```python
import pandas as pd
import numpy as np
```

```python
import sqlite3
```

```python
con = sqlite3.connect(r'C:\Aabid Study\LEARNING DATA SCIENCE\Projects\Zomato Dat
```

```python
df = pd.read_sql("Select * from users", con)
```

```python
df.columns
```

```
Index(['index', 'url', 'address', 'name', 'online_order', 'book_table', 'rate',
       'votes', 'phone', 'location', 'rest_type', 'dish_liked', 'cuisines',
       'approx_cost(for two people)', 'reviews_list', 'menu_item',
       'listed_in(type)', 'listed_in(city)'],
      dtype='object')
```

```python
df.isnull().sum()
```

```
index                            0
url                              0
address                          0
name                             0
online_order                     0
book_table                       0
rate                          7775
votes                            0
phone                         1208
location                        21
rest_type                      227
dish_liked                   28078
cuisines                        45
approx_cost(for two people)    346
reviews_list                     0
menu_item                        0
listed_in(type)                  0
listed_in(city)                  0
dtype: int64
```

```python
df.isnull().sum()/ len(df)*100
```

```
Out[ ]:  index                           0.000000
         url                             0.000000
         address                         0.000000
         name                            0.000000
         online_order                    0.000000
         book_table                      0.000000
         rate                           15.033741
         votes                           0.000000
         phone                           2.335789
         location                        0.040606
         rest_type                       0.438927
         dish_liked                     54.291626
         cuisines                        0.087012
         approx_cost(for two people)     0.669026
         reviews_list                    0.000000
         menu_item                       0.000000
         listed_in(type)                 0.000000
         listed_in(city)                 0.000000
         dtype: float64
```

In [ ]: `df['rate'].unique()`

```
Out[ ]:  array(['4.1/5', '3.8/5', '3.7/5', '3.6/5', '4.6/5', '4.0/5', '4.2/5',
                '3.9/5', '3.1/5', '3.0/5', '3.2/5', '3.3/5', '2.8/5', '4.4/5',
                '4.3/5', 'NEW', '2.9/5', '3.5/5', None, '2.6/5', '3.8 /5', '3.4/5',
                '4.5/5', '2.5/5', '2.7/5', '4.7/5', '2.4/5', '2.2/5', '2.3/5',
                '3.4 /5', '-', '3.6 /5', '4.8/5', '3.9 /5', '4.2 /5', '4.0 /5',
                '4.1 /5', '3.7 /5', '3.1 /5', '2.9 /5', '3.3 /5', '2.8 /5',
                '3.5 /5', '2.7 /5', '2.5 /5', '3.2 /5', '2.6 /5', '4.5 /5',
                '4.3 /5', '4.4 /5', '4.9/5', '2.1/5', '2.0/5', '1.8/5', '4.6 /5',
                '4.9 /5', '3.0 /5', '4.8 /5', '2.3 /5', '4.7 /5', '2.4 /5',
                '2.1 /5', '2.2 /5', '2.0 /5', '1.8 /5'], dtype=object)
```

In [ ]: `df['rate'].replace(('NEW','-'), np.nan, inplace = True)`

```
C:\Users\aabid\AppData\Local\Temp\ipykernel_13708\2647609656.py:1: FutureWarning:
A value is trying to be set on a copy of a DataFrame or Series through chained as
signment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work becau
se the intermediate object on which we are setting values always behaves as a cop
y.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.meth
od({col: value}, inplace=True)' or df[col] = df[col].method(value) instead, to pe
rform the operation inplace on the original object.


  df['rate'].replace(('NEW','-'), np.nan, inplace = True)
```

In [ ]: `df['rate'].unique()`

```
Out[ ]:  array(['4.1/5', '3.8/5', '3.7/5', '3.6/5', '4.6/5', '4.0/5', '4.2/5',
                '3.9/5', '3.1/5', '3.0/5', '3.2/5', '3.3/5', '2.8/5', '4.4/5',
                '4.3/5', nan, '2.9/5', '3.5/5', None, '2.6/5', '3.8 /5', '3.4/5',
                '4.5/5', '2.5/5', '2.7/5', '4.7/5', '2.4/5', '2.2/5', '2.3/5',
                '3.4 /5', '3.6 /5', '4.8/5', '3.9 /5', '4.2 /5', '4.0 /5',
                '4.1 /5', '3.7 /5', '3.1 /5', '2.9 /5', '3.3 /5', '2.8 /5',
                '3.5 /5', '2.7 /5', '2.5 /5', '3.2 /5', '2.6 /5', '4.5 /5',
                '4.3 /5', '4.4 /5', '4.9/5', '2.1/5', '2.0/5', '1.8/5', '4.6 /5',
                '4.9 /5', '3.0 /5', '4.8 /5', '2.3 /5', '4.7 /5', '2.4 /5',
                '2.1 /5', '2.2 /5', '2.0 /5', '1.8 /5'], dtype=object)
```

In [ ]: `df['rate']= df['rate'].apply(lambda x :float(x.split('/')[0]) if type(x) == str`

In [ ]: `df['rate']`

```
Out[ ]:  0          4.1
         1          4.1
         2          3.8
         3          3.7
         4          3.8
                   ...
         51712      3.6
         51713      NaN
         51714      NaN
         51715      4.3
         51716      3.4
         Name: rate, Length: 51717, dtype: float64
```

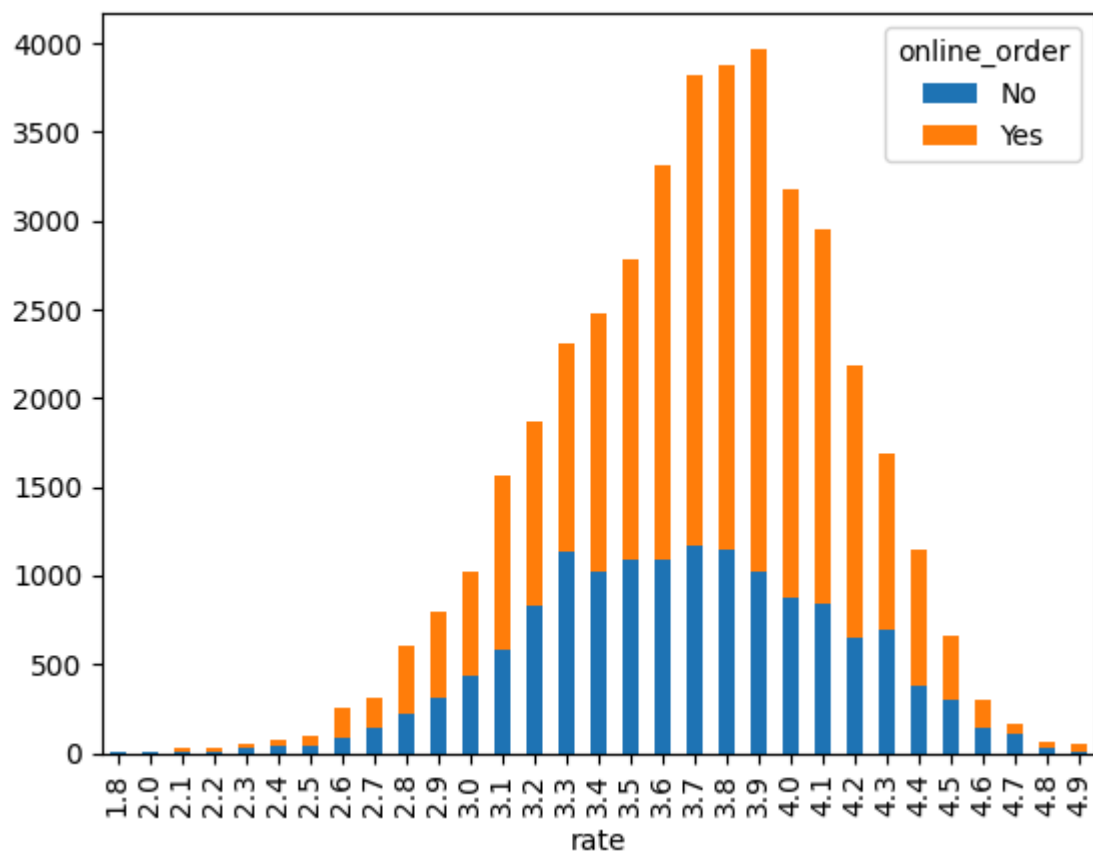In [ ]: `x = pd.crosstab(df['rate'],df['online_order'])`

