----------Module 2(Data cleaning and Data Pre-processing)----------

lodading legitimate User Data

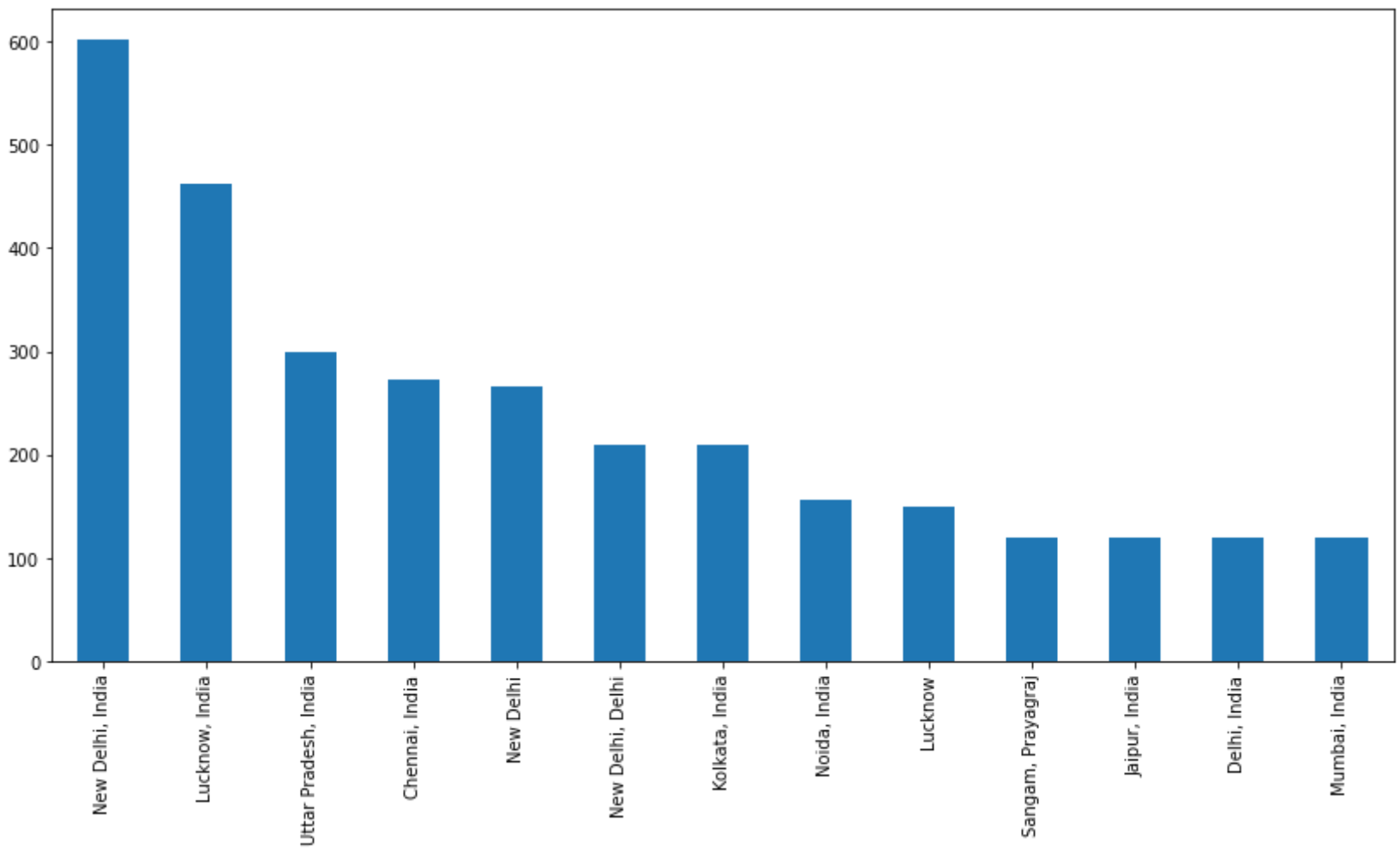
In [1]:
```
import pandas as pd
Total_leg_data = pd.read_csv('Leg_data.csv')
Total_leg_data.fillna(0, inplace=True)
Total_leg_data.shape
```

Out[1]:
```
(11118, 21)
```

drow bar plot to see tweet come from the which locations

In [2]:
```
location_data = Total_leg_data['UserLocation'].value_counts()
location_data[2:15].plot(kind='bar', figsize=(14,7))
```

Out[2]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x206a81bba00>
```

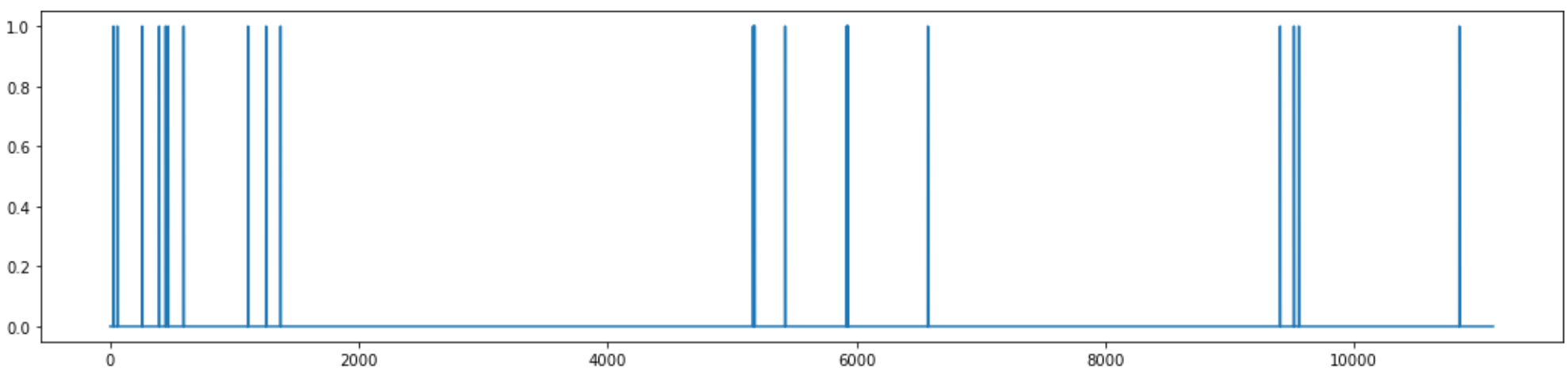


draw for a word how many times it used in tweets

Hypothesis is Legitimate users user very less compare to spammer

In [4]:
```
import matplotlib.pyplot as plt
plt.rcParams['figure.figsize'] = (18,4)
plt.rcParams['font.family'] = 'sans-serif'
text = Total_leg_data['TextData']
is_sex = text.str.contains('sex')
is_sex=is_sex.astype(float)
is_sex.plot()
```

Out[4]:
```
<matplotlib.axes._subplots.AxesSubplot at 0x206a8e3e0d0>
```



Save Followers count

In [7]:
```
temp1 = Total_leg_data[["UserFollowersCount"]]
temp1.to_csv('C:/Users/asha/Desktop/Final Year Project Phase 2/Phase 2/Step2/userfollowerscount.csv', sep=',',encoding='utf8'
```

Retweet ratio also will be higher compare to spammer user

In [8]:
```
Total_leg_data[['RetweetCount']] = Total_leg_data[['RetweetCount']].astype(float)
Total_leg_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 11118 entries, 0 to 11117
Data columns (total 21 columns):
 #   Column                 Non-Null Count  Dtype
---  ------                 --------------  -----
 0   Unnamed: 0             11118 non-null  int64
 1   Unnamed: 0.1           11118 non-null  int64
 2   TwittID                11118 non-null  int64
 3   TextData               11118 non-null  object
 4   TweetCreatedAt         11118 non-null  object
 5   RetweetCount           11118 non-null  float64
 6   TweetFavouriteCount    11118 non-null  int64
 7   TweetSource            11118 non-null  object
 8   UserID                 11118 non-null  int64
 9   UserScreenName         11118 non-null  object
 10  UserName               11118 non-null  object
 11  UserCreatedAt          11118 non-null  object
 12  UserDescription        11118 non-null  object
 13  UserDescriptionLength  11118 non-null  int64
