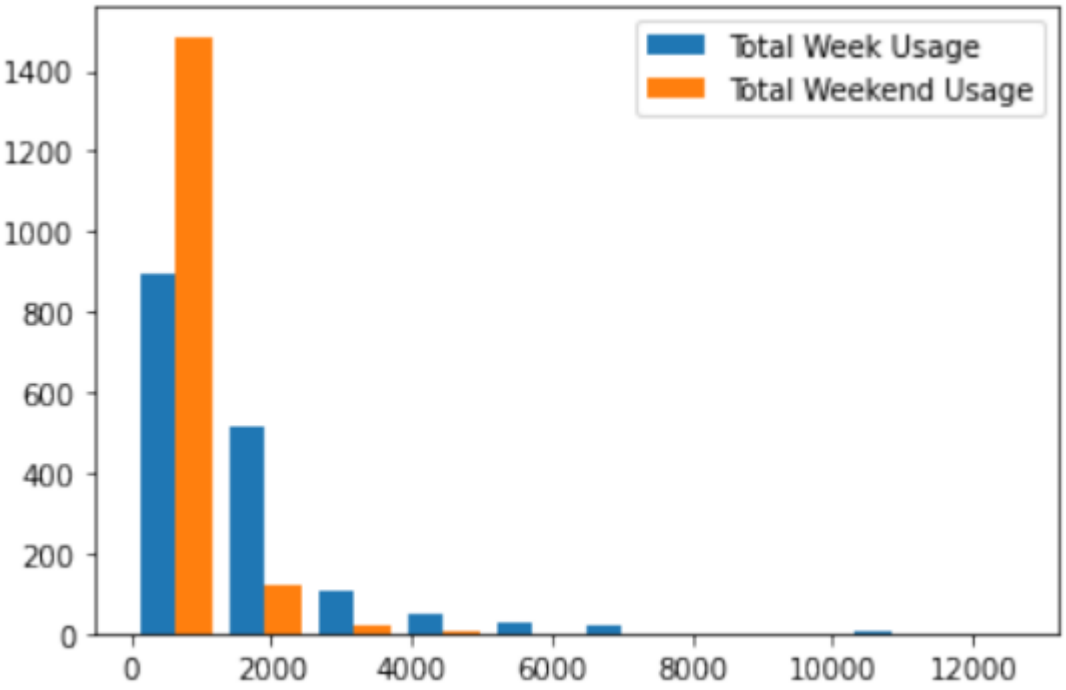
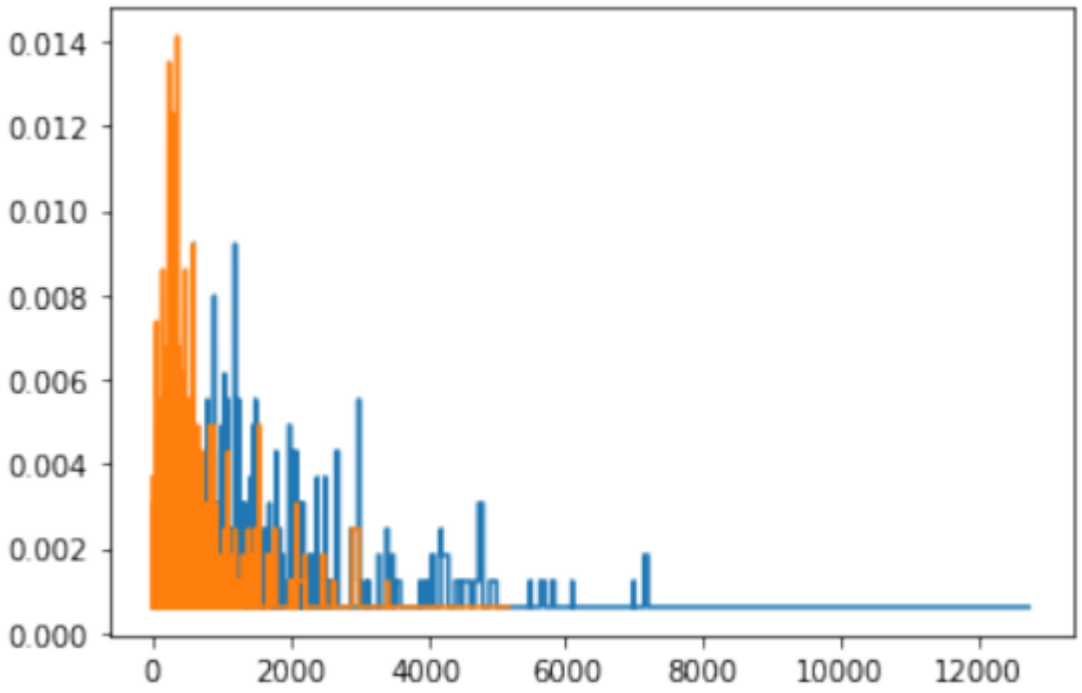
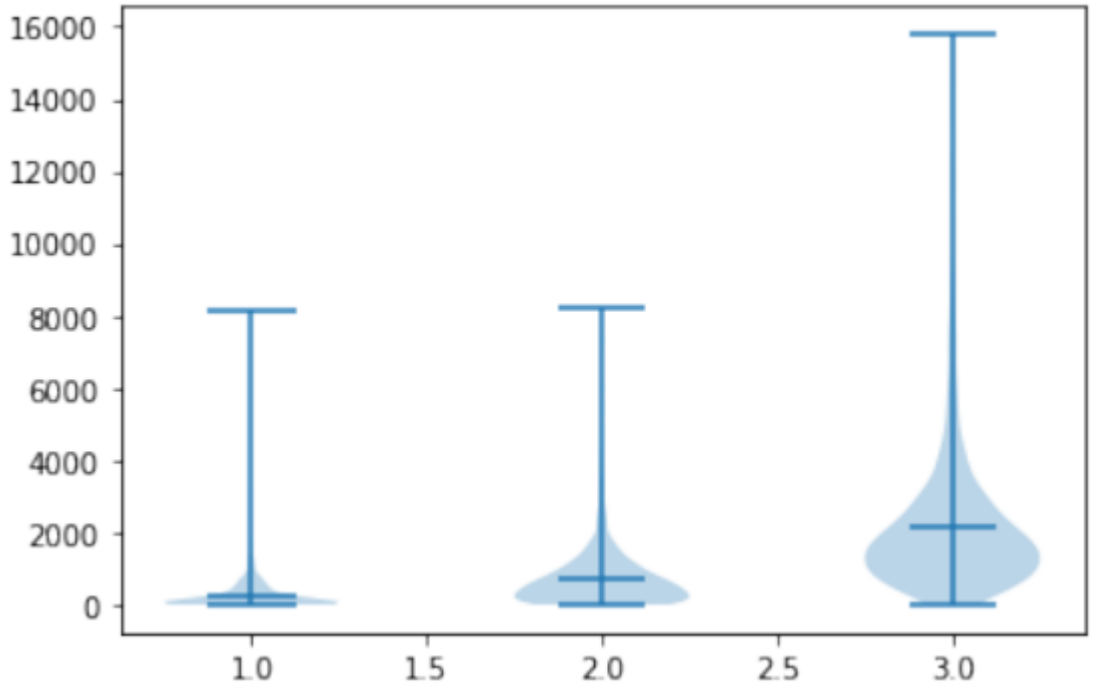
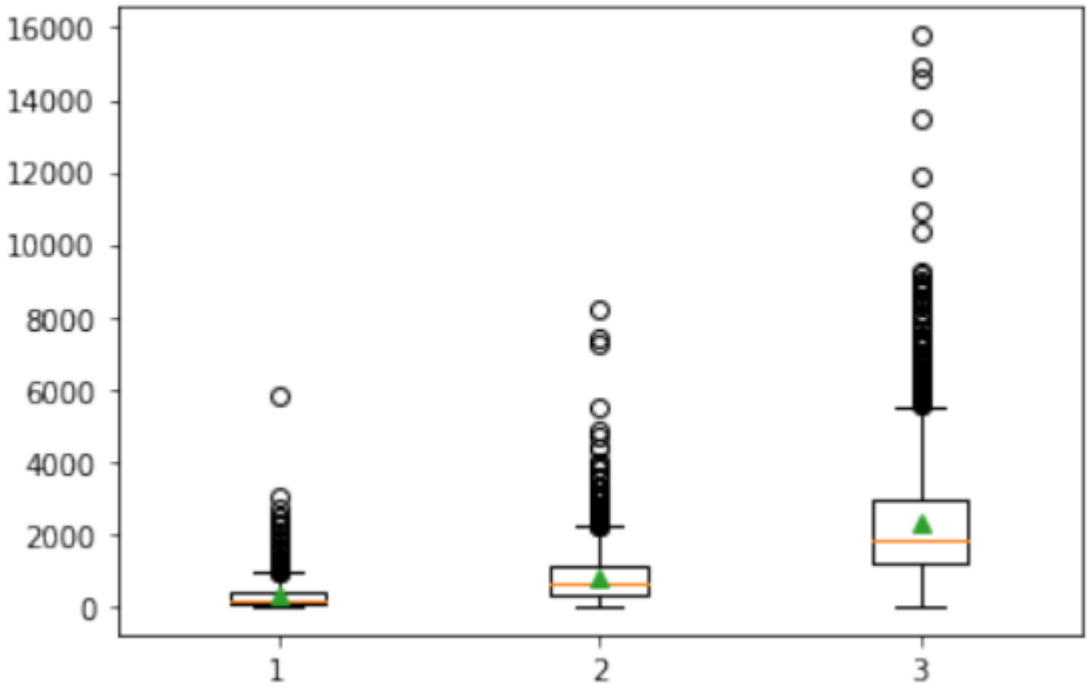
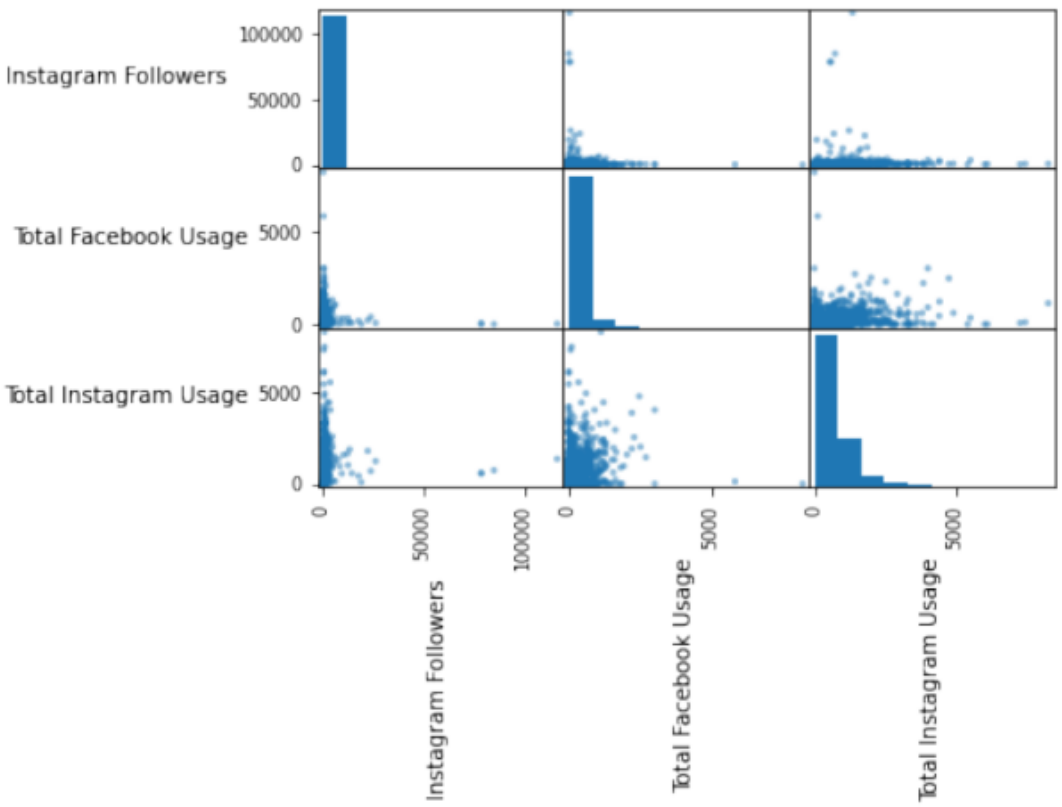
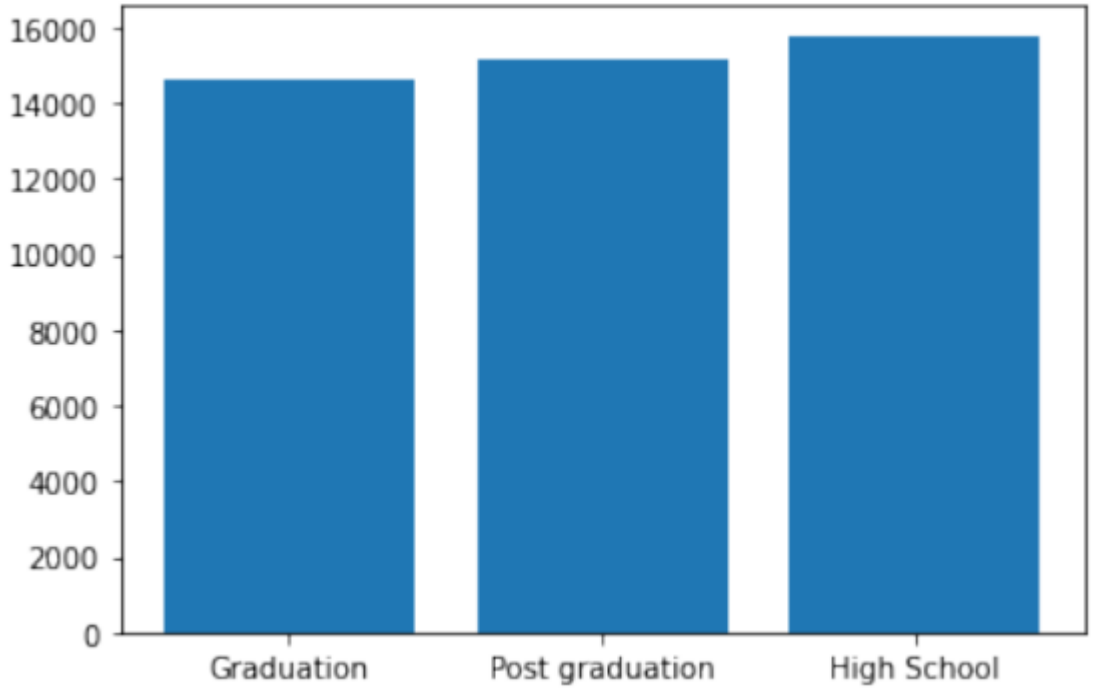

