In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

In [2]:
```
df=pd.read_csv("5_Instagram data.csv")
df
```

Out[2]:

| | Impressions | From Home | From Hashtags | From Explore | From Other | Saves | Comments | Shares | Likes | Profile Visits | Follows |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 3920 | 2586 | 1028 | 619 | 56 | 98 | 9 | 5 | 162 | 35 | 2 |
| **1** | 5394 | 2727 | 1838 | 1174 | 78 | 194 | 7 | 14 | 224 | 48 | 10 |
| **2** | 4021 | 2085 | 1188 | 0 | 533 | 41 | 11 | 1 | 131 | 62 | 12 |
| **3** | 4528 | 2700 | 621 | 932 | 73 | 172 | 10 | 7 | 213 | 23 | 8 |
| **4** | 2518 | 1704 | 255 | 279 | 37 | 96 | 5 | 4 | 123 | 8 | 0 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| **114** | 13700 | 5185 | 3041 | 5352 | 77 | 573 | 2 | 38 | 373 | 73 | 80 |
| **115** | 5731 | 1923 | 1368 | 2266 | 65 | 135 | 4 | 1 | 148 | 20 | 18 |

| | Impressions | From Home | From Hashtags | From Explore | From Other | Saves | Comments | Shares | Likes | Profile Visits | Follows |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **116** | 4139 | 1133 | 1538 | 1367 | 33 | 36 | 0 | 1 | 92 | 34 | 10 |
| **117** | 32695 | 11815 | 3147 | 17414 | 170 | 1095 | 2 | 75 | 549 | 148 | 214 |
| **118** | 36919 | 13473 | 4176 | 16444 | 2547 | 653 | 5 | 26 | 443 | 611 | 228 |

119 rows × 13 columns

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

Out[3]:

| | Impressions | From Home | From Hashtags | From Explore | From Other | Saves | Comments | Shares | Likes | Profile Visits | Follows | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 3920 | 2586 | 1028 | 619 | 56 | 98 | 9 | 5 | 162 | 35 | 2 | i da |
| **1** | 5394 | 2727 | 1838 | 1174 | 78 | 194 | 7 | 14 | 224 | 48 | 10 | |
| **2** | 4021 | 2085 | 1188 | 0 | 533 | 41 | 11 | 1 | 131 | 62 | 12 | L m |
| **3** | 4528 | 2700 | 621 | 932 | 73 | 172 | 10 | 7 | 213 | 23 | 8 | c pr |
| **4** | 2518 | 1704 | 255 | 279 | 37 | 96 | 5 | 4 | 123 | 8 | 0 | an |

| | Impressions | From Home | From Hashtags | From Explore | From Other | Saves | Comments | Shares | Likes | Profile Visits | Follows |
|---|---|---|---|---|---|---|---|---|---|---|---|

# DATA CLEANING AND DATA PREPROCESSING

In [4]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 119 entries, 0 to 118
Data columns (total 13 columns):
 #   Column          Non-Null Count  Dtype 
---  ------          --------------  ----- 
 0   Impressions     119 non-null    int64 
 1   From Home       119 non-null    int64 
 2   From Hashtags   119 non-null    int64 
 3   From Explore    119 non-null    int64 
 4   From Other      119 non-null    int64 
 5   Saves           119 non-null    int64 
 6   Comments        119 non-null    int64 
 7   Shares          119 non-null    int64 
 8   Likes           119 non-null    int64 
 9   Profile Visits  119 non-null    int64 
 10  Follows         119 non-null    int64 
 11  Caption         119 non-null    object
 12  Hashtags        119 non-null    object
dtypes: int64(11), object(2)
memory usage: 12.2+ KB
```

In [5]:
```
df.describe()
```

Out[5]:

| | Impressions | From Home | From Hashtags | From Explore | From Other | Saves | Comments | |
|---|---|---|---|---|---|---|---|---|
| **count** | 119.000000 | 119.000000 | 119.000000 | 119.000000 | 119.000000 | 119.000000 | 119.000000 | 1 |
| **mean** | 5703.991597 | 2475.789916 | 1887.512605 | 1078.100840 | 171.092437 | 153.310924 | 6.663866 | |
| **std** | 4843.780105 | 1489.386348 | 1884.361443 | 2613.026132 | 289.431031 | 156.317731 | 3.544576 | |
| **min** | 1941.000000 | 1133.000000 | 116.000000 | 0.000000 | 9.000000 | 22.000000 | 0.000000 | |
| **25%** | 3467.000000 | 1945.000000 | 726.000000 | 157.500000 | 38.000000 | 65.000000 | 4.000000 | |
| **50%** | 4289.000000 | 2207.000000 | 1278.000000 | 326.000000 | 74.000000 | 109.000000 | 6.000000 | |
| **75%** | 6138.000000 | 2602.500000 | 2363.500000 | 689.500000 | 196.000000 | 169.000000 | 8.000000 | |
| **max** | 36919.000000 | 13473.000000 | 11817.000000 | 17414.000000 | 2547.000000 | 1095.000000 | 19.000000 | |

In [6]:
```
df.columns
```

Out[6]:
```
Index(['Impressions', 'From Home', 'From Hashtags', 'From Explore',
       'From Other', 'Saves', 'Comments', 'Shares', 'Likes', 'Profile Visits',
```