In [ ]: `x`

online_order rate	No	Yes
1.8	5	0
2.0	11	0
2.1	9	15
2.2	10	16
2.3	29	22
2.4	36	34
2.5	38	63
2.6	83	177
2.7	141	166
2.8	224	376
2.9	314	488
3.0	439	584
3.1	587	974
3.2	829	1044
3.3	1137	1173
3.4	1024	1452
3.5	1090	1694
3.6	1090	2226
3.7	1172	2649
3.8	1147	2726
3.9	1017	2955
4.0	874	2309
4.1	843	2105
4.2	648	1536
4.3	692	1001
4.4	374	773
4.5	297	359
4.6	140	160
4.7	113	54
4.8	34	32
4.9	12	43

```
In [ ]:  x.plot(kind = 'bar', stacked= True)
```

```
Out[ ]:  <Axes: xlabel='rate'>
```



```
In [ ]:  x.sum(axis = 1).astype(float)
```

```
Out[ ]:  rate
         1.8        5.0
         2.0       11.0
         2.1       24.0
         2.2       26.0
         2.3       51.0
         2.4       70.0
         2.5      101.0
         2.6      260.0
         2.7      307.0
         2.8      600.0
         2.9      802.0
         3.0     1023.0
         3.1     1561.0
         3.2     1873.0
         3.3     2310.0
         3.4     2476.0
         3.5     2784.0
         3.6     3316.0
         3.7     3821.0
         3.8     3873.0
         3.9     3972.0
         4.0     3183.0
         4.1     2948.0
         4.2     2184.0
         4.3     1693.0
         4.4     1147.0
         4.5      656.0
         4.6      300.0
         4.7      167.0
         4.8       66.0
         4.9       55.0
         dtype: float64
```

```python
In [ ]: normalize_df =x.div(x.sum(axis = 1).astype(float),axis = 0)
```
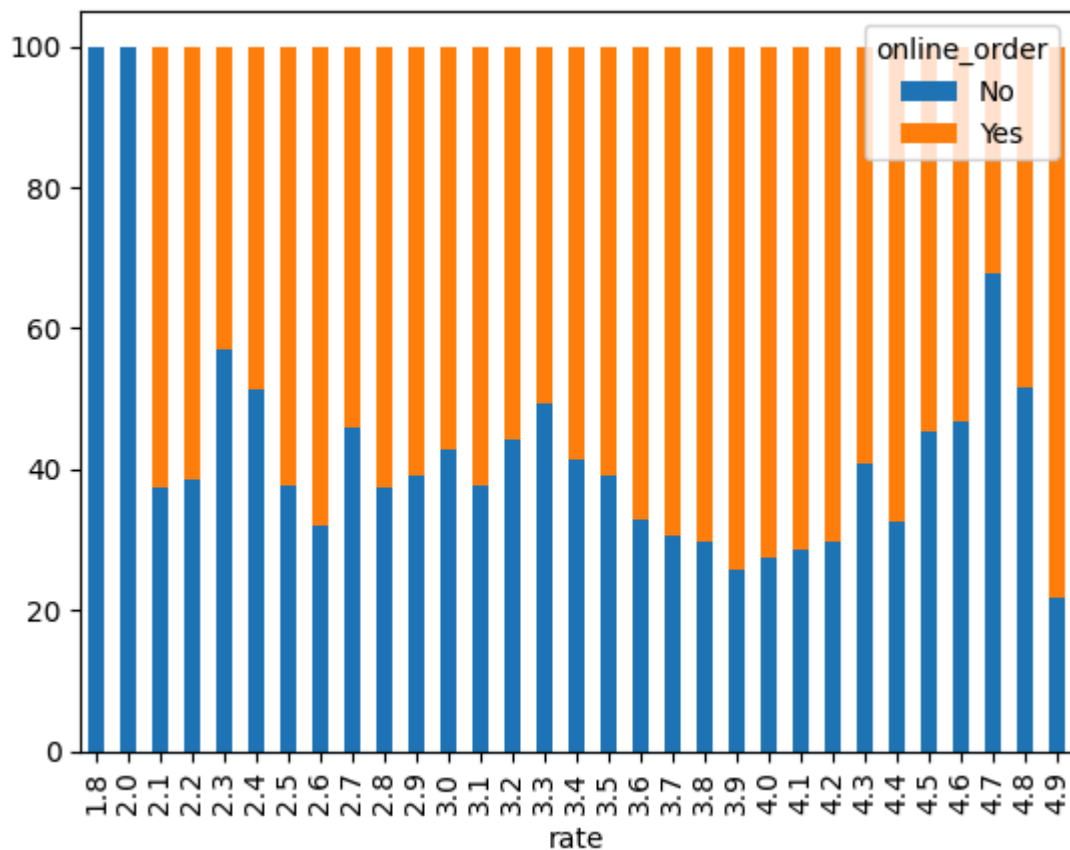
```python
In [ ]: normalize_df*100
```

online_order	No	Yes
rate		
1.8	100.000000	0.000000
2.0	100.000000	0.000000
2.1	37.500000	62.500000
2.2	38.461538	61.538462
2.3	56.862745	43.137255
2.4	51.428571	48.571429
2.5	37.623762	62.376238
2.6	31.923077	68.076923
2.7	45.928339	54.071661
2.8	37.333333	62.666667
2.9	39.152120	60.847880
3.0	42.913001	57.086999
3.1	37.604100	62.395900
3.2	44.260545	55.739455
3.3	49.220779	50.779221
3.4	41.357027	58.642973
3.5	39.152299	60.847701
3.6	32.870929	67.129071
3.7	30.672599	69.327401
3.8	29.615285	70.384715
3.9	25.604230	74.395770
4.0	27.458373	72.541627
4.1	28.595658	71.404342
4.2	29.670330	70.329670
4.3	40.874188	59.125812
4.4	32.606800	67.393200
4.5	45.274390	54.725610
4.6	46.666667	53.333333
4.7	67.664671	32.335329
4.8	51.515152	48.484848
4.9	21.818182	78.181818

```
In [ ]: (normalize_df*100).plot(kind='bar',stacked = True)
```

```
Out[ ]: <Axes: xlabel='rate'>
```



```
In [ ]: df['rest_type'].isnull().sum()
```

```
Out[ ]: np.int64(227)
```

```
In [ ]: data = df.dropna(subset=['rest_type'])
```

```
In [ ]: data['rest_type'].isnull().sum()
```

```
Out[ ]: np.int64(0)
```

```
In [ ]: data['rest_type'].unique()
```

```
Out[ ]:  array(['Casual Dining', 'Cafe, Casual Dining', 'Quick Bites',
                'Casual Dining, Cafe', 'Cafe', 'Quick Bites, Cafe',
                'Cafe, Quick Bites', 'Delivery', 'Mess', 'Dessert Parlor',
                'Bakery, Dessert Parlor', 'Pub', 'Bakery', 'Takeaway, Delivery',
                'Fine Dining', 'Beverage Shop', 'Sweet Shop', 'Bar',
                'Beverage Shop, Quick Bites', 'Confectionery',
                'Quick Bites, Beverage Shop', 'Dessert Parlor, Sweet Shop',
                'Bakery, Quick Bites', 'Sweet Shop, Quick Bites', 'Kiosk',
                'Food Truck', 'Quick Bites, Dessert Parlor',
                'Beverage Shop, Dessert Parlor', 'Takeaway', 'Pub, Casual Dining',
                'Casual Dining, Bar', 'Dessert Parlor, Beverage Shop',
                'Quick Bites, Bakery', 'Dessert Parlor, Quick Bites',
                'Microbrewery, Casual Dining', 'Lounge', 'Bar, Casual Dining',
                'Food Court', 'Cafe, Bakery', 'Dhaba', 'Quick Bites, Sweet Shop',
                'Microbrewery', 'Food Court, Quick Bites', 'Pub, Bar',
                'Casual Dining, Pub', 'Lounge, Bar', 'Food Court, Dessert Parlor',
                'Casual Dining, Sweet Shop', 'Food Court, Casual Dining',
                'Casual Dining, Microbrewery', 'Sweet Shop, Dessert Parlor',
                'Bakery, Beverage Shop', 'Lounge, Casual Dining',
                'Cafe, Food Court', 'Beverage Shop, Cafe', 'Cafe, Dessert Parlor',
                'Dessert Parlor, Cafe', 'Dessert Parlor, Bakery',
                'Microbrewery, Pub', 'Bakery, Food Court', 'Club',
                'Quick Bites, Food Court', 'Bakery, Cafe', 'Bar, Cafe',
                'Pub, Cafe', 'Casual Dining, Irani Cafee', 'Fine Dining, Lounge',
                'Bar, Quick Bites', 'Bakery, Kiosk', 'Pub, Microbrewery',
                'Microbrewery, Lounge', 'Fine Dining, Microbrewery',
                'Fine Dining, Bar', 'Mess, Quick Bites', 'Dessert Parlor, Kiosk',
                'Bhojanalya', 'Casual Dining, Quick Bites', 'Pop Up', 'Cafe, Bar',
                'Casual Dining, Lounge', 'Bakery, Sweet Shop', 'Microbrewery, Bar',
                'Cafe, Lounge', 'Bar, Pub', 'Lounge, Cafe', 'Club, Casual Dining',
                'Quick Bites, Mess', 'Quick Bites, Meat Shop',
                'Quick Bites, Kiosk', 'Lounge, Microbrewery',
                'Food Court, Beverage Shop', 'Dessert Parlor, Food Court',
                'Bar, Lounge'], dtype=object)
```

```python
In [ ]:  quick_bites_df =data[data['rest_type'].str.contains('Quick Bites')]
```

```python
In [ ]:  quick_bites_df.columns
```

```
Out[ ]:  Index(['index', 'url', 'address', 'name', 'online_order', 'book_table', 'rate',
                'votes', 'phone', 'location', 'rest_type', 'dish_liked', 'cuisines',
                'approx_cost(for two people)', 'reviews_list', 'menu_item',
                'listed_in(type)', 'listed_in(city)'],
               dtype='object')
```

```python
In [ ]:  quick_bites_df['reviews_list'] =quick_bites_df['reviews_list'].apply(lambda x :x
```

```
C:\Users\aabid\AppData\Local\Temp\ipykernel_13708\3119713499.py:1: SettingWithCop
yWarning:
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/stabl
e/user_guide/indexing.html#returning-a-view-versus-a-copy
  quick_bites_df['reviews_list'] =quick_bites_df['reviews_list'].apply(lambda x :
x.lower())
```

```python
In [ ]:  quick_bites_df['reviews_list'].astype(str)
```

```
Out[ ]:  3          [('rated 4.0', "rated\n  great food and proper...
         23         [('rated 4.0', "rated\n  so, went here with fr...
         26         [('rated 5.0', 'rated\n  please provide some e...
         31         [('rated 1.0', "rated\n  worst restaurant ever...
         34         [('rated 3.0', 'rated\n  not worth for the mon...
                                          ...
         51641      [('rated 2.0', "rated\n  food is not upto the ...
         51642                                                   []
         51643                                                   []
         51644                                                   []
         51645      [('rated 5.0', "rated\n  i was randomly lookin...
         Name: reviews_list, Length: 20639, dtype: object
```

In [ ]:
```python
from nltk.corpus import RegexpTokenizer
```

In [ ]:
```python
tokenizer = RegexpTokenizer("[a-zA-Z]+")
```

In [ ]:
```python
tokenizer
```

Out[ ]:
```
RegexpTokenizer(pattern='[a-zA-Z]+', gaps=False, discard_empty=True, flags=re.U
NICODE|re.MULTILINE|re.DOTALL)
```

