```
import numpy as np
import pandas as pd
import seaborn as sns

from sklearn.model_selection import train_test_split
from sklearn.preprocessing import StandardScaler
from sklearn.linear_model import LinearRegression
from sklearn.ensemble import RandomForestRegressor

from sklearn.metrics import r2_score
from sklearn.metrics import mean_absolute_error
from sklearn.metrics import mean_squared_error

import warnings
warnings.filterwarnings('ignore')


data = pd.read_csv('uber.csv')


data.head()
```

	Unnamed: 0	key	fare_amount	pickup_datetime	pickup_longitude	picku
0	24238194	2015-05-07 19:52:06.0000003	7.5	2015-05-07 19:52:06 UTC	-73.999817	
1	27835199	2009-07-17 20:04:56.0000002	7.7	2009-07-17 20:04:56 UTC	-73.994355	
2	44984355	2009-08-24 21:45:00.00000061	12.9	2009-08-24 21:45:00 UTC	-74.005043	

```
data.shape
```

```
(53589, 9)
```

DATA PREPROCESSING

```
data.isnull().sum()
```

```
Unnamed: 0           0
key                  0
fare_amount          0
pickup_datetime      0
pickup_longitude     0
pickup_latitude      0
dropoff_longitude    0
dropoff_latitude     0
passenger_count      1
dtype: int64
```

```
data.drop(columns='Unnamed: 0',inplace=True)


data=data.dropna()


data = data[data['fare_amount']> 0]
data["pickup_datetime"] = data["pickup_datetime"].apply(lambda x:[x[0:10] for x in x.split(' ')])
data['pickup_datetime'] = data['pickup_datetime'].apply(lambda x:x[0])
data['pickup_datetime'] = pd.DatetimeIndex(data['pickup_datetime']).year

'''
data = data[data['fare_amount'] > 0]:

This line filters the dataset to remove rows where the 'fare_amount' is less than or equal to 0. It eliminates any rows with non-positive
data["pickup_datetime"] = data["pickup_datetime"].apply(lambda x: [x[0:10] for x in x.split(' ')]):

This line appears to split the 'pickup_datetime' column and keep only the date portion (first 10 characters) of each datetime value. This
data["pickup_datetime"] = data["pickup_datetime"].apply(lambda x: x[0]):

This line seems to extract the first character from the date string, which corresponds to the year. It converts the date into the year po
data["pickup_datetime"] = pd.DatetimeIndex(data["pickup_datetime"]).year:

This line is attempting to convert the 'pickup_datetime' column into a datetime object and extract the year.
'''


data.drop(columns=['key','pickup_datetime'],inplace=True)
```

```
X = data.drop(['fare_amount'],axis=1)
y = data['fare_amount']
x_train,x_test,y_train,y_test = train_test_split(X,y,test_size=0.25,random_state=0)
```

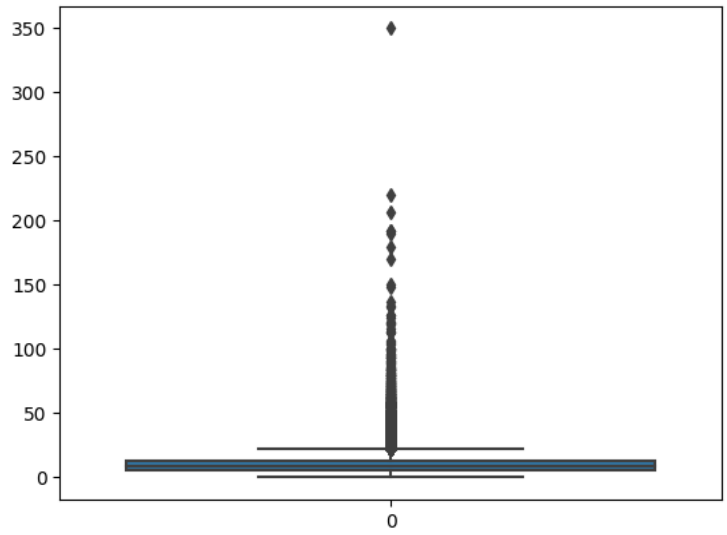
```
data.corr()
```

	fare_amount	pickup_longitude	pickup_latitude	dropoff_longitude
fare_amount	1.000000	0.016963	-0.019794	0.020301
pickup_longitude	0.016963	1.000000	-0.909274	0.850172
pickup_latitude	-0.019794	-0.909274	1.000000	-0.901077
dropoff_longitude	0.020301	0.850172	-0.901077	1.000000
dropoff_latitude	-0.021241	-0.868170	0.957681	-0.943760
passenger_count	0.009050	0.003271	-0.005238	0.002244

OUTLIER DETECTION

```
sns.boxplot(data['fare_amount'])
```

```
<Axes: >
```




```
#removing the outlier
Q1 = np.percentile(data['fare_amount'], 25, interpolation = 'midpoint')
Q3 = np.percentile(data['fare_amount'],75, interpolation='midpoint')
print(Q1,Q3)
```

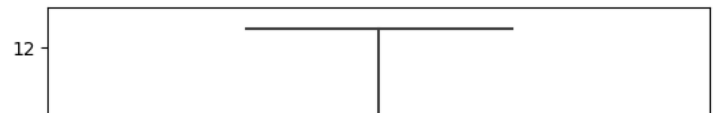
```
6.0 12.5
```

Outlier Treatment

```
data.drop(data[data['fare_amount'].values>12.5].index, inplace=True)
```

```
sns.boxplot(data['fare_amount'])
```

```
<Axes: >
```



LINEAR REGRESSION

```
linear_model = LinearRegression()
linear_model.fit(x_train,y_train)
y_pred = linear_model.predict(x_test)
```

```
from math import sqrt

def evaluate_model(y_true, y_pred, model_name):
    rmse = sqrt(mean_squared_error(y_true,y_pred))
    r2 = r2_score(y_true,y_pred)
    print(f"{model_name} RMSE: {rmse:.2f}")
    print(f"{model_name} R-squared (R2): {r2:.2f}")

evaluate_model(y_test,y_pred,"Linear Regression")
```

```
Linear Regression RMSE: 10.27
Linear Regression R-squared (R2): 0.00
```

RANDOM FOREST

```
rf_model = RandomForestRegressor(n_estimators=100, random_state=42)
rf_model.fit(x_train, y_train)
y_pred_rf = rf_model.predict(x_test)
```

```
def evaluate_model(y_true, y_pred, model_name):
  rmse = sqrt(mean_squared_error(y_true, y_pred))
  r2 = r2_score(y_true, y_pred)
  print(f"{model_name} RMSE: {rmse:.2f}")
  print(f"{model_name} R-squared (R2): {r2:.2f}")

evaluate_model(y_test,y_pred_rf,"Random Forest Regression")
```

```
Random Forest Regression RMSE: 5.20
Random Forest Regression R-squared (R2): 0.74
```