 14  UserFollowersCount     11118 non-null  int64
 15  UserFriendsCount       11118 non-null  int64
 16  UserLocation           11118 non-null  object
 17  HttpCount              11118 non-null  int64
 18  HashtagCount           11118 non-null  int64
 19  MentionCount           11118 non-null  int64
 20  TweetCount             11118 non-null  int64
dtypes: float64(1), int64(12), object(8)
memory usage: 1.8+ MB
```

to see how many people have zero tweet

In [9]:
```
Total_leg_data = Total_leg_data[Total_leg_data.TweetCount!=0]
len(Total_leg_data[Total_leg_data.TweetCount<30])
```

Out[9]: 378

adding New feature

In [10]:
```
Total_leg_data.loc[:,"AvgHashtag"] = (Total_leg_data.groupby('UserID')["HashtagCount"].transform('sum'))/30
Total_leg_data.loc[:,"AvgURLCount"] = (Total_leg_data.groupby('UserID')["HttpCount"].transform('sum'))/30
Total_leg_data.loc[:,"AvgMention"] = (Total_leg_data.groupby('UserID')["MentionCount"].transform('sum'))/30
Total_leg_data.loc[:,"AvgRetweet"] = (Total_leg_data.groupby('UserID')["RetweetCount"].transform('sum'))/30
Total_leg_data.loc[:,"AvgFavCount"] = (Total_leg_data.groupby('UserID')["TweetFavouriteCount"].transform('sum'))/30
```

Selecting Repeted columns only and droping the repeted rows

In [13]:
```
unique_leg_row = Total_leg_data[["UserID", "UserScreenName", "UserCreatedAt", "UserDescriptionLength","UserFollowersCount", "
leg_data = unique_leg_row.drop_duplicates()
leg_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 375 entries, 0 to 11088
Data columns (total 13 columns):
 #   Column                 Non-Null Count  Dtype
---  ------                 --------------  -----
 0   UserID                 375 non-null    int64
 1   UserScreenName         375 non-null    object
 2   UserCreatedAt          375 non-null    object
 3   UserDescriptionLength  375 non-null    int64
 4   UserFollowersCount     375 non-null    int64
 5   UserFriendsCount       375 non-null    int64
 6   UserLocation           375 non-null    object
 7   AvgHashtag             375 non-null    float64
 8   AvgURLCount            375 non-null    float64
 9   AvgMention             375 non-null    float64
 10  AvgRetweet             375 non-null    float64
 11  AvgFavCount            375 non-null    float64
 12  TweetCount             375 non-null    int64
dtypes: float64(5), int64(5), object(3)
memory usage: 41.0+ KB
```