In [ ]:
```python
tokenizer.tokenize(quick_bites_df['reviews_list'][3])
```

```
Out[ ]: ['rated',
         'rated',
         'n',
         'great',
         'food',
         'and',
         'proper',
         'karnataka',
         'style',
         'full',
         'meals',
         'been',
         'there',
         'twice',
         'and',
         'was',
         'fully',
         'satisfied',
         'will',
         'give',
         'stars',
         'if',
         'it',
         's',
         'well',
         'managed',
         'rated',
         'rated',
         'n',
         'reached',
         'the',
         'place',
         'at',
         'pm',
         'on',
         'saturday',
         'half',
         'of',
         'the',
         'items',
         'on',
         'the',
         'menu',
         'were',
         'over',
         'what',
         'was',
         'annoying',
         'was',
         'is',
         'the',
         'food',
         'was',
         'cold',
         'the',
         'taste',
         'was',
         'also',
         'very',
         'average',
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'only',
'dosa',
'and',
'holige',
'were',
'good',
'there',
'were',
'very',
'few',
'people',
'in',
'the',
'restaurant',
'and',
'the',
'service',
'was',
'still',
'very',
'slow',
'the',
'waiters',
'were',
'all',
'standing',
'in',
'one',
'corner',
'and',
'talking',
'had',
'to',
'call',
'them',
'repeatedly',
'rated',
'rated',
'n',
'had',
'been',
'here',
'good',
'food',
'served',
'and',
'tasty',
'good',
'place',
'to',
'go',
'with',
'freinds',
'and',
'family',
'should',
'be',
'first',
'to',
'get',

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'served',
'well',
'with',
'all',
'food',
'one',
'of',
'the',
'good',
'hotel',
'there',
'for',
'this',
'price',
'rated',
'rated',
'n',
'how',
'can',
'a',
'udupi',
'restaurant',
'be',
'so',
'dirty',
'the',
'floor',
'the',
'walls',
'the',
'waiters',
'are',
'all',
'stained',
'in',
'food',
'why',
'cant',
'they',
'clean',
'it',
'the',
'floor',
'even',
'had',
'decorative',
'colour',
'paper',
'every',
'where',
'and',
'lot',
'of',
'food',
'now',
'coming',
'to',
'the',
'taste',
'of',
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'the',
'food',
'it',
'was',
'pretty',
'decent',
'for',
'what',
'they',
'chargw',
'what',
'upset',
'us',
'was',
'the',
'menu',
'says',
'they',
'serve',
'thambuli',
'two',
'variety',
'of',
'rice',
'etc',
'but',
'they',
'were',
'all',
'over',
'at',
'but',
'they',
'still',
'charged',
'us',
'full',
'amount',
'lastly',
'if',
'u',
'r',
'ok',
'to',
'b',
'seated',
'with',
'random',
'people',
'and',
'adjust',
'with',
'their',
'table',
'manners',
'burrping',
'etc',
'then',
'tis',
'place',

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'is',
'decent',
'for',
'a',
'quick',
'veg',
'udupi',
'meals',
'rated',
'rated',
'n',
'aadhuri',
'udupi',
'bhojana',
'is',
'one',
'of',
'the',
'best',
'vegetarian',
'hotel',
'in',
'and',
'around',
'banashankari',
'locality',
'nwere',
'we',
'can',
'enjoy',
'the',
'authentic',
'south',
'karnataka',
'style',
'food',
'rated',
'rated',
'n',
'one',
'of',
'the',
'best',
'restaurants',
'for',
'unlimited',
'food',
'price',
'for',
'one',
'full',
'unlimited',
'meal',
'is',
'and',
'the',
'service',
'is',
'awesome',
'here',
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'if',
'you',
'x',
'x',
'x',
'x',
'x',
'x',
'x',
'x',
're',
'a',
'costalian',
'you',
'will',
'love',
'the',
'food',
'served',
'here',
'rated',
'rated',
'n',
'been',
'here',
'a',
'couple',
'of',
'times',
'highly',
'satisfying',
'on',
'both',
'the',
'ocassions',
'great',
'food',
'decent',
'service',
'at',
'price',
'of',
'per',
'person',
'it',
'is',
'of',
'a',
'great',
'value',
'the',
'staff',
'here',
'serves',
'in',
'a',
'traditional',
'mysore',
'style',
'dresses',

'the',
'food',
'is',
'authentic',
'karnataka',
'meals',
'i',
'really',
'liked',
'the',
'pineapple',
'pickle',
'chutney',
'they',
'serve',
'some',
'varities',
'of',
'rice',
'of',
'which',
'you',
'shouldn',
't',
'try',
'all',
'as',
'you',
'would',
'already',
'be',
'full',
'roti',
'dosa',
'were',
'decent',
'in',
'the',
'deserts',
'payasam',
'holige',
'were',
'good',
'ni',
'think',
'it',
'is',
'one',
'the',
'must',
'try',
'places',
'to',
'try',
'some',
'authentic',
'south',
'food',
'even',
'if',

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'you',
'have',
'been',
'to',
'the',
'likes',
'of',
'kamath',
'etc',
'this',
'one',
'is',
'a',
'little',
'different',
'rated',
'rated',
'n',
'very',
'good',
'restorent',
'good',
'south',
'indian',
'food',
'very',
'nice',
'all',
'food',
's',
'are',
'good',
'we',
'spent',
'good',
'time',
'and',
'food',
'in',
'this',
'hotel',
'value',
'of',
'money',
'we',
'loved',
'it',
'rated',
'rated',
'n',
'i',
'went',
'to',
'this',
'restaurant',
'on',
'sunday',
'afternoon',
'it',
'was',
```

'a',
'bit',
'crowded',
'n',
'nits',
'located',
'in',
'the',
'st',
'floor',
'above',
'anna',
'kuteera',
'kathriguppe',
'n',
'nyou',
'need',
'to',
'take',
'food',
'coupon',
'in',
'the',
'ground',
'floor',
'itself',
'nit',
'was',
'rs',
'n',
'ntaste',
'wise',
'it',
'was',
'good',
'nservice',
'was',
'slow',
'nnothing',
'exciting',
'different',
'in',
'the',
'menu',
'nwhatever',
'they',
'serve',
'its',
'good',
'nworth',
'for',
'money',
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'visit',
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'place',
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'udupi',
'staff',
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'and',
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'i',
'm',
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'of',
'the',
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'poor',
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'poorly',
'trained',
'i',
'didn',
't',
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'few',
'items',
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'and',
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'my',
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'and',
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'and',
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'of',
'palya',
'kosambari',
'and',
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'then',
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'dosa',
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'pulav',
'veg',
'rice',
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'as',
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'will',
'make',
'it',
'slow',
'if',
'u',
'tell',
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'to',
'then',
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'rice',
'with',
'sambar',
'rasam',
'daal',
'tambali',
'and',
'yes',
'dont',
'forget',
'to',
'eat',
'holige',
'payasam',
'and',
'icecream',
'service',
'is',
'very',
'nice',
'one',
'best',
'thing',
'is',
'all',
'of',
'this',
'comes',
'in',
'just',
'rs',
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'and',
'its',
'unlimited',
'what',
'else',
'you',
'want',
'a',
'must',
'visit',
'place',
'for',
'south',
'indian',
'foodie',
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'n',
'been',
'here',
'last',
'week',
'with',
'high',
'expectations',
'based',
'on',
'few',
'reviews',
'but',
'utterly',
'disappointed',
'with',
'the',
'food',
'quality',
'taste',
'i',
'feel',
'it',
's',
'an',
'overhyped',
'place',
'there',
'are',
'many',
'better',
'places',
'in',
'the',
'vicinity',
'for',
'plantain',
'leaf',
'meal',
'there',
'was',
'too',
'much',
```

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           'of',
           'waiting',
           'these',
           'staffs',
           'were',
           'too',
           'hurry',
           'in',
           'serving',
           'food',
           'asking',
           'people',
           'to',
           'finish',
           'meal',
           'leave',
           'quickly',
           'i',
           'can',
           'understand',
           'there',
           'is',
           'a',
           'waiting',
           'and',
           'staffs',
           'should',
           'approach',
           'in',
           'a',
           'positive',
           'way',
           'i',
           'will',
           'never',
           'go',
           'there',
           'again',
           'n',
           'nbangaloreepicure',
           ...]
```

In [ ]: `sample = data['reviews_list'].apply(tokenizer.tokenize)`

In [ ]: `sample`

Out[ ]:
```
0        [Rated, RATED, n, A, beautiful, place, to, din...
1        [Rated, RATED, n, Had, been, here, for, dinner...
2        [Rated, RATED, n, Ambience, is, not, that, goo...
3        [Rated, RATED, n, Great, food, and, proper, Ka...
4        [Rated, RATED, n, Very, good, restaurant, in, ...
                               ...
51712    [Rated, RATED, n, Food, and, service, are, inc...
51713                                                   []
51714                                                   []
51715    [Rated, RATED, n, Nice, and, friendly, place, ...
51716    [Rated, RATED, n, Great, ambience, looking, ni...
Name: reviews_list, Length: 51490, dtype: object
```

```python
from nltk.corpus import stopwords
```

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

```
[nltk_data] Downloading package stopwords to
[nltk_data]     C:\Users\aabid\AppData\Roaming\nltk_data...
[nltk_data]   Package stopwords is already up-to-date!
```

```
True
```

```python
stop = stopwords.words('english')
```

```python
stop.extend(['rated','n','nan','x','RATED',"Rated"])
```

```python
rev3 = sample[3]
```

```python
print(rev3)
```