Total Week Usage
Total Weekend Usage
1400
1200
1000
800
600
400
200
0
0
2000
4000
6000
8000
10000
12000

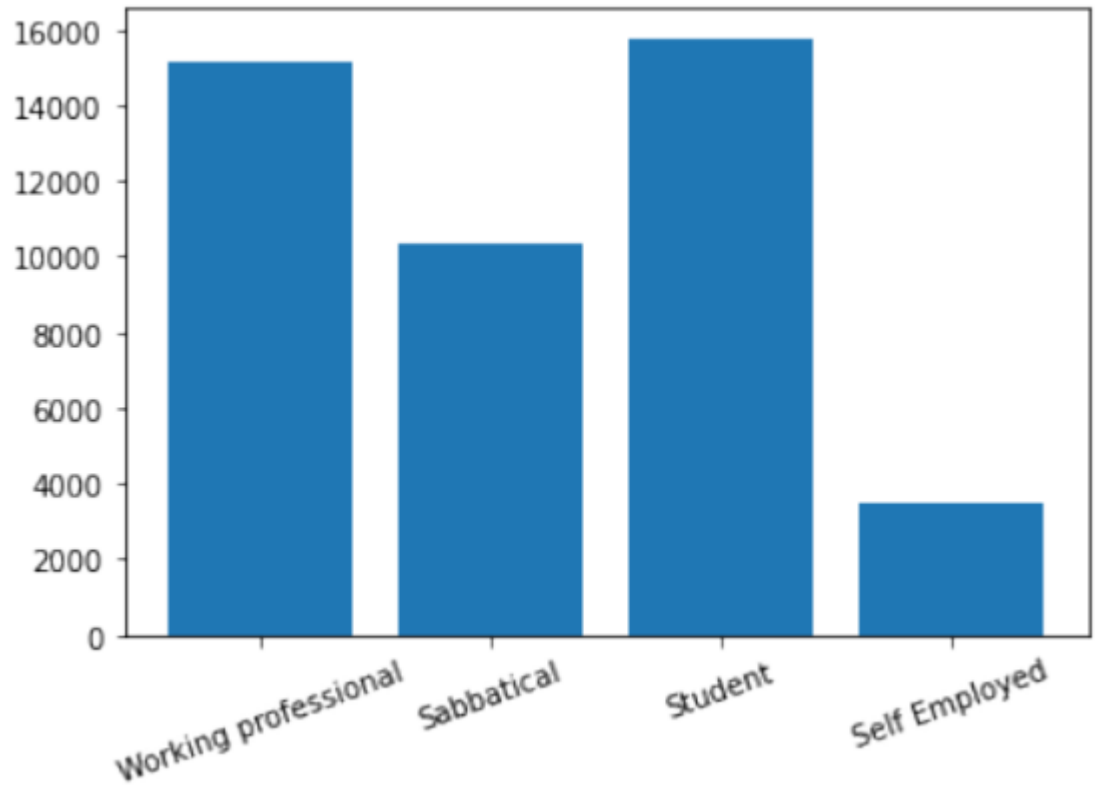

0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
0
2000
4000
6000
8000
10000
12000