Saving the reduced legitimate data

In [16]:
```
fre = leg_data["UserFriendsCount"]
fre.to_csv("C:/Users/asha/Desktop/Final Year Project Phase 2/Phase 2/Step2/userfriendscount.csv", sep=',',encoding='utf8')
```

Datatype conversion from object to float

In [17]:
```
leg_data[['UserFriendsCount']] = leg_data[['UserFriendsCount']].astype(float)
leg_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 375 entries, 0 to 11088
Data columns (total 13 columns):
 #   Column                 Non-Null Count  Dtype
---  ------                 --------------  -----
 0   UserID                 375 non-null    int64
 1   UserScreenName         375 non-null    object
 2   UserCreatedAt          375 non-null    object
 3   UserDescriptionLength  375 non-null    int64
 4   UserFollowersCount     375 non-null    int64
 5   UserFriendsCount       375 non-null    float64
 6   UserLocation           375 non-null    object
 7   AvgHashtag             375 non-null    float64
 8   AvgURLCount            375 non-null    float64
 9   AvgMention             375 non-null    float64
 10  AvgRetweet             375 non-null    float64
 11  AvgFavCount            375 non-null    float64
 12  TweetCount             375 non-null    int64
dtypes: float64(6), int64(4), object(3)
memory usage: 41.0+ KB
```

Add a Column to Legitimate Data that this is not Spam =0

In [25]:
```
leg_data.loc[:, "SpammerOrNot"]=0
leg_data.tail()
```

```
C:\Users\asha\anaconda3\lib\site-packages\pandas\core\indexing.py:966: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  self.obj[item] = s
```

Out[25]:

	UserID	UserScreenName	UserCreatedAt	UserDescriptionLength	UserFollowersCount	UserFriendsCount	UserLocation	AvgHashtag	AvgURLC
10968	767677235805511680	mediaamantra	2016-08-22 10:58:10	128	1566	958.0	Lucknow, India	0.400000	
10998	67378160	DainikBhaskar	2009-08-20 18:04:36	76	634524	46.0	India	8.933333	
11028	461841349	ZeeNewsHindi	2012-01-12 07:52:31	110	1868923	22.0	India	2.033333	
11058	98362607	News18India	2009-12-21 12:11:21	47	1035839	89.0	India	2.033333	
11088	3266889528	allahabdtraffic	2015-07-03 09:06:39	138	7608	146.0	Allahabad, India	0.733333	

In [26]:
```
leg_data["TweetCount"].describe()
```

Out[26]:
```
count       375.000000
mean      41288.162667
std       93281.144477
min           1.000000
25%         324.000000
50%        3883.000000
75%       20650.000000
max      596778.000000
