.22	8
1533	0.80	0.25	0.38	16
1534	0.00	0.00	0.00	9
1535	0.00	0.00	0.00	10
1536	0.00	0.00	0.00	13
1537	1.00	0.36	0.53	11
1538	1.00	0.08	0.15	12
1539	0.00	0.00	0.00	8
1540	0.00	0.00	0.00	9
1541	0.00	0.00	0.00	7
1542	0.80	0.50	0.62	8
1543	0.00	0.00	0.00	7
1544	0.50	0.19	0.27	16
1545	0.00	0.00	0.00	7
1546	1.00	0.08	0.15	12
1547	0.00	0.00	0.00	6
1548	0.00	0.00	0.00	11
1549	0.00	0.00	0.00	8
1550	0.50	0.12	0.20	8
1551	0.00	0.00	0.00	8
1552	0.60	0.38	0.46	8
1553	1.00	0.40	0.57	10
1554	1.00	0.17	0.29	12
1555	0.00	0.00	0.00	10
1556	0.00	0.00	0.00	11
1557	0.00	0.00	0.00	9
1558	0.33	0.14	0.20	7
1559	0.88	0.58	0.70	12
1560	0.00	0.00	0.00	11
1561	0.00	0.00	0.00	10
1562	0.00	0.00	0.00	8
1563	0.00	0.00	0.00	12
1564	0.00	0.00	0.00	9
1565	0.00	0.00	0.00	10
1566	1.00	0.22	0.36	9
1567	1.00	0.29	0.44	14
1568	0.00	0.00	0.00	9
1569	0.00	0.00	0.00	10
1570	1.00	0.50	0.67	10
1571	0.00	0.00	0.00	14
1572	0.00	0.00	0.00	6
1573	0.50	0.14	0.22	7
1574	0.00	0.00	0.00	9
1575	0.00	0.00	0.00	9
1576	0.00	0.00	0.00	11
1577	0.00	0.00	0.00	7
1578	0.00	0.00	0.00	8

1579	0.00	0.00	0.00	11
1580	1.00	0.17	0.29	6
1581	0.00	0.00	0.00	12
1582	0.50	0.17	0.25	6
1583	0.00	0.00	0.00	4
1584	0.00	0.00	0.00	15
1585	1.00	0.25	0.40	8
1586	0.00	0.00	0.00	12
1587	0.00	0.00	0.00	14
1588	0.00	0.00	0.00	7
1589	0.50	0.14	0.22	7
1590	0.00	0.00	0.00	11
1591	0.00	0.00	0.00	8
1592	0.50	0.14	0.22	7
1593	0.00	0.00	0.00	7
1594	0.00	0.00	0.00	4
1595	0.00	0.00	0.00	9
1596	0.00	0.00	0.00	8
1597	1.00	0.11	0.19	19
1598	0.00	0.00	0.00	12
1599	1.00	0.43	0.60	7
1600	0.50	0.11	0.18	9
1601	0.00	0.00	0.00	11
1602	0.00	0.00	0.00	8
1603	0.00	0.00	0.00	7
1604	1.00	0.27	0.43	11
1605	0.00	0.00	0.00	5
1606	1.00	0.20	0.33	5
1607	0.00	0.00	0.00	7
1608	0.00	0.00	0.00	7
1609	0.00	0.00	0.00	9
1610	0.00	0.00	0.00	8
1611	0.00	0.00	0.00	13
1612	0.00	0.00	0.00	9
1613	0.00	0.00	0.00	5
1614	0.00	0.00	0.00	11
1615	0.00	0.00	0.00	8
1616	0.00	0.00	0.00	6
1617	1.00	0.12	0.21	17
1618	0.00	0.00	0.00	8
1619	0.67	0.13	0.22	15
1620	1.00	0.38	0.55	8
1621	0.00	0.00	0.00	8
1622	0.00	0.00	0.00	8
1623	0.00	0.00	0.00	4
1624	0.00	0.00	0.00	5
1625	0.00	0.00	0.00	11
1626	0.00	0.00	0.00	2
1627	0.00	0.00	0.00	14
1628	0.00	0.00	0.00	8
1629	0.67	0.15	0.25	13
1630	1.00	0.55	0.71	11
1631	1.00	0.12	0.22	8
1632	0.00	0.00	0.00	13
1633	0.00	0.00	0.00	9
1634	0.75	0.60	0.67	5
1635	0.00	0.00	0.00	11
1636	0.50	0.33	0.40	3
1637	0.00	0.00	0.00	6
1638	1.00	0.08	0.15	12
1639	0.00	0.00	0.00	12

1640	0.00	0.00	0.00	6
1641	0.00	0.00	0.00	10
1642	0.00	0.00	0.00	9
1643	1.00	0.10	0.18	10
1644	1.00	0.54	0.70	13
1645	0.86	0.75	0.80	8
1646	0.00	0.00	0.00	10
1647	0.00	0.00	0.00	4
1648	0.00	0.00	0.00	8
1649	0.00	0.00	0.00	16
1650	0.00	0.00	0.00	11
1651	1.00	0.42	0.59	12
1652	1.00	0.14	0.25	7
1653	0.00	0.00	0.00	4
1654	0.50	0.11	0.18	9
1655	0.50	0.12	0.20	8
1656	0.50	0.14	0.22	7
1657	0.00	0.00	0.00	11
1658	0.00	0.00	0.00	8
1659	0.50	0.11	0.18	9
1660	0.00	0.00	0.00	9
1661	1.00	0.50	0.67	4
1662	0.00	0.00	0.00	8
1663	0.00	0.00	0.00	15
1664	0.00	0.00	0.00	14
1665	0.00	0.00	0.00	9
1666	0.00	0.00	0.00	6
1667	0.75	0.33	0.46	9
1668	0.00	0.00	0.00	5
1669	1.00	0.12	0.22	8
1670	0.80	0.40	0.53	10
1671	0.67	0.12	0.21	16
1672	0.00	0.00	0.00	4
1673	0.00	0.00	0.00	9
1674	1.00	0.56	0.71	9
1675	0.00	0.00	0.00	8
1676	0.50	0.25	0.33	4
1677	0.00	0.00	0.00	10
1678	1.00	0.08	0.14	13
1679	0.00	0.00	0.00	14
1680	1.00	0.33	0.50	6
1681	1.00	0.09	0.17	11
1682	0.00	0.00	0.00	10
1683	0.20	0.20	0.20	5
1684	0.86	0.60	0.71	10
1685	0.00	0.00	0.00	10
1686	1.00	0.10	0.18	10
1687	0.00	0.00	0.00	10
1688	0.00	0.00	0.00	9
1689	1.00	0.09	0.17	11
1690	0.00	0.00	0.00	8
1691	0.67	0.17	0.27	12
1692	0.00	0.00	0.00	7
1693	0.00	0.00	0.00	5
1694	0.00	0.00	0.00	7
1695	1.00	0.07	0.12	15
1696	0.00	0.00	0.00	10
1697	0.00	0.00	0.00	8
1698	1.00	0.11	0.20	9
1699	0.00	0.00	0.00	9
1700	0.00	0.00	0.00	9

1701	0.00	0.00	0.00	10
1702	0.00	0.00	0.00	12
1703	0.00	0.00	0.00	6
1704	0.00	0.00	0.00	6
1705	1.00	0.20	0.33	15
1706	1.00	0.17	0.29	6
1707	0.00	0.00	0.00	8
1708	0.00	0.00	0.00	7
1709	0.00	0.00	0.00	10
1710	0.00	0.00	0.00	11
1711	0.80	0.80	0.80	5
1712	0.00	0.00	0.00	8
1713	1.00	0.25	0.40	8
1714	0.00	0.00	0.00	9
1715	0.00	0.00	0.00	7
1716	0.00	0.00	0.00	6
1717	0.00	0.00	0.00	11
1718	1.00	0.54	0.70	13
1719	0.00	0.00	0.00	10
1720	1.00	0.14	0.25	7
1721	0.00	0.00	0.00	5
1722	0.00	0.00	0.00	4
1723	0.33	0.25	0.29	4
1724	1.00	0.12	0.22	8
1725	0.00	0.00	0.00	10
1726	0.00	0.00	0.00	7
1727	0.00	0.00	0.00	7
1728	0.00	0.00	0.00	7
1729	0.00	0.00	0.00	12
1730	0.00	0.00	0.00	6
1731	1.00	0.08	0.14	13
1732	0.00	0.00	0.00	6
1733	0.00	0.00	0.00	8
1734	0.33	0.20	0.25	5
1735	0.00	0.00	0.00	10
1736	0.00	0.00	0.00	8
1737	0.00	0.00	0.00	9
1738	0.00	0.00	0.00	6
1739	0.00	0.00	0.00	13
1740	1.00	0.31	0.47	13
1741	0.00	0.00	0.00	6
1742	0.00	0.00	0.00	1
1743	0.00	0.00	0.00	10
1744	0.00	0.00	0.00	5
1745	0.00	0.00	0.00	12
1746	1.00	0.22	0.36	9
1747	0.75	0.23	0.35	13
1748	0.00	0.00	0.00	9
1749	0.00	0.00	0.00	4
1750	0.00	0.00	0.00	11
1751	0.00	0.00	0.00	8
1752	0.00	0.00	0.00	9
1753	0.40	0.20	0.27	10
1754	0.00	0.00	0.00	5
1755	0.00	0.00	0.00	8
1756	0.75	0.50	0.60	6
1757	0.00	0.00	0.00	9
1758	0.83	0.50	0.62	10
1759	0.00	0.00	0.00	11
1760	0.25	0.09	0.13	11
1761	0.00	0.00	0.00	7

1762	0.00	0.00	0.00	11
1763	0.00	0.00	0.00	10
1764	0.00	0.00	0.00	11
1765	0.00	0.00	0.00	5
1766	0.00	0.00	0.00	7
1767	0.40	0.25	0.31	8
1768	0.00	0.00	0.00	11
1769	0.00	0.00	0.00	15
1770	0.50	0.14	0.22	7
1771	0.00	0.00	0.00	6
1772	0.00	0.00	0.00	4
1773	1.00	0.07	0.12	15
1774	0.00	0.00	0.00	8
1775	0.00	0.00	0.00	5
1776	0.00	0.00	0.00	8
1777	1.00	0.29	0.44	7
1778	1.00	0.08	0.15	12
1779	0.00	0.00	0.00	10
1780	0.50	0.10	0.17	10
1781	1.00	0.08	0.14	13
1782	0.00	0.00	0.00	5
1783	0.60	0.27	0.37	11
1784	0.00	0.00	0.00	9
1785	1.00	0.20	0.33	5
1786	0.00	0.00	0.00	5
1787	0.00	0.00	0.00	8
1788	1.00	0.78	0.88	9
1789	0.00	0.00	0.00	12
1790	0.00	0.00	0.00	9
1791	0.00	0.00	0.00	9
1792	0.80	0.44	0.57	9
1793	1.00	0.60	0.75	5
1794	0.50	0.29	0.36	7
1795	1.00	0.18	0.31	11
1796	0.75	0.18	0.29	17
1797	1.00	0.44	0.62	9
1798	0.50	0.07	0.12	15
1799	0.50	0.40	0.44	5
1800	0.00	0.00	0.00	6
1801	0.00	0.00	0.00	15
1802	0.00	0.00	0.00	9
1803	0.00	0.00	0.00	7
1804	0.00	0.00	0.00	7
1805	0.00	0.00	0.00	10
1806	0.00	0.00	0.00	6
1807	0.00	0.00	0.00	7
1808	0.00	0.00	0.00	14
1809	0.00	0.00	0.00	8
1810	0.00	0.00	0.00	8
1811	0.67	0.29	0.40	7
1812	0.00	0.00	0.00	9
1813	0.00	0.00	0.00	5
1814	1.00	0.10	0.18	10
1815	0.00	0.00	0.00	9
1816	1.00	0.20	0.33	5
1817	0.33	0.11	0.17	9
1818	0.33	0.20	0.25	5
1819	0.00	0.00	0.00	11
1820	0.00	0.00	0.00	8
1821	1.00	0.18	0.31	11
1822	0.00	0.00	0.00	8

1823	0.00	0.00	0.00	10
1824	0.00	0.00	0.00	6
1825	0.50	0.22	0.31	9
1826	0.00	0.00	0.00	11
1827	0.00	0.00	0.00	10
1828	0.00	0.00	0.00	2
1829	0.00	0.00	0.00	9
1830	0.00	0.00	0.00	5
1831	1.00	0.38	0.55	8
1832	0.00	0.00	0.00	2
1833	1.00	0.12	0.22	8
1834	0.00	0.00	0.00	5
1835	0.00	0.00	0.00	4
1836	1.00	0.11	0.20	9
1837	0.00	0.00	0.00	9
1838	0.00	0.00	0.00	7
1839	0.00	0.00	0.00	6
1840	0.00	0.00	0.00	8
1841	1.00	0.33	0.50	6
1842	1.00	0.11	0.20	9
1843	0.00	0.00	0.00	6
1844	0.00	0.00	0.00	7
1845	1.00	0.10	0.18	10
1846	0.00	0.00	0.00	11
1847	0.00	0.00	0.00	15
1848	0.75	0.38	0.50	8
1849	0.00	0.00	0.00	11
1850	0.00	0.00	0.00	8
1851	0.75	0.33	0.46	9
1852	0.00	0.00	0.00	4
1853	0.00	0.00	0.00	10
1854	0.00	0.00	0.00	7
1855	1.00	0.30	0.46	10
1856	0.00	0.00	0.00	3
1857	0.00	0.00	0.00	13
1858	0.00	0.00	0.00	6
1859	0.00	0.00	0.00	12
1860	0.00	0.00	0.00	11
1861	0.00	0.00	0.00	7
1862	0.00	0.00	0.00	11
1863	0.00	0.00	0.00	8
1864	0.00	0.00	0.00	7
1865	0.00	0.00	0.00	11
1866	0.00	0.00	0.00	7
1867	0.00	0.00	0.00	10
1868	0.00	0.00	0.00	7
1869	0.00	0.00	0.00	9
1870	0.00	0.00	0.00	6
1871	0.00	0.00	0.00	10
1872	1.00	0.44	0.62	9
1873	0.00	0.00	0.00	8
1874	0.00	0.00	0.00	9
1875	0.00	0.00	0.00	13
1876	0.00	0.00	0.00	10
1877	0.00	0.00	0.00	5
1878	0.00	0.00	0.00	6
1879	1.00	0.08	0.14	13
1880	0.00	0.00	0.00	8
1881	0.75	0.60	0.67	5
1882	0.00	0.00	0.00	12
1883	0.00	0.00	0.00	5

1884	1.00	0.10	0.18	10
1885	0.00	0.00	0.00	10
1886	1.00	0.40	0.57	10
1887	0.00	0.00	0.00	10
1888	0.00	0.00	0.00	13
1889	0.00	0.00	0.00	7
1890	1.00	0.36	0.53	11
1891	0.00	0.00	0.00	6
1892	0.00	0.00	0.00	10
1893	0.00	0.00	0.00	5
1894	1.00	0.11	0.20	9
1895	1.00	0.20	0.33	10
1896	1.00	0.50	0.67	2
1897	0.00	0.00	0.00	5
1898	1.00	0.33	0.50	9
1899	0.00	0.00	0.00	6
1900	0.00	0.00	0.00	3
1901	0.00	0.00	0.00	7
1902	1.00	0.38	0.55	8
1903	0.00	0.00	0.00	6
1904	0.00	0.00	0.00	6
1905	1.00	0.44	0.62	9
1906	1.00	0.22	0.36	9
1907	0.00	0.00	0.00	6
1908	1.00	0.14	0.25	7
1909	0.00	0.00	0.00	10
1910	0.00	0.00	0.00	10
1911	1.00	0.38	0.55	8
1912	1.00	0.09	0.17	11
1913	0.00	0.00	0.00	6
1914	0.00	0.00	0.00	4
1915	0.00	0.00	0.00	5
1916	0.00	0.00	0.00	13
1917	0.80	0.50	0.62	8
1918	0.50	0.12	0.20	8
1919	0.00	0.00	0.00	9
1920	0.00	0.00	0.00	8
1921	0.00	0.00	0.00	4
1922	0.00	0.00	0.00	7
1923	0.00	0.00	0.00	9
1924	0.00	0.00	0.00	5
1925	0.00	0.00	0.00	5
1926	0.00	0.00	0.00	10
1927	0.75	0.43	0.55	7
1928	0.00	0.00	0.00	5
1929	0.00	0.00	0.00	7
1930	0.00	0.00	0.00	4
1931	1.00	0.43	0.60	14
1932	0.00	0.00	0.00	7
1933	0.00	0.00	0.00	6
1934	0.00	0.00	0.00	9
1935	1.00	0.38	0.55	8
1936	0.00	0.00	0.00	9
1937	0.00	0.00	0.00	8
1938	0.00	0.00	0.00	9
1939	0.00	0.00	0.00	9
1940	0.50	0.50	0.50	2
1941	0.00	0.00	0.00	8
1942	0.00	0.00	0.00	19
1943	0.00	0.00	0.00	6
1944	0.00	0.00	0.00	5

1945	0.50	0.25	0.33	4
1946	0.00	0.00	0.00	8
1947	0.00	0.00	0.00	5
1948	1.00	0.17	0.29	6
1949	0.00	0.00	0.00	9
1950	0.00	0.00	0.00	10
1951	0.00	0.00	0.00	8
1952	0.00	0.00	0.00	7
1953	0.00	0.00	0.00	7
1954	0.00	0.00	0.00	12
1955	0.00	0.00	0.00	6
1956	0.00	0.00	0.00	8
1957	1.00	0.23	0.38	13
1958	0.00	0.00	0.00	5
1959	0.00	0.00	0.00	1
1960	0.00	0.00	0.00	10
1961	0.00	0.00	0.00	4
1962	0.00	0.00	0.00	10
1963	0.75	0.50	0.60	6
1964	0.33	0.20	0.25	5
1965	0.33	0.11	0.17	9
1966	0.75	0.75	0.75	4
1967	0.00	0.00	0.00	2
1968	0.00	0.00	0.00	5
1969	0.50	0.11	0.18	9
1970	0.00	0.00	0.00	10
1971	0.00	0.00	0.00	6
1972	0.00	0.00	0.00	9
1973	0.00	0.00	0.00	9
1974	0.00	0.00	0.00	10
1975	0.00	0.00	0.00	10
1976	0.00	0.00	0.00	10
1977	0.00	0.00	0.00	9
1978	0.00	0.00	0.00	8
1979	1.00	0.22	0.36	9
1980	1.00	0.17	0.29	6
1981	0.00	0.00	0.00	6
1982	1.00	0.20	0.33	5
1983	0.00	0.00	0.00	10
1984	0.00	0.00	0.00	8
1985	0.00	0.00	0.00	9
1986	1.00	0.20	0.33	10
1987	0.00	0.00	0.00	8
1988	0.00	0.00	0.00	8
1989	0.00	0.00	0.00	4
1990	0.00	0.00	0.00	4
1991	0.50	0.14	0.22	7
1992	0.00	0.00	0.00	8
1993	0.00	0.00	0.00	9
1994	1.00	0.14	0.25	7
1995	0.00	0.00	0.00	5
1996	0.00	0.00	0.00	8
1997	1.00	0.12	0.22	8
1998	0.00	0.00	0.00	8
1999	0.00	0.00	0.00	4
2000	1.00	0.50	0.67	2
2001	0.00	0.00	0.00	9
2002	1.00	0.12	0.22	8
2003	0.33	0.08	0.12	13
2004	1.00	0.43	0.60	7
2005	1.00	0.12	0.22	8

2006	0.00	0.00	0.00	11
2007	0.00	0.00	0.00	8
2008	0.00	0.00	0.00	8
2009	0.00	0.00	0.00	8
2010	1.00	0.38	0.55	8
2011	0.00	0.00	0.00	3
2012	1.00	0.09	0.17	11
2013	0.00	0.00	0.00	12
2014	0.00	0.00	0.00	9
2015	0.00	0.00	0.00	10
2016	0.00	0.00	0.00	6
2017	0.00	0.00	0.00	7
2018	0.00	0.00	0.00	2
2019	1.00	0.20	0.33	5
2020	1.00	0.25	0.40	4
2021	0.00	0.00	0.00	5
2022	0.00	0.00	0.00	9
2023	0.00	0.00	0.00	10
2024	0.00	0.00	0.00	9
2025	0.00	0.00	0.00	7
2026	0.00	0.00	0.00	5
2027	0.00	0.00	0.00	10
2028	0.00	0.00	0.00	3
2029	0.00	0.00	0.00	5
2030	0.00	0.00	0.00	8
2031	1.00	0.56	0.71	9
2032	0.00	0.00	0.00	10
2033	0.00	0.00	0.00	9
2034	0.00	0.00	0.00	5
2035	1.00	0.14	0.25	7
2036	0.00	0.00	0.00	9
2037	0.00	0.00	0.00	6
2038	0.00	0.00	0.00	8
2039	0.00	0.00	0.00	9
2040	0.00	0.00	0.00	3
2041	1.00	0.12	0.22	8
2042	0.00	0.00	0.00	3
2043	1.00	0.12	0.22	8
2044	1.00	0.20	0.33	10
2045	0.00	0.00	0.00	5
2046	1.00	0.20	0.33	5
2047	1.00	0.20	0.33	5
2048	0.00	0.00	0.00	8
2049	0.00	0.00	0.00	4
2050	0.00	0.00	0.00	3
2051	0.00	0.00	0.00	8
2052	0.50	0.40	0.44	5
2053	0.00	0.00	0.00	4
2054	0.00	0.00	0.00	10
2055	0.00	0.00	0.00	6
2056	0.00	0.00	0.00	4
2057	0.00	0.00	0.00	7
2058	0.00	0.00	0.00	6
2059	0.00	0.00	0.00	3
2060	1.00	0.14	0.25	7
2061	1.00	0.80	0.89	5
2062	0.00	0.00	0.00	2
2063	0.00	0.00	0.00	6
2064	0.20	0.20	0.20	5
2065	1.00	0.40	0.57	5
2066	0.00	0.00	0.00	11

2067	0.00	0.00	0.00	6
2068	0.67	0.33	0.44	6
2069	0.00	0.00	0.00	7
2070	0.00	0.00	0.00	8
2071	1.00	0.20	0.33	5
2072	0.00	0.00	0.00	4
2073	0.00	0.00	0.00	4
2074	0.00	0.00	0.00	10
2075	0.00	0.00	0.00	8
2076	0.00	0.00	0.00	12
2077	0.00	0.00	0.00	8
2078	0.00	0.00	0.00	6
2079	0.00	0.00	0.00	6
2080	0.00	0.00	0.00	5
2081	1.00	0.75	0.86	4
2082	0.00	0.00	0.00	8
2083	0.00	0.00	0.00	4
2084	0.00	0.00	0.00	12
2085	0.00	0.00	0.00	3
2086	0.00	0.00	0.00	9
2087	0.00	0.00	0.00	8
2088	0.00	0.00	0.00	5
2089	0.00	0.00	0.00	9
2090	1.00	0.50	0.67	4
2091	1.00	0.29	0.44	7
2092	0.00	0.00	0.00	7
2093	0.00	0.00	0.00	8
2094	0.00	0.00	0.00	8
2095	0.00	0.00	0.00	5
2096	0.00	0.00	0.00	9
2097	1.00	0.12	0.22	8
2098	0.00	0.00	0.00	4
2099	0.00	0.00	0.00	7
2100	1.00	0.83	0.91	6
2101	1.00	0.43	0.60	7
2102	1.00	0.17	0.29	6
2103	1.00	0.50	0.67	10
2104	0.00	0.00	0.00	10
2105	0.00	0.00	0.00	8
2106	0.75	0.43	0.55	7
2107	0.00	0.00	0.00	8
2108	0.00	0.00	0.00	5
2109	1.00	0.20	0.33	10
2110	0.00	0.00	0.00	6
2111	0.00	0.00	0.00	7
2112	0.00	0.00	0.00	7
2113	0.00	0.00	0.00	7
2114	0.00	0.00	0.00	6
2115	0.00	0.00	0.00	5
2116	1.00	0.38	0.55	8
2117	0.00	0.00	0.00	5
2118	0.00	0.00	0.00	6
2119	0.00	0.00	0.00	7
2120	0.25	0.14	0.18	7
2121	0.00	0.00	0.00	3
2122	0.50	0.17	0.25	6
2123	0.00	0.00	0.00	3
2124	0.00	0.00	0.00	6
2125	1.00	0.12	0.22	8
2126	1.00	0.08	0.15	12
2127	0.00	0.00	0.00	7

2128	0.50	0.20	0.29	5
2129	0.00	0.00	0.00	4
2130	0.00	0.00	0.00	6
2131	1.00	0.14	0.25	7
2132	0.00	0.00	0.00	9
2133	0.33	0.20	0.25	5
2134	0.00	0.00	0.00	13
2135	0.00	0.00	0.00	11
2136	0.00	0.00	0.00	7
2137	0.00	0.00	0.00	9
2138	0.00	0.00	0.00	2
2139	1.00	0.29	0.44	7
2140	0.67	0.40	0.50	5
2141	0.00	0.00	0.00	7
2142	0.00	0.00	0.00	5
2143	0.00	0.00	0.00	8
2144	0.00	0.00	0.00	6
2145	0.00	0.00	0.00	8
2146	0.00	0.00	0.00	9
2147	0.00	0.00	0.00	7
2148	0.00	0.00	0.00	7
2149	0.00	0.00	0.00	0
2150	1.00	0.43	0.60	7
2151	0.00	0.00	0.00	5
2152	0.00	0.00	0.00	11
2153	1.00	0.20	0.33	5
2154	0.00	0.00	0.00	8
2155	0.00	0.00	0.00	4
2156	0.00	0.00	0.00	3
2157	1.00	0.25	0.40	4
2158	0.00	0.00	0.00	6
2159	0.00	0.00	0.00	5
2160	0.00	0.00	0.00	7
2161	0.00	0.00	0.00	10
2162	0.00	0.00	0.00	5
2163	0.00	0.00	0.00	3
2164	0.00	0.00	0.00	11
2165	1.00	0.33	0.50	3
2166	0.00	0.00	0.00	5
2167	0.00	0.00	0.00	4
2168	1.00	0.17	0.29	6
2169	0.00	0.00	0.00	5
2170	0.00	0.00	0.00	5
2171	1.00	0.14	0.25	7
2172	0.00	0.00	0.00	9
2173	0.00	0.00	0.00	13
2174	0.00	0.00	0.00	9
2175	0.00	0.00	0.00	4
2176	0.00	0.00	0.00	10
2177	0.00	0.00	0.00	5
2178	0.00	0.00	0.00	10
2179	0.00	0.00	0.00	9
2180	0.00	0.00	0.00	7
2181	0.00	0.00	0.00	5
2182	0.00	0.00	0.00	7
2183	1.00	0.10	0.18	10
2184	0.00	0.00	0.00	8
2185	0.00	0.00	0.00	8
2186	0.00	0.00	0.00	9
2187	0.00	0.00	0.00	7
2188	0.00	0.00	0.00	3

2189	1.00	0.50	0.67	6
2190	1.00	0.67	0.80	9
2191	0.00	0.00	0.00	5
2192	0.00	0.00	0.00	7
2193	0.00	0.00	0.00	6
2194	0.00	0.00	0.00	7
2195	1.00	0.08	0.15	12
2196	0.00	0.00	0.00	7
2197	0.00	0.00	0.00	4
2198	0.00	0.00	0.00	3
2199	0.00	0.00	0.00	3
2200	0.00	0.00	0.00	6
2201	1.00	0.20	0.33	5
2202	0.67	0.20	0.31	10
2203	0.00	0.00	0.00	6
2204	1.00	0.20	0.33	5
2205	0.00	0.00	0.00	9
2206	0.00	0.00	0.00	7
2207	0.00	0.00	0.00	6
2208	0.00	0.00	0.00	4
2209	0.00	0.00	0.00	4
2210	0.00	0.00	0.00	5
2211	0.00	0.00	0.00	6
2212	0.00	0.00	0.00	2
2213	0.00	0.00	0.00	10
2214	0.00	0.00	0.00	9
2215	0.00	0.00	0.00	7
2216	0.00	0.00	0.00	5
2217	0.00	0.00	0.00	7
2218	0.00	0.00	0.00	6
2219	1.00	0.17	0.29	6
2220	0.00	0.00	0.00	8
2221	0.00	0.00	0.00	5
2222	1.00	0.29	0.44	7
2223	0.00	0.00	0.00	8
2224	0.00	0.00	0.00	8
2225	1.00	0.14	0.25	7
2226	0.00	0.00	0.00	6
2227	0.00	0.00	0.00	10
2228	0.00	0.00	0.00	6
2229	0.00	0.00	0.00	8
2230	0.00	0.00	0.00	5
2231	0.00	0.00	0.00	5
2232	0.00	0.00	0.00	4
2233	0.00	0.00	0.00	5
2234	1.00	0.33	0.50	6
2235	0.00	0.00	0.00	3
2236	1.00	0.25	0.40	4
2237	0.00	0.00	0.00	8
2238	0.00	0.00	0.00	3
2239	0.00	0.00	0.00	4
2240	0.00	0.00	0.00	6
2241	0.00	0.00	0.00	3
2242	0.00	0.00	0.00	6
2243	0.00	0.00	0.00	11
2244	0.00	0.00	0.00	3
2245	0.00	0.00	0.00	9
2246	1.00	0.14	0.25	7
2247	0.00	0.00	0.00	6
2248	0.00	0.00	0.00	4
2249	0.00	0.00	0.00	7

2250	0.00	0.00	0.00	2
2251	0.00	0.00	0.00	11
2252	0.00	0.00	0.00	1
2253	0.00	0.00	0.00	3
2254	0.00	0.00	0.00	9
2255	1.00	0.08	0.14	13
2256	1.00	0.11	0.20	9
2257	0.00	0.00	0.00	4
2258	0.00	0.00	0.00	8
2259	0.00	0.00	0.00	10
2260	0.00	0.00	0.00	9
2261	0.00	0.00	0.00	5
2262	0.00	0.00	0.00	4
2263	0.00	0.00	0.00	7
2264	0.00	0.00	0.00	11
2265	0.50	0.33	0.40	6
2266	0.00	0.00	0.00	4
2267	0.00	0.00	0.00	5
2268	0.00	0.00	0.00	8
2269	0.00	0.00	0.00	6
2270	0.00	0.00	0.00	6
2271	0.33	0.14	0.20	7
2272	0.00	0.00	0.00	5
2273	0.00	0.00	0.00	4
2274	0.50	0.33	0.40	3
2275	0.00	0.00	0.00	7
2276	0.00	0.00	0.00	3
2277	0.00	0.00	0.00	7
2278	0.00	0.00	0.00	6
2279	0.00	0.00	0.00	7
2280	0.00	0.00	0.00	3
2281	0.00	0.00	0.00	6
2282	0.00	0.00	0.00	7
2283	0.00	0.00	0.00	3
2284	0.00	0.00	0.00	6
2285	0.00	0.00	0.00	5
2286	0.00	0.00	0.00	5
2287	0.25	0.20	0.22	5
2288	0.00	0.00	0.00	6
2289	0.00	0.00	0.00	9
2290	0.00	0.00	0.00	16
2291	0.00	0.00	0.00	2
2292	0.00	0.00	0.00	4
2293	0.00	0.00	0.00	5
2294	0.00	0.00	0.00	5
2295	0.00	0.00	0.00	9
2296	0.00	0.00	0.00	9
2297	0.00	0.00	0.00	3
2298	0.00	0.00	0.00	6
2299	0.00	0.00	0.00	3
2300	0.00	0.00	0.00	7
2301	0.00	0.00	0.00	11
2302	0.00	0.00	0.00	4
2303	0.00	0.00	0.00	10
2304	0.00	0.00	0.00	1
2305	0.00	0.00	0.00	6
2306	1.00	0.14	0.25	7
2307	0.00	0.00	0.00	4
2308	0.00	0.00	0.00	6
2309	0.00	0.00	0.00	3
2310	0.00	0.00	0.00	5