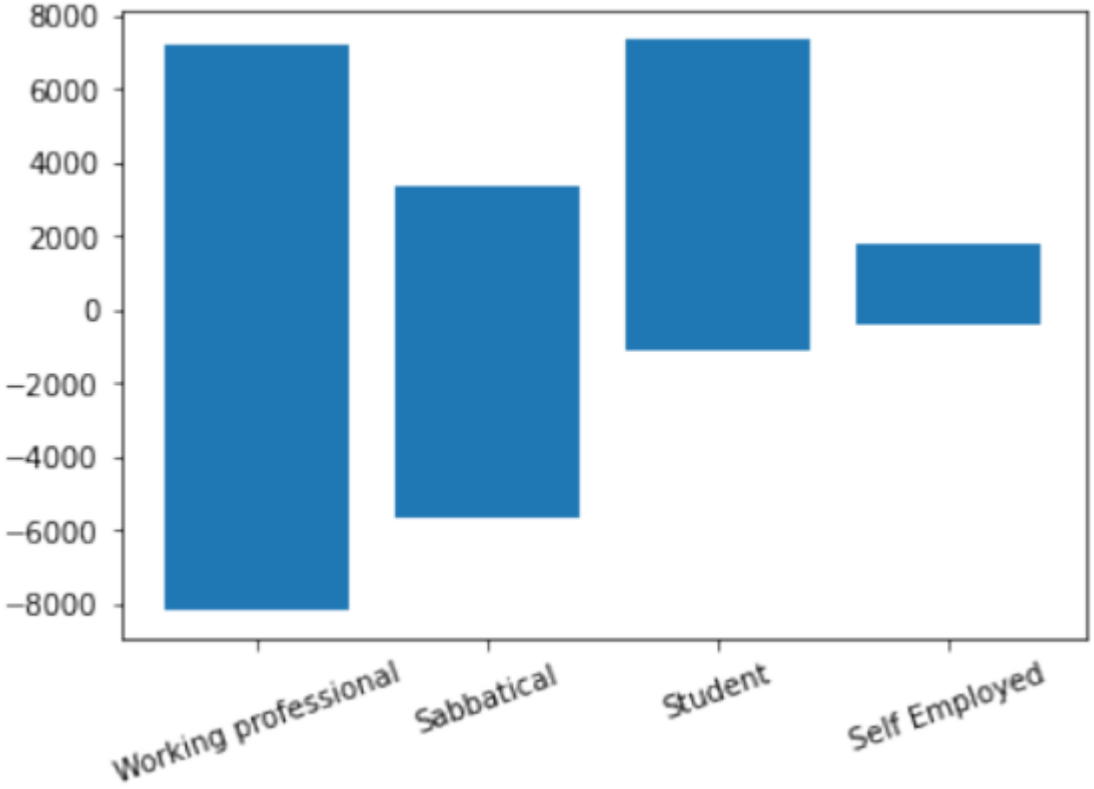

16000
14000
12000
10000
8000
6000
4000
2000
0
1.0
1.5
2.0
2.5
3.0


16000
14000
12000
10000
8000
6000
4000
2000
0
1
2
3


Instagram Followers
Total Facebook Usage
Total Instagram Usage
100000
50000
0
5000
0
5000
0
0
50000
100000
0
5000
0
5000
Instagram Followers
Total Facebook Usage
Total Instagram Usage


16000
14000
12000
10000
8000
6000
4000
2000
0
Graduation
Post graduation
High School


16000
14000
12000
10000
8000
6000
4000
2000
0
Working professional
Sabbatical
Student
Self Employed


8000
6000
4000
2000
0
−2000
−4000
−6000
−8000
Working professional
Sabbatical
Student
Self Employed

Social Media Analysis using Jupyter

April 23, 2023

[1]:
```
import numpy as np
import pandas as pd
import os
for dirname, _, filenames in os.walk('/kaggle/input'):
    for filename in filenames:
        print(os.path.join(dirname, filename))
```

```
/kaggle/input/social-media-usage-trends-india/Social Media Usage India.csv
```

[2]:
```
import pandas as pd
data = pd.read_csv('/kaggle/input/social-media-usage-trends-india/Social Media␣
 ↪Usage India.csv')
data.head()
```

[2]:

	Age	City	Current Status	Do you own multiple profiles on Instagram?	Gender	Highest Education	Location (City Airport Code)	Phone OS	State	Zone	…	Time Spent on Instagram in last week (in minutes)
0	24	Delhi	Working professional	No	Female	Graduation	DEL	iOs	Delhi	Northern	…	770
1	39	Delhi	Working professional	No	Female	Post graduation	DEL	iOs	Delhi	Northern	…	0
2	22	Mumbai	Working professional	No	Male	Graduation	BOM	Android	Maharashtra	Western	…	
3	26	Bengaluru	Sabbatical	Yes	Female	Graduation	BLR	Android	Karnataka	Southern	…	
4	50	Delhi	Working professional	No	Male	Graduation	DEL	iOs	Delhi	Northern	…	

```
2                                                1,000
3                                                2,000
4                                                    0

  Time Spent on Instagram in last weekend (in minutes)  \
0                                                  400
1                                                    0
2                                                1,000
3                                                2,000
4                                                    0

   Time Spent on WhatsApp in last week (in minutes)  \
0                                                900
1                                              5,000
2                                              7,000
3                                              1,680
4                                              2,400

   Time Spent on WhatsApp in last weekend (in minutes) Total Facebook Usage  \
0                                                  120                     0
1                                                2,000                 8,160
2                                                2,000                 2,500
3                                                1,680                 3,000
4                                                1,300                 3,000

  Total Instagram Usage Total Social Media Usage Total Week Usage  \
0                 1,170                   2,190             1,670
1                     0                  15,160            11,000
2                 2,000                  13,500             8,500
3                 4,000                  10,360             5,180
4                     0                   6,700             3,900

  Total Weekend Usage Total WhatsApp Usage
0                 520                1,020
1               4,160                7,000
2               5,000                9,000
3               5,180                3,360
4               2,800                3,700

[5 rows x 26 columns]
```

[3]:
```
data.columns
```

[3]:
```
Index(['Age', 'City', 'Current Status',
       'Do you own multiple profiles on Instagram?', 'Gender',
       'Highest Education', 'Location (City Airport Code)', 'Phone OS',
       'State', 'Zone',
```

```
       'How many followers do you have on Instagram? (In case of multiple
accounts, please mention the one with the maximum)',
       'How many posts do you have on Instagram?', 'Latitude', 'Longitude',
       'Time Spent on Facebook in last week (in minutes)',
       'Time Spent on Facebook in last weekend (in minutes)',
       'Time Spent on Instagram in last week (in minutes)',
       'Time Spent on Instagram in last weekend (in minutes)',
       'Time Spent on WhatsApp in last week (in minutes)',
       'Time Spent on WhatsApp in last weekend (in minutes)',
       'Total Facebook Usage', 'Total Instagram Usage',
       'Total Social Media Usage', 'Total Week Usage', 'Total Weekend Usage',
       'Total WhatsApp Usage'],
      dtype='object')
```

[4]:
```
data = data.rename(columns={
    'How many followers do you have on Instagram? (In case of multiple␣
 ↪accounts, please mention the one with the maximum)':'Instagram Followers',
    'How many posts do you have on Instagram?':'Instagram Posts'
})
data.columns
```

[4]:
```
Index(['Age', 'City', 'Current Status',
       'Do you own multiple profiles on Instagram?', 'Gender',
       'Highest Education', 'Location (City Airport Code)', 'Phone OS',
       'State', 'Zone', 'Instagram Followers', 'Instagram Posts', 'Latitude',
       'Longitude', 'Time Spent on Facebook in last week (in minutes)',
       'Time Spent on Facebook in last weekend (in minutes)',
       'Time Spent on Instagram in last week (in minutes)',
       'Time Spent on Instagram in last weekend (in minutes)',
       'Time Spent on WhatsApp in last week (in minutes)',
       'Time Spent on WhatsApp in last weekend (in minutes)',
       'Total Facebook Usage', 'Total Instagram Usage',
       'Total Social Media Usage', 'Total Week Usage', 'Total Weekend Usage',
       'Total WhatsApp Usage'],
      dtype='object')
```

[5]:
```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 1628 entries, 0 to 1627
Data columns (total 26 columns):
 #   Column                                                Non-Null Count  Dtype
---  ------                                                --------------  -----
 0   Age                                                   1628 non-null   int64
 1   City                                                  1628 non-null
object
 2   Current Status                                        1628 non-null
object
```

```
 3   Do you own multiple profiles on Instagram?           1628 non-null
object
 4   Gender                                               1628 non-null
object
 5   Highest Education                                    1628 non-null
object
 6   Location (City Airport Code)                         1628 non-null
object
 7   Phone OS                                             1628 non-null
object
 8   State                                                1628 non-null
object
 9   Zone                                                 1628 non-null
object
 10  Instagram Followers                                  1628 non-null
object
 11  Instagram Posts                                      1628 non-null
object
 12  Latitude                                             1628 non-null
float64
 13  Longitude                                            1628 non-null
float64
 14  Time Spent on Facebook in last week (in minutes)     1628 non-null
object
 15  Time Spent on Facebook in last weekend (in minutes)  1628 non-null
object
 16  Time Spent on Instagram in last week (in minutes)    1628 non-null
object
 17  Time Spent on Instagram in last weekend (in minutes) 1628 non-null
object
 18  Time Spent on WhatsApp in last week (in minutes)     1628 non-null
object
 19  Time Spent on WhatsApp in last weekend (in minutes)  1628 non-null
object
 20  Total Facebook Usage                                 1628 non-null
object
 21  Total Instagram Usage                                1628 non-null
object
 22  Total Social Media Usage                             1628 non-null
object
 23  Total Week Usage                                     1628 non-null
object
 24  Total Weekend Usage                                  1628 non-null
object
 25  Total WhatsApp Usage                                 1628 non-null
object
dtypes: float64(2), int64(1), object(23)
memory usage: 330.8+ KB
```