['Rated', 'RATED', 'n', 'Great', 'food', 'and', 'proper', 'Karnataka', 'style',
'full', 'meals', 'Been', 'there', 'twice', 'and', 'was', 'fully', 'satisfied', 'W
ill', 'give', 'stars', 'if', 'it', 's', 'well', 'managed', 'Rated', 'RATED', 'n',
'Reached', 'the', 'place', 'at', 'pm', 'on', 'Saturday', 'Half', 'of', 'the', 'it
ems', 'on', 'the', 'menu', 'were', 'over', 'What', 'was', 'annoying', 'was', 'i
s', 'the', 'food', 'was', 'cold', 'The', 'taste', 'was', 'also', 'very', 'averag
e', 'Only', 'dosa', 'and', 'holige', 'were', 'good', 'There', 'were', 'very', 'fe
w', 'people', 'in', 'the', 'restaurant', 'and', 'the', 'service', 'was', 'still',
'very', 'slow', 'The', 'waiters', 'were', 'all', 'standing', 'in', 'one', 'corne
r', 'and', 'talking', 'Had', 'to', 'call', 'them', 'repeatedly', 'Rated', 'RATE
D', 'n', 'Had', 'been', 'here', 'good', 'food', 'served', 'and', 'tasty', 'good',
'place', 'to', 'go', 'with', 'freinds', 'and', 'family', 'should', 'be', 'first',
'to', 'get', 'served', 'well', 'with', 'all', 'food', 'One', 'of', 'the', 'good',
'hotel', 'there', 'for', 'this', 'price', 'Rated', 'RATED', 'n', 'How', 'can',
'a', 'Udupi', 'restaurant', 'be', 'so', 'dirty', 'the', 'floor', 'the', 'walls',
'the', 'waiters', 'are', 'all', 'stained', 'in', 'food', 'Why', 'cant', 'they',
'clean', 'it', 'The', 'floor', 'even', 'had', 'decorative', 'colour', 'paper', 'e
very', 'where', 'and', 'lot', 'of', 'food', 'Now', 'coming', 'to', 'the', 'tast
e', 'of', 'the', 'food', 'it', 'was', 'pretty', 'decent', 'for', 'what', 'they',
'chargw', 'What', 'upset', 'us', 'was', 'the', 'menu', 'says', 'they', 'serve',
'thambuli', 'two', 'variety', 'of', 'rice', 'etc', 'but', 'they', 'were', 'all',
'over', 'at', 'but', 'they', 'still', 'charged', 'us', 'full', 'amount', 'Lastl
y', 'if', 'u', 'r', 'ok', 'to', 'b', 'seated', 'with', 'random', 'people', 'and',
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egetarian', 'hotel', 'in', 'and', 'around', 'Banashankari', 'locality', 'nwere',
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ed', 'food', 'Price', 'for', 'one', 'full', 'unlimited', 'meal', 'is', 'and', 'th
e', 'service', 'is', 'awesome', 'here', 'If', 'you', 'x', 'x', 'x', 'x', 'x',
'x', 'x', 'x', 're', 'a', 'costalian', 'you', 'will', 'love', 'the', 'food', 'ser
ved', 'here', 'Rated', 'RATED', 'n', 'Been', 'here', 'a', 'couple', 'of', 'time
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s', 'I', 'really', 'liked', 'the', 'pineapple', 'pickle', 'chutney', 'They', 'ser
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s', 'of', 'Kamath', 'etc', 'this', 'one', 'is', 'a', 'little', 'different', 'Rate
d', 'RATED', 'n', 'Very', 'good', 'restorent', 'good', 'south', 'Indian', 'food',
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t', 'Rated', 'RATED', 'n', 'I', 'went', 'to', 'this', 'restaurant', 'on', 'Sunda
y', 'afternoon', 'It', 'was', 'a', 'bit', 'crowded', 'n', 'nIts', 'located', 'i
n', 'the', 'st', 'floor', 'Above', 'anna', 'kuteera', 'kathriguppe', 'n', 'nYou',
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s', 'slow', 'nNothing', 'exciting', 'different', 'in', 'the', 'menu', 'nWhateve
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d', 'RATED', 'n', 'Nice', 'food', 'good', 'ambiance', 'so', 'many', 'verity', 'o
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d', 'totally', 'unresponsive', 'staff', 'They', 'are', 'either', 'understaffed',
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ew', 'reviews', 'But', 'utterly', 'disappointed', 'with', 'the', 'food', 'qualit
y', 'taste', 'I', 'feel', 'it', 's', 'an', 'overhyped', 'place', 'There', 'are',
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e', 'too', 'hurry', 'in', 'serving', 'food', 'asking', 'people', 'to', 'finish',
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g', 'and', 'staffs', 'should', 'approach', 'in', 'a', 'positive', 'way', 'I', 'wi
ll', 'never', 'go', 'there', 'again', 'n', 'nbangaloreepicure', 'com', 'Rated',
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'I', 'don', 't', 'like', 'it', 'either', 'But', 'still', 'made', 'up', 'my', 'min
d', 'on', 'Sankaranti', 'to', 'have', 'authentic', 'south', 'Indian', 'food', 'vi
sited', 'Adduri', 'Udupi', 'Bhojana', 'because', 'it', 'was', 'close', 'to', 'm
y', 'place', 'I', 'just', 'had', 'a', 'look', 'at', 'the', 'menu', 'told', 'mysel
f', 'that', 'I', 'can', 'do', 'it', 'I', 'am', 'not', 'blessed', 'with', 'a', 'tr
emendous', 'appetite', 'welcomed', 'with', 'the', 'mango', 'soup', 'followed', 'b
y', 'the', 'wide', 'variety', 'of', 'dishes', 'served', 'I', 'have', 'developed',
'the', 'new', 'love', 'for', 'Pongal', 'both', 'sweet', 'and', 'Khara', 'I', 'ca
n', 'still', 'feel', 'the', 'taste', 'of', 'the', 'ghee', 'bursting', 'in', 'my',
'mouth', 'but', 'it', 'was', 'kai', 'holige', 'that', 'made', 'my', 'day', 'cris
p', 'and', 'soft', 'not', 'to', 'forget', 'food', 'is', 'served', 'on', 'a', 'ban
ana', 'leaf', 'that', 'adds', 'in', 'more', 'flavor', 'and', 'taste', 'waiters',
'are', 'attentive', 'and', 'responsive', 'The', 'customer', 's', 'needs', 'are',
'monitored', 'and', 'addressed', 'so', 'much', 'variety', 'for', 'just', 'Rs', 'w
ithout', 'compromising', 'on', 'quantity', 'and', 'quality', 'and', 'yes', 'it',
'is', 'unlimited', 'This', 'visit', 'turned', 'out', 'to', 'be', 'a', 'surprise',

'package', 'Rated', 'RATED', 'n', 'Food', 'is', 'good', 'nNo', 'parking', 'nAmbie
nce', 'is', 'average', 'nOverall', 'its', 'value', 'for', 'money', 'if', 'you',
'looking', 'for', 'south', 'Indian', 'food', 'nPreferred', 'the', 'tiffin', 'item
s', 'Rated', 'RATED', 'n', 'Been', 'here', 'last', 'week', 'with', 'high', 'expec
tations', 'based', 'on', 'few', 'reviews', 'But', 'utterly', 'disappointed', 'wit
h', 'the', 'food', 'quality', 'taste', 'I', 'feel', 'it', 's', 'an', 'overhyped',
'place', 'There', 'are', 'many', 'better', 'places', 'in', 'the', 'vicinity', 'fo
r', 'Plantain', 'leaf', 'meal', 'There', 'was', 'too', 'much', 'of', 'waiting',
'these', 'staffs', 'were', 'too', 'hurry', 'in', 'serving', 'food', 'asking', 'pe
ople', 'to', 'finish', 'meal', 'leave', 'quickly', 'I', 'can', 'understand', 'the
re', 'is', 'a', 'waiting', 'and', 'staffs', 'should', 'approach', 'in', 'a', 'pos
itive', 'way', 'I', 'will', 'never', 'go', 'there', 'again', 'n', 'nbangaloreepic
ure', 'com', 'Rated', 'RATED', 'n', 'I', 'have', 'a', 'confession', 'being', 'a',
'south', 'Indian', 'I', 'distaste', 'south', 'Indian', 'food', 'not', 'that',
'I', 'hate', 'it', 'I', 'don', 't', 'like', 'it', 'either', 'But', 'still', 'mad
e', 'up', 'my', 'mind', 'on', 'Sankaranti', 'to', 'have', 'authentic', 'south',
'Indian', 'food', 'visited', 'Adduri', 'Udupi', 'Bhojana', 'because', 'it', 'wa
s', 'close', 'to', 'my', 'place', 'I', 'just', 'had', 'a', 'look', 'at', 'the',
'menu', 'told', 'myself', 'that', 'I', 'can', 'do', 'it', 'I', 'am', 'not', 'bles
sed', 'with', 'a', 'tremendous', 'appetite', 'welcomed', 'with', 'the', 'mango',
'soup', 'followed', 'by', 'the', 'wide', 'variety', 'of', 'dishes', 'served',
'I', 'have', 'developed', 'the', 'new', 'love', 'for', 'Pongal', 'both', 'sweet',
'and', 'Khara', 'I', 'can', 'still', 'feel', 'the', 'taste', 'of', 'the', 'ghee',
'bursting', 'in', 'my', 'mouth', 'but', 'it', 'was', 'kai', 'holige', 'that', 'ma
de', 'my', 'day', 'crisp', 'and', 'soft', 'not', 'to', 'forget', 'food', 'is', 's
erved', 'on', 'a', 'banana', 'leaf', 'that', 'adds', 'in', 'more', 'flavor', 'an
d', 'taste', 'waiters', 'are', 'attentive', 'and', 'responsive', 'The', 'custome
r', 's', 'needs', 'are', 'monitored', 'and', 'addressed', 'so', 'much', 'variet
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'menu', 'told', 'myself', 'that', 'I', 'can', 'do', 'it', 'I', 'am', 'not', 'bles
sed', 'with', 'a', 'tremendous', 'appetite', 'welcomed', 'with', 'the', 'mango',
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n', 'thing', 'is', 'have', 'patience', 'to', 'get', 'place', 'to', 'sit', 'ther
e', 'is', 'no', 'parking', 'place', 'of', 'this', 'outlet', 'and', 'difficult',
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In [ ]: print([token for token in rev3 if token not in stop])

['Great', 'food', 'proper', 'Karnataka', 'style', 'full', 'meals', 'Been', 'twic
e', 'fully', 'satisfied', 'Will', 'give', 'stars', 'well', 'managed', 'Reached',
'place', 'pm', 'Saturday', 'Half', 'items', 'menu', 'What', 'annoying', 'food',
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ing', 'one', 'corner', 'talking', 'Had', 'call', 'repeatedly', 'Had', 'good', 'fo
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itional', 'Mysore', 'attire', 'wearing', 'peta', 'The', 'food', 'delicious', 'def
initely', 'worth', 'price', 'The', 'waiters', 'friendly', 'serve', 'u', 'well',
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y', 'masala', 'dosa', 'Service', 'ambience', 'also', 'good', 'visit', 'friends',
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ater', 'bottle', 'main', 'thing', 'patience', 'get', 'place', 'sit', 'parking',
'place', 'outlet', 'difficult', 'park', 'front', 'restaurants']
```

In [ ]: `reviews_clean = sample.apply(lambda each_review: [token for token in each_review`

In [ ]: `type(reviews_clean)`

Out[ ]: `pandas.core.series.Series`

In [ ]: `total_reviews_2d = list(reviews_clean)`

