Problem statement

Data collection

Importing libraries

In [1]:

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns
```

Importing dataset

In [2]:

```
data=pd.read_csv(r"C:\Users\user\Downloads\uber - uber.csv")
data
```

Out[2]:

	Unnamed: 0	key	fare_amount	pickup_datetime	pickup_longitude	pickup_latitude	dropoff_l
0	24238194	2015-05-07 19:52:06	7.5	2015-05-07 19:52:06 UTC	-73.999817	40.738354	-
1	27835199	2009-07-17 20:04:56	7.7	2009-07-17 20:04:56 UTC	-73.994355	40.728225	-
2	44984355	2009-08-24 21:45:00	12.9	2009-08-24 21:45:00 UTC	-74.005043	40.740770	-
3	25894730	2009-06-26 08:22:21	5.3	2009-06-26 08:22:21 UTC	-73.976124	40.790844	-
4	17610152	2014-08-28 17:47:00	16.0	2014-08-28 17:47:00 UTC	-73.925023	40.744085	-
...	...	...	...	...	...	...	
199995	42598914	2012-10-28 10:49:00	3.0	2012-10-28 10:49:00 UTC	-73.987042	40.739367	-
199996	16382965	2014-03-14 01:09:00	7.5	2014-03-14 01:09:00 UTC	-73.984722	40.736837	-
199997	27804658	2009-06-29 00:42:00	30.9	2009-06-29 00:42:00 UTC	-73.986017	40.756487	-

	Unnamed: 0	key	fare_amount	pickup_datetime	pickup_longitude	pickup_latitude	dropoff_l
199998	20259894	2015-05-20 14:56:25	14.5	2015-05-20 14:56:25 UTC	-73.997124	40.725452	-7
199999	11951496	2010-05-15 04:08:00	14.1	2010-05-15 04:08:00 UTC	-73.984395	40.720077	-7

200000 rows × 9 columns

head

In [3]:

```
# to display first 8 dataset values
da=data.head(8)
da
```

Out[3]:

	Unnamed: 0	key	fare_amount	pickup_datetime	pickup_longitude	pickup_latitude	dropoff_longitu
0	24238194	2015-05-07 19:52:06	7.5	2015-05-07 19:52:06 UTC	-73.999817	40.738354	-73.999
1	27835199	2009-07-17 20:04:56	7.7	2009-07-17 20:04:56 UTC	-73.994355	40.728225	-73.994
2	44984355	2009-08-24 21:45:00	12.9	2009-08-24 21:45:00 UTC	-74.005043	40.740770	-73.962
3	25894730	2009-06-26 08:22:21	5.3	2009-06-26 08:22:21 UTC	-73.976124	40.790844	-73.965
4	17610152	2014-08-28 17:47:00	16.0	2014-08-28 17:47:00 UTC	-73.925023	40.744085	-73.973
5	44470845	2011-02-12 02:27:09	4.9	2011-02-12 02:27:09 UTC	-73.969019	40.755910	-73.969
6	48725865	2014-10-12 07:04:00	24.5	2014-10-12 07:04:00 UTC	-73.961447	40.693965	-73.871
7	44195482	2012-12-11 13:52:00	2.5	2012-12-11 13:52:00 UTC	0.000000	0.000000	0.000

info

In [4]:

```
# to identify missing values
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 200000 entries, 0 to 199999
Data columns (total 9 columns):
 #   Column             Non-Null Count   Dtype  
---  ------             --------------   -----  
 0   Unnamed: 0         200000 non-null  int64  
 1   key                200000 non-null  object 
 2   fare_amount        200000 non-null  float64
 3   pickup_datetime    200000 non-null  object 
 4   pickup_longitude   200000 non-null  float64
 5   pickup_latitude    200000 non-null  float64
 6   dropoff_longitude  199999 non-null  float64
 7   dropoff_latitude   199999 non-null  float64
 8   passenger_count    200000 non-null  int64  
dtypes: float64(5), int64(2), object(2)
memory usage: 13.7+ MB
```

describe

In [5]:

```
# to display summary of the dataset
data.describe()
```

Out[5]:

	Unnamed: 0	fare_amount	pickup_longitude	pickup_latitude	dropoff_longitude	dropoff_latitu
count	2.000000e+05	200000.000000	200000.000000	200000.000000	199999.000000	199999.0000
mean	2.771250e+07	11.359955	-72.527638	39.935885	-72.525292	39.9238
std	1.601382e+07	9.901776	11.437787	7.720539	13.117408	6.7948
min	1.000000e+00	-52.000000	-1340.648410	-74.015515	-3356.666300	-881.9855
25%	1.382535e+07	6.000000	-73.992065	40.734796	-73.991407	40.7338
50%	2.774550e+07	8.500000	-73.981823	40.752592	-73.980093	40.7530
75%	4.155530e+07	12.500000	-73.967153	40.767158	-73.963659	40.7680
max	5.542357e+07	499.000000	57.418457	1644.421482	1153.572603	872.6976

columns

In [6]:

```
# to display headings of the dataset
data.columns
```

Out[6]:

```
Index(['Unnamed: 0', 'key', 'fare_amount', 'pickup_datetime',
       'pickup_longitude', 'pickup_latitude', 'dropoff_longitude',
       'dropoff_latitude', 'passenger_count'],
      dtype='object')
```

In [7]:

```
a=data.dropna(axis=1)
a
b=a.head(8)
b
```

Out[7]:

	Unnamed: 0	key	fare_amount	pickup_datetime	pickup_longitude	pickup_latitude	passenger_cour
0	24238194	2015-05-07 19:52:06	7.5	2015-05-07 19:52:06 UTC	-73.999817	40.738354	
1	27835199	2009-07-17 20:04:56	7.7	2009-07-17 20:04:56 UTC	-73.994355	40.728225	
2	44984355	2009-08-24 21:45:00	12.9	2009-08-24 21:45:00 UTC	-74.005043	40.740770	
3	25894730	2009-06-26 08:22:21	5.3	2009-06-26 08:22:21 UTC	-73.976124	40.790844	
4	17610152	2014-08-28 17:47:00	16.0	2014-08-28 17:47:00 UTC	-73.925023	40.744085	
5	44470845	2011-02-12 02:27:09	4.9	2011-02-12 02:27:09 UTC	-73.969019	40.755910	
6	48725865	2014-10-12 07:04:00	24.5	2014-10-12 07:04:00 UTC	-73.961447	40.693965	
7	44195482	2012-12-11 13:52:00	2.5	2012-12-11 13:52:00 UTC	0.000000	0.000000	

In [8]:

```
a.columns
```

Out[8]:

```
Index(['Unnamed: 0', 'key', 'fare_amount', 'pickup_datetime',
       'pickup_longitude', 'pickup_latitude', 'passenger_count'],
      dtype='object')
```

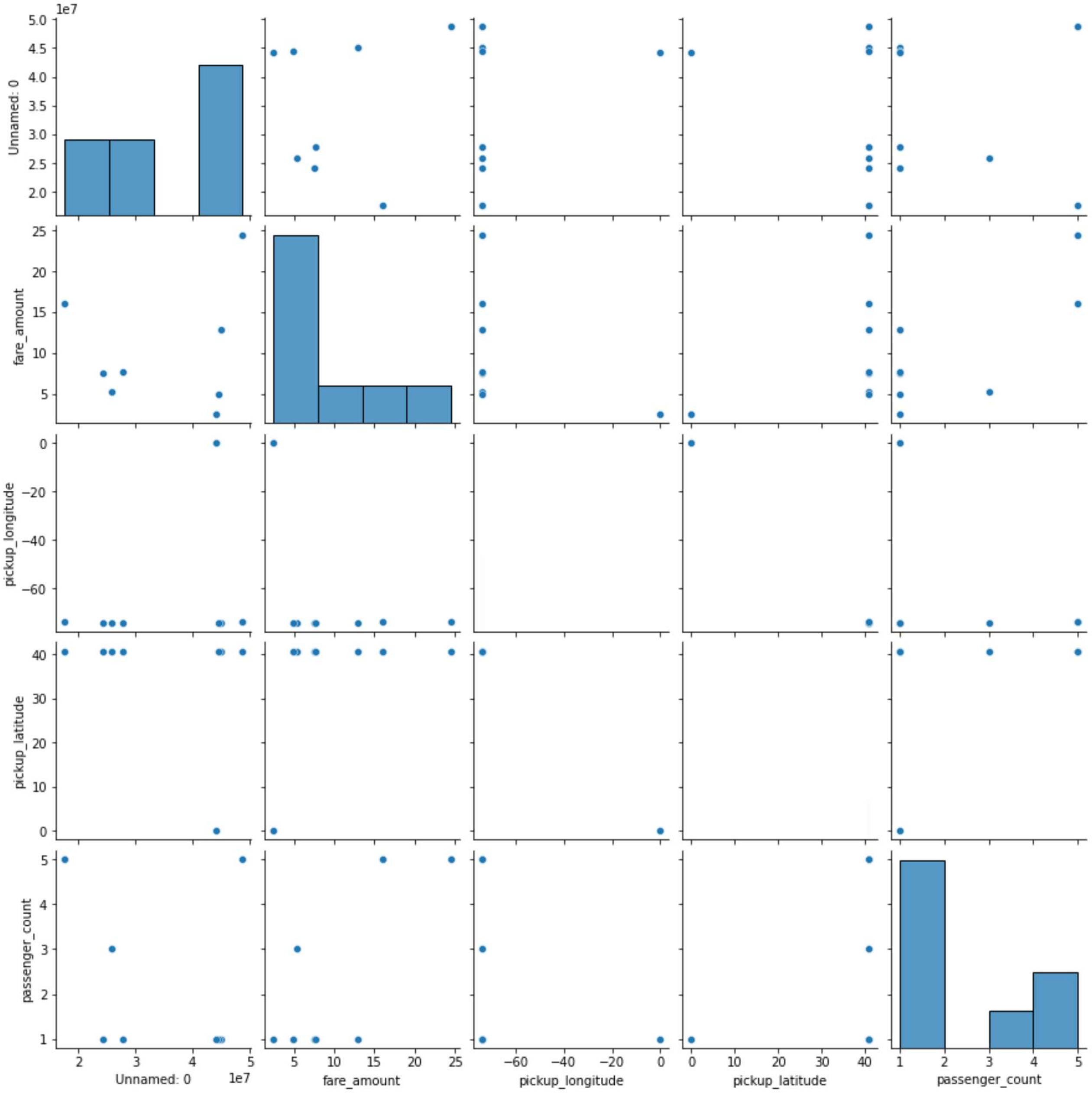
EDA and Visualization

In [9]:

```
sns.pairplot(b)
```

Out[9]:

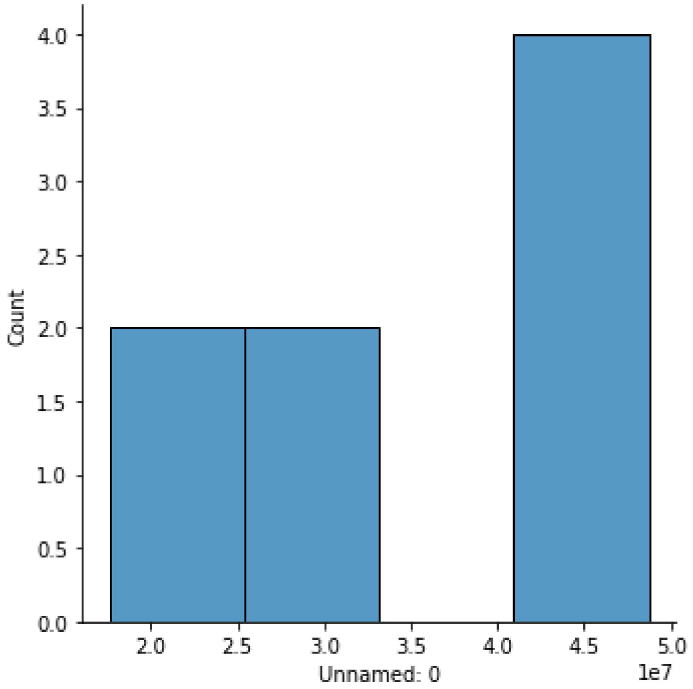
```
<seaborn.axisgrid.PairGrid at 0x21700623ac0>
```



distribution plot

```
In [10]: sns.displot(b['Unnamed: 0'])
```

```
Out[10]: <seaborn.axisgrid.FacetGrid at 0x21707cf4760>
```



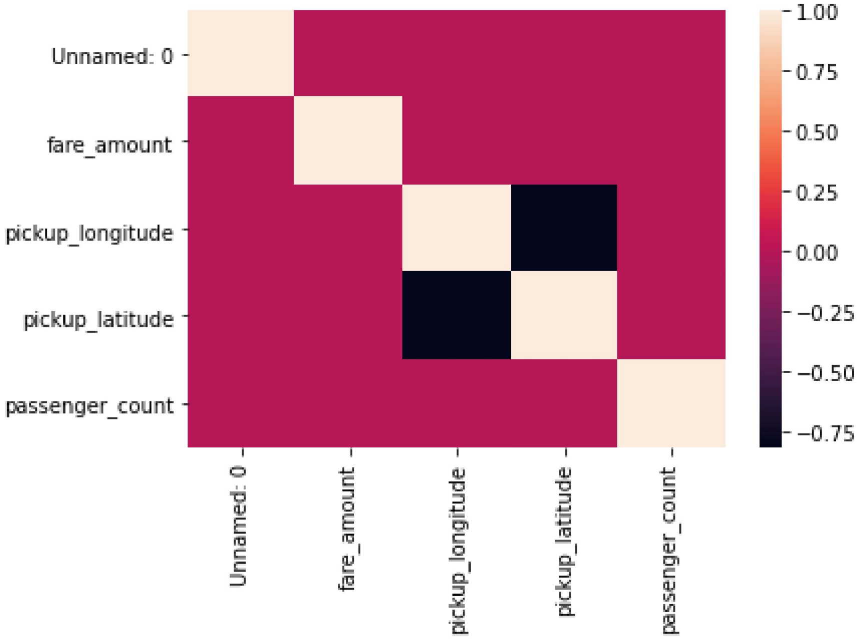
correlation

In [11]:

```
dat=data[['Unnamed: 0', 'key', 'fare_amount', 'pickup_datetime',
       'pickup_longitude', 'pickup_latitude', 'passenger_count'
      ]]
sns.heatmap(dat.corr())
```

Out[11]:

```
<AxesSubplot:>
```



To train the model-Model Building

In [12]:

```
x=b[[ 'passenger_count']]
y=b['Unnamed: 0']
```

In [13]:

```
# to split my dataset into training and test data
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 [14]:

```
from sklearn.linear_model import LinearRegression
lr= LinearRegression()
lr.fit(x_train,y_train)
```

Out[14]:

```
LinearRegression()
```

In [15]:

```
print(lr.intercept_)
```

```
31799696.25
```

In [16]:

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

Out[16]:

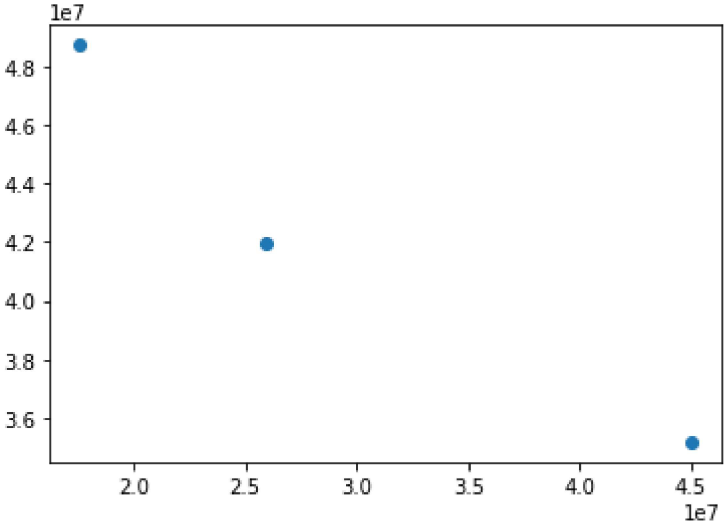
	Co-efficient
passenger_count	3385233.75

In [17]:

```
prediction=lr.predict(x_test)
plt.scatter(y_test,prediction)
```

Out[17]:

```
<matplotlib.collections.PathCollection at 0x2170a5d9250>
```



In [18]:

```
print(lr.score(x_test,y_test))
```

```
-2.3546184496726354
```

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

Out[19]: -2.3546184496726354
```

Ridge regression

```
In [20]: from sklearn.linear_model import Ridge,Lasso
```

```
In [21]: rr=Ridge(alpha=10)
         rr.fit(x_train,y_train)
         rr.score(x_test,y_test)

Out[21]: -1.4690636790653642
```

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

Out[22]: 0.24278569024577645
```

Lasso regression

```
In [23]: la=Lasso(alpha=10)
         la.fit(x_train,y_train)
         la.score(x_train,y_train)

Out[23]: 0.30061383674065434
```

```
In [24]: la.score(x_test,y_test)

Out[24]: -2.354615938563074
```

```
In [25]: from sklearn.linear_model import ElasticNet
         en=ElasticNet()
         en.fit(x_train,y_train)

Out[25]: ElasticNet()
```

```
In [26]: print(en.coef_)

         [2832090.81699346]
```

```
In [27]: print(en.intercept_)

         32795353.529411763
```

```
In [28]: predict=en.predict(x_test)
```

```
In [29]: print(en.score(x_test,y_test))
```

```
-2.0085978401533984
```

```
In [30]: from sklearn import metrics
```

```
In [31]: print("Mean Absolute error:",metrics.mean_absolute_error(y_test,predict))
```

```
Mean Absolute error: 18033154.082788672
```

```
In [32]: print("Mean Squared error:",metrics.mean_squared_error(y_test,predict))
```

```
Mean Squared error: 395261228749370.0
```

```
In [33]: print("Root squared error:",np.sqrt(metrics.mean_squared_error(y_test,predict)))
```

```
Root squared error: 19881177.7505602
```