[6]:
```
data.shape
```

[6]:
```
(1628, 26)
```

[7]:
```
data.loc[0]
```

[7]:
```
Age                                                          24
City                                                      Delhi
Current Status                              Working professional
Do you own multiple profiles on Instagram?                    No
Gender                                                    Female
Highest Education                                     Graduation
Location (City Airport Code)                                 DEL
Phone OS                                                     iOs
State                                                     Delhi
Zone                                                    Northern
Instagram Followers                                          456
Instagram Posts                                               20
Latitude                                                28.651952
Longitude                                               77.231495
Time Spent on Facebook in last week (in minutes)                0
Time Spent on Facebook in last weekend (in minutes)             0
Time Spent on Instagram in last week (in minutes)             770
Time Spent on Instagram in last weekend (in minutes)          400
Time Spent on WhatsApp in last week (in minutes)              900
Time Spent on WhatsApp in last weekend (in minutes)           120
Total Facebook Usage                                            0
Total Instagram Usage                                       1,170
Total Social Media Usage                                    2,190
Total Week Usage                                            1,670
Total Weekend Usage                                           520
Total WhatsApp Usage                                        1,020
Name: 0, dtype: object
```

[8]:
```
data['Current Status'].value_counts()
```

[8]:
```
Working professional    796
Student                 637
Sabbatical              190
Self Employed             5
Name: Current Status, dtype: int64
```

[9]:
```
def convert_to_num(x):
    x = x.replace(',','')
    return pd.to_numeric(x)
```

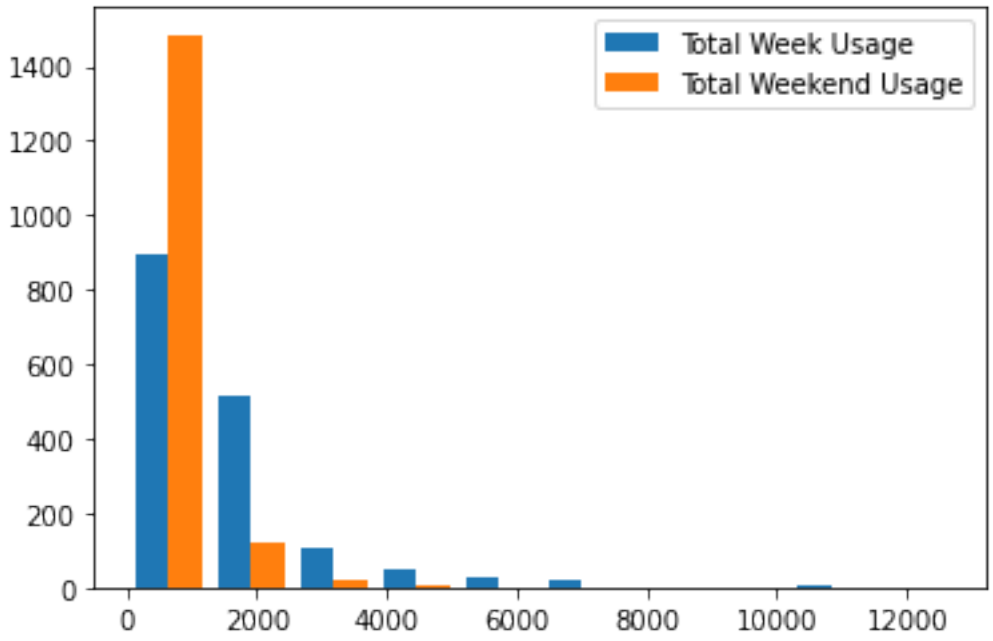
From our experience, we see that people tend to be online more often on the weekend than on the weekdays. The reason being obvious, that they are busy in schools or work. My Hypothesis Total

Social Media usage on the weekend is more than that on weekdays

[10]:
```
data_c = data[data['Current Status']=='Working professional']
data_c = data[['Total Week Usage','Total Weekend Usage']].
  ↪applymap(convert_to_num)
```

Let's use a Histogram to visualize

[11]:
```
import matplotlib.pyplot as plt
plt.hist([data_c['Total Week Usage'], data_c['Total Weekend␣
  ↪Usage']],label=['Total Week Usage','Total Weekend Usage'])
plt.legend(loc='upper right')
plt.show()
```



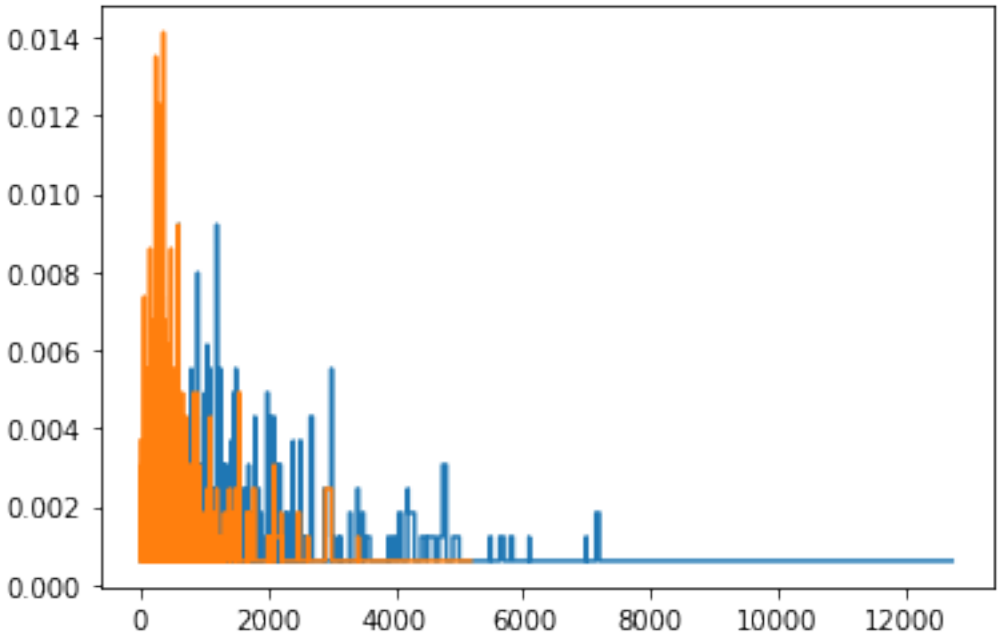
The Histogram gives a good look at the Weekend Usage vs Weekly Usage and it seems our hypothesis is correct.

Let's use a Probability Mass Function to Visualize and be sure about our claim.

[12]:
```
from collections import OrderedDict
def pmf(seq):
    freq_dict = {}
    for i in seq:
        if i in freq_dict:
            freq_dict[i]+=1
        else:
            freq_dict[i]=1
```

```
    N = len(seq)
    pmf_dict={}
    for k,v in freq_dict.items():
        pmf_dict[k]=v/N
    return pmf_dict
pmf_week_usage = pmf(data_c['Total Week Usage'])
pmf_weekend_usage = pmf(data_c['Total Weekend Usage'])
pmf_week_usage_sorted = OrderedDict(sorted(pmf_week_usage.items()))
pmf_weekend_usage_sorted = OrderedDict(sorted(pmf_weekend_usage.items()))
plt.step(list(pmf_week_usage_sorted.keys()),list(pmf_week_usage_sorted.
 ↪values()), label="Total Week Usage")
plt.step(list(pmf_weekend_usage_sorted.keys()),list(pmf_weekend_usage_sorted.
 ↪values()), label="Total Weekend Usage")
```

[12]: `[<matplotlib.lines.Line2D at 0x7fe452830410>]`



ConclusionIt looks like our Hypothesis is True. From the PMF we can be sure that there are more of Weekend Usage than Weekly Usage

Let us now analyze the Instagram and Facebook Usage.

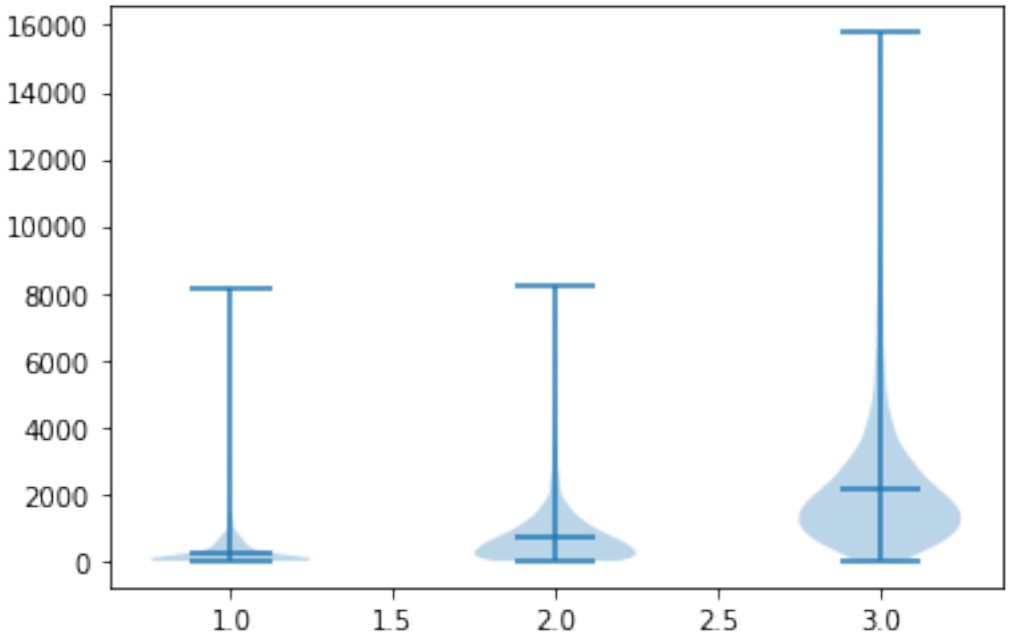
My HypothesisMy friends have been telling me that people are shifting to Instagram from Facebook as a new trend.Let's check that out

[13]:
```
data_c = data[['Total Facebook Usage', 'Total Instagram Usage', 'Total Social␣
 ↪Media Usage']]
```

```
data_c['Total Facebook Usage'] = data_c['Total Facebook Usage'].
 ↪map(convert_to_num)
data_c['Total Instagram Usage'] = data_c['Total Instagram Usage'].
 ↪map(convert_to_num)
data_c['Total Social Media Usage'] = data_c['Total Social Media Usage'].
 ↪map(convert_to_num)
plt.violinplot(data_c, showmeans=True)
```

```
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:3:
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
  This is separate from the ipykernel package so we can avoid doing imports
until
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:4:
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
  after removing the cwd from sys.path.
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:5:
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
  """
```

```
[13]: {'bodies': [<matplotlib.collections.PolyCollection at 0x7fe4527b6c90>,
        <matplotlib.collections.PolyCollection at 0x7fe4527b6fd0>,
        <matplotlib.collections.PolyCollection at 0x7fe4527b6c10>],
       'cmeans': <matplotlib.collections.LineCollection at 0x7fe45286c290>,
       'cmaxes': <matplotlib.collections.LineCollection at 0x7fe4527ce910>,
       'cmins': <matplotlib.collections.LineCollection at 0x7fe4527ced90>,
       'cbars': <matplotlib.collections.LineCollection at 0x7fe4527ce8d0>}
```



Looks like there are more users of Instagram than Facebook. To be more sure let us get rid of the Non Facebook and Instagram users, i.e. users who have 0 usage for Facebook or Instagram.

[14]:
```
data_c.shape
```

[14]:
```
(1628, 3)
```

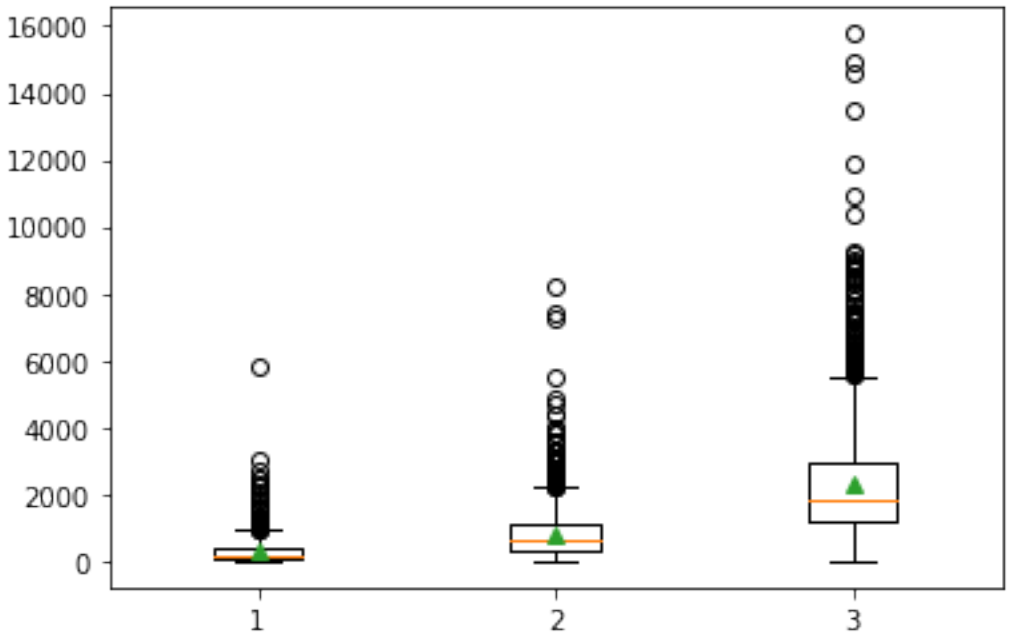
[15]:
```
data_c = data_c[(data_c['Total Facebook Usage']>0)&(data_c['Total Instagram␣
↪Usage']>0)]
data_c.shape
```

[15]:
```
(1147, 3)
```

[16]:
```
plt.boxplot(data_c, showmeans=True)
```

[16]:
```
{'whiskers': [<matplotlib.lines.Line2D at 0x7fe4504dec50>,
  <matplotlib.lines.Line2D at 0x7fe450465050>,
  <matplotlib.lines.Line2D at 0x7fe450472ed0>,
  <matplotlib.lines.Line2D at 0x7fe45047b350>,
  <matplotlib.lines.Line2D at 0x7fe450491190>,
  <matplotlib.lines.Line2D at 0x7fe450491610>],
 'caps': [<matplotlib.lines.Line2D at 0x7fe450465390>,
  <matplotlib.lines.Line2D at 0x7fe4504657d0>,
  <matplotlib.lines.Line2D at 0x7fe45047b790>,
  <matplotlib.lines.Line2D at 0x7fe45047bbd0>,
  <matplotlib.lines.Line2D at 0x7fe450491a50>,
```

```
 <matplotlib.lines.Line2D at 0x7fe450491ed0>],
'boxes': [<matplotlib.lines.Line2D at 0x7fe4504de890>,
 <matplotlib.lines.Line2D at 0x7fe450472ad0>,
 <matplotlib.lines.Line2D at 0x7fe450485d10>],
'medians': [<matplotlib.lines.Line2D at 0x7fe450465c50>,
 <matplotlib.lines.Line2D at 0x7fe450485050>,
 <matplotlib.lines.Line2D at 0x7fe45049a350>],
'fliers': [<matplotlib.lines.Line2D at 0x7fe450472510>,
 <matplotlib.lines.Line2D at 0x7fe4504858d0>,
 <matplotlib.lines.Line2D at 0x7fe45049abd0>],
'means': [<matplotlib.lines.Line2D at 0x7fe4504720d0>,
 <matplotlib.lines.Line2D at 0x7fe450485490>,
 <matplotlib.lines.Line2D at 0x7fe45049a790>]}
```



Conclusion Looking at both the Box Plot and Violin Plot, we can now be sure that people are indeed shifting to Instagram from facebook

Now let us have a analysis amongst Facebook Users, Instagram Users and if and how they relate to the number of Instagram Followers.

[17]:
```
data_c = data[['Age', 'City', 'Current Status',
       'Do you own multiple profiles on Instagram?', 'Gender',
       'Highest Education', 'Location (City Airport Code)', 'Phone OS',
       'State', 'Zone','Instagram Followers','Total Facebook Usage', 'Total␣
↪Instagram Usage', 'Total Social Media Usage']]
```

```
data_c['Total Facebook Usage'] = data_c['Total Facebook Usage'].
 ↪map(convert_to_num)
data_c['Total Instagram Usage'] = data_c['Total Instagram Usage'].
 ↪map(convert_to_num)
data_c['Instagram Followers'] = data_c['Instagram Followers'].
 ↪map(convert_to_num)
data_c['Total Social Media Usage'] = data_c['Total Social Media Usage'].
 ↪map(convert_to_num)
data_c.head()
```

```
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:6:
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

/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:7:
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
  import sys
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:8:
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

/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:9:
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
  if __name__ == '__main__':
```

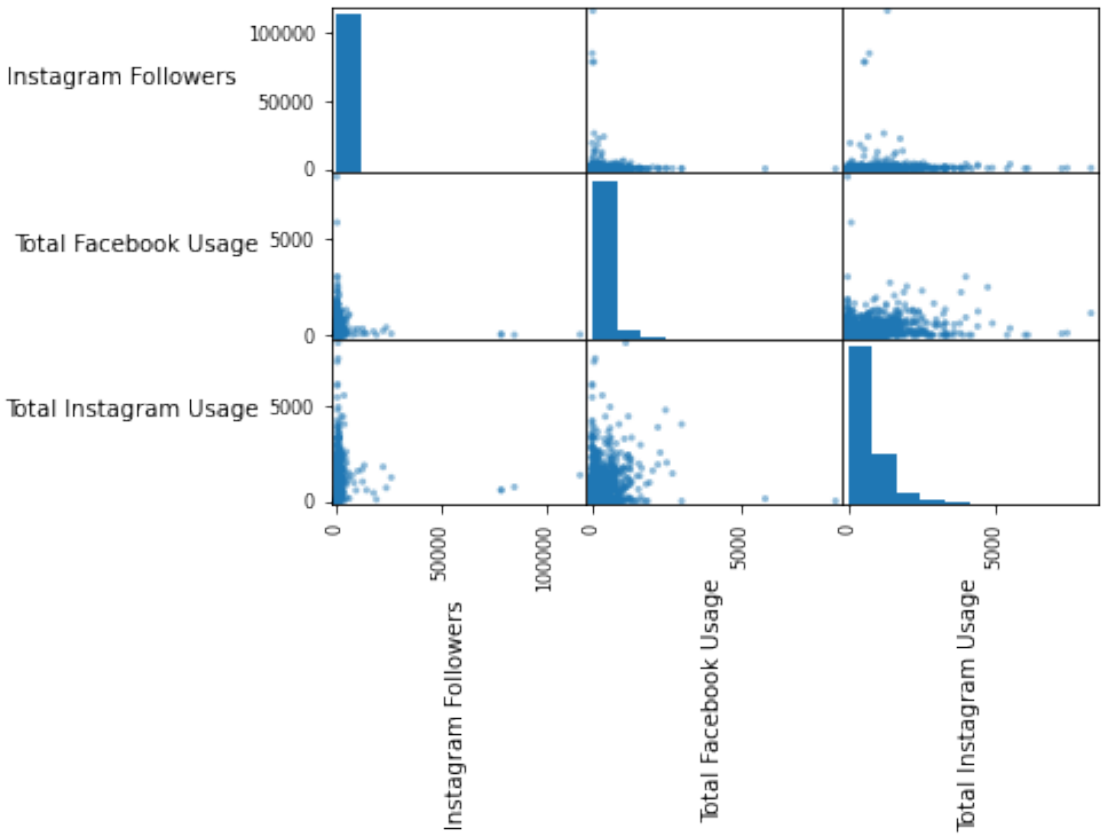
[17]:

	Age	City	Current Status	\
0	24	Delhi	Working professional	
1	39	Delhi	Working professional	
2	22	Mumbai	Working professional	

```
3   26  Bengaluru            Sabbatical
4   50      Delhi  Working professional

  Do you own multiple profiles on Instagram?  Gender Highest Education  \
0                                         No  Female        Graduation
1                                         No  Female   Post graduation
2                                         No    Male        Graduation
3                                        Yes  Female        Graduation
4                                         No    Male        Graduation

  Location (City Airport Code) Phone OS        State      Zone  \
0                          DEL      iOs        Delhi  Northern
1                          DEL      iOs        Delhi  Northern
2                          BOM  Android  Maharashtra   Western
3                          BLR  Android    Karnataka  Southern
4                          DEL      iOs        Delhi  Northern

   Instagram Followers  Total Facebook Usage  Total Instagram Usage  \
0                  456                     0                   1170
1                    0                  8160                      0
2                  400                  2500                   2000
3                  485                  3000                   4000
4                    0                  3000                      0

   Total Social Media Usage
0                    2190.0
1                   15160.0
2                   13500.0
3                   10360.0
4                    6700.0
```

[18]:
```
axes = pd.plotting.scatter_matrix(data_c[['Instagram Followers','Total Facebook␣
 ↪Usage', 'Total Instagram Usage']])
for ax in axes.flatten():
    ax.xaxis.label.set_rotation(90)
    ax.yaxis.label.set_rotation(0)
    ax.yaxis.label.set_ha('right')
```

```
/opt/conda/lib/python3.7/site-packages/pandas/plotting/_matplotlib/tools.py:400:
MatplotlibDeprecationWarning:
The is_first_col function was deprecated in Matplotlib 3.4 and will be removed
two minor releases later. Use ax.get_subplotspec().is_first_col() instead.
  if ax.is_first_col():
```



[19]:
```
data_c[['Instagram Followers','Total Facebook Usage', 'Total Instagram Usage']].
↪corr()
```

[19]:

	Instagram Followers	Total Facebook Usage	Total Instagram Usage
Instagram Followers	1.000000	-0.029036	0.055666
Total Facebook Usage	-0.029036	1.000000	0.162187
Total Instagram Usage	0.055666	0.162187	1.000000

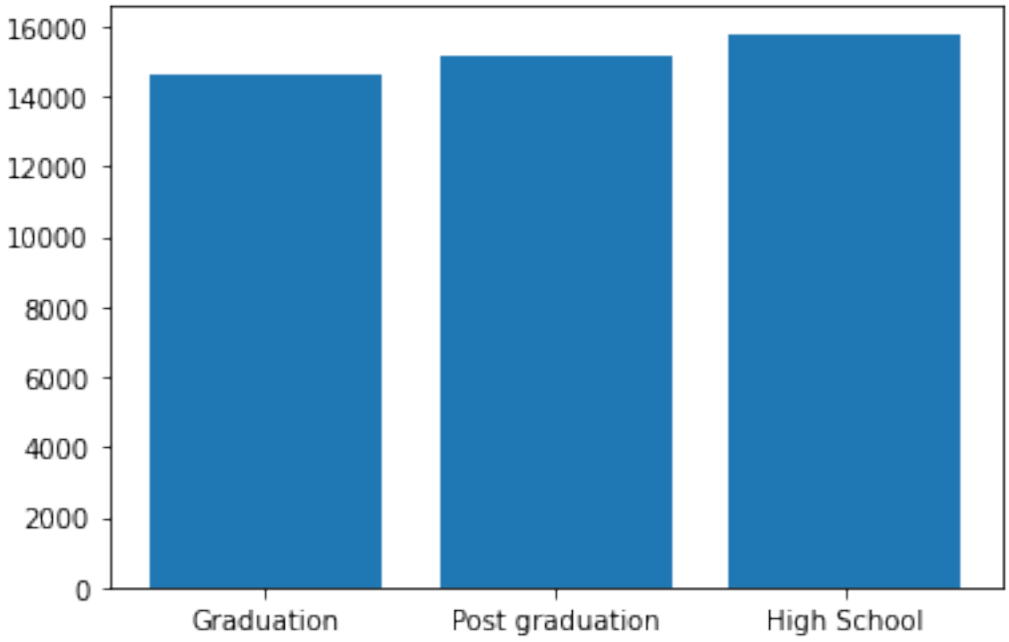
Although the Scatter Matrix did not tell us much. We can see from the Correlation Matrix that number of Instagram Followers are negatively correlated with Facebook Usage. Hence, we can say that, more the number of Instagram Followers people get, the less they visit Facebook!It is also intuitive and validated from the Correlation Matrix that more Instagram Followers leads to more Instagram Usage and vice-versa.

We see that parents scold their kids when they visit Social Media very often and ask them to concentrate on studies as Social Media might distract them. Let us validate their claims!My

HypothesisPeople with more degrees tend to have less Total Social Network Usage

[20]:
```
plt.bar(data_c['Highest Education'],data_c['Total Social Media Usage'])
```

[20]:
```
<BarContainer object of 1628 artists>
```

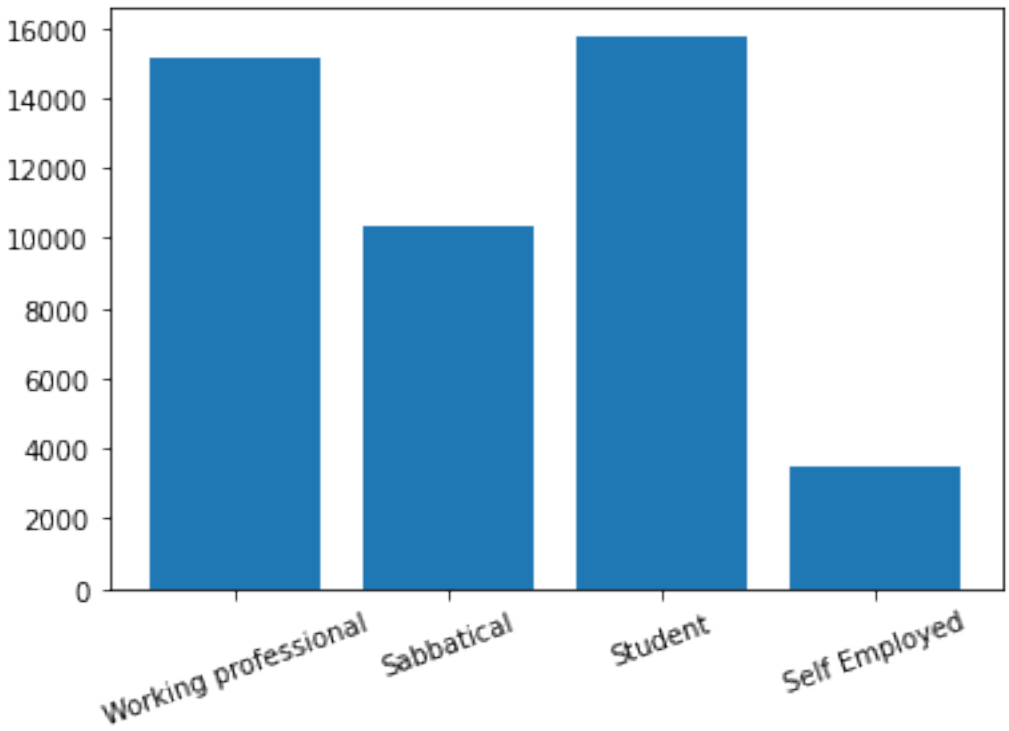


ConclusionNow we have a conclusive proof that our asumption might not be correct! We see that poeple with Post Graduate degrees tend to use social media more than people having Graduation degrees only.Can this be due to the fact that people with Graduation tend to get into industrial jobs than people with Post Graduation degrees as people with PG degrees tend to get into academics and go for further studies?! Let's verify this.

My HypothesisPeople in Working Profession tend to visit Social Media less than others

[21]:
```
plt.bar(data_c['Current Status'],data_c['Total Social Media Usage'])
plt.xticks(rotation=20)
```

[21]:
```
([0, 1, 2, 3],
 [Text(0, 0, ''), Text(0, 0, ''), Text(0, 0, ''), Text(0, 0, '')])
```



ConclusionWe see from the bar chart that although Working Professionals visit social media less than Students (Intuitve!), but it is not always true that Working Professionals tend to visit Social Media less than other people. We can see that people who have taken Sabbatical visit social media less than Students and Working Professionals. People who are Self Employed are lesser. We can interpret and infer various reasons for this!

Let us go back to our Instagram Analogy. We saw the rise and shift of Instagram from Facebook. Can we also say that Working Professional are shifting to Instagram lesser than others.

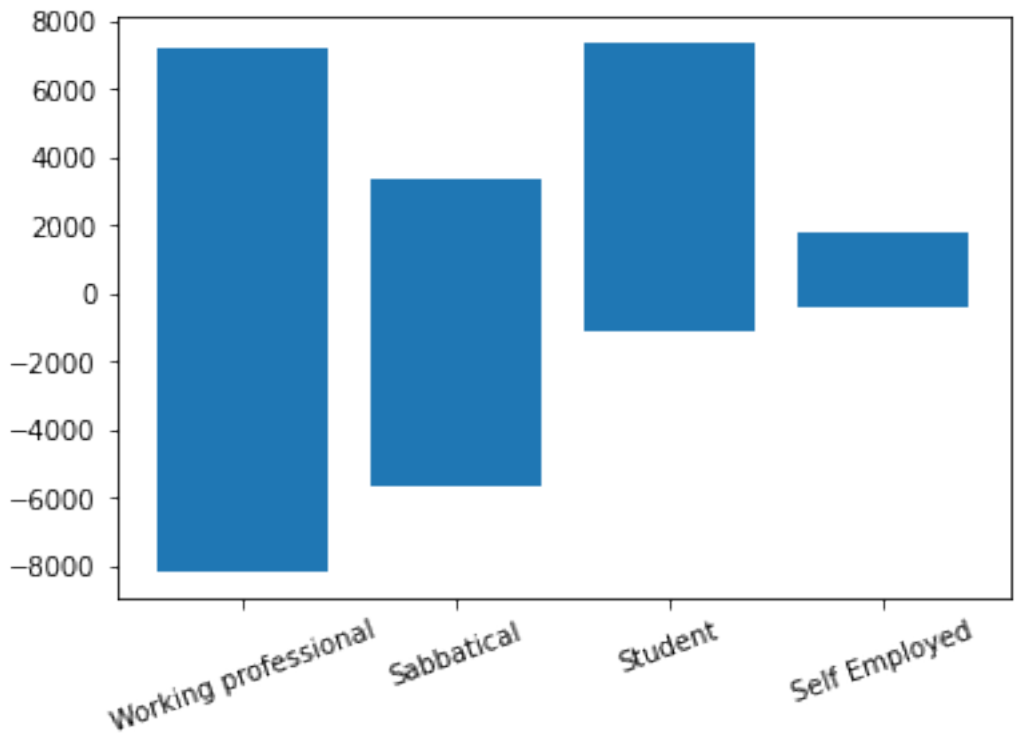
HypothesisWorking Professionals are not shifting to Instagram as much as others.

[22]:
```
data_c['Insta-FB'] = data_c['Total Instagram Usage'] - data_c['Total Facebook␣
↪Usage']
```

```
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:2:
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
```

[23]:
```
plt.bar(data_c['Current Status'],data_c['Insta-FB'])
plt.xticks(rotation=20)
```

[23]:
```
([0, 1, 2, 3],
 [Text(0, 0, ''), Text(0, 0, ''), Text(0, 0, ''), Text(0, 0, '')])
```



ConclusionWe can see from the bar chart that Working Professionals are using as much Facebook as they are using Instagram. This is also almost true for people with Sabbatical. But we see a clear shift to Instagram for Students. The new generation seems to love Instagram!

Now let us talk about Instagram in more detail. How can one get huge number of followers? Can we say that people tend to follow celebraties and so people living in Metropolitan Cities than Non-Metropolitan Cities? (A bit Stereotypical!)

Let's check this out!

[24]:
```
set(data_c['City'])
```

[24]:
```
{'Agra',
 'Ahmedabad',
 'Allahabad',
 'Amritsar',
 'Aurangabad',
 'Bagdogra',
 'Baroda',
 'Belgaum',
 'Bengaluru',
```

```
 'Bhavnagar',
 'Bhopal',
 'Bhubaneshwar',
 'Bhuj',
 'Chandigarh',
 'Chennai',
 'Coimbatore',
 'Cooch-behar',
 'DehraDun',
 'Delhi',
 'Dibrugarh',
 'Durgapur',
 'Goa',
 'Guwahati',
 'Gwalior',
 'Hyderabad',
 'Indore',
 'Jaipur',
 'Jammu',
 'Jorhat',
 'Kandla',
 'Kanpur',
 'Kochi',
 'Kolkata',
 'Kulu',
 'Lucknow',
 'Ludhiana',
 'Madurai',
 'Mangalore',
 'Mumbai',
 'Nagpur',
 'Nainital',
 'Pathankot',
 'Patna',
 'Pune',
 'Raipur',
 'Rajkot',
 'Ranchi',
 'Surat',
 'Thiruvananthapuram',
 'Tiruchirappalli',
 'Udaipur',
 'Varanasi',
 'Vishakhapatnam'}
```

[25]:
```
metro_city_dict = {'Agra':0,
 'Ahmedabad':1,
```

```
'Allahabad':0,
'Amritsar':0,
'Aurangabad':0,
'Bagdogra':0,
'Baroda':0,
'Belgaum':0,
'Bengaluru':1,
'Bhavnagar':0,
'Bhopal':0,
'Bhubaneshwar':0,
'Bhuj':0,
'Chandigarh':0,
'Chennai':1,
'Coimbatore':0,
'Cooch-behar':0,
'DehraDun':0,
'Delhi':1,
'Dibrugarh':0,
'Durgapur':0,
'Goa':0,
'Guwahati':0,
'Gwalior':0,
'Hyderabad':1,
'Indore':0,
'Jaipur':1,
'Jammu':0,
'Jorhat':0,
'Kandla':0,
'Kanpur':1,
'Kochi':0,
'Kolkata':1,
'Kulu':0,
'Lucknow':0,
'Ludhiana':0,
'Madurai':1,
'Mangalore':0,
'Mumbai':1,
'Nagpur':1,
'Nainital':0,
'Pathankot':0,
'Patna':1,
'Pune':1,
'Raipur':0,
'Rajkot':0,
'Ranchi':0,
'Surat':1,
'Thiruvananthapuram':0,
```

```
 'Tiruchirappalli':0,
 'Udaipur':0,
 'Varanasi':0,
 'Vishakhapatnam':1}
data_c['Metropolitan'] = data['City'].map(metro_city_dict)
data_c['Metropolitan']
```

```
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:55:
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
```

[25]:
```
0       1
1       1
2       1
3       1
4       1
       ..
1623    1
1624    1
1625    0
1626    1
1627    1
Name: Metropolitan, Length: 1628, dtype: int64
```

[26]:
```
data_c = data[['Age', 'City', 'Current Status',
       'Do you own multiple profiles on Instagram?', 'Gender',
       'Highest Education', 'Location (City Airport Code)', 'Phone OS',
       'State', 'Zone','Instagram Followers','Total Facebook Usage', 'Total␣
 ↪Instagram Usage', 'Total Social Media Usage']]
data_c['Total Facebook Usage'] = data_c['Total Facebook Usage'].
 ↪map(convert_to_num)
data_c['Total Instagram Usage'] = data_c['Total Instagram Usage'].
 ↪map(convert_to_num)
data_c['Instagram Followers'] = data_c['Instagram Followers'].
 ↪map(convert_to_num)
data_c['Total Social Media Usage'] = data_c['Total Social Media Usage'].
 ↪map(convert_to_num)
data_c.head()
```

```
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:6:
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

/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:7:
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
  import sys
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:8:
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

/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:9:
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
  if __name__ == '__main__':
```

[26]:

	Age	City	Current Status	Do you own multiple profiles on Instagram?	Gender	Highest Education	Location (City Airport Code)	Phone OS	State	Zone
0	24	Delhi	Working professional	No	Female	Graduation	DEL	iOs	Delhi	Northern
1	39	Delhi	Working professional	No	Female	Post graduation	DEL	iOs	Delhi	Northern
2	22	Mumbai	Working professional	No	Male	Graduation	BOM	Android	Maharashtra	Western
3	26	Bengaluru	Sabbatical	Yes	Female	Graduation	BLR	Android	Karnataka	Southern
4	50	Delhi	Working professional	No	Male	Graduation				

```
4                          DEL      iOs        Delhi   Northern

   Instagram Followers  Total Facebook Usage  Total Instagram Usage  \
0                  456                     0                   1170
1                    0                  8160                      0
2                  400                  2500                   2000
3                  485                  3000                   4000
4                    0                  3000                      0

   Total Social Media Usage
0                    2190.0
1                   15160.0
2                   13500.0
3                   10360.0
4                    6700.0
```

[27]:
```
data_c['Metropolitan'] = data['City'].map(metro_city_dict)
```

```
/opt/conda/lib/python3.7/site-packages/ipykernel_launcher.py:1:
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
  """Entry point for launching an IPython kernel.
```

[28]:
```
followersByCity = data_c.groupby('City')['Instagram Followers'].mean()
followersByCity
```

[28]:
```
City
Agra                   446.333333
Ahmedabad              670.412844
Allahabad              936.000000
Amritsar               542.800000
Aurangabad             834.000000
Bagdogra               261.105263
Baroda                 462.043478
Belgaum               1117.000000
Bengaluru              675.057471
Bhavnagar              150.000000
Bhopal                1051.000000
Bhubaneshwar         12627.000000
Bhuj                   692.000000
Chandigarh            1515.064516
Chennai                743.161290
Coimbatore             180.000000
Cooch-behar             56.000000
```

```
DehraDun                485.291667
Delhi                   690.104839
Dibrugarh               259.000000
Durgapur                675.000000
Goa                     977.000000
Guwahati                243.125000
Gwalior                 373.250000
Hyderabad               393.244444
Indore                  390.193548
Jaipur                  485.333333
Jammu                   231.000000
Jorhat                  128.000000
Kandla                  545.000000
Kanpur                  511.666667
Kochi                   642.600000
Kolkata                 917.419192
Kulu                    930.000000
Lucknow                 454.885714
Ludhiana                827.000000
Madurai                 560.000000
Mangalore               430.500000
Mumbai                  853.180000
Nagpur                  233.000000
Nainital                565.285714
Pathankot                 0.000000
Patna                   301.714286
Pune                    530.196078
Raipur                  331.000000
Rajkot                  411.500000
Ranchi                  781.181818
Surat                  3812.388889
Thiruvananthapuram      501.000000
Tiruchirappalli         356.000000
Udaipur                 307.533333
Varanasi                479.750000
Vishakhapatnam          693.681818
Name: Instagram Followers, dtype: float64
```

[29]:
```
followersByCityDf = pd.DataFrame(followersByCity)
followersByCityDf
```

[29]:

City	Instagram Followers
Agra	446.333333
Ahmedabad	670.412844
Allahabad	936.000000
Amritsar	542.800000

Aurangabad	834.000000
Bagdogra	261.105263
Baroda	462.043478
Belgaum	1117.000000
Bengaluru	675.057471
Bhavnagar	150.000000
Bhopal	1051.000000
Bhubaneshwar	12627.000000
Bhuj	692.000000
Chandigarh	1515.064516
Chennai	743.161290
Coimbatore	180.000000
Cooch-behar	56.000000
DehraDun	485.291667
Delhi	690.104839
Dibrugarh	259.000000
Durgapur	675.000000
Goa	977.000000
Guwahati	243.125000
Gwalior	373.250000
Hyderabad	393.244444
Indore	390.193548
Jaipur	485.333333
Jammu	231.000000
Jorhat	128.000000
Kandla	545.000000
Kanpur	511.666667
Kochi	642.600000
Kolkata	917.419192
Kulu	930.000000
Lucknow	454.885714
Ludhiana	827.000000
Madurai	560.000000
Mangalore	430.500000
Mumbai	853.180000
Nagpur	233.000000
Nainital	565.285714
Pathankot	0.000000
Patna	301.714286
Pune	530.196078
Raipur	331.000000
Rajkot	411.500000
Ranchi	781.181818
Surat	3812.388889
Thiruvananthapuram	501.000000
Tiruchirappalli	356.000000
Udaipur	307.533333

```
Varanasi                    479.750000
Vishakhapatnam              693.681818
```

[30]:
```
followersByCityDf['Metropolitan'] = followersByCityDf.index.map(metro_city_dict)
followersByCityDf
```

[30]:

City	Instagram Followers	Metropolitan
Agra	446.333333	0
Ahmedabad	670.412844	1
Allahabad	936.000000	0
Amritsar	542.800000	0
Aurangabad	834.000000	0
Bagdogra	261.105263	0
Baroda	462.043478	0
Belgaum	1117.000000	0
Bengaluru	675.057471	1
Bhavnagar	150.000000	0
Bhopal	1051.000000	0
Bhubaneshwar	12627.000000	0
Bhuj	692.000000	0
Chandigarh	1515.064516	0
Chennai	743.161290	1
Coimbatore	180.000000	0
Cooch-behar	56.000000	0
DehraDun	485.291667	0
Delhi	690.104839	1
Dibrugarh	259.000000	0
Durgapur	675.000000	0
Goa	977.000000	0
Guwahati	243.125000	0
Gwalior	373.250000	0
Hyderabad	393.244444	1
Indore	390.193548	0
Jaipur	485.333333	1
Jammu	231.000000	0
Jorhat	128.000000	0
Kandla	545.000000	0
Kanpur	511.666667	1
Kochi	642.600000	0
Kolkata	917.419192	1
Kulu	930.000000	0
Lucknow	454.885714	0
Ludhiana	827.000000	0
Madurai	560.000000	1
Mangalore	430.500000	0
Mumbai	853.180000	1

```
Nagpur                    233.000000            1
Nainital                  565.285714            0
Pathankot                   0.000000            0
Patna                     301.714286            1
Pune                      530.196078            1
Raipur                    331.000000            0
Rajkot                    411.500000            0
Ranchi                    781.181818            0
Surat                    3812.388889            1
Thiruvananthapuram        501.000000            0
Tiruchirappalli           356.000000            0
Udaipur                   307.533333            0
Varanasi                  479.750000            0
Vishakhapatnam            693.681818            1
```

[31]:
```
followersByCityDf.groupby('Metropolitan')['Instagram Followers'].mean()
```

[31]:
```
Metropolitan
0    847.248510
1    804.704077
Name: Instagram Followers, dtype: float64
```

ConclusionWe see that our stereotypical claim is not true. Everyone can gather followers by talent irrespective of where they belong.

Let us check the same with respect to Standard Deviation.

It is up to you to think that less spread can infer more surity on gathering followers. You can analyze more on this!

[32]:
```
followersByCityDf.groupby('Metropolitan')['Instagram Followers'].std()
```

[32]:
```
Metropolitan
0    1989.096765
1     853.461774
Name: Instagram Followers, dtype: float64
```

ConclusionIt seems that there is less spread in Metropolitan Cities for Instagram Followers Count

Let's check the same for top 10 cities with respect to mean and standard deviation to check for average followers and spread of followers respectvely.

Top 10 Cities based on Mean of Instagram Followers

[33]:
```
followersByCitySTD = data_c.groupby('City')['Instagram Followers'].mean()
followersByCitySTD = followersByCitySTD.sort_values(ascending=False)
followersByCitySTD[:10]
```

[33]:
```
City
Bhubaneshwar    12627.000000
```

```
Surat            3812.388889
Chandigarh       1515.064516
Belgaum          1117.000000
Bhopal           1051.000000
Goa               977.000000
Allahabad         936.000000
Kulu              930.000000
Kolkata           917.419192
Mumbai            853.180000
Name: Instagram Followers, dtype: float64
```

Top 10 Cities based on Standard Deviation of Instagram Followers

[34]:
```
followersByCitySTD = data_c.groupby('City')['Instagram Followers'].std()
followersByCitySTD = followersByCitySTD.sort_values()
followersByCitySTD[:10]
```

[34]:
```
City
Bhavnagar      0.000000
Ludhiana      50.911688
Kandla       148.492424
Bagdogra     200.144918
Nagpur       204.644407
Varanasi     214.108033
Amritsar     215.491763
Gwalior      223.010410
Guwahati     239.581443
Kanpur       250.257201
Name: Instagram Followers, dtype: float64
```

Finally Let's see if number of Instagram Followers has anything to do with Gender

[35]:
```
followersByGender = data_c.groupby('Gender')['Instagram Followers'].mean()
followersByGender
```

[35]:
```
Gender
Female        1059.966790
Male           662.606396
Non Binary    6446.000000
Name: Instagram Followers, dtype: float64
```

It is very clear that Female has far more average number of followers than Male