```
total_reviews_1d = []

for review in total_reviews_2d:
    for word in review:
        total_reviews_1d.append(word)
```

```
total_reviews_1d
```

```
Out[ ]:  ['A',
          'beautiful',
          'place',
          'dine',
          'The',
          'interiors',
          'take',
          'back',
          'Mughal',
          'era',
          'The',
          'lightings',
          'perfect',
          'We',
          'went',
          'occasion',
          'Christmas',
          'limited',
          'items',
          'available',
          'But',
          'taste',
          'service',
          'compromised',
          'The',
          'complaint',
          'breads',
          'could',
          'better',
          'Would',
          'surely',
          'like',
          'come',
          'I',
          'dinner',
          'family',
          'weekday',
          'The',
          'restaurant',
          'completely',
          'empty',
          'Ambience',
          'good',
          'good',
          'old',
          'hindi',
          'music',
          'Seating',
          'arrangement',
          'good',
          'We',
          'ordered',
          'masala',
          'papad',
          'panner',
          'baby',
          'corn',
          'starters',
          'lemon',
          'corrionder',
```

```
'soup',
'butter',
'roti',
'olive',
'chilli',
'paratha',
'Food',
'fresh',
'good',
'service',
'good',
'Good',
'family',
'hangout',
'nCheers',
'Its',
'restaurant',
'near',
'Banashankari',
'BDA',
'Me',
'along',
'office',
'friends',
'visited',
'buffet',
'unfortunately',
'provide',
'veg',
'buffet',
'On',
'inquiring',
'said',
'place',
'mostly',
'visited',
'vegetarians',
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'two',
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'We',
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'Halwa',
'intm',
'dessert',
'amazing',
'Must',
'try',
'The',
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'great',
'Cheers',
'The',
'best',
'thing',
'place',
'ambiance',
'Second',
'best',
'thing',
'yummy',
'food',
'We',
'try',
'buffet',
'buffet',
'food',
'disappointed',
'us',
'nTest',
'nQuality',
'nService',
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'wixsite',
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'ambience',
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'Coll',

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'nAmbience',
'nOverall',
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'rice',
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'You',
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```
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'The',
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'nFood',
'nAmbience',
'nFriendly',
'staff',
'nPocket',
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'nFor',
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'partner',
'price',
'It',
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'enough',
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'corporate',
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'First',
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'Cafe',
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'mins',
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'said',

```
        'still',
        'open',
        'though',
        'preparing',
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        'cafe',
        'day',
        'nQuickly',
        'ordered',
        'Thai',
        'green',
        'curry',
        'served',
        'rice',
        'They',
        'got',
        'within',
        'mins',
        'hot',
        'freshly',
        'made',
        'nIt',
        'tasty',
        'taste',
        'coconut',
        'milk',
        'Not',
        'spicy',
        'mild',
        'spicy',
        'nI',
        'saw',
        'yummy',
        'looking',
        'dessert',
        'menu',
        'go',
        'try',
        'nA',
        'good',
        ...]
```
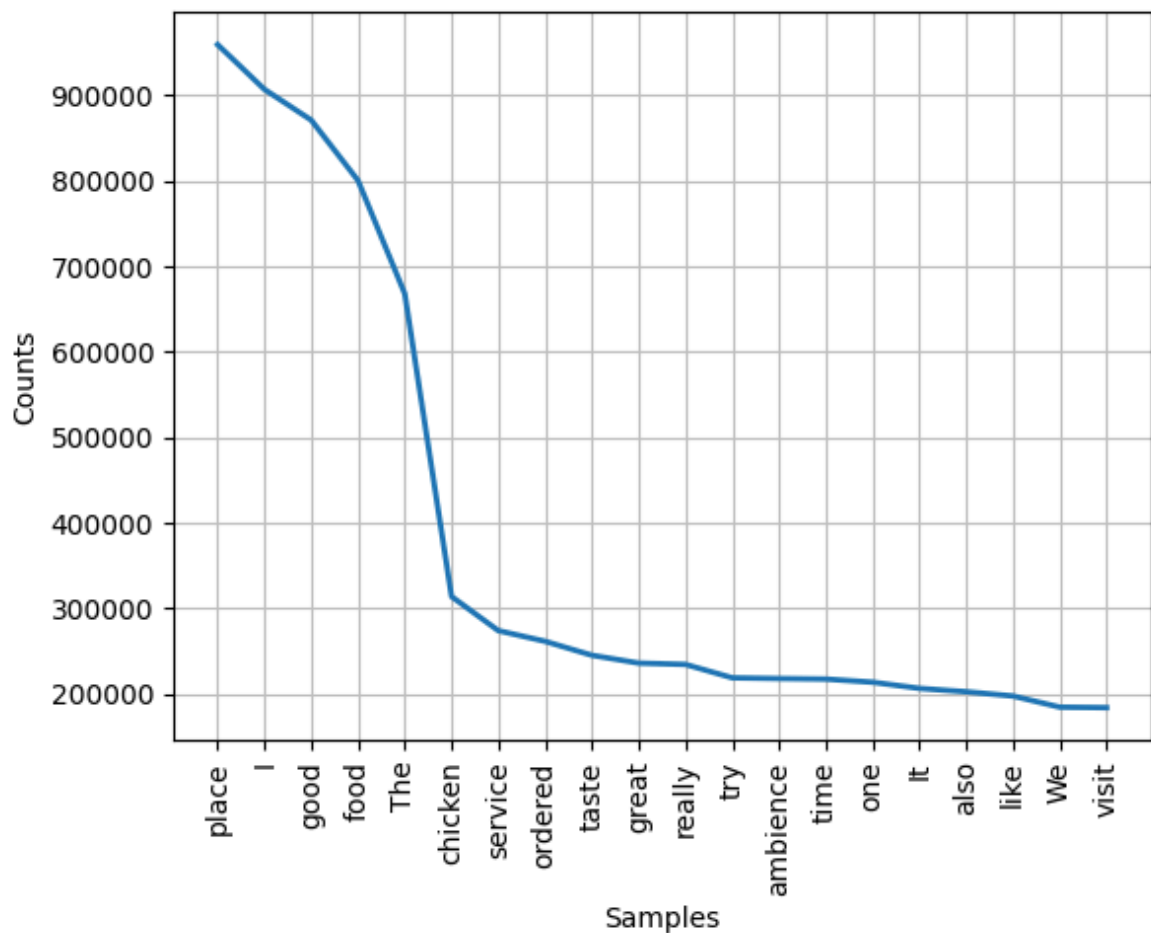
In [ ]:
```python
from nltk import FreqDist
```

In [ ]:
```python
fd = FreqDist()
```

In [ ]:
```python
for word in total_reviews_1d:
    fd[word] = fd[word] + 1
```

In [ ]:
```python
fd.most_common(20)
```

```
Out[ ]:  [('place', 958892),
          ('I', 906624),
          ('good', 870711),
          ('food', 800115),
          ('The', 667679),
          ('chicken', 313719),
          ('service', 273865),
          ('ordered', 261388),
          ('taste', 245081),
          ('great', 235933),
          ('really', 234390),
          ('try', 218724),
          ('ambience', 217874),
          ('time', 217257),
          ('one', 213594),
          ('It', 206382),
          ('also', 202443),
          ('like', 197463),
          ('We', 184449),
          ('visit', 183865)]
```

```
In [ ]:  fd.plot(20)
```



```
Out[ ]:  <Axes: xlabel='Samples', ylabel='Counts'>
```

```
In [ ]:  from nltk import FreqDist, bigrams, trigrams
```
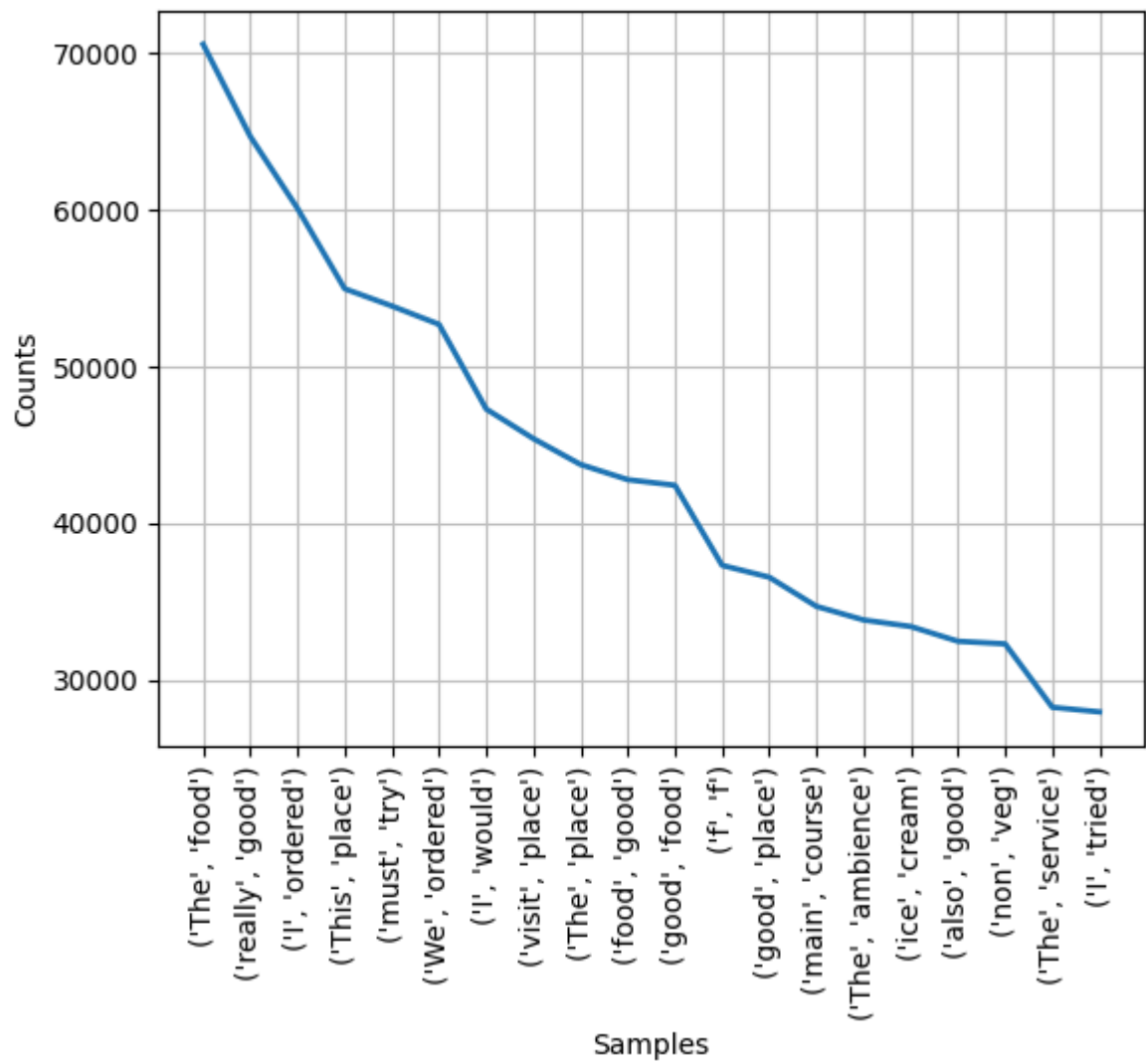
```
In [ ]:  bi_gram = bigrams(total_reviews_1d)
```

```
In [ ]:  fd_bigram = FreqDist()
         for bigram in bi_gram :
             fd_bigram[bigram] = fd_bigram[bigram]+1
```

```
In [ ]:  fd_bigram.most_common(20)
```

```
Out[ ]:  [(('The', 'food'), 70551),
          (('really', 'good'), 64671),
          (('I', 'ordered'), 60088),
          (('This', 'place'), 54963),
          (('must', 'try'), 53865),
          (('We', 'ordered'), 52692),
          (('I', 'would'), 47294),
          (('visit', 'place'), 45409),
          (('The', 'place'), 43758),
          (('food', 'good'), 42791),
          (('good', 'food'), 42433),
          (('f', 'f'), 37330),
          (('good', 'place'), 36570),
          (('main', 'course'), 34713),
          (('The', 'ambience'), 33846),
          (('ice', 'cream'), 33429),
          (('also', 'good'), 32487),
          (('non', 'veg'), 32321),
          (('The', 'service'), 28278),
          (('I', 'tried'), 27983)]
```

```
In [ ]:  fd_bigram.plot(20)
```