Name: TweetCount, dtype: float64
```

Now Loading Spammer Data

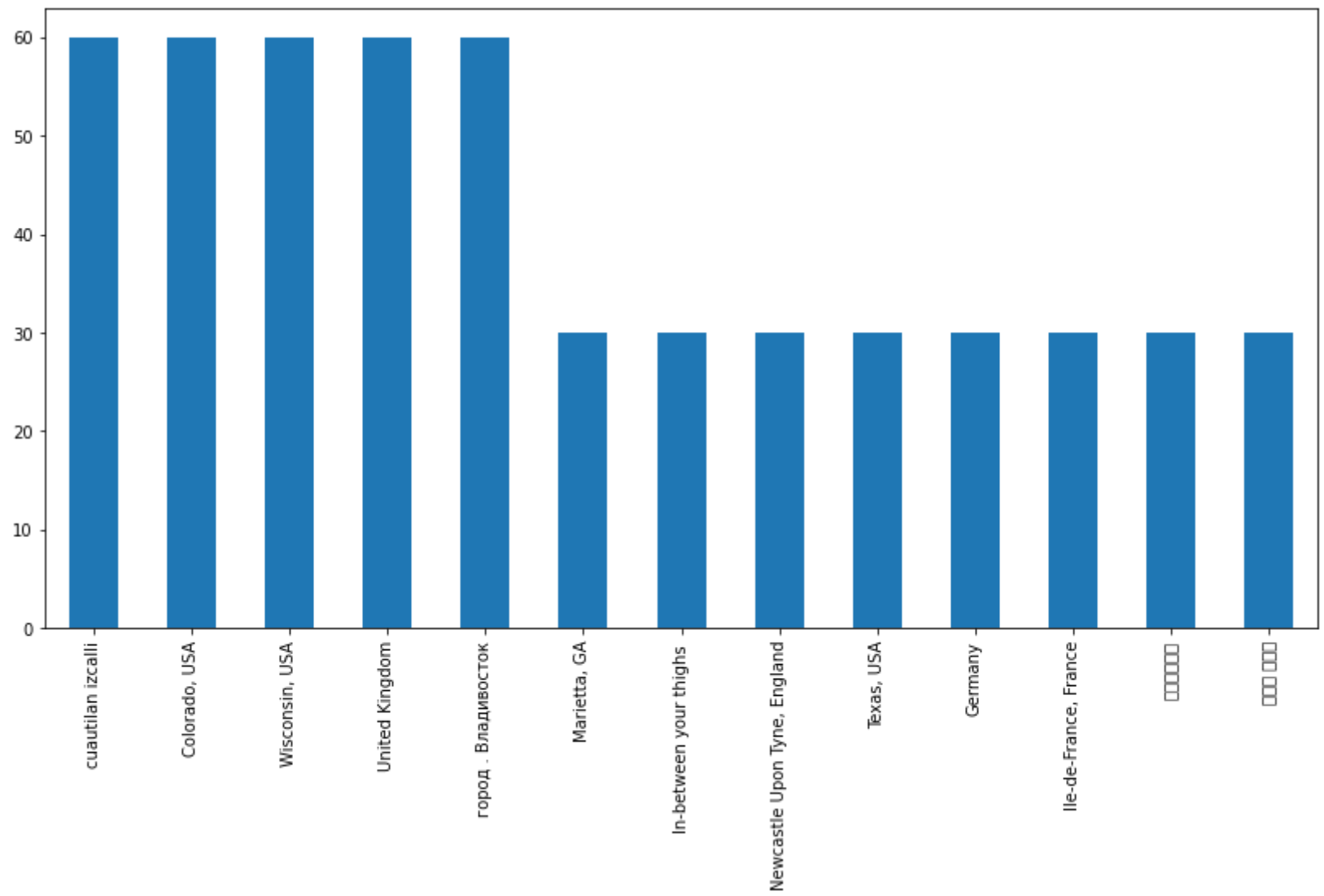
In [27]:
```
Total_spam_data = pd.read_csv("Spam_data.csv")
Total_spam_data.fillna(0, inplace=True)
Total_spam_data.shape
```

Out[27]:
```
(5394, 21)
```

drow bar plot to see tweet come from the which locations

In [22]:
```
%matplotlib inline
location_data = Total_spam_data['UserLocation'].value_counts()
location_data[2:15].plot(kind='bar', figsize=(14,7))
```

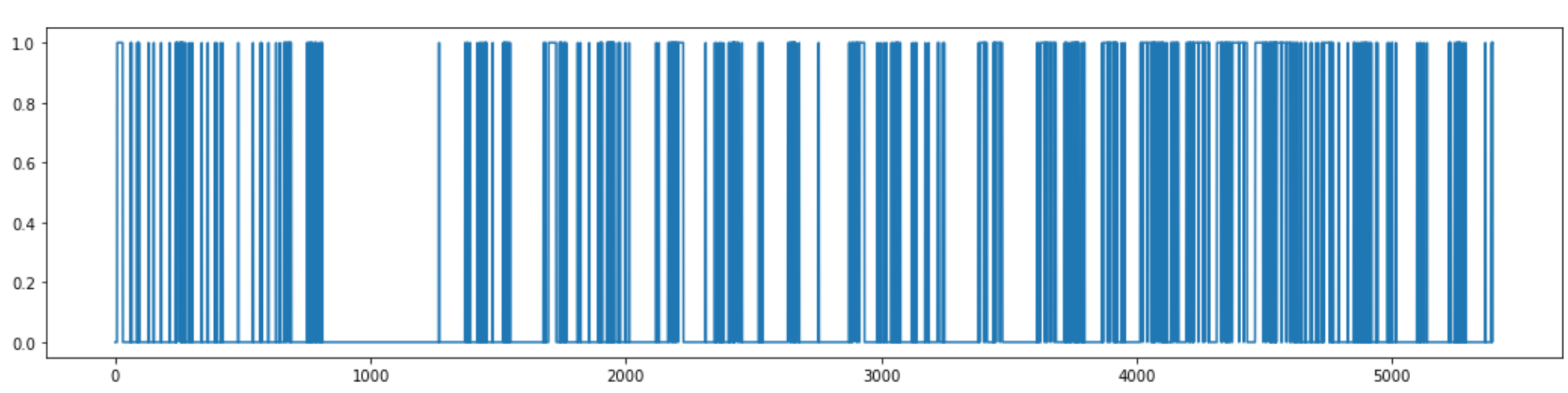
Out[22]: <matplotlib.axes._subplots.AxesSubplot at 0x206aa319280>



By Analyize Tweet I find that there is a lot of volgor word used by spam user compare to legitimate users

In [28]:
```
import matplotlib.pyplot as plt
import string as str
%matplotlib inline
plt.rcParams['figure.figsize'] = (18,4)
plt.rcParams['font.family'] = 'sans-serif'
text = Total_spam_data['TextData']
is_sex = text.str.contains('sex')
is_sex=is_sex.astype(float)
is_sex.plot()
```

Out[28]: <matplotlib.axes._subplots.AxesSubplot at 0x206aa38cee0>



In [29]:
```
Total_spam_data=Total_spam_data.fillna(0)
Total_spam_data.shape
```

Out[29]: (5394, 21)

In [30]:
```
temp2 = Total_spam_data[["UserFollowersCount"]]
temp2.to_csv('C:/Users/asha/Desktop/Final Year Project Phase 2/Phase 2/Step2/userfollowerscount1.csv', sep=',',encoding='utf8
```

convert retweetcount object to float

In [31]:
```
Total_spam_data[['RetweetCount']] = Total_spam_data[['RetweetCount']].astype(float)
Total_spam_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 5394 entries, 0 to 5393
Data columns (total 21 columns):
 #   Column                 Non-Null Count  Dtype
---  ------                 --------------  -----
 0   Unnamed: 0             5394 non-null   int64
 1   Unnamed: 0.1           5394 non-null   int64
 2   TwittID                5394 non-null   int64
 3   TextData               5394 non-null   object
 4   TweetCreatedAt         5394 non-null   object
 5   RetweetCount           5394 non-null   float64
 6   TweetFavouriteCount    5394 non-null   int64
 7   TweetSource            5394 non-null   object
 8   UserID                 5394 non-null   int64
 9   UserScreenName         5394 non-null   object
 10  UserName               5394 non-null   object
 11  UserCreatedAt          5394 non-null   object
 12  UserDescription        5394 non-null   object