```
       'Follows', 'Caption', 'Hashtags'],
      dtype='object')
```

In [7]:

```
df1=df.dropna(axis=1)
df1
```

Out[7]:

| | Impressions | From Home | From Hashtags | From Explore | From Other | Saves | Comments | Shares | Likes | Profile Visits | Follows |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 3920 | 2586 | 1028 | 619 | 56 | 98 | 9 | 5 | 162 | 35 | 2 |
| **1** | 5394 | 2727 | 1838 | 1174 | 78 | 194 | 7 | 14 | 224 | 48 | 10 |
| **2** | 4021 | 2085 | 1188 | 0 | 533 | 41 | 11 | 1 | 131 | 62 | 12 |
| **3** | 4528 | 2700 | 621 | 932 | 73 | 172 | 10 | 7 | 213 | 23 | 8 |
| **4** | 2518 | 1704 | 255 | 279 | 37 | 96 | 5 | 4 | 123 | 8 | 0 |
| **...** | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... | ... |
| **114** | 13700 | 5185 | 3041 | 5352 | 77 | 573 | 2 | 38 | 373 | 73 | 80 |
| **115** | 5731 | 1923 | 1368 | 2266 | 65 | 135 | 4 | 1 | 148 | 20 | 18 |
| **116** | 4139 | 1133 | 1538 | 1367 | 33 | 36 | 0 | 1 | 92 | 34 | 10 |

| | Impressions | From Home | From Hashtags | From Explore | From Other | Saves | Comments | Shares | Likes | Profile Visits | Follows |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **117** | 32695 | 11815 | 3147 | 17414 | 170 | 1095 | 2 | 75 | 549 | 148 | 214 |
| **118** | 36919 | 13473 | 4176 | 16444 | 2547 | 653 | 5 | 26 | 443 | 611 | 228 |

119 rows × 13 columns

In [8]:
```
df1.columns
```

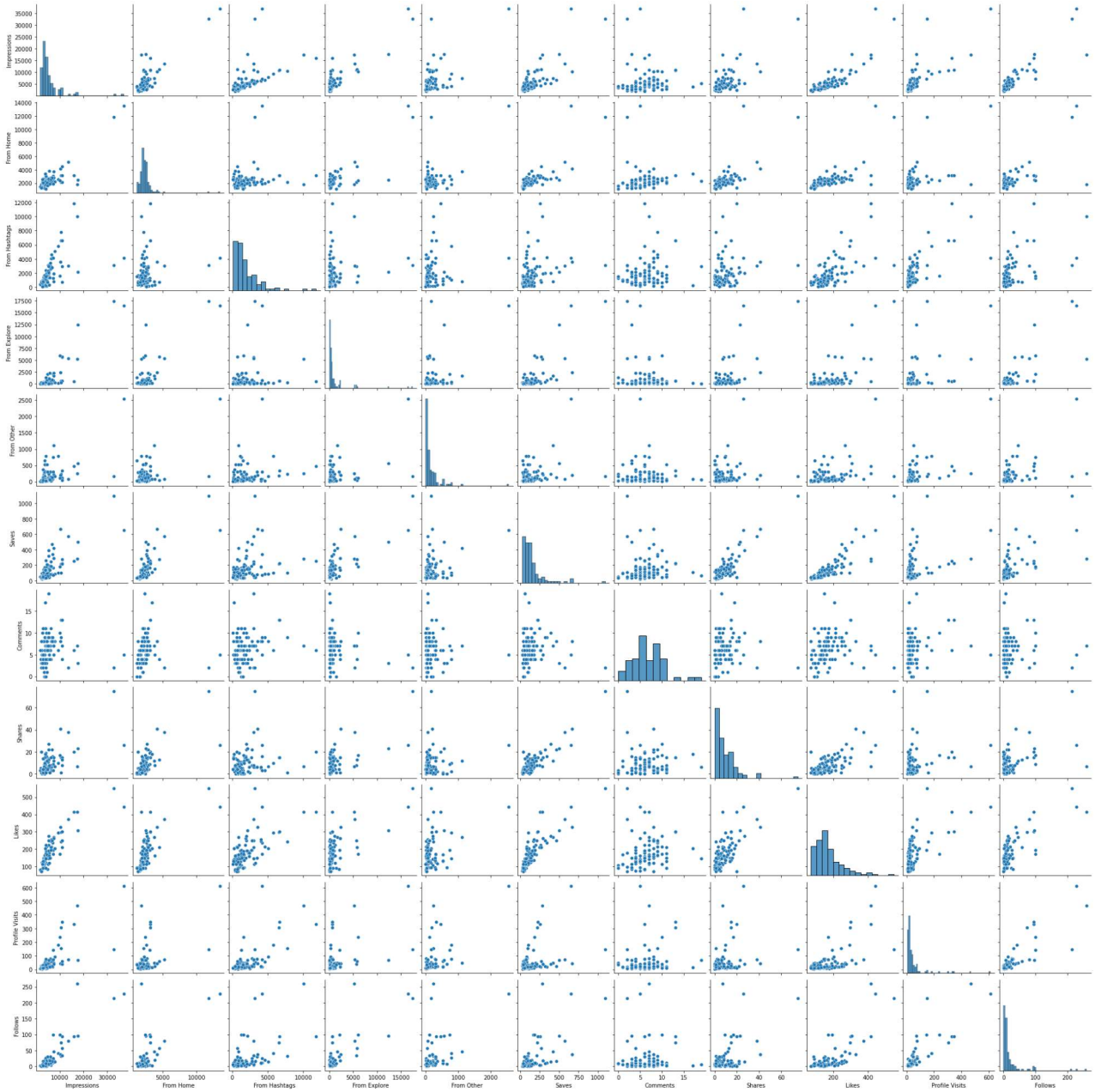
Out[8]:
```
Index(['Impressions', 'From Home', 'From Hashtags', 'From Explore',