Out[ ]: `<Axes: xlabel='Samples', ylabel='Counts'>`

In [ ]: `fd_bigram.most_common(100)`

```
Out[ ]:  [(('The', 'food'), 70551),
         (('really', 'good'), 64671),
         (('I', 'ordered'), 60088),
         (('This', 'place'), 54963),
         (('must', 'try'), 53865),
         (('We', 'ordered'), 52692),
         (('I', 'would'), 47294),
         (('visit', 'place'), 45409),
         (('The', 'place'), 43758),
         (('food', 'good'), 42791),
         (('good', 'food'), 42433),
         (('f', 'f'), 37330),
         (('good', 'place'), 36570),
         (('main', 'course'), 34713),
         (('The', 'ambience'), 33846),
         (('ice', 'cream'), 33429),
         (('also', 'good'), 32487),
         (('non', 'veg'), 32321),
         (('The', 'service'), 28278),
         (('I', 'tried'), 27983),
         (('place', 'I'), 27535),
         (('good', 'The'), 26699),
         (('good', 'I'), 25415),
         (('food', 'I'), 25194),
         (('one', 'best'), 24631),
         (('nWe', 'ordered'), 24599),
         (('The', 'staff'), 23847),
         (('nice', 'place'), 23528),
         (('must', 'visit'), 23491),
         (('I', 'love'), 22794),
         (('time', 'I'), 21754),
         (('place', 'good'), 21720),
         (('I', 'loved'), 21398),
         (('place', 'hangout'), 21305),
         (('pretty', 'good'), 21033),
         (('I', 'like'), 20502),
         (('quality', 'food'), 20010),
         (('taste', 'good'), 19952),
         (('service', 'good'), 19917),
         (('good', 'service'), 19633),
         (('value', 'money'), 19498),
         (('pocket', 'friendly'), 19359),
         (('I', 'visited'), 19026),
         (('fried', 'rice'), 18756),
         (('great', 'place'), 18126),
         (('nThe', 'food'), 17990),
         (('good', 'experience'), 17672),
         (('I', 'went'), 17599),
         (('visited', 'place'), 17592),
         (('ambience', 'good'), 17569),
         (('good', 'taste'), 17082),
         (('recommend', 'place'), 16872),
         (('first', 'time'), 16840),
         (('place', 'The'), 16545),
         (('I', 'really'), 16061),
         (('One', 'best'), 16037),
         (('I', 'liked'), 15988),
         (('food', 'The'), 15776),
         (('I', 'think'), 15704),
         (('really', 'nice'), 15483),
```

```
     (('food', 'great'), 15127),
     (('long', 'time'), 14957),
     (('We', 'went'), 14899),
     (('Must', 'try'), 14756),
     (('I', 'ever'), 14568),
     (('North', 'Indian'), 14454),
     (('best', 'place'), 14299),
     (('nFood', 'nService'), 14258),
     (('chicken', 'biryani'), 14235),
     (('The', 'best'), 14224),
     (('Food', 'good'), 13858),
     (('ordered', 'chicken'), 13831),
     (('nValue', 'money'), 13753),
     (('good', 'ambience'), 13649),
     (('Good', 'place'), 13601),
     (('food', 'really'), 13302),
     (('food', 'quality'), 13190),
     (('place', 'visit'), 12966),
     (('try', 'place'), 12914),
     (('I', 'got'), 12896),
     (('place', 'hang'), 12803),
     (('The', 'chicken'), 12727),
     (('Nice', 'place'), 12671),
     (('great', 'food'), 12664),
     (('quite', 'good'), 12660),
     (('We', 'tried'), 12612),
     (('staff', 'friendly'), 12427),
     (('f', 'c'), 12361),
     (('go', 'place'), 12331),
     (('I', 'felt'), 12290),
     (('tasted', 'good'), 12023),
     (('nAmbience', 'nService'), 12013),
     (('food', 'service'), 11859),
     (('Good', 'food'), 11858),
     (('would', 'recommend'), 11846),
     (('The', 'taste'), 11644),
     (('A', 'must'), 11462),
     (('home', 'delivery'), 11373),
     (('Indian', 'food'), 11287),
     (('must', 'say'), 11251)]
```

In [ ]:
```python
tri_grams = trigrams(total_reviews_1d)
```

In [ ]:
```python
fd_trigram = FreqDist()

for trigram in tri_grams:
    fd_trigram[trigram] = fd_trigram[trigram] + 1
```

In [ ]:
```python
fd_trigram.most_common(50)
```

```
Out[ ]:  [(('f', 'f', 'f'), 19127),
          (('veg', 'non', 'veg'), 9254),
          (('The', 'food', 'good'), 9236),
          (('must', 'visit', 'place'), 9137),
          (('place', 'hangout', 'friends'), 8869),
          (('f', 'c', 'f'), 8001),
          (('xa', 'xa', 'xa'), 7959),
          (('I', 'must', 'say'), 7657),
          (('I', 'visited', 'place'), 7594),
          (('I', 'would', 'recommend'), 6478),
          (('nFood', 'nAmbience', 'nService'), 6236),
          (('I', 'would', 'say'), 5719),
          (('food', 'really', 'good'), 5624),
          (('A', 'good', 'place'), 5454),
          (('A', 'must', 'visit'), 5385),
          (('place', 'hang', 'friends'), 5366),
          (('c', 'f', 'f'), 4784),
          (('The', 'ambience', 'good'), 4665),
          (('North', 'Indian', 'food'), 4597),
          (('nFood', 'nService', 'nAmbience'), 4521),
          (('A', 'must', 'try'), 4381),
          (('f', 'f', 'c'), 4224),
          (('The', 'food', 'really'), 4125),
          (('I', 'would', 'like'), 4092),
          (('first', 'time', 'I'), 3965),
          (('I', 'would', 'definitely'), 3925),
          (('really', 'good', 'The'), 3862),
          (('The', 'service', 'good'), 3778),
          (('nService', 'nValue', 'money'), 3773),
          (('nAmbience', 'nFood', 'nService'), 3708),
          (('The', 'staff', 'friendly'), 3702),
          (('Overall', 'good', 'experience'), 3702),
          (('The', 'staff', 'courteous'), 3543),
          (('I', 'would', 'suggest'), 3495),
          (('I', 'ordered', 'chicken'), 3426),
          (('place', 'good', 'food'), 3415),
          (('chicken', 'fried', 'rice'), 3389),
          (('must', 'try', 'place'), 3384),
          (('peri', 'peri', 'chicken'), 3368),
          (('The', 'best', 'part'), 3355),
          (('We', 'ordered', 'chicken'), 3308),
          (('nRead', 'full', 'post'), 3283),
          (('good', 'We', 'ordered'), 3248),
          (('A', 'nice', 'place'), 3205),
          (('I', 'love', 'place'), 3170),
          (('good', 'place', 'hangout'), 3148),
          (('I', 'really', 'liked'), 3131),
          (('starters', 'main', 'course'), 3125),
          (('food', 'I', 'ordered'), 3033),
          (('One', 'best', 'places'), 3023)]

In [ ]:  df.head(3)
```