2311	0.00	0.00	0.00	11
2312	0.00	0.00	0.00	7
2313	0.00	0.00	0.00	9
2314	0.00	0.00	0.00	6
2315	0.00	0.00	0.00	8
2316	0.00	0.00	0.00	7
2317	0.00	0.00	0.00	8
2318	0.00	0.00	0.00	3
2319	0.00	0.00	0.00	4
2320	0.00	0.00	0.00	7
2321	0.00	0.00	0.00	6
2322	0.00	0.00	0.00	8
2323	0.00	0.00	0.00	4
2324	0.00	0.00	0.00	8
2325	0.00	0.00	0.00	7
2326	0.00	0.00	0.00	5
2327	0.33	0.25	0.29	4
2328	0.00	0.00	0.00	9
2329	0.00	0.00	0.00	6
2330	0.00	0.00	0.00	5
2331	0.00	0.00	0.00	6
2332	1.00	0.67	0.80	6
2333	0.00	0.00	0.00	4
2334	0.00	0.00	0.00	8
2335	0.00	0.00	0.00	7
2336	0.00	0.00	0.00	9
2337	0.00	0.00	0.00	3
2338	0.00	0.00	0.00	4
2339	0.00	0.00	0.00	4
2340	1.00	1.00	1.00	1
2341	0.00	0.00	0.00	3
2342	0.00	0.00	0.00	6
2343	0.00	0.00	0.00	4
2344	0.00	0.00	0.00	9
2345	0.00	0.00	0.00	3
2346	0.00	0.00	0.00	3
2347	0.00	0.00	0.00	6
2348	0.00	0.00	0.00	5
2349	0.00	0.00	0.00	7
2350	0.00	0.00	0.00	4
2351	0.00	0.00	0.00	8
2352	0.00	0.00	0.00	6
2353	0.00	0.00	0.00	5
2354	0.00	0.00	0.00	5
2355	1.00	0.20	0.33	10
2356	0.00	0.00	0.00	9
2357	0.00	0.00	0.00	7
2358	0.00	0.00	0.00	6
2359	0.00	0.00	0.00	4
2360	1.00	0.17	0.29	6
2361	0.00	0.00	0.00	2
2362	0.50	0.10	0.17	10
2363	0.00	0.00	0.00	8
2364	0.00	0.00	0.00	4
2365	0.00	0.00	0.00	6
2366	0.00	0.00	0.00	6
2367	1.00	0.30	0.46	10
2368	0.00	0.00	0.00	3
2369	0.00	0.00	0.00	3
2370	0.00	0.00	0.00	9
2371	0.00	0.00	0.00	9

2372	0.00	0.00	0.00	4
2373	0.00	0.00	0.00	9
2374	0.00	0.00	0.00	8
2375	0.00	0.00	0.00	5
2376	0.00	0.00	0.00	7
2377	0.50	0.14	0.22	7
2378	0.00	0.00	0.00	7
2379	0.00	0.00	0.00	8
2380	0.00	0.00	0.00	6
2381	1.00	0.17	0.29	6
2382	0.00	0.00	0.00	10
2383	0.00	0.00	0.00	5
2384	0.00	0.00	0.00	5
2385	0.00	0.00	0.00	4
2386	0.00	0.00	0.00	3
2387	0.00	0.00	0.00	3
2388	0.00	0.00	0.00	11
2389	1.00	0.20	0.33	5
2390	0.00	0.00	0.00	8
2391	0.00	0.00	0.00	4
2392	0.00	0.00	0.00	8
2393	0.00	0.00	0.00	5
2394	0.00	0.00	0.00	4
2395	0.00	0.00	0.00	2
2396	0.00	0.00	0.00	5
2397	0.00	0.00	0.00	7
2398	0.00	0.00	0.00	4
2399	0.00	0.00	0.00	5
2400	0.00	0.00	0.00	5
2401	1.00	0.33	0.50	6
2402	0.00	0.00	0.00	4
2403	0.00	0.00	0.00	5
2404	0.00	0.00	0.00	7
2405	1.00	0.12	0.22	8
2406	0.00	0.00	0.00	2
2407	0.00	0.00	0.00	3
2408	0.00	0.00	0.00	4
2409	0.00	0.00	0.00	6
2410	0.00	0.00	0.00	7
2411	0.00	0.00	0.00	1
2412	0.00	0.00	0.00	6
2413	0.00	0.00	0.00	2
2414	0.00	0.00	0.00	7
2415	1.00	0.14	0.25	7
2416	0.00	0.00	0.00	3
2417	0.00	0.00	0.00	5
2418	0.00	0.00	0.00	7
2419	0.00	0.00	0.00	6
2420	1.00	0.17	0.29	6
2421	0.00	0.00	0.00	6
2422	0.00	0.00	0.00	4
2423	0.00	0.00	0.00	3
2424	0.00	0.00	0.00	5
2425	0.00	0.00	0.00	9
2426	0.00	0.00	0.00	9
2427	0.50	0.17	0.25	6
2428	0.00	0.00	0.00	3
2429	0.00	0.00	0.00	3
2430	0.00	0.00	0.00	4
2431	0.00	0.00	0.00	5
2432	0.00	0.00	0.00	7

2433	0.00	0.00	0.00	5
2434	0.00	0.00	0.00	5
2435	0.00	0.00	0.00	7
2436	0.00	0.00	0.00	8
2437	1.00	0.14	0.25	7
2438	0.00	0.00	0.00	7
2439	0.00	0.00	0.00	10
2440	0.00	0.00	0.00	3
2441	0.00	0.00	0.00	4
2442	0.00	0.00	0.00	7
2443	0.00	0.00	0.00	6
2444	1.00	0.40	0.57	5
2445	0.00	0.00	0.00	2
2446	0.00	0.00	0.00	9
2447	0.00	0.00	0.00	2
2448	0.00	0.00	0.00	9
2449	0.00	0.00	0.00	5
2450	0.00	0.00	0.00	7
2451	0.00	0.00	0.00	9
2452	0.00	0.00	0.00	4
2453	0.00	0.00	0.00	7
2454	0.00	0.00	0.00	6
2455	0.00	0.00	0.00	3
2456	0.00	0.00	0.00	2
2457	0.00	0.00	0.00	1
2458	0.67	0.33	0.44	6
2459	0.00	0.00	0.00	6
2460	0.00	0.00	0.00	6
2461	0.00	0.00	0.00	4
2462	0.00	0.00	0.00	8
2463	1.00	0.29	0.44	7
2464	0.00	0.00	0.00	5
2465	0.00	0.00	0.00	12
2466	0.00	0.00	0.00	3
2467	0.00	0.00	0.00	4
2468	0.00	0.00	0.00	7
2469	0.00	0.00	0.00	5
2470	0.00	0.00	0.00	2
2471	0.00	0.00	0.00	7
2472	0.00	0.00	0.00	3
2473	0.00	0.00	0.00	5
2474	0.00	0.00	0.00	7
2475	0.00	0.00	0.00	4
2476	0.00	0.00	0.00	5
2477	0.00	0.00	0.00	7
2478	0.00	0.00	0.00	4
2479	0.00	0.00	0.00	3
2480	0.00	0.00	0.00	7
2481	0.00	0.00	0.00	6
2482	0.00	0.00	0.00	3
2483	0.00	0.00	0.00	4
2484	1.00	0.17	0.29	6
2485	0.00	0.00	0.00	7
2486	0.00	0.00	0.00	3
2487	0.00	0.00	0.00	4
2488	0.00	0.00	0.00	4
2489	0.00	0.00	0.00	4
2490	0.00	0.00	0.00	4
2491	0.00	0.00	0.00	8
2492	0.00	0.00	0.00	6
2493	0.00	0.00	0.00	3

2494	0.00	0.00	0.00	5
2495	0.00	0.00	0.00	5
2496	0.00	0.00	0.00	5
2497	0.00	0.00	0.00	3
2498	0.00	0.00	0.00	4
2499	0.00	0.00	0.00	8
2500	0.00	0.00	0.00	5
2501	1.00	0.60	0.75	5
2502	0.50	0.20	0.29	5
2503	0.00	0.00	0.00	5
2504	0.00	0.00	0.00	5
2505	0.00	0.00	0.00	5
2506	0.00	0.00	0.00	9
2507	0.00	0.00	0.00	1
2508	0.00	0.00	0.00	7
2509	0.00	0.00	0.00	5
2510	0.00	0.00	0.00	4
2511	0.00	0.00	0.00	4
2512	0.00	0.00	0.00	4
2513	0.00	0.00	0.00	7
2514	0.00	0.00	0.00	6
2515	0.00	0.00	0.00	5
2516	0.00	0.00	0.00	4
2517	0.00	0.00	0.00	5
2518	0.00	0.00	0.00	2
2519	0.00	0.00	0.00	5
2520	0.00	0.00	0.00	7
2521	0.00	0.00	0.00	4
2522	0.00	0.00	0.00	3
2523	1.00	0.14	0.25	7
2524	0.00	0.00	0.00	1
2525	0.00	0.00	0.00	4
2526	0.00	0.00	0.00	4
2527	0.00	0.00	0.00	5
2528	0.00	0.00	0.00	3
2529	0.00	0.00	0.00	3
2530	1.00	0.12	0.22	8
2531	0.00	0.00	0.00	6
2532	1.00	0.40	0.57	10
2533	0.00	0.00	0.00	9
2534	0.00	0.00	0.00	6
2535	0.00	0.00	0.00	5
2536	0.00	0.00	0.00	2
2537	0.00	0.00	0.00	3
2538	0.00	0.00	0.00	4
2539	0.00	0.00	0.00	1
2540	0.00	0.00	0.00	3
2541	0.00	0.00	0.00	8
2542	0.00	0.00	0.00	9
2543	0.00	0.00	0.00	7
2544	0.00	0.00	0.00	5
2545	0.00	0.00	0.00	7
2546	0.00	0.00	0.00	4
2547	0.00	0.00	0.00	7
2548	0.00	0.00	0.00	6
2549	0.00	0.00	0.00	4
2550	0.00	0.00	0.00	2
2551	1.00	0.50	0.67	4
2552	0.00	0.00	0.00	4
2553	1.00	0.20	0.33	5
2554	0.00	0.00	0.00	4

2555	0.00	0.00	0.00	7
2556	0.00	0.00	0.00	8
2557	0.00	0.00	0.00	5
2558	0.00	0.00	0.00	5
2559	0.00	0.00	0.00	5
2560	0.00	0.00	0.00	2
2561	0.00	0.00	0.00	4
2562	0.00	0.00	0.00	4
2563	0.00	0.00	0.00	5
2564	0.33	0.33	0.33	3
2565	0.50	0.12	0.20	8
2566	0.00	0.00	0.00	8
2567	0.75	0.43	0.55	7
2568	1.00	0.17	0.29	6
2569	0.00	0.00	0.00	3
2570	0.00	0.00	0.00	1
2571	0.00	0.00	0.00	7
2572	0.00	0.00	0.00	5
2573	0.00	0.00	0.00	3
2574	0.00	0.00	0.00	2
2575	1.00	0.50	0.67	6
2576	0.00	0.00	0.00	2
2577	0.00	0.00	0.00	3
2578	0.00	0.00	0.00	5
2579	0.00	0.00	0.00	1
2580	0.00	0.00	0.00	2
2581	0.00	0.00	0.00	5
2582	0.00	0.00	0.00	1
2583	0.00	0.00	0.00	4
2584	0.00	0.00	0.00	11
2585	0.00	0.00	0.00	5
2586	0.00	0.00	0.00	4
2587	0.00	0.00	0.00	1
2588	0.00	0.00	0.00	7
2589	0.00	0.00	0.00	6
2590	0.00	0.00	0.00	5
2591	0.00	0.00	0.00	7
2592	0.00	0.00	0.00	5
2593	0.00	0.00	0.00	6
2594	1.00	0.25	0.40	4
2595	0.00	0.00	0.00	4
2596	0.00	0.00	0.00	2
2597	0.00	0.00	0.00	9
2598	0.00	0.00	0.00	6
2599	0.00	0.00	0.00	5
2600	0.00	0.00	0.00	3
2601	0.00	0.00	0.00	3
2602	0.00	0.00	0.00	4
2603	0.00	0.00	0.00	5
2604	0.00	0.00	0.00	8
2605	0.00	0.00	0.00	6
2606	0.00	0.00	0.00	7
2607	0.00	0.00	0.00	7
2608	0.00	0.00	0.00	7
2609	0.00	0.00	0.00	4
2610	0.00	0.00	0.00	2
2611	0.00	0.00	0.00	10
2612	0.00	0.00	0.00	4
2613	0.00	0.00	0.00	3
2614	0.00	0.00	0.00	6
2615	0.00	0.00	0.00	5

2616	0.00	0.00	0.00	3
2617	0.00	0.00	0.00	5
2618	0.00	0.00	0.00	7
2619	0.00	0.00	0.00	4
2620	1.00	0.40	0.57	5
2621	0.00	0.00	0.00	3
2622	0.00	0.00	0.00	5
2623	0.00	0.00	0.00	5
2624	0.00	0.00	0.00	5
2625	0.00	0.00	0.00	2
2626	0.00	0.00	0.00	7
2627	0.00	0.00	0.00	6
2628	0.00	0.00	0.00	7
2629	0.00	0.00	0.00	4
2630	0.00	0.00	0.00	4
2631	0.00	0.00	0.00	2
2632	0.00	0.00	0.00	8
2633	0.00	0.00	0.00	1
2634	0.00	0.00	0.00	5
2635	0.00	0.00	0.00	6
2636	0.00	0.00	0.00	3
2637	0.00	0.00	0.00	4
2638	0.00	0.00	0.00	8
2639	1.00	0.40	0.57	5
2640	0.00	0.00	0.00	3
2641	0.00	0.00	0.00	8
2642	1.00	0.17	0.29	6
2643	0.00	0.00	0.00	3
2644	0.00	0.00	0.00	7
2645	0.00	0.00	0.00	4
2646	0.00	0.00	0.00	4
2647	0.00	0.00	0.00	3
2648	0.00	0.00	0.00	3
2649	0.00	0.00	0.00	10
2650	0.00	0.00	0.00	3
2651	1.00	0.25	0.40	4
2652	0.00	0.00	0.00	9
2653	0.00	0.00	0.00	4
2654	0.00	0.00	0.00	4
2655	0.00	0.00	0.00	3
2656	0.00	0.00	0.00	5
2657	0.00	0.00	0.00	7
2658	0.00	0.00	0.00	5
2659	0.00	0.00	0.00	4
2660	0.00	0.00	0.00	4
2661	0.00	0.00	0.00	3
2662	0.00	0.00	0.00	8
2663	0.00	0.00	0.00	8
2664	0.00	0.00	0.00	10
2665	0.00	0.00	0.00	5
2666	0.00	0.00	0.00	10
2667	1.00	0.25	0.40	4
2668	0.00	0.00	0.00	5
2669	1.00	0.20	0.33	5
2670	0.00	0.00	0.00	6
2671	0.00	0.00	0.00	8
2672	0.00	0.00	0.00	5
2673	0.00	0.00	0.00	7
2674	0.00	0.00	0.00	4
2675	0.00	0.00	0.00	3
2676	0.00	0.00	0.00	3

2677	0.00	0.00	0.00	5
2678	0.00	0.00	0.00	7
2679	0.00	0.00	0.00	5
2680	0.00	0.00	0.00	0
2681	0.00	0.00	0.00	8
2682	0.00	0.00	0.00	5
2683	0.00	0.00	0.00	11
2684	0.00	0.00	0.00	7
2685	0.00	0.00	0.00	7
2686	0.00	0.00	0.00	5
2687	0.00	0.00	0.00	1
2688	0.00	0.00	0.00	6
2689	0.00	0.00	0.00	5
2690	1.00	0.17	0.29	6
2691	0.00	0.00	0.00	5
2692	1.00	0.17	0.29	6
2693	0.00	0.00	0.00	7
2694	0.00	0.00	0.00	6
2695	0.60	0.33	0.43	9
2696	0.00	0.00	0.00	3
2697	0.00	0.00	0.00	3
2698	0.00	0.00	0.00	2
2699	0.00	0.00	0.00	1
2700	0.00	0.00	0.00	6
2701	0.00	0.00	0.00	5
2702	0.00	0.00	0.00	4
2703	0.00	0.00	0.00	5
2704	0.00	0.00	0.00	3
2705	0.00	0.00	0.00	7
2706	0.00	0.00	0.00	4
2707	0.00	0.00	0.00	8
2708	0.00	0.00	0.00	7
2709	0.00	0.00	0.00	4
2710	0.00	0.00	0.00	4
2711	0.00	0.00	0.00	2
2712	0.00	0.00	0.00	4
2713	0.00	0.00	0.00	6
2714	0.00	0.00	0.00	3
2715	0.00	0.00	0.00	10
2716	1.00	0.33	0.50	3
2717	0.00	0.00	0.00	6
2718	0.00	0.00	0.00	5
2719	0.00	0.00	0.00	9
2720	0.00	0.00	0.00	6
2721	0.00	0.00	0.00	3
2722	0.00	0.00	0.00	3
2723	0.00	0.00	0.00	4
2724	1.00	0.29	0.44	7
2725	0.00	0.00	0.00	4
2726	0.00	0.00	0.00	4
2727	0.00	0.00	0.00	4
2728	0.00	0.00	0.00	6
2729	0.00	0.00	0.00	8
2730	0.00	0.00	0.00	7
2731	0.00	0.00	0.00	7
2732	0.00	0.00	0.00	5
2733	0.00	0.00	0.00	7
2734	0.00	0.00	0.00	7
2735	0.00	0.00	0.00	3
2736	0.00	0.00	0.00	7
2737	0.00	0.00	0.00	3

2738	0.00	0.00	0.00	5
2739	0.00	0.00	0.00	8
2740	1.00	0.20	0.33	5
2741	0.00	0.00	0.00	7
2742	0.00	0.00	0.00	8
2743	0.00	0.00	0.00	7
2744	0.00	0.00	0.00	8
2745	0.00	0.00	0.00	5
2746	0.00	0.00	0.00	7
2747	1.00	1.00	1.00	4
2748	0.00	0.00	0.00	6
2749	0.00	0.00	0.00	4
2750	0.00	0.00	0.00	4
2751	0.00	0.00	0.00	5
2752	0.00	0.00	0.00	5
2753	0.00	0.00	0.00	2
2754	0.00	0.00	0.00	5
2755	0.00	0.00	0.00	4
2756	0.00	0.00	0.00	5
2757	0.00	0.00	0.00	4
2758	0.00	0.00	0.00	10
2759	0.00	0.00	0.00	3
2760	0.00	0.00	0.00	2
2761	0.00	0.00	0.00	3
2762	0.00	0.00	0.00	1
2763	1.00	0.33	0.50	3
2764	0.00	0.00	0.00	3
2765	0.00	0.00	0.00	6
2766	0.00	0.00	0.00	5
2767	0.00	0.00	0.00	4
2768	0.00	0.00	0.00	9
2769	0.00	0.00	0.00	6
2770	0.00	0.00	0.00	6
2771	0.00	0.00	0.00	4
2772	0.67	0.25	0.36	8
2773	0.00	0.00	0.00	6
2774	0.00	0.00	0.00	7
2775	0.00	0.00	0.00	7
2776	0.00	0.00	0.00	4
2777	0.00	0.00	0.00	5
2778	0.00	0.00	0.00	5
2779	0.00	0.00	0.00	2
2780	0.00	0.00	0.00	9
2781	0.00	0.00	0.00	3
2782	0.00	0.00	0.00	7
2783	0.00	0.00	0.00	7
2784	0.00	0.00	0.00	5
2785	0.00	0.00	0.00	8
2786	0.00	0.00	0.00	5
2787	0.00	0.00	0.00	5
2788	1.00	0.25	0.40	4
2789	0.00	0.00	0.00	4
2790	0.00	0.00	0.00	3
2791	0.00	0.00	0.00	4
2792	0.00	0.00	0.00	8
2793	0.00	0.00	0.00	4
2794	0.00	0.00	0.00	7
2795	0.00	0.00	0.00	2
2796	0.00	0.00	0.00	1
2797	1.00	0.29	0.44	7
2798	0.00	0.00	0.00	3

2799	0.00	0.00	0.00	3
2800	0.00	0.00	0.00	8
2801	0.00	0.00	0.00	1
2802	0.00	0.00	0.00	4
2803	0.00	0.00	0.00	7
2804	0.00	0.00	0.00	4
2805	0.00	0.00	0.00	3
2806	0.00	0.00	0.00	3
2807	0.00	0.00	0.00	5
2808	0.00	0.00	0.00	5
2809	0.00	0.00	0.00	2
2810	0.00	0.00	0.00	8
2811	0.00	0.00	0.00	4
2812	0.00	0.00	0.00	3
2813	0.00	0.00	0.00	3
2814	0.00	0.00	0.00	3
2815	0.00	0.00	0.00	5
2816	0.00	0.00	0.00	3
2817	0.00	0.00	0.00	5
2818	0.00	0.00	0.00	2
2819	0.00	0.00	0.00	7
2820	0.00	0.00	0.00	3
2821	0.00	0.00	0.00	10
2822	0.00	0.00	0.00	3
2823	0.00	0.00	0.00	3
2824	0.00	0.00	0.00	7
2825	0.00	0.00	0.00	4
2826	0.00	0.00	0.00	3
2827	1.00	0.17	0.29	6
2828	0.00	0.00	0.00	4
2829	0.00	0.00	0.00	9
2830	0.00	0.00	0.00	4
2831	0.00	0.00	0.00	6
2832	0.00	0.00	0.00	5
2833	0.00	0.00	0.00	8
2834	0.00	0.00	0.00	7
2835	0.00	0.00	0.00	4
2836	0.00	0.00	0.00	4
2837	0.00	0.00	0.00	4
2838	0.00	0.00	0.00	6
2839	0.00	0.00	0.00	7
2840	0.00	0.00	0.00	6
2841	0.00	0.00	0.00	6
2842	0.00	0.00	0.00	5
2843	0.00	0.00	0.00	4
2844	0.00	0.00	0.00	4
2845	0.00	0.00	0.00	2
2846	0.00	0.00	0.00	3
2847	0.00	0.00	0.00	3
2848	0.00	0.00	0.00	8
2849	0.00	0.00	0.00	3
2850	0.00	0.00	0.00	3
2851	0.00	0.00	0.00	4
2852	0.00	0.00	0.00	1
2853	0.00	0.00	0.00	3
2854	0.00	0.00	0.00	4
2855	0.00	0.00	0.00	8
2856	0.00	0.00	0.00	8
2857	0.00	0.00	0.00	9
2858	0.00	0.00	0.00	1
2859	0.00	0.00	0.00	0

2860	0.00	0.00	0.00	4
2861	0.00	0.00	0.00	8
2862	0.00	0.00	0.00	4
2863	0.00	0.00	0.00	2
2864	0.00	0.00	0.00	5
2865	1.00	0.33	0.50	3
2866	0.00	0.00	0.00	2
2867	0.00	0.00	0.00	5
2868	0.00	0.00	0.00	1
2869	0.00	0.00	0.00	4
2870	0.00	0.00	0.00	1
2871	0.00	0.00	0.00	3
2872	0.00	0.00	0.00	1
2873	0.00	0.00	0.00	6
2874	0.00	0.00	0.00	4
2875	0.00	0.00	0.00	2
2876	0.00	0.00	0.00	4
2877	0.00	0.00	0.00	7
2878	0.00	0.00	0.00	4
2879	0.00	0.00	0.00	4
2880	0.00	0.00	0.00	4
2881	0.00	0.00	0.00	4
2882	0.00	0.00	0.00	5
2883	0.00	0.00	0.00	4
2884	0.00	0.00	0.00	4
2885	0.00	0.00	0.00	4
2886	0.00	0.00	0.00	4
2887	0.00	0.00	0.00	4
2888	0.00	0.00	0.00	5
2889	0.00	0.00	0.00	3
2890	0.00	0.00	0.00	5
2891	0.00	0.00	0.00	3
2892	0.00	0.00	0.00	2
2893	0.00	0.00	0.00	3
2894	0.00	0.00	0.00	6
2895	0.00	0.00	0.00	3
2896	0.00	0.00	0.00	5
2897	0.00	0.00	0.00	3
2898	0.00	0.00	0.00	5
2899	0.00	0.00	0.00	9
2900	0.00	0.00	0.00	3
2901	0.00	0.00	0.00	2
2902	0.00	0.00	0.00	6
2903	0.00	0.00	0.00	3
2904	0.00	0.00	0.00	2
2905	0.00	0.00	0.00	3
2906	0.00	0.00	0.00	6
2907	0.00	0.00	0.00	4
2908	0.00	0.00	0.00	2
2909	0.00	0.00	0.00	4
2910	0.00	0.00	0.00	2
2911	0.00	0.00	0.00	1
2912	1.00	0.25	0.40	4
2913	1.00	0.25	0.40	4
2914	0.00	0.00	0.00	4
2915	1.00	0.20	0.33	5
2916	0.00	0.00	0.00	4
2917	0.00	0.00	0.00	6
2918	0.00	0.00	0.00	7
2919	0.00	0.00	0.00	5
2920	0.00	0.00	0.00	7

2921	0.00	0.00	0.00	7
2922	0.00	0.00	0.00	6
2923	0.00	0.00	0.00	6
2924	0.00	0.00	0.00	5
2925	0.00	0.00	0.00	5
2926	0.00	0.00	0.00	4
2927	0.00	0.00	0.00	6
2928	0.00	0.00	0.00	3
2929	0.00	0.00	0.00	6
2930	0.00	0.00	0.00	2
2931	0.00	0.00	0.00	3
2932	0.00	0.00	0.00	6
2933	0.00	0.00	0.00	4
2934	0.00	0.00	0.00	2
2935	0.00	0.00	0.00	5
2936	0.00	0.00	0.00	4
2937	0.00	0.00	0.00	4
2938	0.00	0.00	0.00	4
2939	0.00	0.00	0.00	4
2940	0.00	0.00	0.00	6
2941	0.50	0.20	0.29	5
2942	0.00	0.00	0.00	4
2943	0.00	0.00	0.00	5
2944	0.00	0.00	0.00	4
2945	0.00	0.00	0.00	2
2946	0.00	0.00	0.00	6
2947	0.00	0.00	0.00	6
2948	0.00	0.00	0.00	5
2949	0.00	0.00	0.00	1
2950	0.00	0.00	0.00	3
2951	0.00	0.00	0.00	8
2952	0.00	0.00	0.00	6
2953	0.00	0.00	0.00	4
2954	0.00	0.00	0.00	5
2955	0.00	0.00	0.00	1
2956	0.00	0.00	0.00	3
2957	0.00	0.00	0.00	1
2958	1.00	0.40	0.57	5
2959	0.00	0.00	0.00	6
2960	0.00	0.00	0.00	2
2961	0.00	0.00	0.00	3
2962	0.00	0.00	0.00	7
2963	0.00	0.00	0.00	0
2964	0.00	0.00	0.00	1
2965	0.00	0.00	0.00	4
2966	0.00	0.00	0.00	6
2967	0.00	0.00	0.00	8
2968	0.00	0.00	0.00	8
2969	0.00	0.00	0.00	3
2970	0.00	0.00	0.00	3
2971	0.00	0.00	0.00	5
2972	0.00	0.00	0.00	5
2973	0.00	0.00	0.00	2
2974	0.00	0.00	0.00	0
2975	0.00	0.00	0.00	5
2976	0.00	0.00	0.00	2
2977	0.00	0.00	0.00	5
2978	0.00	0.00	0.00	7
2979	0.00	0.00	0.00	3
2980	0.00	0.00	0.00	3
2981	0.00	0.00	0.00	4

2982	0.00	0.00	0.00	4
2983	0.00	0.00	0.00	2
2984	0.00	0.00	0.00	3
2985	0.00	0.00	0.00	1
2986	0.00	0.00	0.00	3
2987	0.00	0.00	0.00	4
2988	1.00	1.00	1.00	1
2989	0.00	0.00	0.00	8
2990	0.00	0.00	0.00	3
2991	0.00	0.00	0.00	3
2992	1.00	0.67	0.80	3
2993	0.00	0.00	0.00	4
2994	0.00	0.00	0.00	2
2995	0.00	0.00	0.00	0
2996	0.00	0.00	0.00	6
2997	0.00	0.00	0.00	6
2998	0.00	0.00	0.00	6
2999	0.00	0.00	0.00	6
3000	0.00	0.00	0.00	7
3001	0.00	0.00	0.00	2
3002	0.00	0.00	0.00	4
3003	0.00	0.00	0.00	3
3004	0.00	0.00	0.00	3
3005	0.00	0.00	0.00	4
3006	0.00	0.00	0.00	4
3007	0.00	0.00	0.00	5
3008	0.00	0.00	0.00	3
3009	0.00	0.00	0.00	2
3010	0.00	0.00	0.00	2
3011	0.00	0.00	0.00	1
3012	0.00	0.00	0.00	8
3013	0.00	0.00	0.00	2
3014	0.00	0.00	0.00	5
3015	0.00	0.00	0.00	5
3016	1.00	0.25	0.40	4
3017	0.00	0.00	0.00	8
3018	0.00	0.00	0.00	4
3019	0.00	0.00	0.00	4
3020	0.00	0.00	0.00	5
3021	0.00	0.00	0.00	2
3022	0.00	0.00	0.00	5
3023	0.00	0.00	0.00	3
3024	0.00	0.00	0.00	5
3025	0.00	0.00	0.00	4
3026	0.00	0.00	0.00	1
3027	0.00	0.00	0.00	8
3028	0.00	0.00	0.00	2
3029	0.00	0.00	0.00	1
3030	0.00	0.00	0.00	2
3031	0.00	0.00	0.00	3
3032	0.00	0.00	0.00	3
3033	0.00	0.00	0.00	4
3034	0.00	0.00	0.00	2
3035	0.00	0.00	0.00	4
3036	0.00	0.00	0.00	6
3037	0.00	0.00	0.00	4
3038	0.00	0.00	0.00	5
3039	0.00	0.00	0.00	2
3040	0.00	0.00	0.00	5
3041	0.00	0.00	0.00	4
3042	0.00	0.00	0.00	0

3043	0.00	0.00	0.00	2
3044	0.00	0.00	0.00	5
3045	0.00	0.00	0.00	2
3046	0.00	0.00	0.00	2
3047	0.00	0.00	0.00	6
3048	0.00	0.00	0.00	2
3049	0.00	0.00	0.00	6
3050	0.00	0.00	0.00	5
3051	0.00	0.00	0.00	5
3052	0.00	0.00	0.00	1
3053	1.00	0.33	0.50	6
3054	0.00	0.00	0.00	3
3055	0.00	0.00	0.00	7
3056	0.00	0.00	0.00	4
3057	0.00	0.00	0.00	1
3058	0.00	0.00	0.00	2
3059	0.00	0.00	0.00	5
3060	0.00	0.00	0.00	3
3061	0.00	0.00	0.00	1
3062	0.00	0.00	0.00	3
3063	0.00	0.00	0.00	2
3064	0.00	0.00	0.00	4
3065	0.00	0.00	0.00	6
3066	0.00	0.00	0.00	2
3067	0.00	0.00	0.00	1
3068	0.00	0.00	0.00	6
3069	0.00	0.00	0.00	6
3070	0.00	0.00	0.00	3
3071	0.00	0.00	0.00	5
3072	0.00	0.00	0.00	2
3073	0.00	0.00	0.00	4
3074	0.00	0.00	0.00	2
3075	0.00	0.00	0.00	5
3076	0.00	0.00	0.00	2
3077	0.00	0.00	0.00	0
3078	0.00	0.00	0.00	3
3079	0.00	0.00	0.00	4
3080	0.00	0.00	0.00	6
3081	0.00	0.00	0.00	8
3082	0.00	0.00	0.00	4
3083	0.00	0.00	0.00	0
3084	0.00	0.00	0.00	2
3085	0.00	0.00	0.00	6
3086	0.00	0.00	0.00	1
3087	0.00	0.00	0.00	5
3088	0.00	0.00	0.00	1
3089	0.00	0.00	0.00	8
3090	0.00	0.00	0.00	4
3091	0.00	0.00	0.00	7
3092	0.00	0.00	0.00	2
3093	0.00	0.00	0.00	3
3094	0.00	0.00	0.00	9
3095	0.50	1.00	0.67	1
3096	0.00	0.00	0.00	4
3097	0.00	0.00	0.00	3
3098	0.00	0.00	0.00	4
3099	0.00	0.00	0.00	3
3100	0.00	0.00	0.00	3
3101	0.00	0.00	0.00	4
3102	0.00	0.00	0.00	4
3103	0.00	0.00	0.00	2

3104	0.00	0.00	0.00	3
3105	0.00	0.00	0.00	3
3106	0.00	0.00	0.00	2
3107	0.00	0.00	0.00	4
3108	0.00	0.00	0.00	2
3109	0.00	0.00	0.00	6
3110	0.00	0.00	0.00	1
3111	0.00	0.00	0.00	5
3112	0.00	0.00	0.00	2
3113	0.00	0.00	0.00	5
3114	0.00	0.00	0.00	2
3115	0.00	0.00	0.00	3
3116	0.00	0.00	0.00	4
3117	0.00	0.00	0.00	5
3118	1.00	0.25	0.40	4
3119	0.00	0.00	0.00	1
3120	0.00	0.00	0.00	4
3121	1.00	0.67	0.80	3
3122	0.00	0.00	0.00	2
3123	0.00	0.00	0.00	5
3124	0.00	0.00	0.00	2
3125	0.00	0.00	0.00	4
3126	0.00	0.00	0.00	1
3127	0.00	0.00	0.00	6
3128	0.00	0.00	0.00	3
3129	0.00	0.00	0.00	0
3130	0.00	0.00	0.00	4
3131	0.00	0.00	0.00	6
3132	0.00	0.00	0.00	4
3133	0.00	0.00	0.00	2
3134	0.00	0.00	0.00	2
3135	0.00	0.00	0.00	2
3136	0.00	0.00	0.00	6
3137	0.00	0.00	0.00	5
3138	1.00	0.17	0.29	6
3139	0.00	0.00	0.00	2
3140	0.00	0.00	0.00	1
3141	0.00	0.00	0.00	2
3142	0.00	0.00	0.00	3
3143	0.00	0.00	0.00	2
3144	0.00	0.00	0.00	3
3145	0.00	0.00	0.00	7
3146	0.00	0.00	0.00	4
3147	0.00	0.00	0.00	4
3148	0.00	0.00	0.00	3
3149	0.00	0.00	0.00	8
3150	0.00	0.00	0.00	2
3151	0.00	0.00	0.00	2
3152	0.00	0.00	0.00	8
3153	0.00	0.00	0.00	6
3154	0.00	0.00	0.00	4
3155	0.00	0.00	0.00	4
3156	1.00	0.25	0.40	4
3157	0.00	0.00	0.00	2
3158	0.00	0.00	0.00	2
3159	0.00	0.00	0.00	8
3160	0.00	0.00	0.00	3
3161	0.00	0.00	0.00	3
3162	1.00	0.20	0.33	5
3163	0.00	0.00	0.00	3
3164	1.00	0.50	0.67	4

3165	0.00	0.00	0.00	4
3166	0.00	0.00	0.00	0
3167	0.00	0.00	0.00	2
3168	0.00	0.00	0.00	4
3169	0.00	0.00	0.00	3
3170	0.00	0.00	0.00	3
3171	0.00	0.00	0.00	4
3172	0.00	0.00	0.00	3
3173	0.00	0.00	0.00	4
3174	0.00	0.00	0.00	4
3175	0.00	0.00	0.00	7
3176	0.00	0.00	0.00	5
3177	0.00	0.00	0.00	5
3178	0.00	0.00	0.00	2
3179	0.00	0.00	0.00	2
3180	0.00	0.00	0.00	5
3181	0.00	0.00	0.00	8
3182	0.00	0.00	0.00	6
3183	0.00	0.00	0.00	4
3184	0.00	0.00	0.00	3
3185	0.00	0.00	0.00	4
3186	0.00	0.00	0.00	2
3187	0.00	0.00	0.00	0
3188	0.00	0.00	0.00	2
3189	0.00	0.00	0.00	5
3190	0.00	0.00	0.00	4
3191	0.00	0.00	0.00	4
3192	0.00	0.00	0.00	4
3193	0.00	0.00	0.00	2
3194	0.00	0.00	0.00	6
3195	0.00	0.00	0.00	4
3196	0.00	0.00	0.00	1
3197	0.00	0.00	0.00	3
3198	0.00	0.00	0.00	5
3199	1.00	0.17	0.29	6
3200	0.00	0.00	0.00	1
3201	0.00	0.00	0.00	2
3202	0.00	0.00	0.00	2
3203	0.00	0.00	0.00	5
3204	0.00	0.00	0.00	5
3205	0.00	0.00	0.00	2
3206	0.00	0.00	0.00	2
3207	0.00	0.00	0.00	5
3208	0.00	0.00	0.00	2
3209	0.00	0.00	0.00	7
3210	0.00	0.00	0.00	7
3211	0.00	0.00	0.00	3
3212	0.00	0.00	0.00	1
3213	0.00	0.00	0.00	4
3214	0.00	0.00	0.00	7
3215	0.00	0.00	0.00	7
3216	0.00	0.00	0.00	3
3217	0.00	0.00	0.00	2
3218	0.00	0.00	0.00	3
3219	0.00	0.00	0.00	7
3220	0.00	0.00	0.00	3
3221	0.00	0.00	0.00	3
3222	0.00	0.00	0.00	4
3223	0.00	0.00	0.00	8
3224	0.00	0.00	0.00	6
3225	0.00	0.00	0.00	6

3226	0.00	0.00	0.00	1
3227	0.00	0.00	0.00	7
3228	0.00	0.00	0.00	0
3229	0.00	0.00	0.00	1
3230	0.00	0.00	0.00	2
3231	0.00	0.00	0.00	3
3232	0.00	0.00	0.00	5
3233	0.00	0.00	0.00	4
3234	0.00	0.00	0.00	2
3235	0.00	0.00	0.00	2
3236	0.00	0.00	0.00	1
3237	0.00	0.00	0.00	2
3238	0.00	0.00	0.00	2
3239	0.00	0.00	0.00	3
3240	0.00	0.00	0.00	4
3241	0.00	0.00	0.00	0
3242	0.00	0.00	0.00	2
3243	0.00	0.00	0.00	5
3244	0.00	0.00	0.00	3
3245	0.00	0.00	0.00	4
3246	0.00	0.00	0.00	4
3247	0.00	0.00	0.00	4
3248	0.00	0.00	0.00	3
3249	1.00	0.25	0.40	4
3250	0.00	0.00	0.00	2
3251	0.00	0.00	0.00	3
3252	0.00	0.00	0.00	2
3253	0.00	0.00	0.00	3
3254	0.00	0.00	0.00	1
3255	0.00	0.00	0.00	5
3256	0.00	0.00	0.00	3
3257	0.00	0.00	0.00	2
3258	0.00	0.00	0.00	5
3259	0.00	0.00	0.00	6
3260	0.00	0.00	0.00	2
3261	0.20	0.25	0.22	4
3262	0.00	0.00	0.00	5
3263	0.00	0.00	0.00	2
3264	0.00	0.00	0.00	5
3265	0.00	0.00	0.00	2
3266	0.00	0.00	0.00	1
3267	0.00	0.00	0.00	6
3268	0.00	0.00	0.00	2
3269	0.00	0.00	0.00	4
3270	0.00	0.00	0.00	2
3271	0.00	0.00	0.00	4
3272	0.00	0.00	0.00	4
3273	0.00	0.00	0.00	4
3274	0.00	0.00	0.00	3
3275	0.00	0.00	0.00	3
3276	0.00	0.00	0.00	2
3277	0.00	0.00	0.00	3
3278	0.00	0.00	0.00	3
3279	0.00	0.00	0.00	5
3280	0.00	0.00	0.00	4
3281	0.00	0.00	0.00	2
3282	0.00	0.00	0.00	5
3283	0.00	0.00	0.00	4
3284	0.00	0.00	0.00	4
3285	0.00	0.00	0.00	4
3286	1.00	0.20	0.33	5

3287	0.00	0.00	0.00	4
3288	0.00	0.00	0.00	2
3289	0.00	0.00	0.00	7
3290	0.00	0.00	0.00	6
3291	1.00	0.33	0.50	6
3292	0.00	0.00	0.00	4
3293	0.00	0.00	0.00	0
3294	0.00	0.00	0.00	4
3295	0.00	0.00	0.00	5
3296	0.00	0.00	0.00	3
3297	0.00	0.00	0.00	3
3298	0.00	0.00	0.00	4
3299	0.00	0.00	0.00	0
3300	0.00	0.00	0.00	4
3301	0.00	0.00	0.00	0
3302	0.00	0.00	0.00	6
3303	0.00	0.00	0.00	3
3304	0.00	0.00	0.00	3
3305	0.00	0.00	0.00	8
3306	0.00	0.00	0.00	1
3307	0.00	0.00	0.00	4
3308	0.00	0.00	0.00	4
3309	0.00	0.00	0.00	3
3310	0.00	0.00	0.00	3
3311	0.00	0.00	0.00	3
3312	0.00	0.00	0.00	5
3313	0.00	0.00	0.00	3
3314	0.00	0.00	0.00	3
3315	0.00	0.00	0.00	1
3316	0.00	0.00	0.00	1
3317	0.00	0.00	0.00	4
3318	0.00	0.00	0.00	3
3319	0.00	0.00	0.00	5
3320	1.00	0.25	0.40	4
3321	0.00	0.00	0.00	4
3322	0.00	0.00	0.00	4
3323	0.00	0.00	0.00	5
3324	0.00	0.00	0.00	8
3325	0.00	0.00	0.00	4
3326	0.00	0.00	0.00	6
3327	0.00	0.00	0.00	2
3328	0.00	0.00	0.00	3
3329	0.00	0.00	0.00	3
3330	0.00	0.00	0.00	4
3331	0.00	0.00	0.00	2
3332	0.00	0.00	0.00	4
3333	0.00	0.00	0.00	3
3334	0.00	0.00	0.00	2
3335	0.00	0.00	0.00	4
3336	0.50	0.14	0.22	7
3337	0.00	0.00	0.00	5
3338	0.00	0.00	0.00	4
3339	0.00	0.00	0.00	3
3340	0.00	0.00	0.00	3
3341	0.00	0.00	0.00	1
3342	0.00	0.00	0.00	5
3343	0.00	0.00	0.00	0
3344	0.00	0.00	0.00	6
3345	0.00	0.00	0.00	7
3346	0.00	0.00	0.00	3
3347	0.00	0.00	0.00	2

3348	0.00	0.00	0.00	3
3349	0.00	0.00	0.00	3
3350	0.00	0.00	0.00	5
3351	0.00	0.00	0.00	2
3352	0.00	0.00	0.00	2
3353	0.00	0.00	0.00	2
3354	0.00	0.00	0.00	3
3355	0.00	0.00	0.00	2
3356	0.00	0.00	0.00	5
3357	0.00	0.00	0.00	6
3358	0.00	0.00	0.00	6
3359	0.00	0.00	0.00	6
3360	0.00	0.00	0.00	2
3361	0.00	0.00	0.00	4
3362	0.00	0.00	0.00	2
3363	0.00	0.00	0.00	3
3364	0.00	0.00	0.00	6
3365	0.00	0.00	0.00	1
3366	0.00	0.00	0.00	5
3367	0.00	0.00	0.00	1
3368	0.00	0.00	0.00	2
3369	0.00	0.00	0.00	3
3370	0.00	0.00	0.00	3
3371	0.00	0.00	0.00	5
3372	0.00	0.00	0.00	2
3373	0.00	0.00	0.00	4
3374	0.00	0.00	0.00	2
3375	0.00	0.00	0.00	6
3376	0.00	0.00	0.00	2
3377	0.00	0.00	0.00	3
3378	0.00	0.00	0.00	5
3379	0.00	0.00	0.00	6
3380	0.00	0.00	0.00	3
3381	0.00	0.00	0.00	1
3382	0.00	0.00	0.00	2
3383	0.00	0.00	0.00	6
3384	0.00	0.00	0.00	7
3385	0.00	0.00	0.00	1
3386	0.00	0.00	0.00	5
3387	0.00	0.00	0.00	5
3388	0.00	0.00	0.00	4
3389	0.00	0.00	0.00	2
3390	0.00	0.00	0.00	2
3391	0.00	0.00	0.00	5
3392	0.00	0.00	0.00	4
3393	0.00	0.00	0.00	0
3394	0.00	0.00	0.00	2
3395	0.00	0.00	0.00	3
3396	0.00	0.00	0.00	3
3397	0.00	0.00	0.00	1
3398	0.00	0.00	0.00	4
3399	0.00	0.00	0.00	2
3400	0.00	0.00	0.00	4
3401	0.00	0.00	0.00	8
3402	0.00	0.00	0.00	3
3403	0.00	0.00	0.00	3
3404	0.00	0.00	0.00	4
3405	0.00	0.00	0.00	3
3406	0.00	0.00	0.00	8
3407	0.00	0.00	0.00	3
3408	0.00	0.00	0.00	7

3409	0.00	0.00	0.00	5
3410	0.00	0.00	0.00	4
3411	0.00	0.00	0.00	2
3412	0.00	0.00	0.00	5
3413	0.00	0.00	0.00	4
3414	0.00	0.00	0.00	4
3415	0.00	0.00	0.00	5
3416	0.00	0.00	0.00	3
3417	0.00	0.00	0.00	2
3418	0.00	0.00	0.00	3
3419	0.00	0.00	0.00	3
3420	0.00	0.00	0.00	4
3421	0.00	0.00	0.00	5
3422	0.00	0.00	0.00	6
3423	0.00	0.00	0.00	2
3424	0.00	0.00	0.00	4
3425	0.00	0.00	0.00	4
3426	0.00	0.00	0.00	3
3427	0.00	0.00	0.00	2
3428	0.00	0.00	0.00	2
3429	0.00	0.00	0.00	3
3430	0.00	0.00	0.00	3
3431	0.00	0.00	0.00	2
3432	0.00	0.00	0.00	3
3433	0.00	0.00	0.00	8
3434	0.00	0.00	0.00	5
3435	0.00	0.00	0.00	3
3436	0.00	0.00	0.00	4
3437	0.00	0.00	0.00	7
3438	0.00	0.00	0.00	2
3439	0.00	0.00	0.00	3
3440	0.00	0.00	0.00	4
3441	0.00	0.00	0.00	8
3442	0.00	0.00	0.00	3
3443	0.00	0.00	0.00	1
3444	0.00	0.00	0.00	4
3445	0.00	0.00	0.00	1
3446	0.00	0.00	0.00	0
3447	0.00	0.00	0.00	2
3448	0.00	0.00	0.00	1
3449	0.00	0.00	0.00	4
3450	0.00	0.00	0.00	2
3451	0.00	0.00	0.00	3
3452	0.00	0.00	0.00	3
3453	0.00	0.00	0.00	5
3454	0.00	0.00	0.00	2
3455	0.00	0.00	0.00	7
3456	0.00	0.00	0.00	4
3457	0.00	0.00	0.00	4
3458	0.00	0.00	0.00	4
3459	0.00	0.00	0.00	4
3460	0.00	0.00	0.00	1
3461	0.00	0.00	0.00	3
3462	0.00	0.00	0.00	5
3463	0.00	0.00	0.00	3
3464	0.00	0.00	0.00	2
3465	0.00	0.00	0.00	2
3466	0.00	0.00	0.00	2
3467	1.00	0.33	0.50	3
3468	0.00	0.00	0.00	2
3469	0.00	0.00	0.00	3

3470	0.00	0.00	0.00	4
3471	0.00	0.00	0.00	1
3472	0.00	0.00	0.00	4
3473	0.00	0.00	0.00	2
3474	0.00	0.00	0.00	6
3475	0.00	0.00	0.00	4
3476	0.00	0.00	0.00	3
3477	0.00	0.00	0.00	4
3478	0.00	0.00	0.00	4
3479	0.00	0.00	0.00	2
3480	0.00	0.00	0.00	6
3481	0.00	0.00	0.00	4
3482	0.00	0.00	0.00	5
3483	0.00	0.00	0.00	4
3484	0.00	0.00	0.00	1
3485	0.00	0.00	0.00	3
3486	0.00	0.00	0.00	2
3487	0.00	0.00	0.00	0
3488	0.00	0.00	0.00	1
3489	0.00	0.00	0.00	0
3490	0.00	0.00	0.00	4
3491	0.00	0.00	0.00	3
3492	0.00	0.00	0.00	2
3493	0.00	0.00	0.00	3
3494	0.00	0.00	0.00	6
3495	0.00	0.00	0.00	3
3496	0.00	0.00	0.00	1
3497	0.00	0.00	0.00	3
3498	0.00	0.00	0.00	3
3499	0.00	0.00	0.00	5
3500	0.00	0.00	0.00	0
3501	0.00	0.00	0.00	3
3502	0.00	0.00	0.00	4
3503	0.00	0.00	0.00	3
3504	0.00	0.00	0.00	6
3505	0.00	0.00	0.00	1
3506	0.00	0.00	0.00	2
3507	0.00	0.00	0.00	5
3508	0.00	0.00	0.00	4
3509	0.00	0.00	0.00	4
3510	0.00	0.00	0.00	4
3511	0.00	0.00	0.00	5
3512	0.00	0.00	0.00	3
3513	0.00	0.00	0.00	3
3514	0.00	0.00	0.00	1
3515	0.00	0.00	0.00	5
3516	0.00	0.00	0.00	5
3517	0.00	0.00	0.00	3
3518	0.00	0.00	0.00	3
3519	0.00	0.00	0.00	4
3520	0.00	0.00	0.00	5
3521	0.00	0.00	0.00	7
3522	0.00	0.00	0.00	2
3523	0.00	0.00	0.00	3
3524	0.00	0.00	0.00	2
3525	0.00	0.00	0.00	7
3526	0.00	0.00	0.00	2
3527	0.00	0.00	0.00	1
3528	0.00	0.00	0.00	4
3529	0.00	0.00	0.00	8
3530	0.00	0.00	0.00	2

3531	0.00	0.00	0.00	4
3532	0.00	0.00	0.00	3
3533	0.00	0.00	0.00	6
3534	0.00	0.00	0.00	0
3535	0.00	0.00	0.00	3
3536	0.00	0.00	0.00	4
3537	0.00	0.00	0.00	2
3538	0.00	0.00	0.00	2
3539	0.00	0.00	0.00	0
3540	0.00	0.00	0.00	3
3541	0.00	0.00	0.00	2
3542	0.00	0.00	0.00	5
3543	0.00	0.00	0.00	5
3544	0.00	0.00	0.00	7
3545	0.00	0.00	0.00	8
3546	0.00	0.00	0.00	3
3547	0.00	0.00	0.00	3
3548	0.00	0.00	0.00	4
3549	0.00	0.00	0.00	3
3550	0.00	0.00	0.00	3
3551	0.00	0.00	0.00	5
3552	0.00	0.00	0.00	2
3553	0.00	0.00	0.00	4
3554	0.00	0.00	0.00	2
3555	0.00	0.00	0.00	1
3556	1.00	0.33	0.50	3
3557	0.00	0.00	0.00	5
3558	0.00	0.00	0.00	6
3559	0.00	0.00	0.00	2
3560	0.00	0.00	0.00	4
3561	1.00	0.50	0.67	2
3562	0.00	0.00	0.00	5
3563	0.00	0.00	0.00	5
3564	0.00	0.00	0.00	2
3565	0.00	0.00	0.00	5
3566	0.00	0.00	0.00	5
3567	0.00	0.00	0.00	3
3568	0.00	0.00	0.00	5
3569	0.00	0.00	0.00	3
3570	0.00	0.00	0.00	5
3571	0.00	0.00	0.00	4
3572	0.00	0.00	0.00	6
3573	0.00	0.00	0.00	5
3574	0.00	0.00	0.00	3
3575	0.00	0.00	0.00	3
3576	0.00	0.00	0.00	6
3577	0.00	0.00	0.00	3
3578	0.00	0.00	0.00	4
3579	0.00	0.00	0.00	4
3580	0.00	0.00	0.00	5
3581	0.00	0.00	0.00	3
3582	0.00	0.00	0.00	3
3583	0.00	0.00	0.00	3
3584	0.00	0.00	0.00	3
3585	0.00	0.00	0.00	2
3586	0.00	0.00	0.00	4
3587	0.00	0.00	0.00	3
3588	0.00	0.00	0.00	2
3589	0.00	0.00	0.00	1
3590	0.00	0.00	0.00	2
3591	0.00	0.00	0.00	2

3592	0.00	0.00	0.00	3
3593	1.00	0.50	0.67	4
3594	0.00	0.00	0.00	2
3595	0.00	0.00	0.00	1
3596	0.00	0.00	0.00	0
3597	0.00	0.00	0.00	2
3598	0.00	0.00	0.00	3
3599	0.00	0.00	0.00	2
3600	0.00	0.00	0.00	3
3601	0.00	0.00	0.00	2
3602	0.00	0.00	0.00	1
3603	0.00	0.00	0.00	3
3604	0.00	0.00	0.00	1
3605	0.00	0.00	0.00	7
3606	0.00	0.00	0.00	6
3607	0.00	0.00	0.00	0
3608	0.00	0.00	0.00	1
3609	0.00	0.00	0.00	2
3610	0.00	0.00	0.00	6
3611	0.00	0.00	0.00	4
3612	0.00	0.00	0.00	4
3613	0.00	0.00	0.00	6
3614	0.00	0.00	0.00	7
3615	0.00	0.00	0.00	3
3616	0.00	0.00	0.00	2
3617	0.00	0.00	0.00	2
3618	0.00	0.00	0.00	3
3619	0.00	0.00	0.00	4
3620	0.00	0.00	0.00	5
3621	0.00	0.00	0.00	4
3622	0.00	0.00	0.00	2
3623	0.00	0.00	0.00	3
3624	0.00	0.00	0.00	1
3625	0.00	0.00	0.00	3
3626	0.00	0.00	0.00	4
3627	0.00	0.00	0.00	1
3628	0.00	0.00	0.00	4
3629	0.00	0.00	0.00	3
3630	0.00	0.00	0.00	2
3631	0.00	0.00	0.00	5
3632	0.00	0.00	0.00	1
3633	0.00	0.00	0.00	4
3634	0.00	0.00	0.00	3
3635	0.00	0.00	0.00	4
3636	0.00	0.00	0.00	1
3637	0.00	0.00	0.00	8
3638	0.00	0.00	0.00	1
3639	0.00	0.00	0.00	3
3640	0.00	0.00	0.00	3
3641	0.00	0.00	0.00	2
3642	0.00	0.00	0.00	6
3643	0.00	0.00	0.00	2
3644	0.00	0.00	0.00	3
3645	0.00	0.00	0.00	2
3646	0.00	0.00	0.00	1
3647	0.00	0.00	0.00	3
3648	0.00	0.00	0.00	0
3649	0.00	0.00	0.00	6
3650	0.00	0.00	0.00	3
3651	0.00	0.00	0.00	3
3652	0.00	0.00	0.00	6

3653	0.00	0.00	0.00	3
3654	0.00	0.00	0.00	1
3655	0.00	0.00	0.00	3
3656	0.00	0.00	0.00	4
3657	0.00	0.00	0.00	2
3658	0.00	0.00	0.00	3
3659	0.00	0.00	0.00	2
3660	0.00	0.00	0.00	5
3661	0.00	0.00	0.00	5
3662	0.00	0.00	0.00	2
3663	0.00	0.00	0.00	4
3664	0.00	0.00	0.00	5
3665	0.00	0.00	0.00	6
3666	0.00	0.00	0.00	4
3667	0.00	0.00	0.00	5
3668	0.00	0.00	0.00	1
3669	0.00	0.00	0.00	3
3670	0.00	0.00	0.00	3
3671	0.00	0.00	0.00	3
3672	0.00	0.00	0.00	4
3673	0.00	0.00	0.00	5
3674	0.00	0.00	0.00	4
3675	0.00	0.00	0.00	2
3676	0.00	0.00	0.00	7
3677	0.00	0.00	0.00	4
3678	0.00	0.00	0.00	3
3679	0.00	0.00	0.00	5
3680	0.00	0.00	0.00	3
3681	0.00	0.00	0.00	5
3682	0.00	0.00	0.00	1
3683	0.00	0.00	0.00	7
3684	0.00	0.00	0.00	3
3685	0.00	0.00	0.00	6
3686	0.00	0.00	0.00	4
3687	0.00	0.00	0.00	1
3688	0.00	0.00	0.00	4
3689	0.00	0.00	0.00	3
3690	0.00	0.00	0.00	4
3691	0.00	0.00	0.00	3
3692	0.00	0.00	0.00	7
3693	0.00	0.00	0.00	6
3694	0.00	0.00	0.00	2
3695	0.00	0.00	0.00	3
3696	0.00	0.00	0.00	2
3697	0.00	0.00	0.00	1
3698	0.00	0.00	0.00	4
3699	0.00	0.00	0.00	4
3700	0.00	0.00	0.00	4
3701	0.00	0.00	0.00	2
3702	0.00	0.00	0.00	4
3703	0.00	0.00	0.00	2
3704	0.00	0.00	0.00	2
3705	0.00	0.00	0.00	4
3706	0.00	0.00	0.00	5
3707	0.00	0.00	0.00	4
3708	0.00	0.00	0.00	3
3709	0.00	0.00	0.00	3
3710	0.00	0.00	0.00	2
3711	0.00	0.00	0.00	4
3712	0.00	0.00	0.00	2
3713	0.00	0.00	0.00	8

3714	0.00	0.00	0.00	2
3715	0.00	0.00	0.00	3
3716	0.00	0.00	0.00	2
3717	0.00	0.00	0.00	1
3718	0.00	0.00	0.00	2
3719	0.00	0.00	0.00	5
3720	0.00	0.00	0.00	3
3721	0.00	0.00	0.00	1
3722	0.00	0.00	0.00	4
3723	0.00	0.00	0.00	3
3724	0.00	0.00	0.00	2
3725	0.00	0.00	0.00	1
3726	0.00	0.00	0.00	1
3727	0.00	0.00	0.00	4
3728	0.00	0.00	0.00	3
3729	0.00	0.00	0.00	3
3730	0.00	0.00	0.00	1
3731	0.00	0.00	0.00	1
3732	0.00	0.00	0.00	1
3733	0.00	0.00	0.00	3
3734	0.00	0.00	0.00	1
3735	0.00	0.00	0.00	2
3736	0.00	0.00	0.00	3
3737	0.00	0.00	0.00	3
3738	0.00	0.00	0.00	2
3739	0.00	0.00	0.00	2
3740	0.00	0.00	0.00	1
3741	0.00	0.00	0.00	1
3742	0.00	0.00	0.00	3
3743	0.00	0.00	0.00	2
3744	0.00	0.00	0.00	2
3745	0.00	0.00	0.00	0
3746	0.00	0.00	0.00	5
3747	0.00	0.00	0.00	4
3748	0.00	0.00	0.00	2
3749	0.00	0.00	0.00	6
3750	0.00	0.00	0.00	1
3751	0.00	0.00	0.00	2
3752	0.00	0.00	0.00	3
3753	0.00	0.00	0.00	3
3754	0.00	0.00	0.00	1
3755	0.00	0.00	0.00	2
3756	0.00	0.00	0.00	3
3757	0.00	0.00	0.00	2
3758	0.00	0.00	0.00	3
3759	0.00	0.00	0.00	2
3760	0.00	0.00	0.00	3
3761	0.00	0.00	0.00	1
3762	0.00	0.00	0.00	3
3763	0.00	0.00	0.00	4
3764	0.00	0.00	0.00	1
3765	0.00	0.00	0.00	6
3766	0.00	0.00	0.00	4
3767	0.00	0.00	0.00	3
3768	0.00	0.00	0.00	2
3769	0.00	0.00	0.00	3
3770	0.00	0.00	0.00	2
3771	0.00	0.00	0.00	2
3772	0.00	0.00	0.00	2
3773	0.00	0.00	0.00	3
3774	0.00	0.00	0.00	1

3775	0.00	0.00	0.00	3
3776	0.00	0.00	0.00	3
3777	0.00	0.00	0.00	1
3778	0.00	0.00	0.00	1
3779	0.00	0.00	0.00	9
3780	0.00	0.00	0.00	4
3781	0.00	0.00	0.00	4
3782	0.00	0.00	0.00	2
3783	0.00	0.00	0.00	5
3784	0.00	0.00	0.00	2
3785	0.00	0.00	0.00	1
3786	0.00	0.00	0.00	5
3787	0.00	0.00	0.00	4
3788	0.00	0.00	0.00	0
3789	0.00	0.00	0.00	1
3790	0.00	0.00	0.00	3
3791	0.00	0.00	0.00	4
3792	1.00	0.11	0.20	9
3793	0.00	0.00	0.00	5
3794	0.00	0.00	0.00	6
3795	0.00	0.00	0.00	2
3796	0.00	0.00	0.00	2
3797	0.00	0.00	0.00	2
3798	0.00	0.00	0.00	3
3799	0.00	0.00	0.00	6
3800	0.00	0.00	0.00	5
3801	0.00	0.00	0.00	4
3802	0.00	0.00	0.00	5
3803	0.00	0.00	0.00	4
3804	1.00	0.33	0.50	3
3805	0.00	0.00	0.00	3
3806	0.00	0.00	0.00	2
3807	0.00	0.00	0.00	2
3808	0.00	0.00	0.00	1
3809	0.00	0.00	0.00	3
3810	0.00	0.00	0.00	5
3811	0.00	0.00	0.00	4
3812	0.00	0.00	0.00	3
3813	0.00	0.00	0.00	2
3814	0.00	0.00	0.00	5
3815	0.00	0.00	0.00	1
3816	0.00	0.00	0.00	3
3817	0.00	0.00	0.00	3
3818	0.00	0.00	0.00	3
3819	0.00	0.00	0.00	6
3820	0.00	0.00	0.00	1
3821	0.00	0.00	0.00	1
3822	0.00	0.00	0.00	4
3823	0.00	0.00	0.00	5
3824	0.00	0.00	0.00	3
3825	0.00	0.00	0.00	1
3826	0.00	0.00	0.00	2
3827	0.00	0.00	0.00	5
3828	0.00	0.00	0.00	2
3829	0.00	0.00	0.00	5
3830	0.00	0.00	0.00	3
3831	0.00	0.00	0.00	5
3832	0.00	0.00	0.00	3
3833	0.00	0.00	0.00	0
3834	0.00	0.00	0.00	1
3835	0.00	0.00	0.00	1

3836	0.00	0.00	0.00	4
3837	0.00	0.00	0.00	2
3838	0.00	0.00	0.00	0
3839	0.00	0.00	0.00	1
3840	0.00	0.00	0.00	2
3841	0.00	0.00	0.00	4
3842	0.00	0.00	0.00	2
3843	0.00	0.00	0.00	1
3844	0.00	0.00	0.00	1
3845	0.00	0.00	0.00	3
3846	0.00	0.00	0.00	1
3847	0.00	0.00	0.00	4
3848	0.00	0.00	0.00	4
3849	0.00	0.00	0.00	3
3850	0.00	0.00	0.00	4
3851	0.00	0.00	0.00	1
3852	0.00	0.00	0.00	4
3853	0.00	0.00	0.00	3
3854	0.00	0.00	0.00	2
3855	0.00	0.00	0.00	4
3856	0.00	0.00	0.00	1
3857	0.00	0.00	0.00	0
3858	0.00	0.00	0.00	0
3859	0.00	0.00	0.00	1
3860	0.00	0.00	0.00	3
3861	0.00	0.00	0.00	5
3862	0.00	0.00	0.00	0
3863	0.00	0.00	0.00	4
3864	0.00	0.00	0.00	3
3865	0.00	0.00	0.00	6
3866	0.00	0.00	0.00	2
3867	0.00	0.00	0.00	2
3868	0.00	0.00	0.00	4
3869	0.00	0.00	0.00	4
3870	0.00	0.00	0.00	2
3871	0.00	0.00	0.00	1
3872	0.00	0.00	0.00	5
3873	0.00	0.00	0.00	3
3874	0.00	0.00	0.00	2
3875	0.00	0.00	0.00	4
3876	0.00	0.00	0.00	3
3877	0.00	0.00	0.00	2
3878	0.00	0.00	0.00	3
3879	0.00	0.00	0.00	4
3880	0.00	0.00	0.00	3
3881	0.00	0.00	0.00	2
3882	0.00	0.00	0.00	2
3883	0.00	0.00	0.00	2
3884	0.00	0.00	0.00	2
3885	0.00	0.00	0.00	2
3886	0.00	0.00	0.00	3
3887	0.00	0.00	0.00	2
3888	0.00	0.00	0.00	6
3889	0.00	0.00	0.00	2
3890	0.00	0.00	0.00	2
3891	0.00	0.00	0.00	6
3892	0.00	0.00	0.00	3
3893	0.00	0.00	0.00	1
3894	0.00	0.00	0.00	2
3895	0.00	0.00	0.00	5
3896	0.00	0.00	0.00	2

3897	0.00	0.00	0.00	2
3898	0.00	0.00	0.00	1
3899	0.00	0.00	0.00	1
3900	0.00	0.00	0.00	1
3901	0.00	0.00	0.00	3
3902	0.00	0.00	0.00	2
3903	0.00	0.00	0.00	2
3904	0.00	0.00	0.00	1
3905	0.00	0.00	0.00	8
3906	0.00	0.00	0.00	1
3907	0.00	0.00	0.00	7
3908	0.00	0.00	0.00	3
3909	0.00	0.00	0.00	3
3910	0.00	0.00	0.00	0
3911	0.00	0.00	0.00	1
3912	0.00	0.00	0.00	4
3913	0.00	0.00	0.00	2
3914	0.00	0.00	0.00	2
3915	0.00	0.00	0.00	5
3916	0.00	0.00	0.00	4
3917	0.00	0.00	0.00	4
3918	0.00	0.00	0.00	3
3919	0.00	0.00	0.00	2
3920	0.00	0.00	0.00	0
3921	0.00	0.00	0.00	3
3922	0.00	0.00	0.00	0
3923	0.00	0.00	0.00	3
3924	0.00	0.00	0.00	2
3925	0.00	0.00	0.00	2
3926	0.00	0.00	0.00	2
3927	0.00	0.00	0.00	4
3928	0.00	0.00	0.00	4
3929	0.00	0.00	0.00	4
3930	0.00	0.00	0.00	2
3931	0.00	0.00	0.00	2
3932	0.00	0.00	0.00	0
3933	0.00	0.00	0.00	3
3934	0.00	0.00	0.00	1
3935	0.00	0.00	0.00	4
3936	0.00	0.00	0.00	4
3937	0.00	0.00	0.00	1
3938	0.00	0.00	0.00	3
3939	0.00	0.00	0.00	2
3940	0.00	0.00	0.00	1
3941	0.00	0.00	0.00	2
3942	0.00	0.00	0.00	4
3943	0.00	0.00	0.00	1
3944	0.00	0.00	0.00	2
3945	0.00	0.00	0.00	3
3946	0.00	0.00	0.00	3
3947	0.00	0.00	0.00	2
3948	0.00	0.00	0.00	2
3949	0.00	0.00	0.00	5
3950	0.00	0.00	0.00	3
3951	0.00	0.00	0.00	3
3952	0.00	0.00	0.00	3
3953	0.00	0.00	0.00	3
3954	0.00	0.00	0.00	3
3955	1.00	0.50	0.67	2
3956	0.00	0.00	0.00	2
3957	0.00	0.00	0.00	3

3958	0.00	0.00	0.00	5
3959	0.00	0.00	0.00	3
3960	0.00	0.00	0.00	0
3961	0.00	0.00	0.00	2
3962	0.00	0.00	0.00	3
3963	0.00	0.00	0.00	0
3964	0.00	0.00	0.00	1
3965	0.00	0.00	0.00	0
3966	0.00	0.00	0.00	2
3967	0.00	0.00	0.00	4
3968	0.00	0.00	0.00	2
3969	0.00	0.00	0.00	3
3970	0.00	0.00	0.00	4
3971	0.00	0.00	0.00	2
3972	0.00	0.00	0.00	2
3973	0.00	0.00	0.00	2
3974	0.00	0.00	0.00	6
3975	0.00	0.00	0.00	3
3976	0.00	0.00	0.00	1
3977	0.00	0.00	0.00	4
3978	0.00	0.00	0.00	1
3979	0.00	0.00	0.00	3
3980	0.00	0.00	0.00	1
3981	0.00	0.00	0.00	0
3982	0.00	0.00	0.00	2
3983	0.00	0.00	0.00	6
3984	0.00	0.00	0.00	1
3985	0.00	0.00	0.00	1
3986	0.00	0.00	0.00	6
3987	0.00	0.00	0.00	2
3988	0.00	0.00	0.00	3
3989	0.00	0.00	0.00	3
3990	0.00	0.00	0.00	3
3991	0.00	0.00	0.00	1
3992	0.00	0.00	0.00	3
3993	0.00	0.00	0.00	5
3994	0.00	0.00	0.00	3
3995	0.00	0.00	0.00	3
3996	0.00	0.00	0.00	3
3997	0.00	0.00	0.00	8
3998	0.00	0.00	0.00	1
3999	0.00	0.00	0.00	0
4000	0.00	0.00	0.00	2
4001	0.00	0.00	0.00	4
4002	0.00	0.00	0.00	3
4003	0.00	0.00	0.00	1
4004	0.00	0.00	0.00	2
4005	0.00	0.00	0.00	1
4006	0.00	0.00	0.00	0
4007	0.00	0.00	0.00	3
4008	0.00	0.00	0.00	3
4009	0.00	0.00	0.00	4
4010	0.00	0.00	0.00	1
4011	0.00	0.00	0.00	5
4012	0.00	0.00	0.00	3
4013	0.00	0.00	0.00	2
4014	0.00	0.00	0.00	1
4015	0.00	0.00	0.00	1
4016	0.00	0.00	0.00	4
4017	0.00	0.00	0.00	2
4018	0.00	0.00	0.00	3

4019	0.00	0.00	0.00	3
4020	0.00	0.00	0.00	2
4021	0.00	0.00	0.00	1
4022	0.00	0.00	0.00	3
4023	0.00	0.00	0.00	1
4024	0.00	0.00	0.00	1
4025	0.00	0.00	0.00	0
4026	0.00	0.00	0.00	2
4027	0.00	0.00	0.00	3
4028	0.00	0.00	0.00	1
4029	0.00	0.00	0.00	2
4030	0.00	0.00	0.00	1
4031	0.00	0.00	0.00	3
4032	0.00	0.00	0.00	3
4033	0.00	0.00	0.00	3
4034	0.00	0.00	0.00	4
4035	0.00	0.00	0.00	3
4036	0.00	0.00	0.00	4
4037	0.00	0.00	0.00	1
4038	0.00	0.00	0.00	2
4039	0.00	0.00	0.00	4
4040	0.00	0.00	0.00	3
4041	0.00	0.00	0.00	4
4042	1.00	0.50	0.67	2
4043	0.00	0.00	0.00	2
4044	0.00	0.00	0.00	5
4045	0.00	0.00	0.00	2
4046	0.00	0.00	0.00	3
4047	0.00	0.00	0.00	1
4048	0.00	0.00	0.00	1
4049	0.00	0.00	0.00	5
4050	0.00	0.00	0.00	3
4051	0.00	0.00	0.00	0
4052	0.00	0.00	0.00	1
4053	0.00	0.00	0.00	3
4054	0.00	0.00	0.00	2
4055	0.00	0.00	0.00	3
4056	0.00	0.00	0.00	6
4057	0.00	0.00	0.00	2
4058	0.00	0.00	0.00	1
4059	0.00	0.00	0.00	4
4060	0.00	0.00	0.00	2
4061	0.00	0.00	0.00	3
4062	0.00	0.00	0.00	1
4063	0.00	0.00	0.00	4
4064	0.00	0.00	0.00	2
4065	0.00	0.00	0.00	4
4066	0.00	0.00	0.00	4
4067	0.00	0.00	0.00	3
4068	0.00	0.00	0.00	2
4069	0.00	0.00	0.00	4
4070	0.00	0.00	0.00	2
4071	0.00	0.00	0.00	2
4072	0.00	0.00	0.00	2
4073	1.00	0.43	0.60	7
4074	0.00	0.00	0.00	2
4075	0.00	0.00	0.00	4
4076	0.00	0.00	0.00	3
4077	0.00	0.00	0.00	1
4078	0.00	0.00	0.00	5
4079	0.00	0.00	0.00	1

4080	0.00	0.00	0.00	5
4081	0.00	0.00	0.00	3
4082	0.00	0.00	0.00	4
4083	0.00	0.00	0.00	2
4084	0.00	0.00	0.00	2
4085	0.00	0.00	0.00	3
4086	0.00	0.00	0.00	3
4087	0.00	0.00	0.00	4
4088	0.00	0.00	0.00	2
4089	0.00	0.00	0.00	1
4090	0.00	0.00	0.00	4
4091	0.00	0.00	0.00	2
4092	0.00	0.00	0.00	6
4093	0.00	0.00	0.00	2
4094	0.00	0.00	0.00	1
4095	0.00	0.00	0.00	2
4096	0.00	0.00	0.00	1
4097	0.00	0.00	0.00	3
4098	0.00	0.00	0.00	2
4099	0.00	0.00	0.00	4
4100	0.00	0.00	0.00	1
4101	0.00	0.00	0.00	3
4102	0.00	0.00	0.00	3
4103	0.00	0.00	0.00	6
4104	0.00	0.00	0.00	4
4105	0.00	0.00	0.00	2
4106	0.00	0.00	0.00	7
4107	0.00	0.00	0.00	2
4108	0.00	0.00	0.00	4
4109	0.00	0.00	0.00	2
4110	0.00	0.00	0.00	2
4111	0.00	0.00	0.00	3
4112	0.00	0.00	0.00	0
4113	0.00	0.00	0.00	0
4114	0.00	0.00	0.00	3
4115	0.00	0.00	0.00	2
4116	0.00	0.00	0.00	3
4117	0.00	0.00	0.00	2
4118	0.00	0.00	0.00	3
4119	0.00	0.00	0.00	2
4120	0.00	0.00	0.00	2
4121	0.00	0.00	0.00	3
4122	0.00	0.00	0.00	4
4123	0.00	0.00	0.00	1
4124	0.00	0.00	0.00	3
4125	0.00	0.00	0.00	5
4126	0.00	0.00	0.00	4
4127	0.00	0.00	0.00	4
4128	0.00	0.00	0.00	3
4129	0.00	0.00	0.00	4
4130	0.00	0.00	0.00	2
4131	0.00	0.00	0.00	5
4132	0.00	0.00	0.00	0
4133	0.00	0.00	0.00	1
4134	0.00	0.00	0.00	2
4135	0.00	0.00	0.00	6
4136	0.00	0.00	0.00	2
4137	0.00	0.00	0.00	2
4138	0.00	0.00	0.00	4
4139	0.00	0.00	0.00	4
4140	0.00	0.00	0.00	2

4141	0.00	0.00	0.00	2
4142	0.00	0.00	0.00	0
4143	0.00	0.00	0.00	4
4144	0.00	0.00	0.00	2
4145	0.00	0.00	0.00	6
4146	0.00	0.00	0.00	2
4147	0.00	0.00	0.00	5
4148	0.00	0.00	0.00	2
4149	0.00	0.00	0.00	2
4150	0.00	0.00	0.00	2
4151	0.00	0.00	0.00	8
4152	0.00	0.00	0.00	3
4153	0.00	0.00	0.00	1
4154	0.00	0.00	0.00	1
4155	0.00	0.00	0.00	4
4156	0.00	0.00	0.00	3
4157	0.00	0.00	0.00	0
4158	0.00	0.00	0.00	3
4159	0.00	0.00	0.00	3
4160	0.00	0.00	0.00	1
4161	0.00	0.00	0.00	3
4162	0.00	0.00	0.00	2
4163	0.00	0.00	0.00	3
4164	0.00	0.00	0.00	2
4165	0.00	0.00	0.00	3
4166	0.00	0.00	0.00	3
4167	0.00	0.00	0.00	0
4168	0.00	0.00	0.00	3
4169	0.00	0.00	0.00	4
4170	0.00	0.00	0.00	1
4171	0.00	0.00	0.00	2
4172	0.00	0.00	0.00	1
4173	0.00	0.00	0.00	7
4174	0.00	0.00	0.00	2
4175	0.00	0.00	0.00	3
4176	0.00	0.00	0.00	2
4177	0.00	0.00	0.00	3
4178	0.00	0.00	0.00	1
4179	0.00	0.00	0.00	2
4180	0.00	0.00	0.00	1
4181	0.00	0.00	0.00	4
4182	0.00	0.00	0.00	1
4183	0.00	0.00	0.00	3
4184	0.00	0.00	0.00	0
4185	0.00	0.00	0.00	3
4186	0.00	0.00	0.00	3
4187	0.00	0.00	0.00	3
4188	0.00	0.00	0.00	6
4189	0.00	0.00	0.00	1
4190	0.00	0.00	0.00	2
4191	0.00	0.00	0.00	3
4192	0.00	0.00	0.00	1
4193	0.00	0.00	0.00	5
4194	0.00	0.00	0.00	4
4195	0.00	0.00	0.00	2
4196	0.00	0.00	0.00	2
4197	0.00	0.00	0.00	1
4198	0.00	0.00	0.00	6
4199	0.00	0.00	0.00	1
4200	0.00	0.00	0.00	4
4201	0.00	0.00	0.00	3

4202	0.00	0.00	0.00	1
4203	0.00	0.00	0.00	3
4204	0.00	0.00	0.00	1
4205	0.00	0.00	0.00	2
4206	0.00	0.00	0.00	8
4207	0.00	0.00	0.00	3
4208	0.00	0.00	0.00	4
4209	0.00	0.00	0.00	2
4210	0.00	0.00	0.00	4
4211	0.00	0.00	0.00	1
4212	0.00	0.00	0.00	4
4213	0.00	0.00	0.00	3
4214	0.00	0.00	0.00	2
4215	0.00	0.00	0.00	5
4216	0.00	0.00	0.00	4
4217	0.00	0.00	0.00	1
4218	0.00	0.00	0.00	3
4219	0.00	0.00	0.00	0
4220	0.00	0.00	0.00	4
4221	0.00	0.00	0.00	6
4222	0.00	0.00	0.00	3
4223	0.00	0.00	0.00	1
4224	0.00	0.00	0.00	3
4225	0.00	0.00	0.00	5
4226	0.00	0.00	0.00	4
4227	0.00	0.00	0.00	2
4228	0.00	0.00	0.00	0
4229	0.00	0.00	0.00	2
4230	0.00	0.00	0.00	3
4231	0.00	0.00	0.00	4
4232	0.00	0.00	0.00	1
4233	0.00	0.00	0.00	3
4234	0.00	0.00	0.00	2
4235	0.00	0.00	0.00	2
4236	0.00	0.00	0.00	5
4237	0.00	0.00	0.00	2
4238	0.00	0.00	0.00	6
4239	0.00	0.00	0.00	4
4240	0.00	0.00	0.00	2
4241	0.00	0.00	0.00	3
4242	0.00	0.00	0.00	4
4243	0.00	0.00	0.00	2
4244	0.00	0.00	0.00	2
4245	0.00	0.00	0.00	2
4246	0.00	0.00	0.00	3
4247	0.00	0.00	0.00	1
4248	0.00	0.00	0.00	3
4249	0.00	0.00	0.00	6
4250	0.00	0.00	0.00	4
4251	0.00	0.00	0.00	2
4252	0.00	0.00	0.00	6
4253	0.00	0.00	0.00	2
4254	0.00	0.00	0.00	1
4255	0.00	0.00	0.00	0
4256	0.00	0.00	0.00	2
4257	0.00	0.00	0.00	0
4258	0.00	0.00	0.00	3
4259	0.00	0.00	0.00	2
4260	0.00	0.00	0.00	3
4261	0.00	0.00	0.00	4
4262	0.00	0.00	0.00	3

4263	0.00	0.00	0.00	4
4264	0.00	0.00	0.00	3
4265	0.00	0.00	0.00	4
4266	0.00	0.00	0.00	4
4267	0.00	0.00	0.00	1
4268	0.00	0.00	0.00	1
4269	0.00	0.00	0.00	4
4270	0.00	0.00	0.00	2
4271	0.00	0.00	0.00	1
4272	0.00	0.00	0.00	3
4273	0.00	0.00	0.00	5
4274	0.00	0.00	0.00	2
4275	0.00	0.00	0.00	6
4276	0.00	0.00	0.00	2
4277	0.00	0.00	0.00	3
4278	0.00	0.00	0.00	5
4279	0.00	0.00	0.00	3
4280	0.00	0.00	0.00	2
4281	0.00	0.00	0.00	1
4282	0.00	0.00	0.00	2
4283	0.00	0.00	0.00	6
4284	0.00	0.00	0.00	2
4285	0.00	0.00	0.00	3
4286	0.00	0.00	0.00	1
4287	0.00	0.00	0.00	2
4288	0.00	0.00	0.00	5
4289	0.00	0.00	0.00	4
4290	0.00	0.00	0.00	5
4291	0.00	0.00	0.00	1
4292	0.00	0.00	0.00	3
4293	0.00	0.00	0.00	1
4294	0.00	0.00	0.00	4
4295	0.00	0.00	0.00	3
4296	0.00	0.00	0.00	1
4297	0.00	0.00	0.00	2
4298	0.00	0.00	0.00	3
4299	0.00	0.00	0.00	2
4300	0.00	0.00	0.00	3
4301	0.00	0.00	0.00	2
4302	0.00	0.00	0.00	4
4303	0.00	0.00	0.00	4
4304	0.00	0.00	0.00	3
4305	0.00	0.00	0.00	2
4306	0.00	0.00	0.00	2
4307	0.00	0.00	0.00	5
4308	0.00	0.00	0.00	2
4309	0.00	0.00	0.00	1
4310	0.00	0.00	0.00	3
4311	0.00	0.00	0.00	6
4312	0.00	0.00	0.00	2
4313	0.00	0.00	0.00	1
4314	0.00	0.00	0.00	5
4315	0.00	0.00	0.00	2
4316	0.00	0.00	0.00	5
4317	0.00	0.00	0.00	3
4318	0.00	0.00	0.00	1
4319	0.00	0.00	0.00	0
4320	0.00	0.00	0.00	1
4321	0.00	0.00	0.00	0
4322	0.00	0.00	0.00	4
4323	0.00	0.00	0.00	5

4324	0.00	0.00	0.00	1
4325	0.00	0.00	0.00	2
4326	0.00	0.00	0.00	4
4327	0.00	0.00	0.00	1
4328	0.00	0.00	0.00	4
4329	0.00	0.00	0.00	2
4330	0.00	0.00	0.00	3
4331	0.00	0.00	0.00	3
4332	0.00	0.00	0.00	1
4333	0.00	0.00	0.00	2
4334	0.00	0.00	0.00	3
4335	0.00	0.00	0.00	3
4336	0.00	0.00	0.00	2
4337	0.00	0.00	0.00	4
4338	0.00	0.00	0.00	6
4339	0.00	0.00	0.00	2
4340	0.00	0.00	0.00	1
4341	0.00	0.00	0.00	3
4342	0.00	0.00	0.00	2
4343	0.00	0.00	0.00	0
4344	0.00	0.00	0.00	1
4345	0.00	0.00	0.00	4
4346	0.00	0.00	0.00	4
4347	0.00	0.00	0.00	1
4348	0.00	0.00	0.00	5
4349	0.00	0.00	0.00	3
4350	0.00	0.00	0.00	2
4351	0.00	0.00	0.00	4
4352	0.00	0.00	0.00	2
4353	0.00	0.00	0.00	2
4354	0.00	0.00	0.00	5
4355	0.00	0.00	0.00	1
4356	0.00	0.00	0.00	5
4357	0.00	0.00	0.00	1
4358	0.00	0.00	0.00	2
4359	0.00	0.00	0.00	1
4360	0.00	0.00	0.00	1
4361	0.00	0.00	0.00	2
4362	0.00	0.00	0.00	4
4363	0.00	0.00	0.00	2
4364	0.00	0.00	0.00	2
4365	0.00	0.00	0.00	1
4366	0.00	0.00	0.00	2
4367	0.00	0.00	0.00	4
4368	0.00	0.00	0.00	2
4369	0.00	0.00	0.00	6
4370	0.00	0.00	0.00	1
4371	0.00	0.00	0.00	3
4372	0.00	0.00	0.00	2
4373	0.00	0.00	0.00	2
4374	0.00	0.00	0.00	1
4375	0.00	0.00	0.00	0
4376	0.00	0.00	0.00	3
4377	0.00	0.00	0.00	5
4378	0.00	0.00	0.00	2
4379	0.00	0.00	0.00	5
4380	0.00	0.00	0.00	2
4381	0.00	0.00	0.00	2
4382	0.00	0.00	0.00	2
4383	0.00	0.00	0.00	3
4384	0.00	0.00	0.00	0

4385	0.00	0.00	0.00	1
4386	0.00	0.00	0.00	3
4387	0.00	0.00	0.00	6
4388	0.00	0.00	0.00	5
4389	0.00	0.00	0.00	0
4390	0.00	0.00	0.00	4
4391	0.00	0.00	0.00	1
4392	0.00	0.00	0.00	1
4393	0.00	0.00	0.00	3
4394	0.00	0.00	0.00	0
4395	0.00	0.00	0.00	3
4396	0.00	0.00	0.00	4
4397	0.00	0.00	0.00	3
4398	0.00	0.00	0.00	3
4399	0.00	0.00	0.00	1
4400	0.00	0.00	0.00	1
4401	0.00	0.00	0.00	2
4402	0.00	0.00	0.00	0
4403	0.00	0.00	0.00	5
4404	0.00	0.00	0.00	3
4405	0.00	0.00	0.00	1
4406	0.00	0.00	0.00	3
4407	0.00	0.00	0.00	1
4408	0.00	0.00	0.00	0
4409	0.00	0.00	0.00	2
4410	0.00	0.00	0.00	3
4411	0.00	0.00	0.00	2
4412	0.00	0.00	0.00	5
4413	0.00	0.00	0.00	3
4414	0.00	0.00	0.00	3
4415	0.00	0.00	0.00	3
4416	0.00	0.00	0.00	1
4417	0.00	0.00	0.00	3
4418	0.00	0.00	0.00	2
4419	0.00	0.00	0.00	2
4420	0.00	0.00	0.00	4
4421	0.00	0.00	0.00	2
4422	0.00	0.00	0.00	0
4423	0.00	0.00	0.00	1
4424	0.00	0.00	0.00	7
4425	0.00	0.00	0.00	6
4426	0.00	0.00	0.00	2
4427	0.00	0.00	0.00	2
4428	0.00	0.00	0.00	2
4429	0.00	0.00	0.00	2
4430	0.00	0.00	0.00	2
4431	0.00	0.00	0.00	3
4432	0.00	0.00	0.00	1
4433	0.00	0.00	0.00	6
4434	0.00	0.00	0.00	2
4435	0.00	0.00	0.00	3
4436	0.00	0.00	0.00	1
4437	0.00	0.00	0.00	2
4438	0.00	0.00	0.00	2
4439	0.00	0.00	0.00	3
4440	0.00	0.00	0.00	4
4441	0.00	0.00	0.00	4
4442	0.00	0.00	0.00	2
4443	0.00	0.00	0.00	1
4444	0.00	0.00	0.00	5
4445	0.00	0.00	0.00	2

4446	0.00	0.00	0.00	2
4447	0.00	0.00	0.00	1
4448	0.00	0.00	0.00	3
4449	0.00	0.00	0.00	1
4450	0.00	0.00	0.00	0
4451	0.00	0.00	0.00	0
4452	0.00	0.00	0.00	3
4453	0.00	0.00	0.00	2
4454	0.00	0.00	0.00	0
4455	0.00	0.00	0.00	1
4456	0.00	0.00	0.00	2
4457	0.00	0.00	0.00	2
4458	0.00	0.00	0.00	1
4459	0.00	0.00	0.00	4
4460	0.00	0.00	0.00	3
4461	0.00	0.00	0.00	1
4462	0.00	0.00	0.00	1
4463	0.00	0.00	0.00	2
4464	0.00	0.00	0.00	2
4465	0.00	0.00	0.00	3
4466	0.00	0.00	0.00	1
4467	0.00	0.00	0.00	3
4468	0.00	0.00	0.00	0
4469	0.00	0.00	0.00	1
4470	0.00	0.00	0.00	2
4471	0.00	0.00	0.00	4
4472	0.00	0.00	0.00	5
4473	0.00	0.00	0.00	2
4474	0.00	0.00	0.00	1
4475	0.00	0.00	0.00	0
4476	0.00	0.00	0.00	4
4477	0.00	0.00	0.00	6
4478	0.00	0.00	0.00	5
4479	0.00	0.00	0.00	2
4480	0.00	0.00	0.00	2
4481	0.00	0.00	0.00	2
4482	0.00	0.00	0.00	1
4483	0.00	0.00	0.00	2
4484	0.00	0.00	0.00	4
4485	0.00	0.00	0.00	2
4486	0.00	0.00	0.00	3
4487	0.00	0.00	0.00	5
4488	0.00	0.00	0.00	3
4489	0.00	0.00	0.00	1
4490	0.00	0.00	0.00	2
4491	0.00	0.00	0.00	3
4492	0.00	0.00	0.00	4
4493	0.00	0.00	0.00	0
4494	0.00	0.00	0.00	3
4495	0.00	0.00	0.00	2
4496	0.00	0.00	0.00	3
4497	0.00	0.00	0.00	4
4498	0.00	0.00	0.00	2
4499	0.00	0.00	0.00	1
4500	0.00	0.00	0.00	3
4501	0.00	0.00	0.00	4
4502	0.00	0.00	0.00	4
4503	0.00	0.00	0.00	3
4504	0.00	0.00	0.00	2
4505	0.00	0.00	0.00	2
4506	0.00	0.00	0.00	4

4507	0.00	0.00	0.00	1
4508	0.00	0.00	0.00	2
4509	0.00	0.00	0.00	3
4510	0.00	0.00	0.00	3
4511	0.00	0.00	0.00	3
4512	0.00	0.00	0.00	1
4513	0.00	0.00	0.00	1
4514	0.00	0.00	0.00	5
4515	0.00	0.00	0.00	1
4516	0.00	0.00	0.00	1
4517	0.00	0.00	0.00	2
4518	0.00	0.00	0.00	4
4519	0.00	0.00	0.00	1
4520	0.00	0.00	0.00	0
4521	0.00	0.00	0.00	2
4522	0.00	0.00	0.00	0
4523	0.00	0.00	0.00	3
4524	0.00	0.00	0.00	4
4525	0.00	0.00	0.00	1
4526	0.00	0.00	0.00	2
4527	0.00	0.00	0.00	1
4528	0.00	0.00	0.00	2
4529	0.00	0.00	0.00	1
4530	0.00	0.00	0.00	3
4531	0.00	0.00	0.00	2
4532	0.00	0.00	0.00	5
4533	0.00	0.00	0.00	4
4534	0.00	0.00	0.00	1
4535	0.00	0.00	0.00	3
4536	0.00	0.00	0.00	5
4537	0.00	0.00	0.00	2
4538	0.00	0.00	0.00	3
4539	0.00	0.00	0.00	3
4540	0.00	0.00	0.00	1
4541	0.00	0.00	0.00	4
4542	0.00	0.00	0.00	6
4543	0.00	0.00	0.00	5
4544	0.00	0.00	0.00	2
4545	0.00	0.00	0.00	1
4546	0.00	0.00	0.00	3
4547	0.00	0.00	0.00	4
4548	0.00	0.00	0.00	4
4549	0.00	0.00	0.00	2
4550	0.00	0.00	0.00	3
4551	0.00	0.00	0.00	2
4552	0.00	0.00	0.00	1
4553	0.00	0.00	0.00	1
4554	0.00	0.00	0.00	3
4555	0.00	0.00	0.00	2
4556	0.00	0.00	0.00	2
4557	0.00	0.00	0.00	1
4558	0.00	0.00	0.00	3
4559	0.00	0.00	0.00	3
4560	0.00	0.00	0.00	0
4561	0.00	0.00	0.00	1
4562	0.00	0.00	0.00	1
4563	0.00	0.00	0.00	0
4564	0.00	0.00	0.00	0
4565	0.00	0.00	0.00	3
4566	0.00	0.00	0.00	3
4567	0.00	0.00	0.00	2

4568	0.00	0.00	0.00	5
4569	0.00	0.00	0.00	2
4570	0.00	0.00	0.00	3
4571	0.00	0.00	0.00	4
4572	0.00	0.00	0.00	4
4573	0.00	0.00	0.00	0
4574	0.00	0.00	0.00	6
4575	0.00	0.00	0.00	2
4576	0.00	0.00	0.00	1
4577	0.00	0.00	0.00	3
4578	0.00	0.00	0.00	3
4579	0.00	0.00	0.00	2
4580	0.00	0.00	0.00	5
4581	0.00	0.00	0.00	3
4582	0.00	0.00	0.00	1
4583	0.00	0.00	0.00	1
4584	0.00	0.00	0.00	3
4585	0.00	0.00	0.00	3
4586	0.00	0.00	0.00	1
4587	0.00	0.00	0.00	2
4588	0.00	0.00	0.00	0
4589	0.00	0.00	0.00	2
4590	0.00	0.00	0.00	2
4591	0.00	0.00	0.00	2
4592	0.00	0.00	0.00	4
4593	0.00	0.00	0.00	8
4594	0.00	0.00	0.00	3
4595	0.00	0.00	0.00	2
4596	0.00	0.00	0.00	4
4597	0.00	0.00	0.00	5
4598	0.00	0.00	0.00	2
4599	0.00	0.00	0.00	1
4600	0.00	0.00	0.00	2
4601	0.00	0.00	0.00	2
4602	0.00	0.00	0.00	2
4603	0.00	0.00	0.00	1
4604	0.00	0.00	0.00	2
4605	0.00	0.00	0.00	1
4606	0.00	0.00	0.00	2
4607	0.00	0.00	0.00	4
4608	0.00	0.00	0.00	3
4609	0.00	0.00	0.00	1
4610	0.00	0.00	0.00	4
4611	0.00	0.00	0.00	2
4612	0.00	0.00	0.00	1
4613	0.00	0.00	0.00	1
4614	0.00	0.00	0.00	3
4615	0.00	0.00	0.00	1
4616	0.00	0.00	0.00	1
4617	0.00	0.00	0.00	4
4618	0.00	0.00	0.00	3
4619	0.00	0.00	0.00	3
4620	0.00	0.00	0.00	4
4621	0.00	0.00	0.00	4
4622	0.00	0.00	0.00	1
4623	0.00	0.00	0.00	2
4624	0.00	0.00	0.00	2
4625	0.00	0.00	0.00	3
4626	0.00	0.00	0.00	2
4627	0.00	0.00	0.00	3
4628	0.00	0.00	0.00	3

4629	0.00	0.00	0.00	3
4630	0.00	0.00	0.00	1
4631	0.00	0.00	0.00	2
4632	0.00	0.00	0.00	2
4633	0.00	0.00	0.00	5
4634	0.00	0.00	0.00	2
4635	0.00	0.00	0.00	2
4636	0.00	0.00	0.00	1
4637	0.00	0.00	0.00	3
4638	0.00	0.00	0.00	3
4639	0.00	0.00	0.00	4
4640	0.00	0.00	0.00	3
4641	0.00	0.00	0.00	1
4642	0.00	0.00	0.00	4
4643	0.00	0.00	0.00	2
4644	0.00	0.00	0.00	2
4645	0.00	0.00	0.00	3
4646	0.00	0.00	0.00	0
4647	0.00	0.00	0.00	4
4648	0.00	0.00	0.00	2
4649	0.00	0.00	0.00	0
4650	0.00	0.00	0.00	5
4651	0.00	0.00	0.00	5
4652	0.00	0.00	0.00	5
4653	0.00	0.00	0.00	2
4654	0.00	0.00	0.00	4
4655	0.00	0.00	0.00	3
4656	0.00	0.00	0.00	2
4657	0.00	0.00	0.00	2
4658	0.00	0.00	0.00	1
4659	0.00	0.00	0.00	3
4660	0.00	0.00	0.00	5
4661	0.00	0.00	0.00	2
4662	0.00	0.00	0.00	4
4663	0.00	0.00	0.00	4
4664	0.00	0.00	0.00	3
4665	0.00	0.00	0.00	2
4666	0.00	0.00	0.00	3
4667	0.00	0.00	0.00	1
4668	0.00	0.00	0.00	5
4669	0.00	0.00	0.00	3
4670	0.00	0.00	0.00	0
4671	0.00	0.00	0.00	0
4672	0.00	0.00	0.00	1
4673	0.00	0.00	0.00	1
4674	0.00	0.00	0.00	3
4675	0.00	0.00	0.00	1
4676	0.00	0.00	0.00	3
4677	0.00	0.00	0.00	1
4678	0.00	0.00	0.00	4
4679	0.00	0.00	0.00	4
4680	0.00	0.00	0.00	5
4681	0.00	0.00	0.00	1
4682	0.00	0.00	0.00	0
4683	0.00	0.00	0.00	1
4684	0.00	0.00	0.00	4
4685	0.00	0.00	0.00	1
4686	0.00	0.00	0.00	1
4687	0.00	0.00	0.00	2
4688	0.00	0.00	0.00	2
4689	0.00	0.00	0.00	1

4690	0.00	0.00	0.00	2
4691	0.00	0.00	0.00	2
4692	0.00	0.00	0.00	2
4693	0.00	0.00	0.00	1
4694	0.00	0.00	0.00	1
4695	0.00	0.00	0.00	2
4696	0.00	0.00	0.00	1
4697	0.00	0.00	0.00	4
4698	0.00	0.00	0.00	2
4699	0.00	0.00	0.00	1
4700	0.00	0.00	0.00	1
4701	0.00	0.00	0.00	3
4702	0.00	0.00	0.00	1
4703	0.00	0.00	0.00	1
4704	0.00	0.00	0.00	1
4705	0.00	0.00	0.00	1
4706	0.00	0.00	0.00	3
4707	0.00	0.00	0.00	1
4708	0.00	0.00	0.00	2
4709	0.00	0.00	0.00	1
4710	0.00	0.00	0.00	1
4711	0.00	0.00	0.00	3
4712	0.00	0.00	0.00	2
4713	0.00	0.00	0.00	0
4714	0.00	0.00	0.00	3
4715	0.00	0.00	0.00	3
4716	0.00	0.00	0.00	3
4717	0.00	0.00	0.00	3
4718	0.00	0.00	0.00	6
4719	0.00	0.00	0.00	1
4720	0.00	0.00	0.00	3
4721	0.00	0.00	0.00	3
4722	0.00	0.00	0.00	3
4723	0.00	0.00	0.00	4
4724	0.00	0.00	0.00	2
4725	0.00	0.00	0.00	3
4726	0.00	0.00	0.00	0
4727	0.00	0.00	0.00	1
4728	0.00	0.00	0.00	4
4729	0.00	0.00	0.00	2
4730	0.00	0.00	0.00	5
4731	0.00	0.00	0.00	3
4732	0.00	0.00	0.00	2
4733	0.00	0.00	0.00	2
4734	0.00	0.00	0.00	0
4735	0.00	0.00	0.00	2
4736	0.00	0.00	0.00	2
4737	0.00	0.00	0.00	0
4738	0.00	0.00	0.00	4
4739	0.00	0.00	0.00	1
4740	0.00	0.00	0.00	5
4741	0.00	0.00	0.00	3
4742	0.00	0.00	0.00	1
4743	0.00	0.00	0.00	2
4744	0.00	0.00	0.00	2
4745	0.00	0.00	0.00	1
4746	0.00	0.00	0.00	3
4747	0.00	0.00	0.00	1
4748	0.00	0.00	0.00	2
4749	0.00	0.00	0.00	2
4750	0.00	0.00	0.00	4

4751	0.00	0.00	0.00	2
4752	0.00	0.00	0.00	2
4753	0.00	0.00	0.00	1
4754	0.00	0.00	0.00	1
4755	0.00	0.00	0.00	1
4756	0.00	0.00	0.00	5
4757	0.00	0.00	0.00	2
4758	0.00	0.00	0.00	4
4759	0.00	0.00	0.00	1
4760	0.00	0.00	0.00	1
4761	0.00	0.00	0.00	0
4762	0.00	0.00	0.00	3
4763	0.00	0.00	0.00	0
4764	0.00	0.00	0.00	5
4765	0.00	0.00	0.00	2
4766	0.00	0.00	0.00	4
4767	0.00	0.00	0.00	4
4768	0.00	0.00	0.00	4
4769	0.00	0.00	0.00	0
4770	0.00	0.00	0.00	1
4771	0.00	0.00	0.00	5
4772	0.00	0.00	0.00	3
4773	0.00	0.00	0.00	3
4774	0.00	0.00	0.00	3
4775	0.00	0.00	0.00	1
4776	0.00	0.00	0.00	3
4777	0.00	0.00	0.00	0
4778	0.00	0.00	0.00	1
4779	0.00	0.00	0.00	3
4780	0.00	0.00	0.00	4
4781	0.00	0.00	0.00	1
4782	0.00	0.00	0.00	0
4783	0.00	0.00	0.00	0
4784	0.00	0.00	0.00	3
4785	0.00	0.00	0.00	0
4786	0.00	0.00	0.00	3
4787	0.00	0.00	0.00	2
4788	0.00	0.00	0.00	3
4789	0.00	0.00	0.00	1
4790	0.00	0.00	0.00	3
4791	0.00	0.00	0.00	3
4792	0.00	0.00	0.00	4
4793	0.00	0.00	0.00	3
4794	0.00	0.00	0.00	0
4795	0.00	0.00	0.00	1
4796	0.00	0.00	0.00	3
4797	0.00	0.00	0.00	1
4798	0.00	0.00	0.00	2
4799	0.00	0.00	0.00	2
4800	0.00	0.00	0.00	1
4801	0.00	0.00	0.00	3
4802	0.00	0.00	0.00	2
4803	0.00	0.00	0.00	2
4804	0.00	0.00	0.00	4
4805	0.00	0.00	0.00	1
4806	0.00	0.00	0.00	0
4807	0.00	0.00	0.00	4
4808	0.00	0.00	0.00	4
4809	0.00	0.00	0.00	1
4810	0.00	0.00	0.00	4
4811	0.00	0.00	0.00	3

4812	0.00	0.00	0.00	2
4813	0.00	0.00	0.00	3
4814	0.00	0.00	0.00	0
4815	0.00	0.00	0.00	1
4816	0.00	0.00	0.00	2
4817	0.00	0.00	0.00	2
4818	0.00	0.00	0.00	4
4819	0.00	0.00	0.00	1
4820	0.00	0.00	0.00	3
4821	0.00	0.00	0.00	3
4822	0.00	0.00	0.00	1
4823	0.00	0.00	0.00	2
4824	0.00	0.00	0.00	1
4825	0.00	0.00	0.00	1
4826	0.00	0.00	0.00	6
4827	0.00	0.00	0.00	4
4828	0.00	0.00	0.00	0
4829	0.00	0.00	0.00	3
4830	0.00	0.00	0.00	1
4831	0.00	0.00	0.00	3
4832	0.00	0.00	0.00	4
4833	0.00	0.00	0.00	4
4834	0.00	0.00	0.00	2
4835	0.00	0.00	0.00	2
4836	0.00	0.00	0.00	5
4837	0.00	0.00	0.00	2
4838	0.00	0.00	0.00	2
4839	0.00	0.00	0.00	2
4840	0.00	0.00	0.00	2
4841	0.00	0.00	0.00	1
4842	0.00	0.00	0.00	4
4843	0.00	0.00	0.00	5
4844	0.00	0.00	0.00	2
4845	0.00	0.00	0.00	1
4846	0.00	0.00	0.00	3
4847	0.00	0.00	0.00	3
4848	0.00	0.00	0.00	1
4849	0.00	0.00	0.00	2
4850	0.00	0.00	0.00	0
4851	0.00	0.00	0.00	1
4852	0.00	0.00	0.00	7
4853	0.00	0.00	0.00	4
4854	0.00	0.00	0.00	1
4855	0.00	0.00	0.00	3
4856	0.00	0.00	0.00	1
4857	0.00	0.00	0.00	2
4858	0.00	0.00	0.00	2
4859	0.00	0.00	0.00	5
4860	0.00	0.00	0.00	1
4861	0.00	0.00	0.00	1
4862	0.00	0.00	0.00	4
4863	0.00	0.00	0.00	3
4864	0.00	0.00	0.00	3
4865	0.00	0.00	0.00	2
4866	0.00	0.00	0.00	2
4867	0.00	0.00	0.00	4
4868	0.00	0.00	0.00	1
4869	0.00	0.00	0.00	2
4870	0.00	0.00	0.00	2
4871	0.00	0.00	0.00	1
4872	0.00	0.00	0.00	2

4873	0.00	0.00	0.00	2
4874	0.00	0.00	0.00	4
4875	0.00	0.00	0.00	4
4876	0.00	0.00	0.00	4
4877	0.00	0.00	0.00	4
4878	0.00	0.00	0.00	2
4879	0.00	0.00	0.00	3
4880	0.00	0.00	0.00	2
4881	0.00	0.00	0.00	4
4882	0.00	0.00	0.00	1
4883	0.00	0.00	0.00	2
4884	0.00	0.00	0.00	2
4885	0.00	0.00	0.00	0
4886	0.00	0.00	0.00	2
4887	0.00	0.00	0.00	2
4888	0.00	0.00	0.00	2
4889	0.00	0.00	0.00	3
4890	0.00	0.00	0.00	1
4891	0.00	0.00	0.00	0
4892	0.00	0.00	0.00	0
4893	0.00	0.00	0.00	3
4894	0.00	0.00	0.00	0
4895	0.00	0.00	0.00	0
4896	0.00	0.00	0.00	0
4897	0.00	0.00	0.00	7
4898	0.00	0.00	0.00	1
4899	0.00	0.00	0.00	5
4900	0.00	0.00	0.00	4
4901	0.00	0.00	0.00	2
4902	0.00	0.00	0.00	1
4903	0.00	0.00	0.00	0
4904	0.00	0.00	0.00	4
4905	0.00	0.00	0.00	4
4906	0.00	0.00	0.00	3
4907	0.00	0.00	0.00	1
4908	0.00	0.00	0.00	0
4909	0.00	0.00	0.00	4
4910	0.00	0.00	0.00	3
4911	0.00	0.00	0.00	2
4912	0.00	0.00	0.00	3
4913	0.00	0.00	0.00	1
4914	0.00	0.00	0.00	5
4915	0.00	0.00	0.00	4
4916	1.00	0.67	0.80	3
4917	0.00	0.00	0.00	2
4918	0.00	0.00	0.00	2
4919	0.00	0.00	0.00	2
4920	0.00	0.00	0.00	2
4921	0.00	0.00	0.00	3
4922	0.00	0.00	0.00	1
4923	0.00	0.00	0.00	4
4924	0.00	0.00	0.00	2
4925	0.00	0.00	0.00	1
4926	0.00	0.00	0.00	1
4927	0.00	0.00	0.00	1
4928	0.00	0.00	0.00	2
4929	0.00	0.00	0.00	2
4930	0.00	0.00	0.00	1
4931	0.00	0.00	0.00	3
4932	0.00	0.00	0.00	2
4933	0.00	0.00	0.00	1

4934	0.00	0.00	0.00	0
4935	0.00	0.00	0.00	2
4936	0.00	0.00	0.00	5
4937	0.00	0.00	0.00	5
4938	0.00	0.00	0.00	2
4939	0.00	0.00	0.00	2
4940	0.00	0.00	0.00	3
4941	0.00	0.00	0.00	1
4942	0.00	0.00	0.00	4
4943	0.00	0.00	0.00	1
4944	0.00	0.00	0.00	4
4945	0.00	0.00	0.00	2
4946	0.00	0.00	0.00	5
4947	0.00	0.00	0.00	2
4948	0.00	0.00	0.00	1
4949	0.00	0.00	0.00	0
4950	0.00	0.00	0.00	1
4951	0.00	0.00	0.00	1
4952	0.00	0.00	0.00	0
4953	0.00	0.00	0.00	1
4954	0.00	0.00	0.00	2
4955	0.00	0.00	0.00	2
4956	0.00	0.00	0.00	3
4957	0.00	0.00	0.00	2
4958	0.00	0.00	0.00	1
4959	0.00	0.00	0.00	1
4960	0.00	0.00	0.00	2
4961	0.00	0.00	0.00	3
4962	0.00	0.00	0.00	1
4963	0.00	0.00	0.00	2
4964	0.00	0.00	0.00	5
4965	0.00	0.00	0.00	0
4966	0.00	0.00	0.00	5
4967	0.00	0.00	0.00	3
4968	0.00	0.00	0.00	2
4969	0.00	0.00	0.00	0
4970	0.00	0.00	0.00	3
4971	0.00	0.00	0.00	2
4972	0.00	0.00	0.00	1
4973	0.00	0.00	0.00	1
4974	0.00	0.00	0.00	2
4975	0.00	0.00	0.00	3
4976	0.00	0.00	0.00	1
4977	0.00	0.00	0.00	2
4978	0.00	0.00	0.00	0
4979	0.00	0.00	0.00	5
4980	0.00	0.00	0.00	2
4981	0.00	0.00	0.00	1
4982	0.00	0.00	0.00	4
4983	0.00	0.00	0.00	3
4984	0.00	0.00	0.00	0
4985	0.00	0.00	0.00	3
4986	0.00	0.00	0.00	4
4987	0.00	0.00	0.00	0
4988	0.00	0.00	0.00	1
4989	0.00	0.00	0.00	0
4990	0.00	0.00	0.00	5
4991	0.00	0.00	0.00	0
4992	0.00	0.00	0.00	2
4993	0.00	0.00	0.00	4
4994	0.00	0.00	0.00	4

4995	0.00	0.00	0.00	2
4996	0.00	0.00	0.00	3
4997	0.00	0.00	0.00	2
4998	0.00	0.00	0.00	3
4999	0.00	0.00	0.00	3
5000	0.00	0.00	0.00	2
5001	0.00	0.00	0.00	0
5002	0.00	0.00	0.00	5
5003	0.00	0.00	0.00	6
5004	0.00	0.00	0.00	1
5005	0.00	0.00	0.00	1
5006	0.00	0.00	0.00	3
5007	0.00	0.00	0.00	2
5008	0.00	0.00	0.00	1
5009	0.00	0.00	0.00	0
5010	0.00	0.00	0.00	5
5011	0.00	0.00	0.00	4
5012	0.00	0.00	0.00	6
5013	0.00	0.00	0.00	6
5014	0.00	0.00	0.00	4
5015	0.00	0.00	0.00	0
5016	0.00	0.00	0.00	1
5017	0.00	0.00	0.00	2
5018	0.00	0.00	0.00	1
5019	0.00	0.00	0.00	4
5020	0.00	0.00	0.00	3
5021	0.00	0.00	0.00	4
5022	0.00	0.00	0.00	4
5023	0.00	0.00	0.00	1
5024	0.00	0.00	0.00	2
5025	0.00	0.00	0.00	2
5026	0.00	0.00	0.00	4
5027	0.00	0.00	0.00	1
5028	0.00	0.00	0.00	1
5029	0.00	0.00	0.00	0
5030	0.00	0.00	0.00	4
5031	0.00	0.00	0.00	1
5032	0.00	0.00	0.00	2
5033	0.00	0.00	0.00	4
5034	0.00	0.00	0.00	1
5035	0.00	0.00	0.00	2
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5039	0.00	0.00	0.00	1
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5053	0.00	0.00	0.00	4
5054	0.00	0.00	0.00	2
5055	0.00	0.00	0.00	4

5056	0.00	0.00	0.00	1
5057	0.00	0.00	0.00	3
5058	0.00	0.00	0.00	3
5059	0.00	0.00	0.00	2
5060	0.00	0.00	0.00	2
5061	0.00	0.00	0.00	3
5062	0.00	0.00	0.00	1
5063	0.00	0.00	0.00	4
5064	0.00	0.00	0.00	2
5065	0.00	0.00	0.00	2
5066	0.00	0.00	0.00	1
5067	0.00	0.00	0.00	4
5068	0.00	0.00	0.00	3
5069	0.00	0.00	0.00	1
5070	0.00	0.00	0.00	0
5071	0.00	0.00	0.00	1
5072	0.00	0.00	0.00	1
5073	0.00	0.00	0.00	2
5074	0.00	0.00	0.00	2
5075	0.00	0.00	0.00	4
5076	0.00	0.00	0.00	4
5077	0.00	0.00	0.00	3
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5153	0.00	0.00	0.00	1
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5156	0.00	0.00	0.00	1
5157	0.00	0.00	0.00	3
5158	0.00	0.00	0.00	4
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5246	0.00	0.00	0.00	4
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5360	0.00	0.00	0.00	1

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5421	0.00	0.00	0.00	3

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5464	0.00	0.00	0.00	4
5465	0.00	0.00	0.00	1
5466	0.00	0.00	0.00	1
5467	0.00	0.00	0.00	2
5468	0.00	0.00	0.00	3
5469	0.00	0.00	0.00	3
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5472	0.00	0.00	0.00	8
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5476	0.00	0.00	0.00	4
5477	0.00	0.00	0.00	2
5478	0.00	0.00	0.00	3
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5480	0.00	0.00	0.00	3
5481	0.00	0.00	0.00	3
5482	0.00	0.00	0.00	3

```
          5483       0.00      0.00      0.00         1
          5484       0.00      0.00      0.00         2
          5485       0.00      0.00      0.00         3
          5486       0.00      0.00      0.00         2
          5487       0.00      0.00      0.00         3
          5488       0.00      0.00      0.00         0
          5489       0.00      0.00      0.00         3
          5490       0.00      0.00      0.00         0
          5491       0.00      0.00      0.00         7
          5492       0.00      0.00      0.00         1
          5493       0.00      0.00      0.00         1
          5494       0.00      0.00      0.00         0
          5495       0.00      0.00      0.00         2
          5496       0.00      0.00      0.00         0
          5497       0.00      0.00      0.00         1
          5498       0.00      0.00      0.00         0
          5499       0.00      0.00      0.00         2

   micro avg       0.70      0.25      0.37    105988
   macro avg       0.17      0.06      0.08    105988
weighted avg       0.52      0.25      0.33    105988
 samples avg       0.46      0.28      0.32    105988
```

In [53]:

```
from sklearn.externals import joblib
joblib.dump(classifier, 'lr_with_equal_weight.pkl')
```

Out[53]:

```
['lr_with_equal_weight.pkl']
```

4.5 Modeling with less data points (0.2M data points) and more weight to title and 500 tags only.

In [54]:

```
sql_create_table = """CREATE TABLE IF NOT EXISTS QuestionsProcessed (question text N
OT NULL, code text, tags text, words_pre integer, words_post integer, is_code intege
r);"""
create_database_table("Titlemoreweight.db", sql_create_table)
```

```
Tables in the databse:
QuestionsProcessed
```

In [55]:

```
# http://www.sqlitetutorial.net/sqlite-delete/
# https://stackoverflow.com/questions/2279706/select-random-row-from-a-sqlite-table

read_db = 'train_no_dup.db'
write_db = 'Titlemoreweight.db'
train_datasize = 200000
if os.path.isfile(read_db):
    conn_r = create_connection(read_db)
    if conn_r is not None:
        reader =conn_r.cursor()
        # for selecting first 0.2M rows
        reader.execute("SELECT Title, Body, Tags From no_dup_train LIMIT 500001;")
        # for selecting random points
        #reader.execute("SELECT Title, Body, Tags From no_dup_train ORDER BY RANDOM
() LIMIT 500001;")

if os.path.isfile(write_db):
    conn_w = create_connection(write_db)
    if conn_w is not None:
        tables = checkTableExists(conn_w)
        writer =conn_w.cursor()
        if tables != 0:
            writer.execute("DELETE FROM QuestionsProcessed WHERE 1")
            print("Cleared All the rows")
```

```
Tables in the databse:
QuestionsProcessed
Cleared All the rows
```

4.5.1 Preprocessing of questions

1. Separate Code from Body
2. Remove Spcial characters from Question title and description (not in code)
3. **Give more weightage to title : Add title three times to the question**
4. Remove stop words (Except 'C')
5. Remove HTML Tags
6. Convert all the characters into small letters
7. Use SnowballStemmer to stem the words

In [56]:

```
#http://www.bernzilla.com/2008/05/13/selecting-a-random-row-from-an-sqlite-table/
start = datetime.now()
preprocessed_data_list=[]
reader.fetchone()
questions_with_code=0
len_pre=0
len_post=0
questions_proccesed = 0
for row in reader:

    is_code = 0

    title, question, tags = row[0], row[1], str(row[2])

    if '<code>' in question:
        questions_with_code+=1
        is_code = 1
    x = len(question)+len(title)
    len_pre+=x

    code = str(re.findall(r'<code>(.*?)</code>', question, flags=re.DOTALL))

    question=re.sub('<code>(.*?)</code>', '', question, flags=re.MULTILINE|re.DOTALL
)
    question=striphtml(question.encode('utf-8'))

    title=title.encode('utf-8')

    # adding title three time to the data to increase its weight
    # add tags string to the training data

    question=str(title)+" "+str(title)+" "+str(title)+" "+question

#     if questions_proccesed<=train_datasize:
#         question=str(title)+" "+str(title)+" "+str(title)+" "+question+" "+str(tag
s)
#     else:
#         question=str(title)+" "+str(title)+" "+str(title)+" "+question

    question=re.sub(r'[^A-Za-z0-9#+.\-]+',' ',question)
    words=word_tokenize(str(question.lower()))

    #Removing all single letter and and stopwords from question exceptt for the lett
er 'c'
    question=' '.join(str(stemmer.stem(j)) for j in words if j not in stop_words and
(len(j)!=1 or j=='c'))

    len_post+=len(question)
    tup = (question,code,tags,x,len(question),is_code)
    questions_proccesed += 1
    writer.execute("insert into QuestionsProcessed(question,code,tags,words_pre,word
s_post,is_code) values (?,?,?,?,?,?)",tup)
    if (questions_proccesed%100000==0):
        print("number of questions completed=",questions_proccesed)

no_dup_avg_len_pre=(len_pre*1.0)/questions_proccesed
no_dup_avg_len_post=(len_post*1.0)/questions_proccesed

print( "Avg. length of questions(Title+Body) before processing: %d"%no_dup_avg_len_p
```

```
re)
print( "Avg. length of questions(Title+Body) after processing: %d"%no_dup_avg_len_po
st)
print ("Percent of questions containing code: %d"%((questions_with_code*100.0)/quest
ions_proccesed))

print("Time taken to run this cell :", datetime.now() - start)
```

```
number of questions completed= 100000
number of questions completed= 200000
number of questions completed= 300000
number of questions completed= 400000
number of questions completed= 500000
Avg. length of questions(Title+Body) before processing: 1239
Avg. length of questions(Title+Body) after processing: 424
Percent of questions containing code: 57
Time taken to run this cell : 0:17:48.671155
```

In [57]:

```
# never forget to close the conections or else we will end up with database locks
conn_r.commit()
conn_w.commit()
conn_r.close()
conn_w.close()
```

Sample quesitons after preprocessing of data

In [58]:

```
if os.path.isfile(write_db):
    conn_r = create_connection(write_db)
    if conn_r is not None:
        reader =conn_r.cursor()
        reader.execute("SELECT question From QuestionsProcessed LIMIT 10")
        print("Questions after preprocessed")
        print('='*100)
        reader.fetchone()
        for row in reader:
            print(row)
            print('-'*100)
conn_r.commit()
conn_r.close()
```

```
Questions after preprocessed
================================================================================
============================
('dynam datagrid bind silverlight dynam datagrid bind silverlight dynam
datagrid bind silverlight bind datagrid dynam code wrote code debug code
block seem bind correct grid come column form come grid column although
necessari bind nthank repli advance..',)
--------------------------------------------------------------------------------
----------------------------
('java.lang.noclassdeffounderror javax servlet jsp tagext taglibraryvali
d java.lang.noclassdeffounderror javax servlet jsp tagext taglibraryvali
d java.lang.noclassdeffounderror javax servlet jsp tagext taglibraryvali
d follow guid link instal jstl got follow error tri launch jsp page jav
a.lang.noclassdeffounderror javax servlet jsp tagext taglibraryvalid tag
lib declar instal jstl 1.1 tomcat webapp tri project work also tri versi
on 1.2 jstl still messag caus solv',)
--------------------------------------------------------------------------------
----------------------------
('java.sql.sqlexcept microsoft odbc driver manag invalid descriptor inde
x java.sql.sqlexcept microsoft odbc driver manag invalid descriptor inde
x java.sql.sqlexcept microsoft odbc driver manag invalid descriptor inde
x use follow code display caus solv',)
--------------------------------------------------------------------------------
----------------------------
('better way updat feed fb php sdk better way updat feed fb php sdk bett
er way updat feed fb php sdk novic facebook api read mani tutori still c
onfused.i find post feed api method like correct second way use curl som
eth like way better',)
--------------------------------------------------------------------------------
----------------------------
('btnadd click event open two window record ad btnadd click event open t
wo window record ad btnadd click event open two window record ad open wi
ndow search.aspx use code hav add button search.aspx nwhen insert record
btnadd click event open anoth window nafter insert record close windo
w',)
--------------------------------------------------------------------------------
----------------------------
('sql inject issu prevent correct form submiss php sql inject issu preve
nt correct form submiss php sql inject issu prevent correct form submiss
php check everyth think make sure input field safe type sql inject good
news safe bad news one tag mess form submiss place even touch life figur
exact html use templat file forgiv okay entir php script get execut see
data post none forum field post problem use someth titl field none data
get post current use print post see submit noth work flawless statement
though also mention script work flawless local machin use host come acro
ss problem state list input test mess',)
--------------------------------------------------------------------------------
----------------------------
('countabl subaddit lebesgu measur countabl subaddit lebesgu measur coun
tabl subaddit lebesgu measur let lbrace rbrace sequenc set sigma -algebr
a mathcal want show left bigcup right leq sum left right countabl addit
measur defin set sigma algebra mathcal think use monoton properti somewh
er proof start appreci littl help nthank ad han answer make follow addit
construct given han answer clear bigcup bigcup cap emptyset neq left big
cup right left bigcup right sum left right also construct subset monoton
left right leq left right final would sum leq sum result follow',)
--------------------------------------------------------------------------------
----------------------------
('hql equival sql queri hql equival sql queri hql equival sql queri hql
queri replac name class properti name error occur hql error',)
--------------------------------------------------------------------------------
```

```
----------------------------
('undefin symbol architectur i386 objc class skpsmtpmessag referenc erro
r undefin symbol architectur i386 objc class skpsmtpmessag referenc erro
r undefin symbol architectur i386 objc class skpsmtpmessag referenc erro
r import framework send email applic background import framework i.e skp
smtpmessag somebodi suggest get error collect2 ld return exit status imp
ort framework correct sorc taken framework follow mfmailcomposeviewcontr
ol question lock field updat answer drag drop folder project click copi
nthat',)
----------------------------------------------------------------------
----------------------------
```

Saving Preprocessed data to a Database

In [59]:

```
#Taking 0.5 Million entries to a dataframe.
write_db = 'Titlemoreweight.db'
if os.path.isfile(write_db):
    conn_r = create_connection(write_db)
    if conn_r is not None:
        preprocessed_data = pd.read_sql_query("""SELECT question, Tags FROM Question
sProcessed""", conn_r)
conn_r.commit()
conn_r.close()
```

In [60]:

```
preprocessed_data.head()
```

Out[60]:

	question	tags
0	dynam datagrid bind silverlight dynam datagrid...	c# silverlight data-binding
1	dynam datagrid bind silverlight dynam datagrid...	c# silverlight data-binding columns
2	java.lang.noclassdeffounderror javax servlet j...	jsp jstl
3	java.sql.sqlexcept microsoft odbc driver manag...	java jdbc
4	better way updat feed fb php sdk better way up...	facebook api facebook-php-sdk

In [61]:

```
print("number of data points in sample :", preprocessed_data.shape[0])
print("number of dimensions :", preprocessed_data.shape[1])
```

```
number of data points in sample : 500000
number of dimensions : 2
```

Converting string Tags to multilable output variables

In [62]:

```
vectorizer = CountVectorizer(tokenizer = lambda x: x.split(), binary='true')
multilabel_y = vectorizer.fit_transform(preprocessed_data['tags'])
```

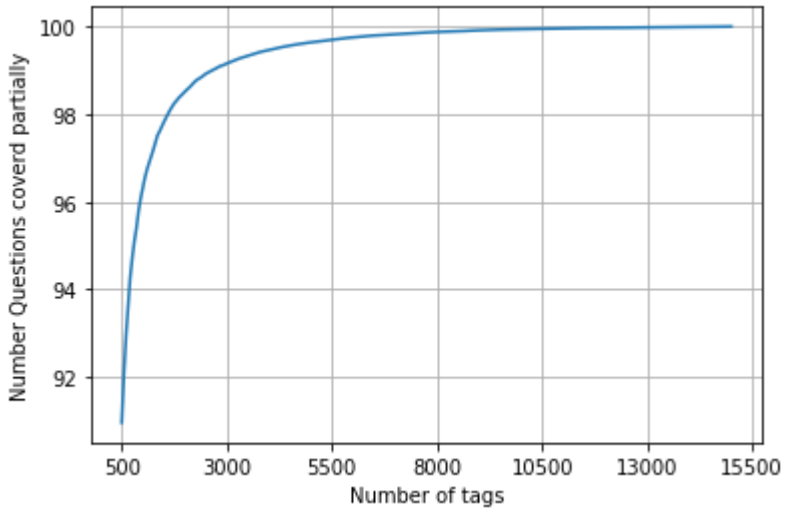
Selecting 500 Tags

In [63]:

```
questions_explained = []
total_tags=multilabel_y.shape[1]
total_qs=preprocessed_data.shape[0]
for i in range(500, total_tags, 100):
    questions_explained.append(np.round(((total_qs-questions_explained_fn(i))/total_
qs)*100,3))
```

In [64]:

```
fig, ax = plt.subplots()
ax.plot(questions_explained)
xlabel = list(500+np.array(range(-50,450,50))*50)
ax.set_xticklabels(xlabel)
plt.xlabel("Number of tags")
plt.ylabel("Number Questions coverd partially")
plt.grid()
plt.show()
# you can choose any number of tags based on your computing power, minimun is 500(it
covers 90% of the tags)
print("with ",5500,"tags we are covering ",questions_explained[50],"% of questions")
print("with ",500,"tags we are covering ",questions_explained[0],"% of questions")
```




```
with  5500 tags we are covering  99.157 % of questions
with  500 tags we are covering  90.956 % of questions
```

In [65]:

```
# we will be taking 500 tags
multilabel_yx = tags_to_choose(500)
print("number of questions that are not covered :", questions_explained_fn(500),"out
of ", total_qs)
```

```
number of questions that are not covered : 45221 out of  500000
```

In [66]:

```
x_train=preprocessed_data.head(train_datasize)
x_test=preprocessed_data.tail(preprocessed_data.shape[0] - 400000)

y_train = multilabel_yx[0:train_datasize,:]
y_test = multilabel_yx[train_datasize:preprocessed_data.shape[0],:]
```

In [67]:

```
print("Number of data points in train data :", y_train.shape)
print("Number of data points in test data :", y_test.shape)
```

```
Number of data points in train data : (200000, 500)
Number of data points in test data : (300000, 500)
```

4.5.2 Featurizing data with Tfidf vectorizer

In [68]:

```
start = datetime.now()
vectorizer = TfidfVectorizer(min_df=0.00009, max_features=100000, smooth_idf=True, n
orm="l2", \
                             tokenizer = lambda x: x.split(), sublinear_tf=False, ng
ram_range=(1,3))
x_train_multilabel = vectorizer.fit_transform(x_train['question'])
x_test_multilabel = vectorizer.transform(x_test['question'])
print("Time taken to run this cell :", datetime.now() - start)
```

```
Time taken to run this cell : 0:02:20.073092
```

In [69]:

```
y_test = y_test[:100000]
```

In [70]:

```
print("Dimensions of train data X:",x_train_multilabel.shape, "Y :",y_train.shape)
print("Dimensions of test data X:",x_test_multilabel.shape,"Y:",y_test.shape)
```

```
Dimensions of train data X: (200000, 98488) Y : (200000, 500)
Dimensions of test data X: (100000, 98488) Y: (100000, 500)
```

4.5.3 Applying Logistic Regression with OneVsRest Classifier

In [71]:

```
start = datetime.now()
classifier = OneVsRestClassifier(SGDClassifier(loss='log', alpha=0.00001, penalty='l
1'), n_jobs=-1)
classifier.fit(x_train_multilabel, y_train)
predictions = classifier.predict (x_test_multilabel)


print("Accuracy :",metrics.accuracy_score(y_test, predictions))
print("Hamming loss ",metrics.hamming_loss(y_test,predictions))


precision = precision_score(y_test, predictions, average='micro')
recall = recall_score(y_test, predictions, average='micro')
f1 = f1_score(y_test, predictions, average='micro')

print("Micro-average quality numbers")
print("Precision: {:.4f}, Recall: {:.4f}, F1-measure: {:.4f}".format(precision, reca
ll, f1))

precision = precision_score(y_test, predictions, average='macro')
recall = recall_score(y_test, predictions, average='macro')
f1 = f1_score(y_test, predictions, average='macro')

print("Macro-average quality numbers")
print("Precision: {:.4f}, Recall: {:.4f}, F1-measure: {:.4f}".format(precision, reca
ll, f1))

print (metrics.classification_report(y_test, predictions))
print("Time taken to run this cell :", datetime.now() - start)
```

```
Accuracy : 0.05216
Hamming loss  0.00505718
Micro-average quality numbers
Precision: 0.0204, Recall: 0.0088, F1-measure: 0.0123
Macro-average quality numbers
Precision: 0.0036, Recall: 0.0015, F1-measure: 0.0019
              precision    recall  f1-score   support

           0       0.05      0.04      0.04      4633
           1       0.09      0.03      0.04      7549
           2       0.08      0.03      0.04      7112
           3       0.04      0.02      0.03      2888
           4       0.05      0.03      0.04      5009
           5       0.04      0.01      0.02      3919
           6       0.06      0.03      0.04      5204
           7       0.03      0.03      0.03      3229
           8       0.03      0.01      0.01      3097
           9       0.02      0.02      0.02      1829
          10       0.02      0.01      0.01      2157
          11       0.03      0.01      0.02      3142
          12       0.03      0.01      0.02      2575
          13       0.01      0.00      0.01      1431
          14       0.02      0.01      0.01      2649
          15       0.02      0.01      0.01      2094
          16       0.02      0.00      0.01      1549
          17       0.02      0.01      0.02      1869
          18       0.02      0.01      0.01      2268
          19       0.01      0.00      0.00       852
          20       0.02      0.01      0.02      1614
          21       0.03      0.01      0.01      1798
          22       0.01      0.01      0.01      1350
          23       0.01      0.01      0.01       888
          24       0.01      0.00      0.00      1528
          25       0.00      0.00      0.00       388
          26       0.00      0.00      0.00       717
          27       0.01      0.01      0.01       986
          28       0.01      0.00      0.00      1046
          29       0.04      0.00      0.01      2380
          30       0.00      0.00      0.00       695
          31       0.01      0.00      0.00      1095
          32       0.04      0.00      0.00      2896
          33       0.01      0.01      0.01       652
          34       0.01      0.00      0.00       929
          35       0.01      0.01      0.01       632
          36       0.00      0.00      0.00       535
          37       0.00      0.00      0.00       172
          38       0.01      0.01      0.01       728
          39       0.01      0.01      0.01       632
          40       0.01      0.01      0.01       964
          41       0.00      0.00      0.00       579
          42       0.01      0.00      0.00       480
          43       0.00      0.00      0.00      2408
          44       0.00      0.00      0.00       719
          45       0.01      0.01      0.01       455
          46       0.01      0.01      0.01       385
          47       0.02      0.00      0.01       517
          48       0.01      0.00      0.00       516
          49       0.01      0.01      0.01       531
          50       0.00      0.00      0.00       410
          51       0.00      0.00      0.00       790
          52       0.00      0.00      0.00       151
```

53	0.00	0.00	0.00	702
54	0.00	0.00	0.00	480
55	0.00	0.00	0.00	423
56	0.00	0.00	0.00	485
57	0.00	0.00	0.00	848
58	0.00	0.00	0.00	473
59	0.00	0.00	0.00	640
60	0.01	0.00	0.00	499
61	0.00	0.00	0.00	234
62	0.01	0.01	0.01	546
63	0.01	0.01	0.01	492
64	0.00	0.00	0.00	138
65	0.00	0.00	0.00	350
66	0.00	0.00	0.00	233
67	0.00	0.00	0.00	203
68	0.00	0.00	0.00	401
69	0.00	0.00	0.00	283
70	0.00	0.00	0.00	444
71	0.00	0.00	0.00	839
72	0.00	0.00	0.00	281
73	0.00	0.00	0.00	1622
74	0.00	0.00	0.00	716
75	0.00	0.00	0.00	127
76	0.00	0.00	0.00	413
77	0.00	0.00	0.00	296
78	0.01	0.01	0.01	264
79	0.00	0.00	0.00	469
80	0.00	0.00	0.00	229
81	0.00	0.00	0.00	416
82	0.00	0.00	0.00	403
83	0.00	0.00	0.00	307
84	0.00	0.00	0.00	224
85	0.00	0.00	0.00	353
86	0.00	0.00	0.00	383
87	0.01	0.00	0.00	260
88	0.00	0.00	0.00	237
89	0.00	0.00	0.00	107
90	0.01	0.00	0.01	490
91	0.01	0.00	0.00	325
92	0.01	0.01	0.01	525
93	0.01	0.00	0.00	263
94	0.00	0.00	0.00	111
95	0.00	0.00	0.00	283
96	0.00	0.00	0.00	205
97	0.00	0.00	0.00	284
98	0.00	0.00	0.00	129
99	0.02	0.01	0.01	568
100	0.00	0.00	0.00	374
101	0.01	0.00	0.00	854
102	0.00	0.00	0.00	360
103	0.00	0.00	0.00	101
104	0.01	0.00	0.01	238
105	0.00	0.00	0.00	205
106	0.02	0.00	0.00	375
107	0.00	0.00	0.00	219
108	0.01	0.00	0.01	255
109	0.00	0.00	0.00	352
110	0.00	0.00	0.00	353
111	0.00	0.00	0.00	224
112	0.00	0.00	0.00	144
113	0.01	0.01	0.01	199

114	0.00	0.00	0.00	237
115	0.00	0.00	0.00	273
116	0.00	0.00	0.00	255
117	0.01	0.00	0.00	606
118	0.00	0.00	0.00	238
119	0.00	0.00	0.00	147
120	0.00	0.00	0.00	374
121	0.00	0.00	0.00	292
122	0.00	0.00	0.00	74
123	0.00	0.00	0.00	232
124	0.03	0.01	0.01	905
125	0.00	0.00	0.00	306
126	0.00	0.00	0.00	153
127	0.00	0.00	0.00	457
128	0.00	0.00	0.00	225
129	0.00	0.00	0.00	196
130	0.00	0.00	0.00	87
131	0.00	0.00	0.00	116
132	0.00	0.00	0.00	228
133	0.00	0.00	0.00	278
134	0.00	0.00	0.00	745
135	0.00	0.00	0.00	213
136	0.00	0.00	0.00	427
137	0.01	0.00	0.00	405
138	0.00	0.00	0.00	164
139	0.00	0.00	0.00	216
140	0.00	0.00	0.00	292
141	0.00	0.00	0.00	126
142	0.00	0.00	0.00	119
143	0.00	0.00	0.00	408
144	0.00	0.00	0.00	629
145	0.00	0.00	0.00	866
146	0.00	0.00	0.00	228
147	0.00	0.00	0.00	100
148	0.00	0.00	0.00	265
149	0.00	0.00	0.00	280
150	0.00	0.00	0.00	169
151	0.00	0.00	0.00	32
152	0.00	0.00	0.00	259
153	0.00	0.00	0.00	220
154	0.00	0.00	0.00	369
155	0.00	0.00	0.00	191
156	0.00	0.00	0.00	81
157	0.00	0.00	0.00	216
158	0.00	0.00	0.00	69
159	0.00	0.00	0.00	127
160	0.00	0.00	0.00	201
161	0.01	0.01	0.01	172
162	0.00	0.00	0.00	271
163	0.00	0.00	0.00	207
164	0.01	0.00	0.01	234
165	0.00	0.00	0.00	363
166	0.00	0.00	0.00	480
167	0.00	0.00	0.00	234
168	0.00	0.00	0.00	224
169	0.00	0.00	0.00	238
170	0.00	0.00	0.00	56
171	0.00	0.00	0.00	824
172	0.01	0.00	0.01	219
173	0.01	0.01	0.01	206
174	0.00	0.00	0.00	240

175	0.00	0.00	0.00	79
176	0.00	0.00	0.00	254
177	0.00	0.00	0.00	305
178	0.00	0.00	0.00	343
179	0.00	0.00	0.00	86
180	0.00	0.00	0.00	113
181	0.00	0.00	0.00	530
182	0.00	0.00	0.00	160
183	0.01	0.01	0.01	101
184	0.00	0.00	0.00	172
185	0.00	0.00	0.00	119
186	0.00	0.00	0.00	228
187	0.01	0.00	0.01	401
188	0.00	0.00	0.00	208
189	0.00	0.00	0.00	186
190	0.01	0.00	0.01	201
191	0.00	0.00	0.00	270
192	0.01	0.00	0.01	222
193	0.00	0.00	0.00	69
194	0.01	0.00	0.01	229
195	0.00	0.00	0.00	108
196	0.00	0.00	0.00	332
197	0.00	0.00	0.00	209
198	0.00	0.00	0.00	289
199	0.00	0.00	0.00	199
200	0.00	0.00	0.00	153
201	0.00	0.00	0.00	225
202	0.00	0.00	0.00	208
203	0.00	0.00	0.00	189
204	0.00	0.00	0.00	345
205	0.01	0.03	0.01	78
206	0.00	0.00	0.00	88
207	0.00	0.00	0.00	159
208	0.01	0.01	0.01	187
209	0.00	0.00	0.00	364
210	0.00	0.00	0.00	136
211	0.00	0.00	0.00	183
212	0.00	0.00	0.00	246
213	0.00	0.00	0.00	192
214	0.00	0.00	0.00	76
215	0.00	0.00	0.00	125
216	0.00	0.00	0.00	158
217	0.00	0.00	0.00	42
218	0.00	0.00	0.00	207
219	0.00	0.00	0.00	129
220	0.01	0.01	0.01	191
221	0.00	0.00	0.00	208
222	0.00	0.00	0.00	180
223	0.07	0.00	0.01	211
224	0.00	0.00	0.00	76
225	0.00	0.00	0.00	175
226	0.00	0.00	0.00	199
227	0.00	0.00	0.00	156
228	0.00	0.00	0.00	293
229	0.00	0.00	0.00	227
230	0.00	0.00	0.00	308
231	0.00	0.00	0.00	311
232	0.00	0.00	0.00	186
233	0.00	0.00	0.00	177
234	0.00	0.00	0.00	167
235	0.00	0.00	0.00	38

236	0.00	0.00	0.00	62
237	0.00	0.00	0.00	256
238	0.00	0.00	0.00	118
239	0.00	0.00	0.00	86
240	0.00	0.00	0.00	595
241	0.00	0.00	0.00	118
242	0.00	0.00	0.00	30
243	0.00	0.00	0.00	248
244	0.00	0.00	0.00	143
245	0.00	0.00	0.00	193
246	0.00	0.00	0.00	100
247	0.00	0.00	0.00	109
248	0.00	0.00	0.00	559
249	0.00	0.00	0.00	142
250	0.00	0.00	0.00	109
251	0.00	0.00	0.00	119
252	0.00	0.00	0.00	154
253	0.00	0.00	0.00	103
254	0.00	0.00	0.00	152
255	0.00	0.00	0.00	99
256	0.00	0.00	0.00	384
257	0.00	0.00	0.00	172
258	0.00	0.00	0.00	201
259	0.00	0.00	0.00	141
260	0.00	0.00	0.00	87
261	0.00	0.00	0.00	153
262	0.00	0.00	0.00	82
263	0.00	0.00	0.00	49
264	0.00	0.00	0.00	142
265	0.00	0.00	0.00	66
266	0.00	0.00	0.00	52
267	0.00	0.00	0.00	71
268	0.00	0.00	0.00	152
269	0.00	0.00	0.00	108
270	0.01	0.01	0.01	140
271	0.00	0.00	0.00	138
272	0.00	0.00	0.00	160
273	0.00	0.00	0.00	159
274	0.00	0.00	0.00	87
275	0.00	0.00	0.00	183
276	0.00	0.00	0.00	370
277	0.00	0.00	0.00	171
278	0.00	0.00	0.00	138
279	0.00	0.00	0.00	170
280	0.00	0.00	0.00	99
281	0.00	0.00	0.00	111
282	0.00	0.00	0.00	114
283	0.00	0.00	0.00	186
284	0.00	0.00	0.00	441
285	0.00	0.00	0.00	169
286	0.01	0.01	0.01	157
287	0.00	0.00	0.00	115
288	0.00	0.00	0.00	80
289	0.00	0.00	0.00	319
290	0.00	0.00	0.00	114
291	0.00	0.00	0.00	224
292	0.00	0.00	0.00	259
293	0.00	0.00	0.00	79
294	0.00	0.00	0.00	95
295	0.00	0.00	0.00	62
296	0.00	0.00	0.00	65

297	0.00	0.00	0.00	113
298	0.00	0.00	0.00	129
299	0.00	0.00	0.00	99
300	0.00	0.00	0.00	127
301	0.00	0.00	0.00	167
302	0.00	0.00	0.00	116
303	0.00	0.00	0.00	111
304	0.00	0.00	0.00	192
305	0.00	0.00	0.00	107
306	0.00	0.00	0.00	72
307	0.00	0.00	0.00	186
308	0.00	0.00	0.00	156
309	0.00	0.00	0.00	81
310	0.00	0.00	0.00	160
311	0.00	0.00	0.00	50
312	0.00	0.00	0.00	279
313	0.00	0.00	0.00	86
314	0.00	0.00	0.00	139
315	0.00	0.00	0.00	106
316	0.00	0.00	0.00	62
317	0.00	0.00	0.00	267
318	0.00	0.00	0.00	124
319	0.00	0.00	0.00	120
320	0.00	0.00	0.00	99
321	0.00	0.00	0.00	199
322	0.00	0.00	0.00	217
323	0.01	0.01	0.01	109
324	0.00	0.00	0.00	107
325	0.00	0.00	0.00	111
326	0.00	0.00	0.00	97
327	0.12	0.01	0.02	93
328	0.00	0.00	0.00	149
329	0.00	0.00	0.00	126
330	0.00	0.00	0.00	81
331	0.00	0.00	0.00	144
332	0.00	0.00	0.00	95
333	0.00	0.00	0.00	126
334	0.00	0.00	0.00	174
335	0.00	0.00	0.00	63
336	0.00	0.00	0.00	115
337	0.00	0.00	0.00	40
338	0.00	0.00	0.00	95
339	0.00	0.00	0.00	216
340	0.00	0.00	0.00	110
341	0.00	0.00	0.00	84
342	0.00	0.00	0.00	190
343	0.00	0.00	0.00	24
344	0.00	0.00	0.00	100
345	0.00	0.00	0.00	37
346	0.00	0.00	0.00	98
347	0.00	0.00	0.00	50
348	0.00	0.00	0.00	200
349	0.00	0.00	0.00	112
350	0.00	0.00	0.00	16
351	0.00	0.00	0.00	117
352	0.00	0.00	0.00	143
353	0.00	0.00	0.00	34
354	0.00	0.00	0.00	202
355	0.00	0.00	0.00	134
356	0.00	0.00	0.00	107
357	0.00	0.00	0.00	91

358	0.00	0.00	0.00	68
359	0.00	0.00	0.00	161
360	0.00	0.00	0.00	120
361	0.00	0.00	0.00	115
362	0.00	0.00	0.00	91
363	0.00	0.00	0.00	143
364	0.00	0.00	0.00	112
365	0.00	0.00	0.00	47
366	0.00	0.00	0.00	439
367	0.12	0.00	0.01	298
368	0.00	0.00	0.00	160
369	0.00	0.00	0.00	97
370	0.00	0.00	0.00	101
371	0.00	0.00	0.00	95
372	0.00	0.00	0.00	50
373	0.00	0.00	0.00	141
374	0.00	0.00	0.00	138
375	0.00	0.00	0.00	83
376	0.00	0.00	0.00	49
377	0.00	0.00	0.00	232
378	0.00	0.00	0.00	143
379	0.00	0.00	0.00	23
380	0.00	0.00	0.00	75
381	0.00	0.00	0.00	87
382	0.00	0.00	0.00	71
383	0.00	0.00	0.00	96
384	0.00	0.00	0.00	122
385	0.00	0.00	0.00	41
386	0.00	0.00	0.00	91
387	0.00	0.00	0.00	121
388	0.00	0.00	0.00	80
389	0.00	0.00	0.00	142
390	0.00	0.00	0.00	134
391	0.00	0.00	0.00	82
392	0.00	0.00	0.00	14
393	0.00	0.00	0.00	121
394	0.00	0.00	0.00	124
395	0.00	0.00	0.00	95
396	0.00	0.00	0.00	142
397	0.00	0.00	0.00	112
398	0.00	0.00	0.00	114
399	0.00	0.00	0.00	189
400	0.00	0.00	0.00	75
401	0.00	0.00	0.00	123
402	0.00	0.00	0.00	128
403	0.00	0.00	0.00	69
404	0.00	0.00	0.00	14
405	0.00	0.00	0.00	120
406	0.00	0.00	0.00	85
407	0.00	0.00	0.00	92
408	0.00	0.00	0.00	70
409	0.00	0.00	0.00	47
410	0.00	0.00	0.00	24
411	0.00	0.00	0.00	88
412	0.00	0.00	0.00	136
413	0.00	0.00	0.00	34
414	0.00	0.00	0.00	67
415	0.00	0.00	0.00	37
416	0.00	0.00	0.00	81
417	0.00	0.00	0.00	112
418	0.00	0.00	0.00	81

419	0.00	0.00	0.00	89
420	0.00	0.00	0.00	27
421	0.00	0.00	0.00	70
422	0.00	0.00	0.00	89
423	0.00	0.00	0.00	97
424	0.00	0.00	0.00	10
425	0.00	0.00	0.00	16
426	0.00	0.00	0.00	85
427	0.00	0.00	0.00	108
428	0.00	0.00	0.00	18
429	0.00	0.00	0.00	53
430	0.00	0.00	0.00	88
431	0.00	0.00	0.00	115
432	0.00	0.00	0.00	20
433	0.00	0.00	0.00	42
434	0.00	0.00	0.00	316
435	0.00	0.00	0.00	43
436	0.00	0.00	0.00	67
437	0.00	0.00	0.00	214
438	0.00	0.00	0.00	110
439	0.00	0.00	0.00	162
440	0.00	0.00	0.00	63
441	0.00	0.00	0.00	83
442	0.00	0.00	0.00	83
443	0.00	0.00	0.00	53
444	0.00	0.00	0.00	40
445	0.00	0.00	0.00	87
446	0.00	0.00	0.00	44
447	0.00	0.00	0.00	56
448	0.00	0.00	0.00	68
449	0.00	0.00	0.00	59
450	0.00	0.00	0.00	113
451	0.00	0.00	0.00	51
452	0.00	0.00	0.00	66
453	0.00	0.00	0.00	31
454	0.00	0.00	0.00	30
455	0.00	0.00	0.00	139
456	0.00	0.00	0.00	26
457	0.00	0.00	0.00	77
458	0.00	0.00	0.00	78
459	0.00	0.00	0.00	117
460	0.00	0.00	0.00	83
461	0.00	0.00	0.00	74
462	0.00	0.00	0.00	83
463	0.00	0.00	0.00	86
464	0.02	0.01	0.01	76
465	0.00	0.00	0.00	123
466	0.01	0.01	0.01	92
467	0.00	0.00	0.00	90
468	0.00	0.00	0.00	135
469	0.00	0.00	0.00	80
470	0.00	0.00	0.00	94
471	0.00	0.00	0.00	62
472	0.00	0.00	0.00	90
473	0.00	0.00	0.00	69
474	0.00	0.00	0.00	84
475	0.00	0.00	0.00	100
476	0.00	0.00	0.00	85
477	0.00	0.00	0.00	79
478	0.00	0.00	0.00	94
479	0.00	0.00	0.00	59

```
           480       0.02      0.01      0.01       132
           481       0.00      0.00      0.00       247
           482       0.00      0.00      0.00        75
           483       0.00      0.00      0.00        62
           484       0.00      0.00      0.00        33
           485       0.00      0.00      0.00        54
           486       0.08      0.01      0.01       170
           487       0.00      0.00      0.00        85
           488       0.00      0.00      0.00       105
           489       0.00      0.00      0.00       116
           490       0.00      0.00      0.00       351
           491       0.00      0.00      0.00        48
           492       0.00      0.00      0.00        65
           493       0.00      0.00      0.00        74
           494       0.00      0.00      0.00        55
           495       0.00      0.00      0.00        22
           496       0.00      0.00      0.00        80
           497       0.00      0.00      0.00        63
           498       0.00      0.00      0.00        67
           499       0.00      0.00      0.00       121

   micro avg       0.02      0.01      0.01    178469
   macro avg       0.00      0.00      0.00    178469
weighted avg       0.02      0.01      0.01    178469
 samples avg       0.01      0.01      0.01    178469

Time taken to run this cell : 0:02:17.153715
```

In [72]:

```
joblib.dump(classifier, 'lr_with_more_title_weight.pkl')
```

Out[72]:

```
['lr_with_more_title_weight.pkl']
```

In [73]:

```
start = datetime.now()
classifier_2 = OneVsRestClassifier(LogisticRegression(penalty='l2'), n_jobs=-1)
classifier_2.fit(x_train_multilabel, y_train)
predictions_2 = classifier_2.predict(x_test_multilabel)
print("Accuracy :",metrics.accuracy_score(y_test, predictions_2))
print("Hamming loss ",metrics.hamming_loss(y_test,predictions_2))


precision = precision_score(y_test, predictions_2, average='micro')
recall = recall_score(y_test, predictions_2, average='micro')
f1 = f1_score(y_test, predictions_2, average='micro')

print("Micro-average quality numbers")
print("Precision: {:.4f}, Recall: {:.4f}, F1-measure: {:.4f}".format(precision, reca
ll, f1))

precision = precision_score(y_test, predictions_2, average='macro')
recall = recall_score(y_test, predictions_2, average='macro')
f1 = f1_score(y_test, predictions_2, average='macro')

print("Macro-average quality numbers")
print("Precision: {:.4f}, Recall: {:.4f}, F1-measure: {:.4f}".format(precision, reca
ll, f1))

print (metrics.classification_report(y_test, predictions_2))
print("Time taken to run this cell :", datetime.now() - start)
```

```
Accuracy : 0.06345
Hamming loss  0.00472184
Micro-average quality numbers
Precision: 0.0240, Recall: 0.0081, F1-measure: 0.0122
Macro-average quality numbers
Precision: 0.0039, Recall: 0.0012, F1-measure: 0.0016
              precision    recall  f1-score   support

           0       0.05      0.04      0.04      4633
           1       0.09      0.03      0.04      7549
           2       0.08      0.03      0.04      7112
           3       0.04      0.02      0.03      2888
           4       0.05      0.03      0.04      5009
           5       0.04      0.01      0.02      3919
           6       0.06      0.03      0.04      5204
           7       0.03      0.03      0.03      3229
           8       0.03      0.01      0.01      3097
           9       0.02      0.01      0.01      1829
          10       0.02      0.01      0.01      2157
          11       0.03      0.01      0.01      3142
          12       0.03      0.01      0.01      2575
          13       0.02      0.00      0.01      1431
          14       0.02      0.01      0.02      2649
          15       0.03      0.01      0.01      2094
          16       0.02      0.00      0.01      1549
          17       0.02      0.01      0.02      1869
          18       0.02      0.01      0.01      2268
          19       0.00      0.00      0.00       852
          20       0.02      0.01      0.01      1614
          21       0.04      0.01      0.01      1798
          22       0.01      0.01      0.01      1350
          23       0.01      0.01      0.01       888
          24       0.01      0.00      0.00      1528
          25       0.00      0.00      0.00       388
          26       0.00      0.00      0.00       717
          27       0.01      0.01      0.01       986
          28       0.01      0.00      0.01      1046
          29       0.05      0.00      0.00      2380
          30       0.00      0.00      0.00       695
          31       0.01      0.00      0.00      1095
          32       0.01      0.00      0.00      2896
          33       0.00      0.00      0.00       652
          34       0.01      0.00      0.00       929
          35       0.01      0.01      0.01       632
          36       0.00      0.00      0.00       535
          37       0.00      0.00      0.00       172
          38       0.01      0.01      0.01       728
          39       0.02      0.01      0.01       632
          40       0.01      0.00      0.00       964
          41       0.00      0.00      0.00       579
          42       0.01      0.00      0.00       480
          43       0.00      0.00      0.00      2408
          44       0.00      0.00      0.00       719
          45       0.01      0.01      0.01       455
          46       0.01      0.01      0.01       385
          47       0.02      0.00      0.01       517
          48       0.01      0.00      0.00       516
          49       0.01      0.01      0.01       531
          50       0.00      0.00      0.00       410
          51       0.00      0.00      0.00       790
          52       0.00      0.00      0.00       151
```

53	0.00	0.00	0.00	702
54	0.00	0.00	0.00	480
55	0.00	0.00	0.00	423
56	0.00	0.00	0.00	485
57	0.00	0.00	0.00	848
58	0.00	0.00	0.00	473
59	0.00	0.00	0.00	640
60	0.01	0.00	0.00	499
61	0.00	0.00	0.00	234
62	0.01	0.01	0.01	546
63	0.01	0.01	0.01	492
64	0.00	0.00	0.00	138
65	0.00	0.00	0.00	350
66	0.00	0.00	0.00	233
67	0.00	0.00	0.00	203
68	0.00	0.00	0.00	401
69	0.00	0.00	0.00	283
70	0.00	0.00	0.00	444
71	0.00	0.00	0.00	839
72	0.00	0.00	0.00	281
73	0.00	0.00	0.00	1622
74	0.00	0.00	0.00	716
75	0.00	0.00	0.00	127
76	0.00	0.00	0.00	413
77	0.00	0.00	0.00	296
78	0.01	0.01	0.01	264
79	0.00	0.00	0.00	469
80	0.00	0.00	0.00	229
81	0.00	0.00	0.00	416
82	0.00	0.00	0.00	403
83	0.00	0.00	0.00	307
84	0.00	0.00	0.00	224
85	0.01	0.00	0.00	353
86	0.00	0.00	0.00	383
87	0.00	0.00	0.00	260
88	0.00	0.00	0.00	237
89	0.00	0.00	0.00	107
90	0.01	0.00	0.00	490
91	0.01	0.00	0.00	325
92	0.01	0.01	0.01	525
93	0.01	0.00	0.01	263
94	0.00	0.00	0.00	111
95	0.00	0.00	0.00	283
96	0.00	0.00	0.00	205
97	0.00	0.00	0.00	284
98	0.00	0.00	0.00	129
99	0.01	0.00	0.00	568
100	0.00	0.00	0.00	374
101	0.01	0.00	0.00	854
102	0.00	0.00	0.00	360
103	0.00	0.00	0.00	101
104	0.02	0.00	0.01	238
105	0.00	0.00	0.00	205
106	0.05	0.00	0.01	375
107	0.00	0.00	0.00	219
108	0.00	0.00	0.00	255
109	0.00	0.00	0.00	352
110	0.00	0.00	0.00	353
111	0.00	0.00	0.00	224
112	0.00	0.00	0.00	144
113	0.00	0.00	0.00	199

114	0.00	0.00	0.00	237
115	0.01	0.00	0.01	273
116	0.00	0.00	0.00	255
117	0.00	0.00	0.00	606
118	0.00	0.00	0.00	238
119	0.00	0.00	0.00	147
120	0.00	0.00	0.00	374
121	0.00	0.00	0.00	292
122	0.00	0.00	0.00	74
123	0.00	0.00	0.00	232
124	0.05	0.01	0.01	905
125	0.00	0.00	0.00	306
126	0.00	0.00	0.00	153
127	0.00	0.00	0.00	457
128	0.00	0.00	0.00	225
129	0.00	0.00	0.00	196
130	0.00	0.00	0.00	87
131	0.00	0.00	0.00	116
132	0.00	0.00	0.00	228
133	0.01	0.00	0.00	278
134	0.00	0.00	0.00	745
135	0.00	0.00	0.00	213
136	0.00	0.00	0.00	427
137	0.01	0.00	0.00	405
138	0.00	0.00	0.00	164
139	0.00	0.00	0.00	216
140	0.00	0.00	0.00	292
141	0.00	0.00	0.00	126
142	0.00	0.00	0.00	119
143	0.00	0.00	0.00	408
144	0.00	0.00	0.00	629
145	0.00	0.00	0.00	866
146	0.00	0.00	0.00	228
147	0.00	0.00	0.00	100
148	0.00	0.00	0.00	265
149	0.00	0.00	0.00	280
150	0.00	0.00	0.00	169
151	0.00	0.00	0.00	32
152	0.00	0.00	0.00	259
153	0.00	0.00	0.00	220
154	0.00	0.00	0.00	369
155	0.00	0.00	0.00	191
156	0.00	0.00	0.00	81
157	0.00	0.00	0.00	216
158	0.00	0.00	0.00	69
159	0.00	0.00	0.00	127
160	0.00	0.00	0.00	201
161	0.00	0.00	0.00	172
162	0.00	0.00	0.00	271
163	0.00	0.00	0.00	207
164	0.01	0.00	0.01	234
165	0.00	0.00	0.00	363
166	0.00	0.00	0.00	480
167	0.00	0.00	0.00	234
168	0.00	0.00	0.00	224
169	0.00	0.00	0.00	238
170	0.00	0.00	0.00	56
171	0.00	0.00	0.00	824
172	0.00	0.00	0.00	219
173	0.00	0.00	0.00	206
174	0.00	0.00	0.00	240

175	0.00	0.00	0.00	79
176	0.00	0.00	0.00	254
177	0.00	0.00	0.00	305
178	0.00	0.00	0.00	343
179	0.00	0.00	0.00	86
180	0.00	0.00	0.00	113
181	0.00	0.00	0.00	530
182	0.00	0.00	0.00	160
183	0.01	0.01	0.01	101
184	0.00	0.00	0.00	172
185	0.00	0.00	0.00	119
186	0.00	0.00	0.00	228
187	0.01	0.00	0.01	401
188	0.00	0.00	0.00	208
189	0.00	0.00	0.00	186
190	0.01	0.00	0.01	201
191	0.00	0.00	0.00	270
192	0.00	0.00	0.00	222
193	0.00	0.00	0.00	69
194	0.01	0.00	0.01	229
195	0.00	0.00	0.00	108
196	0.00	0.00	0.00	332
197	0.00	0.00	0.00	209
198	0.00	0.00	0.00	289
199	0.00	0.00	0.00	199
200	0.00	0.00	0.00	153
201	0.00	0.00	0.00	225
202	0.00	0.00	0.00	208
203	0.00	0.00	0.00	189
204	0.00	0.00	0.00	345
205	0.01	0.01	0.01	78
206	0.00	0.00	0.00	88
207	0.00	0.00	0.00	159
208	0.01	0.01	0.01	187
209	0.00	0.00	0.00	364
210	0.00	0.00	0.00	136
211	0.00	0.00	0.00	183
212	0.00	0.00	0.00	246
213	0.00	0.00	0.00	192
214	0.00	0.00	0.00	76
215	0.00	0.00	0.00	125
216	0.00	0.00	0.00	158
217	0.00	0.00	0.00	42
218	0.00	0.00	0.00	207
219	0.00	0.00	0.00	129
220	0.01	0.01	0.01	191
221	0.00	0.00	0.00	208
222	0.00	0.00	0.00	180
223	0.00	0.00	0.00	211
224	0.00	0.00	0.00	76
225	0.00	0.00	0.00	175
226	0.00	0.00	0.00	199
227	0.00	0.00	0.00	156
228	0.00	0.00	0.00	293
229	0.00	0.00	0.00	227
230	0.00	0.00	0.00	308
231	0.00	0.00	0.00	311
232	0.00	0.00	0.00	186
233	0.00	0.00	0.00	177
234	0.00	0.00	0.00	167
235	0.00	0.00	0.00	38

236	0.00	0.00	0.00	62
237	0.00	0.00	0.00	256
238	0.00	0.00	0.00	118
239	0.00	0.00	0.00	86
240	0.00	0.00	0.00	595
241	0.00	0.00	0.00	118
242	0.00	0.00	0.00	30
243	0.00	0.00	0.00	248
244	0.00	0.00	0.00	143
245	0.00	0.00	0.00	193
246	0.00	0.00	0.00	100
247	0.00	0.00	0.00	109
248	0.00	0.00	0.00	559
249	0.00	0.00	0.00	142
250	0.00	0.00	0.00	109
251	0.00	0.00	0.00	119
252	0.00	0.00	0.00	154
253	0.00	0.00	0.00	103
254	0.00	0.00	0.00	152
255	0.00	0.00	0.00	99
256	0.00	0.00	0.00	384
257	0.00	0.00	0.00	172
258	0.00	0.00	0.00	201
259	0.00	0.00	0.00	141
260	0.00	0.00	0.00	87
261	0.00	0.00	0.00	153
262	0.00	0.00	0.00	82
263	0.00	0.00	0.00	49
264	0.00	0.00	0.00	142
265	0.00	0.00	0.00	66
266	0.00	0.00	0.00	52
267	0.00	0.00	0.00	71
268	0.00	0.00	0.00	152
269	0.00	0.00	0.00	108
270	0.01	0.01	0.01	140
271	0.00	0.00	0.00	138
272	0.00	0.00	0.00	160
273	0.00	0.00	0.00	159
274	0.00	0.00	0.00	87
275	0.00	0.00	0.00	183
276	0.00	0.00	0.00	370
277	0.00	0.00	0.00	171
278	0.00	0.00	0.00	138
279	0.00	0.00	0.00	170
280	0.00	0.00	0.00	99
281	0.00	0.00	0.00	111
282	0.00	0.00	0.00	114
283	0.00	0.00	0.00	186
284	0.00	0.00	0.00	441
285	0.00	0.00	0.00	169
286	0.00	0.00	0.00	157
287	0.00	0.00	0.00	115
288	0.00	0.00	0.00	80
289	0.00	0.00	0.00	319
290	0.00	0.00	0.00	114
291	0.00	0.00	0.00	224
292	0.00	0.00	0.00	259
293	0.00	0.00	0.00	79
294	0.00	0.00	0.00	95
295	0.00	0.00	0.00	62
296	0.00	0.00	0.00	65

297	0.00	0.00	0.00	113
298	0.00	0.00	0.00	129
299	0.00	0.00	0.00	99
300	0.00	0.00	0.00	127
301	0.00	0.00	0.00	167
302	0.00	0.00	0.00	116
303	0.00	0.00	0.00	111
304	0.00	0.00	0.00	192
305	0.00	0.00	0.00	107
306	0.00	0.00	0.00	72
307	0.00	0.00	0.00	186
308	0.00	0.00	0.00	156
309	0.00	0.00	0.00	81
310	0.00	0.00	0.00	160
311	0.00	0.00	0.00	50
312	0.00	0.00	0.00	279
313	0.00	0.00	0.00	86
314	0.00	0.00	0.00	139
315	0.00	0.00	0.00	106
316	0.00	0.00	0.00	62
317	0.00	0.00	0.00	267
318	0.00	0.00	0.00	124
319	0.00	0.00	0.00	120
320	0.00	0.00	0.00	99
321	0.00	0.00	0.00	199
322	0.00	0.00	0.00	217
323	0.01	0.01	0.01	109
324	0.00	0.00	0.00	107
325	0.00	0.00	0.00	111
326	0.00	0.00	0.00	97
327	0.00	0.00	0.00	93
328	0.00	0.00	0.00	149
329	0.00	0.00	0.00	126
330	0.00	0.00	0.00	81
331	0.00	0.00	0.00	144
332	0.00	0.00	0.00	95
333	0.00	0.00	0.00	126
334	0.00	0.00	0.00	174
335	0.00	0.00	0.00	63
336	0.00	0.00	0.00	115
337	0.00	0.00	0.00	40
338	0.00	0.00	0.00	95
339	0.00	0.00	0.00	216
340	0.00	0.00	0.00	110
341	0.00	0.00	0.00	84
342	0.00	0.00	0.00	190
343	0.00	0.00	0.00	24
344	0.00	0.00	0.00	100
345	0.00	0.00	0.00	37
346	0.00	0.00	0.00	98
347	0.00	0.00	0.00	50
348	0.00	0.00	0.00	200
349	0.00	0.00	0.00	112
350	0.00	0.00	0.00	16
351	0.00	0.00	0.00	117
352	0.00	0.00	0.00	143
353	0.00	0.00	0.00	34
354	0.00	0.00	0.00	202
355	0.00	0.00	0.00	134
356	0.00	0.00	0.00	107
357	0.00	0.00	0.00	91

358	0.00	0.00	0.00	68
359	0.00	0.00	0.00	161
360	0.00	0.00	0.00	120
361	0.00	0.00	0.00	115
362	0.00	0.00	0.00	91
363	0.00	0.00	0.00	143
364	0.00	0.00	0.00	112
365	0.00	0.00	0.00	47
366	0.00	0.00	0.00	439
367	0.00	0.00	0.00	298
368	0.00	0.00	0.00	160
369	0.00	0.00	0.00	97
370	0.00	0.00	0.00	101
371	0.00	0.00	0.00	95
372	0.00	0.00	0.00	50
373	0.00	0.00	0.00	141
374	0.00	0.00	0.00	138
375	0.00	0.00	0.00	83
376	0.00	0.00	0.00	49
377	0.00	0.00	0.00	232
378	0.00	0.00	0.00	143
379	0.00	0.00	0.00	23
380	0.00	0.00	0.00	75
381	0.00	0.00	0.00	87
382	0.00	0.00	0.00	71
383	0.00	0.00	0.00	96
384	0.00	0.00	0.00	122
385	0.00	0.00	0.00	41
386	0.00	0.00	0.00	91
387	0.00	0.00	0.00	121
388	0.00	0.00	0.00	80
389	0.00	0.00	0.00	142
390	0.00	0.00	0.00	134
391	0.00	0.00	0.00	82
392	0.00	0.00	0.00	14
393	0.00	0.00	0.00	121
394	0.00	0.00	0.00	124
395	0.00	0.00	0.00	95
396	0.00	0.00	0.00	142
397	0.00	0.00	0.00	112
398	0.00	0.00	0.00	114
399	0.00	0.00	0.00	189
400	0.00	0.00	0.00	75
401	0.00	0.00	0.00	123
402	0.00	0.00	0.00	128
403	0.00	0.00	0.00	69
404	0.00	0.00	0.00	14
405	0.00	0.00	0.00	120
406	0.00	0.00	0.00	85
407	0.00	0.00	0.00	92
408	0.00	0.00	0.00	70
409	0.00	0.00	0.00	47
410	0.00	0.00	0.00	24
411	0.00	0.00	0.00	88
412	0.00	0.00	0.00	136
413	0.00	0.00	0.00	34
414	0.00	0.00	0.00	67
415	0.00	0.00	0.00	37
416	0.00	0.00	0.00	81
417	0.00	0.00	0.00	112
418	0.00	0.00	0.00	81

419	0.00	0.00	0.00	89
420	0.00	0.00	0.00	27
421	0.00	0.00	0.00	70
422	0.00	0.00	0.00	89
423	0.00	0.00	0.00	97
424	0.00	0.00	0.00	10
425	0.00	0.00	0.00	16
426	0.00	0.00	0.00	85
427	0.00	0.00	0.00	108
428	0.00	0.00	0.00	18
429	0.00	0.00	0.00	53
430	0.00	0.00	0.00	88
431	0.00	0.00	0.00	115
432	0.00	0.00	0.00	20
433	0.00	0.00	0.00	42
434	0.00	0.00	0.00	316
435	0.00	0.00	0.00	43
436	0.00	0.00	0.00	67
437	0.00	0.00	0.00	214
438	0.00	0.00	0.00	110
439	0.00	0.00	0.00	162
440	0.00	0.00	0.00	63
441	0.00	0.00	0.00	83
442	0.00	0.00	0.00	83
443	0.00	0.00	0.00	53
444	0.00	0.00	0.00	40
445	0.00	0.00	0.00	87
446	0.00	0.00	0.00	44
447	0.00	0.00	0.00	56
448	0.00	0.00	0.00	68
449	0.00	0.00	0.00	59
450	0.00	0.00	0.00	113
451	0.00	0.00	0.00	51
452	0.00	0.00	0.00	66
453	0.00	0.00	0.00	31
454	0.00	0.00	0.00	30
455	0.00	0.00	0.00	139
456	0.00	0.00	0.00	26
457	0.00	0.00	0.00	77
458	0.00	0.00	0.00	78
459	0.00	0.00	0.00	117
460	0.00	0.00	0.00	83
461	0.00	0.00	0.00	74
462	0.00	0.00	0.00	83
463	0.00	0.00	0.00	86
464	0.03	0.01	0.02	76
465	0.00	0.00	0.00	123
466	0.03	0.01	0.02	92
467	0.00	0.00	0.00	90
468	0.00	0.00	0.00	135
469	0.00	0.00	0.00	80
470	0.00	0.00	0.00	94
471	0.00	0.00	0.00	62
472	0.00	0.00	0.00	90
473	0.00	0.00	0.00	69
474	0.00	0.00	0.00	84
475	0.00	0.00	0.00	100
476	0.00	0.00	0.00	85
477	0.00	0.00	0.00	79
478	0.00	0.00	0.00	94
479	0.00	0.00	0.00	59

```
           480       0.00      0.00      0.00       132
           481       0.00      0.00      0.00       247
           482       0.00      0.00      0.00        75
           483       0.00      0.00      0.00        62
           484       0.00      0.00      0.00        33
           485       0.00      0.00      0.00        54
           486       0.50      0.01      0.01       170
           487       0.00      0.00      0.00        85
           488       0.00      0.00      0.00       105
           489       0.00      0.00      0.00       116
           490       0.00      0.00      0.00       351
           491       0.00      0.00      0.00        48
           492       0.00      0.00      0.00        65
           493       0.00      0.00      0.00        74
           494       0.00      0.00      0.00        55
           495       0.00      0.00      0.00        22
           496       0.00      0.00      0.00        80
           497       0.00      0.00      0.00        63
           498       0.00      0.00      0.00        67
           499       0.00      0.00      0.00       121

   micro avg       0.02      0.01      0.01    178469
   macro avg       0.00      0.00      0.00    178469
weighted avg       0.02      0.01      0.01    178469
 samples avg       0.01      0.01      0.01    178469

Time taken to run this cell : 0:07:01.812820
```

5. Assignments

1. Use bag of words upto 4 grams and compute the micro f1 score with Logistic regression(OvR)
2. Perform hyperparam tuning on alpha (or lambda) for Logistic regression to improve the performance using GridSearch
3. Try OneVsRestClassifier with Linear-SVM (SGDClassifier with loss-hinge)

In [74]:

```
from scipy.sparse import hstack
from sklearn.decomposition import SparsePCA
```

In [75]:

```
%%time
#Bag Of Words upto 4 grams
vectorizer = CountVectorizer(min_df=10, ngram_range=(1,4))
# Bow on Tags
train_t_bow = vectorizer.fit_transform(x_train['tags'])
test_t_bow = vectorizer.transform(x_test['tags'])
# Merging the above features
x_train_wbow = hstack((x_train_multilabel,train_t_bow))
x_test_wbow = hstack((x_test_multilabel,test_t_bow))
```

```
CPU times: user 9.97 s, sys: 552 ms, total: 10.5 s
Wall time: 8.84 s
```

In [76]:

```
from scipy.sparse import csr
x_train_wbow, y_train = x_train_wbow.tocsr(),y_train.tocsr()
x_test_wbow, y_test = x_test_wbow.tocsr(), y_test.tocsr()
```

In [77]:

```
print(x_train_wbow.shape,y_train.shape)
print(x_test_wbow.shape,y_test.shape)
```

```
(200000, 112283) (200000, 500)
(100000, 112283) (100000, 500)
```

In [130]:

```
%%time
# Hyperparameter tuning onevsrest logisstic regression classifier using Gridsearchcv
from sklearn.model_selection import ParameterGrid, GridSearchCV
score = 'f1_micro'
params =[{'estimator__alpha':[0.00001,0.0001,0.001,0.01,0.1,1]}]
gs = GridSearchCV(classifier,params,scoring=score,n_jobs=-1,verbose=True,return_trai
n_score=True)
gfit = gs.fit(x_train_wbow,y_train)
```

```
Fitting 5 folds for each of 6 candidates, totalling 30 fits

[Parallel(n_jobs=-1)]: Using backend LokyBackend with 10 concurrent work
ers.
[Parallel(n_jobs=-1)]: Done  30 out of  30 | elapsed: 44.3min finished

CPU times: user 16min 38s, sys: 12.2 s, total: 16min 51s
Wall time: 52min 32s
```

In [116]:

```
gs.best_estimator_
```

Out[116]:

```
OneVsRestClassifier(estimator=SGDClassifier(alpha=1e-05, average=False,
                                            class_weight=None,
                                            early_stopping=False, epsilo
n=0.1,
                                            eta0=0.0, fit_intercept=Tru
e,
                                            l1_ratio=0.15,
                                            learning_rate='optimal', los
s='log',
                                            max_iter=1000, n_iter_no_cha
nge=5,
                                            n_jobs=-1, penalty='l2',
                                            power_t=0.5, random_state=No
ne,
                                            shuffle=True, tol=0.001,
                                            validation_fraction=0.1, ver
bose=0,
                                            warm_start=False),
                    n_jobs=None)
```

In [126]:

```
gs.cv_results_
```

Out[126]:


```
{'mean_fit_time': array([ 615.16039138,  632.76341586,  715.72279239, 10
65.77075591,
        1131.75176678,  702.47776361]),
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 'split2_test_score': array([0.92990352, 0.86665431, 0.64338855, 0.37878
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 'split4_test_score': array([0.97608059, 0.90469973, 0.74650318, 0.68988
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 'split1_train_score': array([0.96794756, 0.90710614, 0.70437692, 0.4728
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 'split2_train_score': array([0.96158213, 0.90126703, 0.70851509, 0.4802
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 'split4_train_score': array([0.95239213, 0.88703837, 0.67459252, 0.4018
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```

```
        0.04471279]),
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 'std_train_score': array([0.00509112, 0.00685596, 0.01334315, 0.0335606
, 0.07403205,
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```

In [118]:

```
%%time
from sklearn.metrics import *
# micro f1 using logistic regression(OvR)
classifier1 = OneVsRestClassifier(SGDClassifier(loss='log',alpha=1e-05,penalty ='l2'
,n_jobs=-1))
classifier1.fit(x_train_wbow,y_train)
predictions_2 = classifier1.predict(x_test_wbow)
print("Accuracy :",accuracy_score(y_test, predictions_2))
print("Hamming loss ",hamming_loss(y_test,predictions_2))


precision = precision_score(y_test, predictions_2, average='micro')
recall = recall_score(y_test, predictions_2, average='micro')
f1 = f1_score(y_test, predictions_2, average='micro')

print("Micro-average quality numbers")
print("Precision: {:.4f}, Recall: {:.4f}, F1-measure: {:.4f}".format(precision, reca
ll, f1))

precision = precision_score(y_test, predictions_2, average='macro')
recall = recall_score(y_test, predictions_2, average='macro')
f1 = f1_score(y_test, predictions_2, average='macro')

print("Macro-average quality numbers")
print("Precision: {:.4f}, Recall: {:.4f}, F1-measure: {:.4f}".format(precision, reca
ll, f1))

print (classification_report(y_test, predictions_2))
print("Time taken to run this cell :", datetime.now() - start)
```

```
Accuracy : 0.01771
Hamming loss  0.00681732
Micro-average quality numbers
Precision: 0.0186, Recall: 0.0176, F1-measure: 0.0181
Macro-average quality numbers
Precision: 0.0034, Recall: 0.0033, F1-measure: 0.0031
              precision    recall  f1-score   support

           0       0.05      0.06      0.05      4633
           1       0.08      0.05      0.06      7549
           2       0.07      0.07      0.07      7112
           3       0.04      0.03      0.03      2888
           4       0.05      0.07      0.06      5009
           5       0.04      0.03      0.03      3919
           6       0.05      0.05      0.05      5204
           7       0.04      0.05      0.04      3229
           8       0.04      0.04      0.04      3097
           9       0.02      0.03      0.02      1829
          10       0.02      0.03      0.02      2157
          11       0.03      0.03      0.03      3142
          12       0.03      0.03      0.03      2575
          13       0.02      0.01      0.01      1431
          14       0.02      0.02      0.02      2649
          15       0.02      0.03      0.02      2094
          16       0.01      0.01      0.01      1549
          17       0.02      0.02      0.02      1869
          18       0.02      0.02      0.02      2268
          19       0.00      0.00      0.00       852
          20       0.02      0.02      0.02      1614
          21       0.02      0.02      0.02      1798
          22       0.02      0.02      0.02      1350
          23       0.01      0.01      0.01       888
          24       0.03      0.01      0.01      1528
          25       0.00      0.00      0.00       388
          26       0.01      0.01      0.01       717
          27       0.01      0.01      0.01       986
          28       0.01      0.01      0.01      1046
          29       0.02      0.00      0.00      2380
          30       0.01      0.01      0.01       695
          31       0.01      0.01      0.01      1095
          32       0.03      0.00      0.01      2896
          33       0.00      0.01      0.01       652
          34       0.01      0.01      0.01       929
          35       0.01      0.02      0.01       632
          36       0.00      0.00      0.00       535
          37       0.00      0.00      0.00       172
          38       0.01      0.01      0.01       728
          39       0.01      0.01      0.01       632
          40       0.01      0.01      0.01       964
          41       0.01      0.00      0.00       579
          42       0.00      0.00      0.00       480
          43       0.01      0.00      0.00      2408
          44       0.00      0.00      0.00       719
          45       0.01      0.01      0.01       455
          46       0.00      0.01      0.00       385
          47       0.00      0.00      0.00       517
          48       0.00      0.00      0.00       516
          49       0.01      0.01      0.01       531
          50       0.01      0.01      0.01       410
          51       0.01      0.00      0.00       790
          52       0.00      0.00      0.00       151
```

53	0.01	0.01	0.01	702
54	0.00	0.01	0.00	480
55	0.00	0.00	0.00	423
56	0.01	0.01	0.01	485
57	0.01	0.01	0.01	848
58	0.01	0.01	0.01	473
59	0.00	0.00	0.00	640
60	0.00	0.00	0.00	499
61	0.00	0.00	0.00	234
62	0.01	0.01	0.01	546
63	0.01	0.01	0.01	492
64	0.01	0.01	0.01	138
65	0.01	0.01	0.01	350
66	0.00	0.00	0.00	233
67	0.00	0.00	0.00	203
68	0.00	0.00	0.00	401
69	0.00	0.00	0.00	283
70	0.01	0.01	0.01	444
71	0.00	0.00	0.00	839
72	0.00	0.00	0.00	281
73	0.00	0.00	0.00	1622
74	0.01	0.00	0.00	716
75	0.00	0.00	0.00	127
76	0.01	0.01	0.01	413
77	0.01	0.00	0.00	296
78	0.01	0.01	0.01	264
79	0.01	0.01	0.01	469
80	0.00	0.00	0.00	229
81	0.00	0.00	0.00	416
82	0.00	0.00	0.00	403
83	0.00	0.00	0.00	307
84	0.01	0.00	0.00	224
85	0.00	0.01	0.00	353
86	0.00	0.00	0.00	383
87	0.01	0.01	0.01	260
88	0.00	0.00	0.00	237
89	0.00	0.01	0.01	107
90	0.01	0.01	0.01	490
91	0.01	0.01	0.01	325
92	0.01	0.01	0.01	525
93	0.00	0.00	0.00	263
94	0.00	0.00	0.00	111
95	0.00	0.00	0.00	283
96	0.00	0.00	0.00	205
97	0.00	0.00	0.00	284
98	0.00	0.00	0.00	129
99	0.02	0.01	0.01	568
100	0.00	0.00	0.00	374
101	0.00	0.00	0.00	854
102	0.00	0.01	0.00	360
103	0.00	0.00	0.00	101
104	0.00	0.00	0.00	238
105	0.00	0.00	0.00	205
106	0.01	0.00	0.00	375
107	0.01	0.01	0.01	219
108	0.00	0.00	0.00	255
109	0.00	0.00	0.00	352
110	0.01	0.00	0.00	353
111	0.00	0.00	0.00	224
112	0.00	0.00	0.00	144
113	0.00	0.00	0.00	199

114	0.00	0.00	0.00	237
115	0.00	0.00	0.00	273
116	0.00	0.00	0.00	255
117	0.01	0.00	0.01	606
118	0.00	0.01	0.00	238
119	0.00	0.00	0.00	147
120	0.00	0.00	0.00	374
121	0.00	0.00	0.00	292
122	0.00	0.00	0.00	74
123	0.00	0.00	0.00	232
124	0.03	0.01	0.01	905
125	0.00	0.00	0.00	306
126	0.00	0.01	0.00	153
127	0.02	0.00	0.01	457
128	0.01	0.01	0.01	225
129	0.00	0.00	0.00	196
130	0.00	0.00	0.00	87
131	0.00	0.00	0.00	116
132	0.00	0.00	0.00	228
133	0.01	0.01	0.01	278
134	0.00	0.00	0.00	745
135	0.01	0.00	0.01	213
136	0.00	0.00	0.00	427
137	0.01	0.00	0.01	405
138	0.00	0.00	0.00	164
139	0.00	0.00	0.00	216
140	0.00	0.00	0.00	292
141	0.00	0.00	0.00	126
142	0.00	0.01	0.00	119
143	0.00	0.00	0.00	408
144	0.01	0.00	0.00	629
145	0.00	0.00	0.00	866
146	0.00	0.00	0.00	228
147	0.00	0.00	0.00	100
148	0.00	0.00	0.00	265
149	0.00	0.00	0.00	280
150	0.01	0.01	0.01	169
151	0.00	0.00	0.00	32
152	0.00	0.00	0.00	259
153	0.00	0.00	0.00	220
154	0.00	0.00	0.00	369
155	0.00	0.00	0.00	191
156	0.00	0.00	0.00	81
157	0.00	0.00	0.00	216
158	0.00	0.00	0.00	69
159	0.00	0.00	0.00	127
160	0.00	0.00	0.00	201
161	0.00	0.01	0.01	172
162	0.00	0.00	0.00	271
163	0.00	0.00	0.00	207
164	0.00	0.00	0.00	234
165	0.00	0.00	0.00	363
166	0.00	0.00	0.00	480
167	0.00	0.00	0.00	234
168	0.00	0.00	0.00	224
169	0.00	0.00	0.00	238
170	0.00	0.00	0.00	56
171	0.00	0.00	0.00	824
172	0.00	0.00	0.00	219
173	0.00	0.00	0.00	206
174	0.00	0.00	0.00	240

175	0.00	0.00	0.00	79
176	0.00	0.00	0.00	254
177	0.00	0.00	0.00	305
178	0.00	0.00	0.00	343
179	0.00	0.00	0.00	86
180	0.00	0.00	0.00	113
181	0.00	0.00	0.00	530
182	0.00	0.01	0.01	160
183	0.00	0.01	0.01	101
184	0.00	0.00	0.00	172
185	0.00	0.00	0.00	119
186	0.00	0.00	0.00	228
187	0.01	0.00	0.01	401
188	0.00	0.00	0.00	208
189	0.00	0.00	0.00	186
190	0.00	0.00	0.00	201
191	0.00	0.00	0.00	270
192	0.00	0.00	0.00	222
193	0.00	0.00	0.00	69
194	0.00	0.00	0.00	229
195	0.00	0.00	0.00	108
196	0.00	0.00	0.00	332
197	0.00	0.00	0.00	209
198	0.00	0.00	0.00	289
199	0.01	0.01	0.01	199
200	0.00	0.00	0.00	153
201	0.01	0.01	0.01	225
202	0.00	0.00	0.00	208
203	0.00	0.00	0.00	189
204	0.00	0.00	0.00	345
205	0.00	0.01	0.00	78
206	0.00	0.00	0.00	88
207	0.00	0.00	0.00	159
208	0.00	0.01	0.00	187
209	0.00	0.00	0.00	364
210	0.00	0.00	0.00	136
211	0.00	0.00	0.00	183
212	0.00	0.00	0.00	246
213	0.00	0.00	0.00	192
214	0.00	0.00	0.00	76
215	0.00	0.00	0.00	125
216	0.01	0.01	0.01	158
217	0.00	0.00	0.00	42
218	0.00	0.00	0.00	207
219	0.00	0.00	0.00	129
220	0.00	0.01	0.00	191
221	0.00	0.00	0.00	208
222	0.00	0.00	0.00	180
223	0.00	0.00	0.00	211
224	0.01	0.01	0.01	76
225	0.00	0.00	0.00	175
226	0.01	0.01	0.01	199
227	0.00	0.01	0.00	156
228	0.00	0.00	0.00	293
229	0.01	0.01	0.01	227
230	0.00	0.00	0.00	308
231	0.00	0.00	0.00	311
232	0.00	0.00	0.00	186
233	0.00	0.00	0.00	177
234	0.01	0.01	0.01	167
235	0.00	0.00	0.00	38

236	0.00	0.00	0.00	62
237	0.00	0.00	0.00	256
238	0.00	0.00	0.00	118
239	0.00	0.00	0.00	86
240	0.00	0.00	0.00	595
241	0.00	0.00	0.00	118
242	0.00	0.00	0.00	30
243	0.00	0.00	0.00	248
244	0.00	0.00	0.00	143
245	0.00	0.00	0.00	193
246	0.00	0.00	0.00	100
247	0.00	0.00	0.00	109
248	0.00	0.00	0.00	559
249	0.00	0.00	0.00	142
250	0.00	0.00	0.00	109
251	0.00	0.00	0.00	119
252	0.00	0.00	0.00	154
253	0.00	0.00	0.00	103
254	0.00	0.01	0.01	152
255	0.00	0.00	0.00	99
256	0.00	0.00	0.00	384
257	0.00	0.00	0.00	172
258	0.00	0.00	0.00	201
259	0.00	0.00	0.00	141
260	0.00	0.00	0.00	87
261	0.00	0.00	0.00	153
262	0.00	0.00	0.00	82
263	0.00	0.00	0.00	49
264	0.00	0.00	0.00	142
265	0.00	0.00	0.00	66
266	0.00	0.00	0.00	52
267	0.00	0.00	0.00	71
268	0.01	0.01	0.01	152
269	0.00	0.00	0.00	108
270	0.01	0.01	0.01	140
271	0.00	0.00	0.00	138
272	0.00	0.00	0.00	160
273	0.00	0.00	0.00	159
274	0.00	0.00	0.00	87
275	0.00	0.00	0.00	183
276	0.01	0.00	0.00	370
277	0.00	0.00	0.00	171
278	0.00	0.00	0.00	138
279	0.00	0.00	0.00	170
280	0.00	0.00	0.00	99
281	0.00	0.00	0.00	111
282	0.00	0.00	0.00	114
283	0.00	0.01	0.00	186
284	0.00	0.00	0.00	441
285	0.00	0.00	0.00	169
286	0.00	0.01	0.01	157
287	0.00	0.00	0.00	115
288	0.00	0.00	0.00	80
289	0.03	0.01	0.01	319
290	0.00	0.00	0.00	114
291	0.00	0.00	0.00	224
292	0.00	0.00	0.00	259
293	0.00	0.00	0.00	79
294	0.00	0.00	0.00	95
295	0.00	0.00	0.00	62
296	0.00	0.00	0.00	65

297	0.00	0.00	0.00	113
298	0.00	0.00	0.00	129
299	0.00	0.00	0.00	99
300	0.00	0.00	0.00	127
301	0.00	0.00	0.00	167
302	0.00	0.00	0.00	116
303	0.01	0.01	0.01	111
304	0.00	0.00	0.00	192
305	0.00	0.00	0.00	107
306	0.00	0.00	0.00	72
307	0.01	0.01	0.01	186
308	0.00	0.00	0.00	156
309	0.00	0.00	0.00	81
310	0.00	0.00	0.00	160
311	0.00	0.00	0.00	50
312	0.00	0.00	0.00	279
313	0.00	0.00	0.00	86
314	0.00	0.00	0.00	139
315	0.00	0.00	0.00	106
316	0.00	0.00	0.00	62
317	0.00	0.00	0.00	267
318	0.00	0.00	0.00	124
319	0.01	0.01	0.01	120
320	0.00	0.00	0.00	99
321	0.00	0.00	0.00	199
322	0.00	0.00	0.00	217
323	0.00	0.01	0.01	109
324	0.00	0.00	0.00	107
325	0.00	0.00	0.00	111
326	0.00	0.00	0.00	97
327	0.00	0.00	0.00	93
328	0.00	0.00	0.00	149
329	0.00	0.00	0.00	126
330	0.00	0.00	0.00	81
331	0.00	0.00	0.00	144
332	0.00	0.00	0.00	95
333	0.00	0.00	0.00	126
334	0.00	0.00	0.00	174
335	0.00	0.00	0.00	63
336	0.00	0.00	0.00	115
337	0.00	0.00	0.00	40
338	0.00	0.00	0.00	95
339	0.00	0.00	0.00	216
340	0.00	0.00	0.00	110
341	0.00	0.00	0.00	84
342	0.00	0.00	0.00	190
343	0.00	0.00	0.00	24
344	0.00	0.00	0.00	100
345	0.00	0.00	0.00	37
346	0.01	0.01	0.01	98
347	0.00	0.00	0.00	50
348	0.00	0.00	0.00	200
349	0.00	0.00	0.00	112
350	0.00	0.00	0.00	16
351	0.00	0.00	0.00	117
352	0.00	0.00	0.00	143
353	0.00	0.00	0.00	34
354	0.00	0.00	0.00	202
355	0.00	0.00	0.00	134
356	0.00	0.00	0.00	107
357	0.00	0.01	0.01	91

358	0.00	0.00	0.00	68
359	0.00	0.00	0.00	161
360	0.00	0.00	0.00	120
361	0.00	0.00	0.00	115
362	0.00	0.00	0.00	91
363	0.00	0.00	0.00	143
364	0.00	0.00	0.00	112
365	0.01	0.02	0.02	47
366	0.00	0.00	0.00	439
367	0.01	0.00	0.00	298
368	0.00	0.00	0.00	160
369	0.00	0.00	0.00	97
370	0.00	0.00	0.00	101
371	0.00	0.00	0.00	95
372	0.00	0.00	0.00	50
373	0.00	0.00	0.00	141
374	0.00	0.00	0.00	138
375	0.00	0.00	0.00	83
376	0.00	0.00	0.00	49
377	0.00	0.00	0.00	232
378	0.00	0.00	0.00	143
379	0.00	0.00	0.00	23
380	0.00	0.00	0.00	75
381	0.01	0.01	0.01	87
382	0.00	0.00	0.00	71
383	0.00	0.00	0.00	96
384	0.00	0.00	0.00	122
385	0.00	0.00	0.00	41
386	0.00	0.00	0.00	91
387	0.00	0.00	0.00	121
388	0.00	0.00	0.00	80
389	0.00	0.00	0.00	142
390	0.00	0.00	0.00	134
391	0.00	0.00	0.00	82
392	0.00	0.00	0.00	14
393	0.01	0.02	0.01	121
394	0.00	0.00	0.00	124
395	0.00	0.00	0.00	95
396	0.01	0.01	0.01	142
397	0.00	0.00	0.00	112
398	0.00	0.00	0.00	114
399	0.00	0.00	0.00	189
400	0.00	0.00	0.00	75
401	0.00	0.00	0.00	123
402	0.00	0.00	0.00	128
403	0.00	0.00	0.00	69
404	0.00	0.00	0.00	14
405	0.00	0.00	0.00	120
406	0.00	0.00	0.00	85
407	0.00	0.00	0.00	92
408	0.00	0.00	0.00	70
409	0.00	0.00	0.00	47
410	0.00	0.00	0.00	24
411	0.00	0.00	0.00	88
412	0.00	0.00	0.00	136
413	0.00	0.00	0.00	34
414	0.00	0.00	0.00	67
415	0.00	0.00	0.00	37
416	0.00	0.00	0.00	81
417	0.00	0.00	0.00	112
418	0.00	0.00	0.00	81

419	0.00	0.00	0.00	89
420	0.00	0.00	0.00	27
421	0.00	0.00	0.00	70
422	0.00	0.00	0.00	89
423	0.00	0.00	0.00	97
424	0.00	0.00	0.00	10
425	0.00	0.00	0.00	16
426	0.00	0.00	0.00	85
427	0.00	0.00	0.00	108
428	0.00	0.00	0.00	18
429	0.00	0.00	0.00	53
430	0.00	0.00	0.00	88
431	0.01	0.01	0.01	115
432	0.00	0.00	0.00	20
433	0.00	0.00	0.00	42
434	0.00	0.00	0.00	316
435	0.00	0.00	0.00	43
436	0.01	0.01	0.01	67
437	0.00	0.00	0.00	214
438	0.00	0.00	0.00	110
439	0.00	0.00	0.00	162
440	0.00	0.00	0.00	63
441	0.00	0.00	0.00	83
442	0.00	0.00	0.00	83
443	0.00	0.00	0.00	53
444	0.00	0.00	0.00	40
445	0.00	0.00	0.00	87
446	0.00	0.00	0.00	44
447	0.00	0.00	0.00	56
448	0.00	0.00	0.00	68
449	0.00	0.00	0.00	59
450	0.00	0.00	0.00	113
451	0.00	0.00	0.00	51
452	0.00	0.00	0.00	66
453	0.00	0.00	0.00	31
454	0.01	0.03	0.02	30
455	0.00	0.00	0.00	139
456	0.00	0.00	0.00	26
457	0.00	0.00	0.00	77
458	0.00	0.00	0.00	78
459	0.00	0.00	0.00	117
460	0.00	0.00	0.00	83
461	0.00	0.00	0.00	74
462	0.00	0.00	0.00	83
463	0.00	0.00	0.00	86
464	0.03	0.04	0.03	76
465	0.00	0.00	0.00	123
466	0.00	0.00	0.00	92
467	0.00	0.00	0.00	90
468	0.00	0.00	0.00	135
469	0.00	0.00	0.00	80
470	0.00	0.00	0.00	94
471	0.00	0.00	0.00	62
472	0.00	0.00	0.00	90
473	0.00	0.00	0.00	69
474	0.00	0.00	0.00	84
475	0.00	0.00	0.00	100
476	0.00	0.00	0.00	85
477	0.00	0.00	0.00	79
478	0.00	0.00	0.00	94
479	0.00	0.00	0.00	59

```
           480       0.02      0.02      0.02       132
           481       0.00      0.00      0.00       247
           482       0.00      0.00      0.00        75
           483       0.00      0.00      0.00        62
           484       0.00      0.00      0.00        33
           485       0.00      0.00      0.00        54
           486       0.00      0.00      0.00       170
           487       0.00      0.00      0.00        85
           488       0.01      0.01      0.01       105
           489       0.00      0.00      0.00       116
           490       0.00      0.00      0.00       351
           491       0.00      0.00      0.00        48
           492       0.00      0.00      0.00        65
           493       0.00      0.00      0.00        74
           494       0.00      0.00      0.00        55
           495       0.00      0.00      0.00        22
           496       0.00      0.00      0.00        80
           497       0.00      0.00      0.00        63
           498       0.00      0.00      0.00        67
           499       0.00      0.00      0.00       121

   micro avg       0.02      0.02      0.02    178469
   macro avg       0.00      0.00      0.00    178469
weighted avg       0.02      0.02      0.02    178469
 samples avg       0.02      0.02      0.01    178469

Time taken to run this cell : 8:23:03.546896
CPU times: user 16min 56s, sys: 8.96 s, total: 17min 5s
Wall time: 8min 32s
```

In [131]:

```
from sklearn.model_selection import ParameterGrid, GridSearchCV
score = 'f1_micro'
params =[{'estimator__alpha':[0.00001,0.0001,0.001,0.01,0.1,1]}]
classifierf = OneVsRestClassifier(SGDClassifier(loss='hinge', penalty='l2'))
gsf = GridSearchCV(classifierf,params,scoring=score,n_jobs=-1,verbose=True,return_tr
ain_score=True)
gfitf = gs.fit(x_train_wbow,y_train)
```

```
Fitting 5 folds for each of 6 candidates, totalling 30 fits

[Parallel(n_jobs=-1)]: Using backend LokyBackend with 10 concurrent work
ers.
[Parallel(n_jobs=-1)]: Done  30 out of  30 | elapsed: 44.4min finished
```

In [132]:

```
gfitf.best_estimator_
```

Out[132]:

```
OneVsRestClassifier(estimator=SGDClassifier(alpha=1e-05, average=False,
                                            class_weight=None,
                                            early_stopping=False, epsilo
n=0.1,
                                            eta0=0.0, fit_intercept=Tru
e,
                                            l1_ratio=0.15,
                                            learning_rate='optimal', los
s='log',
                                            max_iter=1000, n_iter_no_cha
nge=5,
                                            n_jobs=-1, penalty='l2',
                                            power_t=0.5, random_state=No
ne,
                                            shuffle=True, tol=0.001,
                                            validation_fraction=0.1, ver
bose=0,
                                            warm_start=False),
                    n_jobs=None)
```

In [133]:

```
gfit.cv_results_
```

Out[133]:

```
{'mean_fit_time': array([ 616.95418673,  635.48110318,  718.49127617, 10
62.75535603,
        1139.3322104 ,  703.26464276]),
 'std_fit_time': array([ 5.61128433,  4.49199077,  4.21355524, 26.440214
94, 35.49924695,
         4.42560551]),
 'mean_score_time': array([9.24277344, 9.98951302, 9.18088212, 9.2514324
7, 5.61206827,
        8.24464612]),
 'std_score_time': array([0.50420647, 0.5177753 , 0.39461141, 0.4277663
, 1.26716757,
        0.72798833]),
 'param_estimator__alpha': masked_array(data=[1e-05, 0.0001, 0.001, 0.0
1, 0.1, 1],
              mask=[False, False, False, False, False, False],
        fill_value='?',
             dtype=object),
 'params': [{'estimator__alpha': 1e-05},
  {'estimator__alpha': 0.0001},
  {'estimator__alpha': 0.001},
  {'estimator__alpha': 0.01},
  {'estimator__alpha': 0.1},
  {'estimator__alpha': 1}],
 'split0_test_score': array([0.92612409, 0.85410127, 0.57621544, 0.30083
674, 0.09293081,
        0.05993031]),
 'split1_test_score': array([0.90167997, 0.83859613, 0.61285554, 0.34938
219, 0.03796993,
        0.02977798]),
 'split2_test_score': array([0.93043654, 0.86702821, 0.64357266, 0.37903
403, 0.1336102 ,
        0.09531864]),
 'split3_test_score': array([0.94367021, 0.88677088, 0.66001438, 0.42149
41 , 0.20276397,
        0.17250814]),
 'split4_test_score': array([0.97530996, 0.90524508, 0.74663231, 0.68988
367, 0.32152021,
        0.20661622]),
 'mean_test_score': array([0.93544416, 0.87034832, 0.64785807, 0.4281261
4, 0.15775902,
        0.11283026]),
 'std_test_score': array([0.02412016, 0.02354008, 0.05706195, 0.1366559
4, 0.0979576 ,
        0.06687301]),
 'rank_test_score': array([1, 2, 3, 4, 5, 6], dtype=int32),
 'split0_train_score': array([0.96239113, 0.90343433, 0.71244755, 0.5014
2015, 0.34688712,
        0.31555165]),
 'split1_train_score': array([0.96731837, 0.9076435 , 0.70428761, 0.4730
933 , 0.29399768,
        0.28077648]),
 'split2_train_score': array([0.96224599, 0.90172126, 0.70880031, 0.4804
5337, 0.32099976,
        0.27377205]),
 'split3_train_score': array([0.96071698, 0.89928164, 0.70065372, 0.4692
362 , 0.31344139,
        0.25955247]),
 'split4_train_score': array([0.95302023, 0.88801466, 0.67460012, 0.4016
9508, 0.13452168,
```

```
        0.0506589 ]),
 'mean_train_score': array([0.96113854, 0.90001908, 0.70015786, 0.465179
62, 0.28196953,
        0.23606231]),
 'std_train_score': array([0.00462754, 0.00659307, 0.01338826, 0.0336334
1, 0.07564876,
        0.09451576])}
```

In [135]:

```
%%time
classifierf = OneVsRestClassifier(SGDClassifier(loss='hinge', alpha=1e-05, penalty=
'l2'))
classifierf.fit(x_train_wbow,y_train)
predictionsf = classifierf.predict(x_test_wbow)

print("Accuracy :",accuracy_score(y_test, predictionsf))
print("Hamming loss ",hamming_loss(y_test,predictionsf))


precision = precision_score(y_test, predictionsf, average='micro')
recall = recall_score(y_test, predictionsf, average='micro')
f1 = f1_score(y_test, predictionsf, average='micro')

print("Micro-average quality numbers")
print("Precision: {:.4f}, Recall: {:.4f}, F1-measure: {:.4f}".format(precision, reca
ll, f1))

precision = precision_score(y_test, predictionsf, average='macro')
recall = recall_score(y_test, predictionsf, average='macro')
f1 = f1_score(y_test, predictionsf, average='macro')

print("Macro-average quality numbers")
print("Precision: {:.4f}, Recall: {:.4f}, F1-measure: {:.4f}".format(precision, reca
ll, f1))

print (classification_report(y_test, predictionsf))
```

```
Accuracy : 0.01715
Hamming loss  0.00683364
Micro-average quality numbers
Precision: 0.0184, Recall: 0.0174, F1-measure: 0.0179
Macro-average quality numbers
Precision: 0.0034, Recall: 0.0033, F1-measure: 0.0031
              precision    recall  f1-score   support

           0       0.05      0.06      0.05      4633
           1       0.07      0.04      0.06      7549
           2       0.07      0.07      0.07      7112
           3       0.03      0.02      0.03      2888
           4       0.05      0.07      0.06      5009
           5       0.04      0.03      0.03      3919
           6       0.05      0.05      0.05      5204
           7       0.04      0.05      0.04      3229
           8       0.04      0.04      0.04      3097
           9       0.02      0.03      0.02      1829
          10       0.02      0.03      0.02      2157
          11       0.03      0.03      0.03      3142
          12       0.03      0.03      0.03      2575
          13       0.02      0.01      0.01      1431
          14       0.02      0.02      0.02      2649
          15       0.02      0.03      0.02      2094
          16       0.02      0.01      0.01      1549
          17       0.02      0.02      0.02      1869
          18       0.02      0.02      0.02      2268
          19       0.00      0.00      0.00       852
          20       0.02      0.02      0.02      1614
          21       0.02      0.02      0.02      1798
          22       0.02      0.02      0.02      1350
          23       0.01      0.01      0.01       888
          24       0.03      0.01      0.01      1528
          25       0.00      0.00      0.00       388
          26       0.01      0.01      0.01       717
          27       0.01      0.01      0.01       986
          28       0.01      0.01      0.01      1046
          29       0.01      0.00      0.00      2380
          30       0.01      0.00      0.00       695
          31       0.01      0.01      0.01      1095
          32       0.03      0.00      0.01      2896
          33       0.01      0.01      0.01       652
          34       0.01      0.01      0.01       929
          35       0.01      0.02      0.01       632
          36       0.00      0.00      0.00       535
          37       0.00      0.00      0.00       172
          38       0.01      0.01      0.01       728
          39       0.01      0.01      0.01       632
          40       0.01      0.01      0.01       964
          41       0.01      0.00      0.00       579
          42       0.00      0.00      0.00       480
          43       0.01      0.00      0.00      2408
          44       0.00      0.00      0.00       719
          45       0.01      0.01      0.01       455
          46       0.00      0.01      0.00       385
          47       0.00      0.00      0.00       517
          48       0.00      0.00      0.00       516
          49       0.01      0.01      0.01       531
          50       0.01      0.01      0.01       410
          51       0.01      0.00      0.00       790
          52       0.00      0.00      0.00       151
```

53	0.01	0.01	0.01	702
54	0.00	0.01	0.00	480
55	0.00	0.00	0.00	423
56	0.01	0.01	0.01	485
57	0.01	0.01	0.01	848
58	0.01	0.01	0.01	473
59	0.00	0.00	0.00	640
60	0.00	0.00	0.00	499
61	0.00	0.00	0.00	234
62	0.01	0.01	0.01	546
63	0.01	0.01	0.01	492
64	0.01	0.01	0.01	138
65	0.01	0.01	0.01	350
66	0.00	0.00	0.00	233
67	0.00	0.00	0.00	203
68	0.00	0.00	0.00	401
69	0.00	0.00	0.00	283
70	0.01	0.01	0.01	444
71	0.00	0.00	0.00	839
72	0.00	0.00	0.00	281
73	0.00	0.00	0.00	1622
74	0.01	0.00	0.00	716
75	0.00	0.00	0.00	127
76	0.01	0.01	0.01	413
77	0.01	0.00	0.00	296
78	0.01	0.01	0.01	264
79	0.01	0.01	0.01	469
80	0.00	0.00	0.00	229
81	0.00	0.00	0.00	416
82	0.01	0.00	0.01	403
83	0.00	0.01	0.01	307
84	0.01	0.00	0.00	224
85	0.00	0.01	0.00	353
86	0.00	0.00	0.00	383
87	0.01	0.01	0.01	260
88	0.00	0.00	0.00	237
89	0.00	0.01	0.01	107
90	0.01	0.01	0.01	490
91	0.01	0.01	0.01	325
92	0.01	0.01	0.01	525
93	0.00	0.00	0.00	263
94	0.00	0.00	0.00	111
95	0.00	0.00	0.00	283
96	0.00	0.00	0.00	205
97	0.00	0.00	0.00	284
98	0.00	0.00	0.00	129
99	0.02	0.01	0.01	568
100	0.00	0.00	0.00	374
101	0.00	0.00	0.00	854
102	0.00	0.01	0.00	360
103	0.00	0.00	0.00	101
104	0.00	0.00	0.00	238
105	0.00	0.00	0.00	205
106	0.01	0.00	0.00	375
107	0.01	0.01	0.01	219
108	0.00	0.00	0.00	255
109	0.00	0.00	0.00	352
110	0.01	0.00	0.00	353
111	0.00	0.00	0.00	224
112	0.00	0.00	0.00	144
113	0.00	0.00	0.00	199

114	0.00	0.00	0.00	237
115	0.00	0.00	0.00	273
116	0.00	0.00	0.00	255
117	0.01	0.00	0.01	606
118	0.00	0.01	0.00	238
119	0.00	0.00	0.00	147
120	0.00	0.00	0.00	374
121	0.00	0.00	0.00	292
122	0.00	0.00	0.00	74
123	0.00	0.00	0.00	232
124	0.03	0.01	0.01	905
125	0.00	0.00	0.00	306
126	0.00	0.01	0.00	153
127	0.02	0.00	0.01	457
128	0.01	0.01	0.01	225
129	0.00	0.00	0.00	196
130	0.00	0.00	0.00	87
131	0.00	0.00	0.00	116
132	0.00	0.00	0.00	228
133	0.01	0.01	0.01	278
134	0.00	0.00	0.00	745
135	0.01	0.00	0.01	213
136	0.00	0.00	0.00	427
137	0.01	0.00	0.01	405
138	0.00	0.00	0.00	164
139	0.00	0.00	0.00	216
140	0.00	0.00	0.00	292
141	0.00	0.00	0.00	126
142	0.00	0.01	0.00	119
143	0.00	0.00	0.00	408
144	0.01	0.00	0.00	629
145	0.00	0.00	0.00	866
146	0.00	0.00	0.00	228
147	0.00	0.00	0.00	100
148	0.00	0.00	0.00	265
149	0.00	0.00	0.00	280
150	0.01	0.01	0.01	169
151	0.00	0.00	0.00	32
152	0.00	0.00	0.00	259
153	0.00	0.00	0.00	220
154	0.00	0.00	0.00	369
155	0.00	0.00	0.00	191
156	0.00	0.00	0.00	81
157	0.00	0.00	0.00	216
158	0.00	0.00	0.00	69
159	0.00	0.00	0.00	127
160	0.00	0.00	0.00	201
161	0.00	0.01	0.01	172
162	0.00	0.00	0.00	271
163	0.00	0.00	0.00	207
164	0.00	0.00	0.00	234
165	0.00	0.00	0.00	363
166	0.00	0.00	0.00	480
167	0.00	0.00	0.00	234
168	0.00	0.00	0.00	224
169	0.00	0.00	0.00	238
170	0.00	0.00	0.00	56
171	0.00	0.00	0.00	824
172	0.00	0.00	0.00	219
173	0.00	0.00	0.00	206
174	0.00	0.00	0.00	240

175	0.00	0.00	0.00	79
176	0.00	0.00	0.00	254
177	0.00	0.00	0.00	305
178	0.00	0.00	0.00	343
179	0.00	0.00	0.00	86
180	0.00	0.00	0.00	113
181	0.00	0.00	0.00	530
182	0.00	0.01	0.01	160
183	0.00	0.01	0.01	101
184	0.00	0.00	0.00	172
185	0.00	0.00	0.00	119
186	0.00	0.00	0.00	228
187	0.01	0.00	0.01	401
188	0.00	0.00	0.00	208
189	0.00	0.00	0.00	186
190	0.00	0.00	0.00	201
191	0.00	0.00	0.00	270
192	0.00	0.00	0.00	222
193	0.00	0.00	0.00	69
194	0.00	0.00	0.00	229
195	0.00	0.00	0.00	108
196	0.00	0.00	0.00	332
197	0.00	0.00	0.00	209
198	0.00	0.00	0.00	289
199	0.01	0.01	0.01	199
200	0.00	0.00	0.00	153
201	0.01	0.01	0.01	225
202	0.00	0.00	0.00	208
203	0.00	0.00	0.00	189
204	0.00	0.00	0.00	345
205	0.00	0.01	0.00	78
206	0.00	0.00	0.00	88
207	0.00	0.00	0.00	159
208	0.00	0.01	0.00	187
209	0.00	0.00	0.00	364
210	0.00	0.00	0.00	136
211	0.00	0.00	0.00	183
212	0.00	0.00	0.00	246
213	0.00	0.00	0.00	192
214	0.00	0.00	0.00	76
215	0.00	0.00	0.00	125
216	0.01	0.01	0.01	158
217	0.00	0.00	0.00	42
218	0.00	0.00	0.00	207
219	0.00	0.00	0.00	129
220	0.00	0.01	0.00	191
221	0.00	0.00	0.00	208
222	0.00	0.00	0.00	180
223	0.00	0.00	0.00	211
224	0.01	0.01	0.01	76
225	0.00	0.00	0.00	175
226	0.01	0.01	0.01	199
227	0.00	0.01	0.00	156
228	0.00	0.00	0.00	293
229	0.01	0.01	0.01	227
230	0.00	0.00	0.00	308
231	0.00	0.00	0.00	311
232	0.00	0.00	0.00	186
233	0.00	0.00	0.00	177
234	0.01	0.01	0.01	167
235	0.00	0.00	0.00	38

236	0.00	0.00	0.00	62
237	0.00	0.00	0.00	256
238	0.00	0.00	0.00	118
239	0.00	0.00	0.00	86
240	0.00	0.00	0.00	595
241	0.00	0.00	0.00	118
242	0.00	0.00	0.00	30
243	0.00	0.00	0.00	248
244	0.00	0.00	0.00	143
245	0.00	0.00	0.00	193
246	0.00	0.00	0.00	100
247	0.00	0.00	0.00	109
248	0.00	0.00	0.00	559
249	0.00	0.00	0.00	142
250	0.00	0.00	0.00	109
251	0.00	0.00	0.00	119
252	0.00	0.00	0.00	154
253	0.00	0.00	0.00	103
254	0.00	0.01	0.01	152
255	0.00	0.00	0.00	99
256	0.00	0.00	0.00	384
257	0.00	0.00	0.00	172
258	0.00	0.00	0.00	201
259	0.00	0.00	0.00	141
260	0.00	0.00	0.00	87
261	0.00	0.00	0.00	153
262	0.00	0.00	0.00	82
263	0.00	0.00	0.00	49
264	0.00	0.00	0.00	142
265	0.00	0.00	0.00	66
266	0.00	0.00	0.00	52
267	0.00	0.00	0.00	71
268	0.01	0.01	0.01	152
269	0.00	0.00	0.00	108
270	0.01	0.01	0.01	140
271	0.00	0.00	0.00	138
272	0.00	0.00	0.00	160
273	0.00	0.00	0.00	159
274	0.00	0.00	0.00	87
275	0.00	0.00	0.00	183
276	0.00	0.00	0.00	370
277	0.00	0.00	0.00	171
278	0.00	0.00	0.00	138
279	0.00	0.00	0.00	170
280	0.00	0.00	0.00	99
281	0.00	0.00	0.00	111
282	0.00	0.00	0.00	114
283	0.00	0.01	0.00	186
284	0.00	0.00	0.00	441
285	0.00	0.00	0.00	169
286	0.00	0.01	0.01	157
287	0.00	0.00	0.00	115
288	0.00	0.00	0.00	80
289	0.02	0.01	0.01	319
290	0.00	0.00	0.00	114
291	0.00	0.00	0.00	224
292	0.00	0.00	0.00	259
293	0.00	0.00	0.00	79
294	0.00	0.00	0.00	95
295	0.00	0.00	0.00	62
296	0.00	0.00	0.00	65

297	0.00	0.00	0.00	113
298	0.00	0.00	0.00	129
299	0.00	0.00	0.00	99
300	0.00	0.00	0.00	127
301	0.00	0.00	0.00	167
302	0.00	0.00	0.00	116
303	0.01	0.01	0.01	111
304	0.00	0.00	0.00	192
305	0.00	0.00	0.00	107
306	0.00	0.00	0.00	72
307	0.01	0.01	0.01	186
308	0.00	0.00	0.00	156
309	0.00	0.00	0.00	81
310	0.00	0.00	0.00	160
311	0.00	0.00	0.00	50
312	0.00	0.00	0.00	279
313	0.00	0.00	0.00	86
314	0.00	0.00	0.00	139
315	0.00	0.00	0.00	106
316	0.00	0.00	0.00	62
317	0.00	0.00	0.00	267
318	0.00	0.00	0.00	124
319	0.01	0.01	0.01	120
320	0.00	0.00	0.00	99
321	0.00	0.00	0.00	199
322	0.00	0.00	0.00	217
323	0.00	0.01	0.01	109
324	0.00	0.00	0.00	107
325	0.00	0.00	0.00	111
326	0.00	0.00	0.00	97
327	0.04	0.01	0.02	93
328	0.00	0.00	0.00	149
329	0.00	0.00	0.00	126
330	0.00	0.00	0.00	81
331	0.00	0.00	0.00	144
332	0.00	0.00	0.00	95
333	0.00	0.00	0.00	126
334	0.00	0.00	0.00	174
335	0.00	0.00	0.00	63
336	0.00	0.00	0.00	115
337	0.00	0.00	0.00	40
338	0.00	0.00	0.00	95
339	0.00	0.00	0.00	216
340	0.00	0.00	0.00	110
341	0.00	0.00	0.00	84
342	0.00	0.00	0.00	190
343	0.00	0.00	0.00	24
344	0.00	0.00	0.00	100
345	0.00	0.00	0.00	37
346	0.01	0.01	0.01	98
347	0.00	0.00	0.00	50
348	0.00	0.00	0.00	200
349	0.00	0.00	0.00	112
350	0.00	0.00	0.00	16
351	0.00	0.00	0.00	117
352	0.00	0.00	0.00	143
353	0.00	0.00	0.00	34
354	0.00	0.00	0.00	202
355	0.00	0.00	0.00	134
356	0.00	0.00	0.00	107
357	0.00	0.01	0.01	91

358	0.00	0.00	0.00	68
359	0.00	0.00	0.00	161
360	0.00	0.00	0.00	120
361	0.00	0.00	0.00	115
362	0.00	0.00	0.00	91
363	0.00	0.00	0.00	143
364	0.00	0.00	0.00	112
365	0.01	0.02	0.02	47
366	0.00	0.00	0.00	439
367	0.01	0.00	0.00	298
368	0.00	0.00	0.00	160
369	0.00	0.00	0.00	97
370	0.00	0.00	0.00	101
371	0.00	0.00	0.00	95
372	0.00	0.00	0.00	50
373	0.00	0.00	0.00	141
374	0.00	0.00	0.00	138
375	0.00	0.00	0.00	83
376	0.00	0.00	0.00	49
377	0.00	0.00	0.00	232
378	0.00	0.00	0.00	143
379	0.00	0.00	0.00	23
380	0.00	0.00	0.00	75
381	0.01	0.01	0.01	87
382	0.00	0.00	0.00	71
383	0.00	0.00	0.00	96
384	0.00	0.00	0.00	122
385	0.00	0.00	0.00	41
386	0.00	0.00	0.00	91
387	0.00	0.00	0.00	121
388	0.00	0.00	0.00	80
389	0.00	0.00	0.00	142
390	0.00	0.00	0.00	134
391	0.00	0.00	0.00	82
392	0.00	0.00	0.00	14
393	0.01	0.02	0.01	121
394	0.00	0.00	0.00	124
395	0.00	0.00	0.00	95
396	0.01	0.01	0.01	142
397	0.00	0.00	0.00	112
398	0.00	0.00	0.00	114
399	0.00	0.00	0.00	189
400	0.00	0.00	0.00	75
401	0.00	0.00	0.00	123
402	0.00	0.00	0.00	128
403	0.00	0.00	0.00	69
404	0.00	0.00	0.00	14
405	0.00	0.00	0.00	120
406	0.00	0.00	0.00	85
407	0.00	0.00	0.00	92
408	0.00	0.00	0.00	70
409	0.00	0.00	0.00	47
410	0.00	0.00	0.00	24
411	0.00	0.00	0.00	88
412	0.00	0.00	0.00	136
413	0.00	0.00	0.00	34
414	0.00	0.00	0.00	67
415	0.00	0.00	0.00	37
416	0.00	0.00	0.00	81
417	0.00	0.00	0.00	112
418	0.00	0.00	0.00	81

419	0.00	0.00	0.00	89
420	0.00	0.00	0.00	27
421	0.00	0.00	0.00	70
422	0.00	0.00	0.00	89
423	0.00	0.00	0.00	97
424	0.00	0.00	0.00	10
425	0.00	0.00	0.00	16
426	0.00	0.00	0.00	85
427	0.00	0.00	0.00	108
428	0.00	0.00	0.00	18
429	0.00	0.00	0.00	53
430	0.00	0.00	0.00	88
431	0.01	0.01	0.01	115
432	0.00	0.00	0.00	20
433	0.00	0.00	0.00	42
434	0.00	0.00	0.00	316
435	0.00	0.00	0.00	43
436	0.01	0.01	0.01	67
437	0.00	0.00	0.00	214
438	0.00	0.00	0.00	110
439	0.00	0.00	0.00	162
440	0.00	0.00	0.00	63
441	0.00	0.00	0.00	83
442	0.00	0.00	0.00	83
443	0.00	0.00	0.00	53
444	0.00	0.00	0.00	40
445	0.00	0.00	0.00	87
446	0.00	0.00	0.00	44
447	0.00	0.00	0.00	56
448	0.00	0.00	0.00	68
449	0.00	0.00	0.00	59
450	0.00	0.00	0.00	113
451	0.00	0.00	0.00	51
452	0.00	0.00	0.00	66
453	0.00	0.00	0.00	31
454	0.01	0.03	0.02	30
455	0.00	0.00	0.00	139
456	0.00	0.00	0.00	26
457	0.00	0.00	0.00	77
458	0.00	0.00	0.00	78
459	0.00	0.00	0.00	117
460	0.00	0.00	0.00	83
461	0.00	0.00	0.00	74
462	0.00	0.00	0.00	83
463	0.00	0.00	0.00	86
464	0.03	0.04	0.03	76
465	0.00	0.00	0.00	123
466	0.00	0.00	0.00	92
467	0.00	0.00	0.00	90
468	0.00	0.00	0.00	135
469	0.00	0.00	0.00	80
470	0.00	0.00	0.00	94
471	0.00	0.00	0.00	62
472	0.00	0.00	0.00	90
473	0.00	0.00	0.00	69
474	0.00	0.00	0.00	84
475	0.00	0.00	0.00	100
476	0.00	0.00	0.00	85
477	0.00	0.00	0.00	79
478	0.00	0.00	0.00	94
479	0.00	0.00	0.00	59

```
           480       0.02      0.02      0.02       132
           481       0.00      0.00      0.00       247
           482       0.00      0.00      0.00        75
           483       0.00      0.00      0.00        62
           484       0.00      0.00      0.00        33
           485       0.00      0.00      0.00        54
           486       0.00      0.00      0.00       170
           487       0.00      0.00      0.00        85
           488       0.01      0.01      0.01       105
           489       0.00      0.00      0.00       116
           490       0.00      0.00      0.00       351
           491       0.00      0.00      0.00        48
           492       0.00      0.00      0.00        65
           493       0.00      0.00      0.00        74
           494       0.00      0.00      0.00        55
           495       0.00      0.00      0.00        22
           496       0.00      0.00      0.00        80
           497       0.00      0.00      0.00        63
           498       0.00      0.00      0.00        67
           499       0.00      0.00      0.00       121

   micro avg       0.02      0.02      0.02    178469
   macro avg       0.00      0.00      0.00    178469
weighted avg       0.02      0.02      0.02    178469
 samples avg       0.02      0.02      0.01    178469

CPU times: user 14min 30s, sys: 9.92 s, total: 14min 40s
Wall time: 6min 5s
```

In [143]:

```
# Summary of the total models
from prettytable import PrettyTable
pt = PrettyTable()
pt.field_names = ["No", "MODEL","FEATURIZATION","ALPHA",'LOSS','MICRO_F1_SCORE']
```

In [144]:

```
pt.add_row(["1", 'OneVsRest+SGD Classifier', "Tf-idf",0.0001,"log",0.00505718])
pt.add_row(["2", 'OneVsRest+SGD(log)=LR', "Bag-of-words",0.001,"log",0.00472184 ])
pt.add_row(["3", 'OneVsRest+SGD(log)=LR', "Bag-of-words",1e-05,"log",0.01771])
pt.add_row(["4", 'OneVsRest+SGD Classifier', "Bag-of-words",1e-05,"Hinge",0.01715])
```

In [145]:

```
print(pt)
```

```
+----+--------------------------+--------------+--------+-------+------
----------+
| No |          MODEL           | FEATURIZATION | ALPHA  |  LOSS | MICRO
_F1_SCORE |
+----+--------------------------+--------------+--------+-------+------
----------+
| 1  | OneVsRest+SGD Classifier |     Tf-idf    | 0.0001 |  log  |   0.0
0505718   |
| 2  |  OneVsRest+SGD(log)=LR   |  Bag-of-words | 0.001  |  log  |   0.0
0472184   |
| 3  |  OneVsRest+SGD(log)=LR   |  Bag-of-words | 1e-05  |  log  |    0.
01771     |
| 4  | OneVsRest+SGD Classifier |  Bag-of-words | 1e-05  | Hinge |    0.
01715     |
+----+--------------------------+--------------+--------+-------+------
----------+
```