 13  UserDescriptionLength  5394 non-null   int64
 14  UserFollowersCount     5394 non-null   int64
 15  UserFriendsCount       5394 non-null   int64
 16  UserLocation           5394 non-null   object
 17  HttpCount              5394 non-null   int64
 18  HashtagCount           5394 non-null   int64
 19  MentionCount           5394 non-null   int64
 20  TweetCount             5394 non-null   int64
dtypes: float64(1), int64(12), object(8)
memory usage: 885.1+ KB
```

to see how many people have zero tweet

In [32]:
```
Total_spam_data = Total_spam_data[Total_spam_data.TweetCount!=0]
len(Total_spam_data[Total_spam_data.TweetCount<30])
```

Out[32]: 54

Adding new Extra feature

In [33]:
```
Total_spam_data.loc[:,'AvgHashtag'] = (Total_spam_data.groupby('UserID')["HashtagCount"].transform('sum'))/30
Total_spam_data.loc[:,'AvgURLCount'] = (Total_spam_data.groupby('UserID')["HttpCount"].transform('sum'))/30
Total_spam_data.loc[:,'AvgMention'] = (Total_spam_data.groupby('UserID')["MentionCount"].transform('sum'))/30
Total_spam_data.loc[:,'AvgRetweet'] = (Total_spam_data.groupby('UserID')["RetweetCount"].transform('sum'))/30
Total_spam_data.loc[:,'AvgFavCount'] = (Total_spam_data.groupby('UserID')["TweetFavouriteCount"].transform('sum'))/30
```

In [34]:
```
Total_spam_data.tail(4)
```

Out[34]:

	Unnamed: 0	Unnamed: 0.1	TwittID	TextData	TweetCreatedAt	RetweetCount	TweetFavouriteCount	TweetSource	
5390	5390	746	1120300621578551296	RT @s___fire: your sex life is going bad ? you...	2019-04-22 12:17:37	22.0	0	Twitter for Android	10
5391	5391	747	1120300607309524992	RT @s___fire: Find your fantasy here and make ...	2019-04-22 12:17:33	18.0	0	Twitter for Android	10
5392	5392	748	1120300592046444545	RT @sexole: ONLINE EN https://t.co/wkT9BMovtL ...	2019-04-22 12:17:29	1.0	0	Twitter for Android	10
5393	5393	749	1120300537314979840	RT @DomUrch: @irinagomez60\n@HQPornHQ\n@Erotik...	2019-04-22 12:17:16	121.0	0	Twitter for Android	10

4 rows × 26 columns

Selecting Repeted columns only and droping the repeted rows

In [35]:
```
unique_spam_row = Total_spam_data[["UserID", "UserScreenName", "UserCreatedAt", "UserDescriptionLength","UserFollowersCount",
spam_data = unique_spam_row.drop_duplicates()
spam_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 177 entries, 0 to 5364
Data columns (total 13 columns):
 #   Column                 Non-Null Count  Dtype
---  ------                 --------------  -----
 0   UserID                 177 non-null    int64
 1   UserScreenName         177 non-null    object
 2   UserCreatedAt          177 non-null    object
 3   UserDescriptionLength  177 non-null    int64
 4   UserFollowersCount     177 non-null    int64
 5   UserFriendsCount       177 non-null    int64
 6   UserLocation           177 non-null    object
 7   AvgHashtag             177 non-null    float64
 8   AvgURLCount            177 non-null    float64
 9   AvgMention             177 non-null    float64
 10  AvgRetweet             177 non-null    float64
 11  AvgFavCount            177 non-null    float64
 12  TweetCount             177 non-null    int64
dtypes: float64(5), int64(5), object(3)
memory usage: 19.4+ KB
```

Saving the reduced Spammer data

In [36]:
```
fre = spam_data["UserFriendsCount"]
fre.to_csv("C:/Users/asha/Desktop/Final Year Project Phase 2/Phase 2/Step2/userfriendscount1.csv", sep=',',encoding='utf8')
```

userfriendscount Datatype conversion from object to float

In [38]:
```
spam_data[['UserFriendsCount']] = spam_data[['UserFriendsCount']].astype(float)
spam_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 177 entries, 0 to 5364
Data columns (total 13 columns):
 #   Column                 Non-Null Count  Dtype
---  ------                 --------------  -----
 0   UserID                 177 non-null    int64
 1   UserScreenName         177 non-null    object
 2   UserCreatedAt          177 non-null    object
 3   UserDescriptionLength  177 non-null    int64
 4   UserFollowersCount     177 non-null    int64
 5   UserFriendsCount       177 non-null    float64
 6   UserLocation           177 non-null    object
 7   AvgHashtag             177 non-null    float64
 8   AvgURLCount            177 non-null    float64
 9   AvgMention             177 non-null    float64
 10  AvgRetweet             177 non-null    float64
 11  AvgFavCount            177 non-null    float64
 12  TweetCount             177 non-null    int64
dtypes: float64(6), int64(4), object(3)
memory usage: 19.4+ KB
```

Add a Column to Spammer Data that this is Spam =1

In [42]:
```
spam_data.loc[:, "SpammerOrNot"]=1
spam_data.head()
```

```
C:\Users\asha\anaconda3\lib\site-packages\pandas\core\indexing.py:966: SettingWithCopyWarning:
A value is trying to be set on a copy of a slice from a DataFrame.
Try using .loc[row_indexer,col_indexer] = value instead

See the caveats in the documentation: https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy (https://pandas.pydata.org/pandas-docs/stable/user_guide/indexing.html#returning-a-view-versus-a-copy)
  self.obj[item] = s
```

Out[42]:

	UserID	UserScreenName	UserCreatedAt	UserDescriptionLength	UserFollowersCount	UserFriendsCount	UserLocation	AvgHashtag	AvgURLC
0	1119864633110794240	Murat41222943	2019-04-21 07:25:09	139	17	761.0	İstanbul Beylikdüzü	0.000000	0.966
30	1099556638401486849	Ar1_sa3	2019-02-24 06:28:26	7	96	111.0	0	0.466667	0.533
60	978987895301263360	Stew45641594	2018-03-28 13:31:17	0	61	671.0	Miami, FL/jamaica	1.100000	0.833
90	1066182466669547520	fakesmilesonly	2018-11-24 04:11:23	47	15612	5799.0	0	0.000000	0.333
120	1049690686465949696	BhonestTo	2018-10-09 15:58:56	160	2380	3719.0	Canton Ohio	0.400000	0.533

Describe both legitimate user and spammer user of Twitter count

In [43]:
```
spam_data["TweetCount"].describe()
```

Out[43]:
```
count    1.770000e+02
mean     2.532717e+04
std      9.549593e+04
min      1.000000e+00
25%      6.410000e+02
50%      4.744000e+03
75%      1.185200e+04
max      1.150378e+06
Name: TweetCount, dtype: float64
```

In [49]:
```
leg_data["TweetCount"].describe()
```

Out[49]:
```
count       375.000000
mean      41288.162667
std       93281.144477
min           1.000000
25%         324.000000
50%        3883.000000
75%       20650.000000
max      596778.000000
Name: TweetCount, dtype: float64
```

Merging the legitimate and spammer data

In [48]:
```
frames = [leg_data, spam_data]
Total_data = pd.concat(frames, axis=0, sort=False)
Total_data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
Int64Index: 552 entries, 0 to 5364
Data columns (total 14 columns):
 #   Column                 Non-Null Count  Dtype
---  ------                 --------------  -----
 0   UserID                 552 non-null    int64
 1   UserScreenName         552 non-null    object
 2   UserCreatedAt          552 non-null    object
 3   UserDescriptionLength  552 non-null    int64
 4   UserFollowersCount     552 non-null    int64
 5   UserFriendsCount       552 non-null    float64
 6   UserLocation           552 non-null    object
 7   AvgHashtag             552 non-null    float64
 8   AvgURLCount            552 non-null    float64
 9   AvgMention             552 non-null    float64
 10  AvgRetweet             552 non-null    float64
 11  AvgFavCount            552 non-null    float64
 12  TweetCount             552 non-null    int64
 13  SpammerOrNot           552 non-null    int64
dtypes: float64(6), int64(5), object(3)
memory usage: 64.7+ KB
```

In [47]:
```
Total_data.reset_index()
Total_data.to_csv('Total_data.csv', sep=',', encoding='utf8')
```