	index	url	address	name	online_ord
0	0	https://www.zomato.com/bangalore/jalsa-banasha...	942, 21st Main Road, 2nd Stage, Banashankari, ...	Jalsa	Y
1	1	https://www.zomato.com/bangalore/spice-elephan...	2nd Floor, 80 Feet Road, Near Big Bazaar, 6th ...	Spice Elephant	Y
2	2	https://www.zomato.com/SanchurroBangalore?cont...	1112, Next to KIMS Medical College, 17th Cross...	San Churro Cafe	Y

```
In [ ]:  df['location'].unique()
```

```
Out[ ]:  array(['Banashankari', 'Basavanagudi', 'Mysore Road', 'Jayanagar',
                'Kumaraswamy Layout', 'Rajarajeshwari Nagar', 'Vijay Nagar',
                'Uttarahalli', 'JP Nagar', 'South Bangalore', 'City Market',
                'Nagarbhavi', 'Bannerghatta Road', 'BTM', 'Kanakapura Road',
                'Bommanahalli', None, 'CV Raman Nagar', 'Electronic City', 'HSR',
                'Marathahalli', 'Sarjapur Road', 'Wilson Garden', 'Shanti Nagar',
                'Koramangala 5th Block', 'Koramangala 8th Block', 'Richmond Road',
                'Koramangala 7th Block', 'Jalahalli', 'Koramangala 4th Block',
                'Bellandur', 'Whitefield', 'East Bangalore', 'Old Airport Road',
                'Indiranagar', 'Koramangala 1st Block', 'Frazer Town', 'RT Nagar',
                'MG Road', 'Brigade Road', 'Lavelle Road', 'Church Street',
                'Ulsoor', 'Residency Road', 'Shivajinagar', 'Infantry Road',
                'St. Marks Road', 'Cunningham Road', 'Race Course Road',
                'Commercial Street', 'Vasanth Nagar', 'HBR Layout', 'Domlur',
                'Ejipura', 'Jeevan Bhima Nagar', 'Old Madras Road', 'Malleshwaram',
                'Seshadripuram', 'Kammanahalli', 'Koramangala 6th Block',
                'Majestic', 'Langford Town', 'Central Bangalore', 'Sanjay Nagar',
                'Brookefield', 'ITPL Main Road, Whitefield',
                'Varthur Main Road, Whitefield', 'KR Puram',
                'Koramangala 2nd Block', 'Koramangala 3rd Block', 'Koramangala',
                'Hosur Road', 'Rajajinagar', 'Banaswadi', 'North Bangalore',
                'Nagawara', 'Hennur', 'Kalyan Nagar', 'New BEL Road', 'Jakkur',
                'Rammurthy Nagar', 'Thippasandra', 'Kaggadasapura', 'Hebbal',
                'Kengeri', 'Sankey Road', 'Sadashiv Nagar', 'Basaveshwara Nagar',
                'Yeshwantpur', 'West Bangalore', 'Magadi Road', 'Yelahanka',
                'Sahakara Nagar', 'Peenya'], dtype=object)
```

```
In [ ]:  len(df['location'].unique())
```

```
Out[ ]:  94
```

```python
df['location'] = df['location'] + " , Bangalore, Karnataka, India"
```

```python
df['location'].unique()
```

```
Out[ ]: array(['Banashankari , Bangalore, Karnataka, India',
               'Basavanagudi , Bangalore, Karnataka, India',
               'Mysore Road , Bangalore, Karnataka, India',
               'Jayanagar , Bangalore, Karnataka, India',
               'Kumaraswamy Layout , Bangalore, Karnataka, India',
               'Rajarajeshwari Nagar , Bangalore, Karnataka, India',
               'Vijay Nagar , Bangalore, Karnataka, India',
               'Uttarahalli , Bangalore, Karnataka, India',
               'JP Nagar , Bangalore, Karnataka, India',
               'South Bangalore , Bangalore, Karnataka, India',
               'City Market , Bangalore, Karnataka, India',
               'Nagarbhavi , Bangalore, Karnataka, India',
               'Bannerghatta Road , Bangalore, Karnataka, India',
               'BTM , Bangalore, Karnataka, India',
               'Kanakapura Road , Bangalore, Karnataka, India',
               'Bommanahalli , Bangalore, Karnataka, India', nan,
               'CV Raman Nagar , Bangalore, Karnataka, India',
               'Electronic City , Bangalore, Karnataka, India',
               'HSR , Bangalore, Karnataka, India',
               'Marathahalli , Bangalore, Karnataka, India',
               'Sarjapur Road , Bangalore, Karnataka, India',
               'Wilson Garden , Bangalore, Karnataka, India',
               'Shanti Nagar , Bangalore, Karnataka, India',
               'Koramangala 5th Block , Bangalore, Karnataka, India',
               'Koramangala 8th Block , Bangalore, Karnataka, India',
               'Richmond Road , Bangalore, Karnataka, India',
               'Koramangala 7th Block , Bangalore, Karnataka, India',
               'Jalahalli , Bangalore, Karnataka, India',
               'Koramangala 4th Block , Bangalore, Karnataka, India',
               'Bellandur , Bangalore, Karnataka, India',
               'Whitefield , Bangalore, Karnataka, India',
               'East Bangalore , Bangalore, Karnataka, India',
               'Old Airport Road , Bangalore, Karnataka, India',
               'Indiranagar , Bangalore, Karnataka, India',
               'Koramangala 1st Block , Bangalore, Karnataka, India',
               'Frazer Town , Bangalore, Karnataka, India',
               'RT Nagar , Bangalore, Karnataka, India',
               'MG Road , Bangalore, Karnataka, India',
               'Brigade Road , Bangalore, Karnataka, India',
               'Lavelle Road , Bangalore, Karnataka, India',
               'Church Street , Bangalore, Karnataka, India',
               'Ulsoor , Bangalore, Karnataka, India',
               'Residency Road , Bangalore, Karnataka, India',
               'Shivajinagar , Bangalore, Karnataka, India',
               'Infantry Road , Bangalore, Karnataka, India',
               'St. Marks Road , Bangalore, Karnataka, India',
               'Cunningham Road , Bangalore, Karnataka, India',
               'Race Course Road , Bangalore, Karnataka, India',
               'Commercial Street , Bangalore, Karnataka, India',
               'Vasanth Nagar , Bangalore, Karnataka, India',
               'HBR Layout , Bangalore, Karnataka, India',
               'Domlur , Bangalore, Karnataka, India',
               'Ejipura , Bangalore, Karnataka, India',
               'Jeevan Bhima Nagar , Bangalore, Karnataka, India',
               'Old Madras Road , Bangalore, Karnataka, India',
               'Malleshwaram , Bangalore, Karnataka, India',
               'Seshadripuram , Bangalore, Karnataka, India',
               'Kammanahalli , Bangalore, Karnataka, India',
               'Koramangala 6th Block , Bangalore, Karnataka, India',
               'Majestic , Bangalore, Karnataka, India',
```

```
               'Langford Town , Bangalore, Karnataka, India',
               'Central Bangalore , Bangalore, Karnataka, India',
               'Sanjay Nagar , Bangalore, Karnataka, India',
               'Brookefield , Bangalore, Karnataka, India',
               'ITPL Main Road, Whitefield , Bangalore, Karnataka, India',
               'Varthur Main Road, Whitefield , Bangalore, Karnataka, India',
               'KR Puram , Bangalore, Karnataka, India',
               'Koramangala 2nd Block , Bangalore, Karnataka, India',
               'Koramangala 3rd Block , Bangalore, Karnataka, India',
               'Koramangala , Bangalore, Karnataka, India',
               'Hosur Road , Bangalore, Karnataka, India',
               'Rajajinagar , Bangalore, Karnataka, India',
               'Banaswadi , Bangalore, Karnataka, India',
               'North Bangalore , Bangalore, Karnataka, India',
               'Nagawara , Bangalore, Karnataka, India',
               'Hennur , Bangalore, Karnataka, India',
               'Kalyan Nagar , Bangalore, Karnataka, India',
               'New BEL Road , Bangalore, Karnataka, India',
               'Jakkur , Bangalore, Karnataka, India',
               'Rammurthy Nagar , Bangalore, Karnataka, India',
               'Thippasandra , Bangalore, Karnataka, India',
               'Kaggadasapura , Bangalore, Karnataka, India',
               'Hebbal , Bangalore, Karnataka, India',
               'Kengeri , Bangalore, Karnataka, India',
               'Sankey Road , Bangalore, Karnataka, India',
               'Sadashiv Nagar , Bangalore, Karnataka, India',
               'Basaveshwara Nagar , Bangalore, Karnataka, India',
               'Yeshwantpur , Bangalore, Karnataka, India',
               'West Bangalore , Bangalore, Karnataka, India',
               'Magadi Road , Bangalore, Karnataka, India',
               'Yelahanka , Bangalore, Karnataka, India',
               'Sahakara Nagar , Bangalore, Karnataka, India',
               'Peenya , Bangalore, Karnataka, India'], dtype=object)
```

In [ ]: `df_copy = df.copy()`

In [ ]: `df_copy['location'].isnull().sum()`

Out[ ]: `np.int64(21)`

In [ ]: `df_copy = df_copy.dropna(subset=['location'])`

In [ ]: `df_copy['location'].isnull().sum()`

Out[ ]: `np.int64(0)`

In [ ]: `locations = pd.DataFrame(df_copy['location'].unique())`

In [ ]: `locations.columns =['name']`

In [ ]: `locations`

	name
0	Banashankari , Bangalore, Karnataka, India
1	Basavanagudi , Bangalore, Karnataka, India
2	Mysore Road , Bangalore, Karnataka, India
3	Jayanagar , Bangalore, Karnataka, India
4	Kumaraswamy Layout , Bangalore, Karnataka, India
...	...
88	West Bangalore , Bangalore, Karnataka, India
89	Magadi Road , Bangalore, Karnataka, India
90	Yelahanka , Bangalore, Karnataka, India
91	Sahakara Nagar , Bangalore, Karnataka, India
92	Peenya , Bangalore, Karnataka, India

93 rows × 1 columns

In [ ]:

In [ ]:
```python
from geopy.geocoders import Nominatim
```

In [ ]:
```python
geolocator = Nominatim(user_agent= "app", timeout= None)
```

In [ ]:
```python
lat = []
lon = []

for location in locations['name']:
    location = geolocator.geocode(location)
    if location is None:
        lat.append(None)
        lon.append(None)
    else:
        lat.append(location.latitude)
        lon.append(location.longitude)
```