       'From Other', 'Saves', 'Comments', 'Shares', 'Likes', 'Profile Visits',
       'Follows', 'Caption', 'Hashtags'],
      dtype='object')
```

In [9]:
```
df1=df1[['Impressions', 'From Home', 'From Hashtags', 'From Explore',
       'From Other', 'Saves', 'Comments', 'Shares', 'Likes', 'Profile Visits',
       'Follows']]
```

# EDA AND VISUALIZATION

In [10]:
```
sns.pairplot(df1)
```

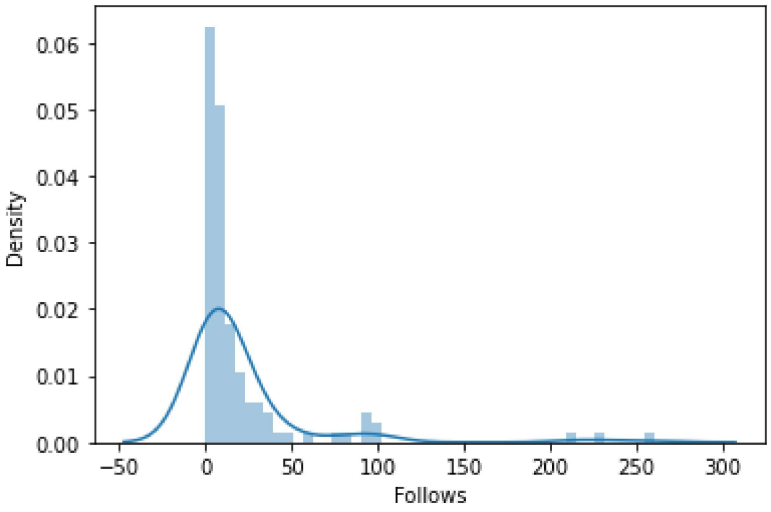
Out[10]:
```
<seaborn.axisgrid.PairGrid at 0x1d5774ffe80>
```




In [11]:
```
sns.distplot(df1['Follows'])
```

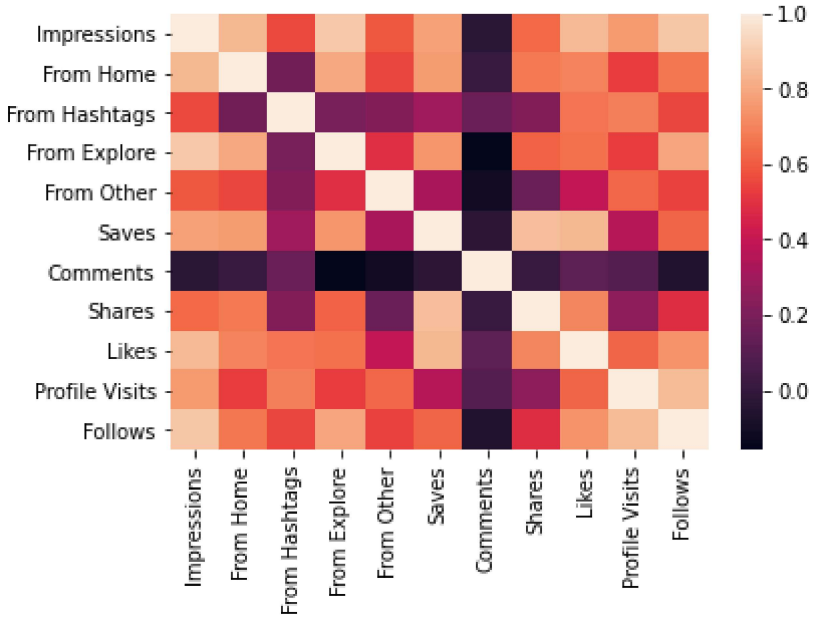
```
C:\ProgramData\Anaconda3\lib\site-packages\seaborn\distributions.py:2557: FutureWarning:
`distplot` is a deprecated function and will be removed in a future version. Please adap
t your code to use either `displot` (a figure-level function with similar flexibility) o
r `histplot` (an axes-level function for histograms).
  warnings.warn(msg, FutureWarning)
```

Out[11]: <AxesSubplot:xlabel='Follows', ylabel='Density'>




In [12]:
```
sns.heatmap(df1.corr())
```

Out[12]: <AxesSubplot:>




# TO TRAIN THE MODEL AND MODEL BULDING

In [13]:
```
x=df[['Impressions', 'From Home', 'From Hashtags', 'From Explore',
       'From Other', 'Saves', 'Comments', 'Shares', 'Likes', 'Profile Visits']]
y=df['Follows']
```

In [14]:
```
from sklearn.model_selection import train_test_split
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.3)
```

In [15]:
```
from sklearn.linear_model import LinearRegression
lr=LinearRegression()
lr.fit(x_train,y_train)
```

Out[15]:
```
LinearRegression()
```

In [16]:
```
lr.intercept_
```

Out[16]:
```
-9.57047930620871
```

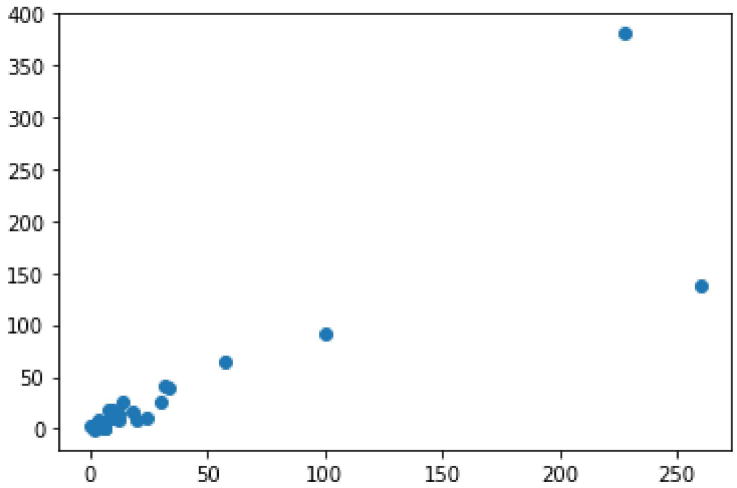
In [17]:
```
coeff=pd.DataFrame(lr.coef_,x.columns,columns=['Co-efficient'])
coeff
```

Out[17]:

| | Co-efficient |
|---|---|
| **Impressions** | -0.001730 |
| **From Home** | 0.010317 |
| **From Hashtags** | 0.003494 |
| **From Explore** | 0.007894 |
| **From Other** | 0.021732 |
| **Saves** | 0.015687 |
| **Comments** | -0.657037 |
| **Shares** | -0.013118 |
| **Likes** | -0.079252 |
| **Profile Visits** | 0.236083 |

In [18]:
```
prediction =lr.predict(x_test)
plt.scatter(y_test,prediction)
```

Out[18]:
```
<matplotlib.collections.PathCollection at 0x1d57dd8a8e0>
```




# ACCURACY

In [19]:
```
lr.score(x_test,y_test)
```

Out[19]: 0.6493242320821324

In [20]:
```
lr.score(x_train,y_train)
```

Out[20]: 0.961913231899332

In [21]:
```
from sklearn.linear_model import Ridge,Lasso
rr=Ridge(alpha=10)
rr.fit(x_train,y_train)
```

Out[21]: Ridge(alpha=10)

In [22]:
```
rr.score(x_train,y_train)
```

Out[22]: 0.9619126519259069

In [23]:
```
rr.score(x_test,y_test)
```

Out[23]: 0.6492901879308461

In [24]:
```
la=Lasso(alpha=10)
la.fit(x_train,y_train)
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\linear_model\_coordinate_descent.py:5
30: ConvergenceWarning: Objective did not converge. You might want to increase the numbe
r of iterations. Duality gap: 695.4401557434301, tolerance: 8.29547951807229
  model = cd_fast.enet_coordinate_descent(
```

Out[24]: Lasso(alpha=10)

In [25]:
```
la.score(x_test,y_test)
```

Out[25]: 0.6571122480225604

In [26]:
```
la.score(x_train,y_train)
```

Out[26]: 0.9567632621574609

In [27]:
```
from sklearn.linear_model import ElasticNet
en=ElasticNet()
en.fit(x_train,y_train)
```

```
C:\ProgramData\Anaconda3\lib\site-packages\sklearn\linear_model\_coordinate_descent.py:5
30: ConvergenceWarning: Objective did not converge. You might want to increase the numbe
r of iterations. Duality gap: 1597.1178128687334, tolerance: 8.29547951807229
  model = cd_fast.enet_coordinate_descent(
```

Out[27]: ElasticNet()

In [28]:
```
en.coef_
```

Out[28]:
```
array([ 0.00057583,  0.00796274,  0.00126171,  0.00563442,  0.01958291,
        0.01498067, -0.57453061, -0.        , -0.07966907,  0.23273118])
```

In [29]:
```
en.intercept_
```

Out[29]:
```
-10.193723001133737
```

In [30]:
```
prediction=en.predict(x_test)
```

In [31]:
```
en.score(x_test,y_test)
```

Out[31]:
```
0.6510933521064324
```

In [32]:
```
from sklearn import metrics
print(metrics.mean_absolute_error(y_test,prediction))
print(metrics.mean_squared_error(y_test,prediction))
print(np.sqrt(metrics.mean_squared_error(y_test,prediction)))
```

```
11.843167194774374
1092.649627135359
33.055251128003235
```