In [ ]:
```python
locations['latitude'] = lat
locations['longitude'] = lon
```

In [ ]:
```python
locations
```

```
Out[ ]:                                                  name    latitude    longitude

         0           Banashankari , Bangalore, Karnataka, India    12.939333    77.553982

         1          Basavanagudi , Bangalore, Karnataka, India    12.941726    77.575502

         2           Mysore Road , Bangalore, Karnataka, India    12.960494    77.556961

         3              Jayanagar , Bangalore, Karnataka, India    12.939904    77.582638

         4    Kumaraswamy Layout , Bangalore, Karnataka, India    12.906768    77.559502

        ...                                                 ...         ...          ...

        88         West Bangalore , Bangalore, Karnataka, India    13.009652    77.553054

        89           Magadi Road , Bangalore, Karnataka, India    12.975608    77.555356

        90             Yelahanka , Bangalore, Karnataka, India    13.107915    77.585524

        91       Sahakara Nagar , Bangalore, Karnataka, India    13.062147    77.580061

        92                Peenya , Bangalore, Karnataka, India    13.032981    77.533180
```

93 rows × 3 columns

```python
In [ ]:  locations.isnull().sum()
```

```
Out[ ]:  name         0
         latitude     2
         longitude    2
         dtype: int64
```

```python
In [ ]:  locations[locations['latitude'].isnull()]
```

```
Out[ ]:                                              name    latitude    longitude

         79    Rammurthy Nagar , Bangalore, Karnataka, India    NaN    NaN

         85    Sadashiv Nagar , Bangalore, Karnataka, India    NaN    NaN
```

```python
In [ ]:  import warnings
         from warnings import filterwarnings
         filterwarnings('ignore')
```

```python
In [ ]:  locations['latitude'][79] = 13.0163
         locations['longitude'][79] = 77.6785
         locations['latitude'][85] = 13.0068
         locations['longitude'][85] = 77.5813
```

```python
In [ ]:  locations['longitude'].isnull().sum()
```

```
Out[ ]:  np.int64(0)
```

let's build the geographical heat maps

```python
In [ ]:  df['cuisines'].isnull()
```

```
Out[ ]:  0         False
         1         False
         2         False
         3         False
         4         False
                   ...
         51712     False
         51713     False
         51714     False
         51715     False
         51716     False
         Name: cuisines, Length: 51717, dtype: bool
```

```python
In [ ]:  df = df.dropna(subset=['cuisines'])
```

```python
In [ ]:  north_india = df[df['cuisines'].str.contains('North Indian')]
```

```python
In [ ]:  north_india.shape
```

```
Out[ ]:  (21085, 18)
```

```python
In [ ]:  north_india.head(2)
```

Out[ ]:

	index	url	address	name	online_order
0	0	https://www.zomato.com/bangalore/jalsa-banasha…	942, 21st Main Road, 2nd Stage, Banashankari, …	Jalsa	Yes
1	1	https://www.zomato.com/bangalore/spice-elephan…	2nd Floor, 80 Feet Road, Near Big Bazaar, 6th …	Spice Elephant	Yes

```python
In [ ]:  north_india_rest_count = north_india['location'].value_counts().reset_index().re
```

```python
In [ ]:  north_india_rest_count
```

	name	count
0	BTM , Bangalore, Karnataka, India	2469
1	HSR , Bangalore, Karnataka, India	1123
2	Whitefield , Bangalore, Karnataka, India	1059
3	Marathahalli , Bangalore, Karnataka, India	1038
4	JP Nagar , Bangalore, Karnataka, India	958
...	...	...
85	Hebbal , Bangalore, Karnataka, India	4
86	Jakkur , Bangalore, Karnataka, India	3
87	Central Bangalore , Bangalore, Karnataka, India	2
88	West Bangalore , Bangalore, Karnataka, India	1
89	Peenya , Bangalore, Karnataka, India	1

90 rows × 2 columns

```python
heatmap_df = north_india_rest_count.merge(locations, on='name', how='left')
```

```python
heatmap_df
```

Out[ ]:

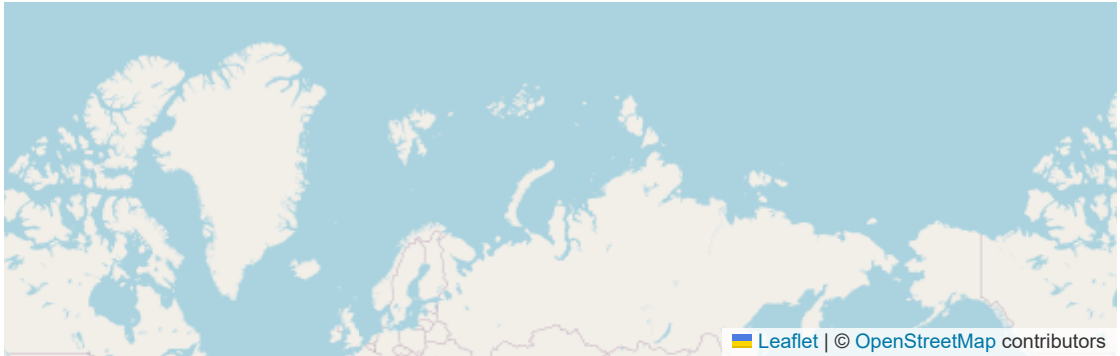|	name	count	latitude	longitude
0	BTM , Bangalore, Karnataka, India	2469	12.915971	77.616227
1	HSR , Bangalore, Karnataka, India	1123	12.900563	77.649475
2	Whitefield , Bangalore, Karnataka, India	1059	12.969637	77.749745
3	Marathahalli , Bangalore, Karnataka, India	1038	12.955257	77.698416
4	JP Nagar , Bangalore, Karnataka, India	958	12.909694	77.586607
...	...	...	...	...
85	Hebbal , Bangalore, Karnataka, India	4	13.038218	77.591900
86	Jakkur , Bangalore, Karnataka, India	3	13.078474	77.606894
87	Central Bangalore , Bangalore, Karnataka, India	2	12.973393	77.611247
88	West Bangalore , Bangalore, Karnataka, India	1	13.009652	77.553054
89	Peenya , Bangalore, Karnataka, India	1	13.032981	77.533180

90 rows × 4 columns

```python
import folium
```

```python
basemap = folium.Map()
```

```python
basemap
```

Out[ ]:
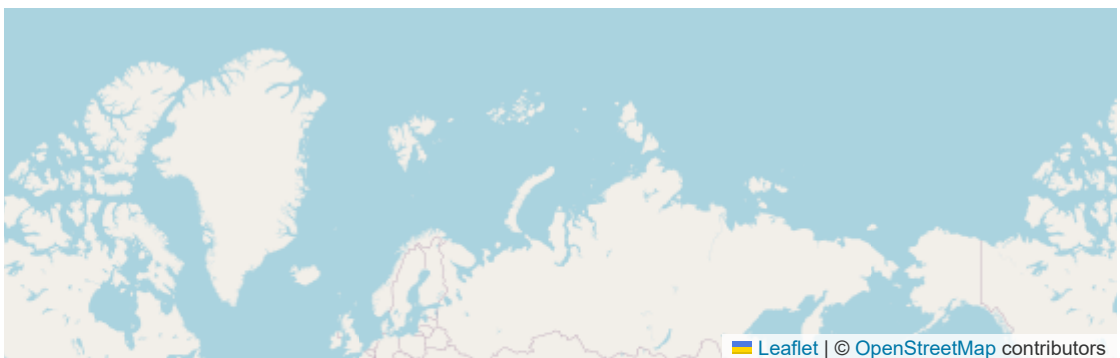

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In [ ]:
```python
from folium.plugins import HeatMap
```

In [ ]:
```python
HeatMap(heatmap_df[['latitude', 'longitude', 'count']]).add_to(basemap)
```

Out[ ]: <folium.plugins.heat_map.HeatMap at 0x213a7a32360>

In [ ]:
```python
basemap
```

Out[ ]:

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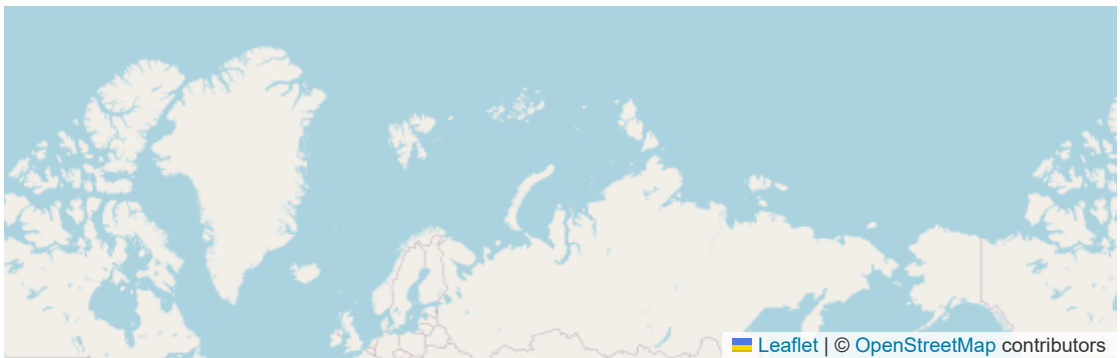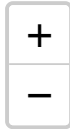How to automate your task: ie Performing Automation

In [ ]:
```python
def get_heatmap(cuisine):
    cuisine_df = df[df['cuisines'].str.contains(cuisine)]
    cuisine_rest_count = cuisine_df['location'].value_counts().reset_index().ren
    heatmap_df = cuisine_rest_count.merge(locations, on='name', how='left')
    print(heatmap_df.head(4))
    basemap = folium.Map()
```

```
        HeatMap(heatmap_df[['latitude', 'longitude', 'count']]).add_to(basemap)
        return basemap
```

In [ ]: `get_heatmap('South Indian')`

```
                               name  count   latitude   longitude
0         BTM , Bangalore, Karnataka, India    815  12.915971  77.616227
1   JP Nagar , Bangalore, Karnataka, India    437  12.909694  77.586607
2       HSR , Bangalore, Karnataka, India    436  12.900563  77.649475
3  Jayanagar , Bangalore, Karnataka, India    416  12.939904  77.582638
```

Out[ ]:

In [ ]: