In [1]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression
from sklearn.neighbors import KNeighborsRegressor
from sklearn.tree import DecisionTreeRegressor
from sklearn.ensemble import RandomForestRegressor
from sklearn.metrics import mean_squared_error as mse
from sklearn.metrics import r2_score
from sklearn.model_selection import train_test_split
from math import sqrt
from sklearn.linear_model import (LinearRegression, Ridge, Lasso, RandomizedLasso)
from sklearn.preprocessing import PolynomialFeatures
```

In [2]:
```
df = pd.read_csv(r"C:\Users\user\Downloads\housesalesprediction\kc_house_data.csv")

df.head(1)
```

Out[2]:

	id	date	price	bedrooms	bathrooms	sqft_living	sqft_lot	floors	waterfront	view	...	grade	sqft_above	sqft_basement	yr_bu
0	7129300520	20141013T000000	221900.0	3	1.0	1180	5650	1.0	0	0	...	7	1180	0	19

1 rows × 21 columns

In [ ]:
```
```

In [3]:
```
#Multiple linear regression

#Predicting_model - 1
```

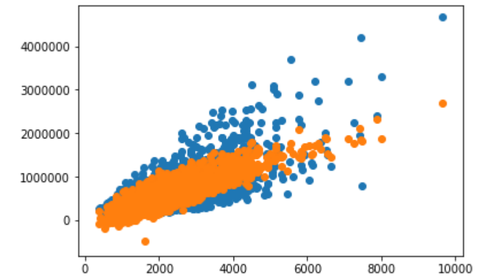
In [4]:
```
df.corr()['price'].sort_values(ascending = False).index
```

Out[4]:
```
Index(['price', 'sqft_living', 'grade', 'sqft_above', 'sqft_living15',
       'bathrooms', 'view', 'sqft_basement', 'bedrooms', 'lat', 'waterfront',
       'floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built',
       'condition', 'long', 'id', 'zipcode'],
      dtype='object')
```

In [5]:
```
#selected features based on correlation of different data with prices for which corr value is above 30%

features = [ 'sqft_living', 'grade', 'sqft_above', 'sqft_living15','bathrooms','view', 'sqft_basement', 'bedrooms', 'lat']

x_train,x_test,y_train,y_test = train_test_split(df[features],df[['price']],test_size = 0.20,shuffle = True)

ln_reg = LinearRegression()

ln_reg.fit(x_train,y_train)

print('intercept :',ln_reg.intercept_)

print('coefficient :',ln_reg.coef_)

print('score :',ln_reg.score(x_test,y_test))

y_pred = ln_reg.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test , y_pred)

print('MSE:',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'] , y = y_pred)

plt.show()
```

```
intercept : [-31812757.75881776]
coefficient : [[-4.38609138e+14  7.60401250e+04  4.38609138e+14  3.28125000e+00
  -1.31472511e+04  9.75398450e+04  4.38609138e+14 -3.18548015e+04
   6.61361056e+05]]
score : 0.6495977819141086
predicted_value : [[465128.26533469]
 [544625.33885248]
 [375952.65750998]
 ...
 [579779.76609354]
 [516862.66471698]
 [365898.96049396]]
MSE: 46202671577.38566
RMSE : 214948.06716364223
R2_score : 0.6495977819141086
```

R2_score : 0.6499977019141666

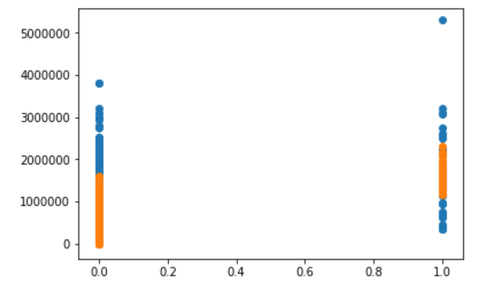


In [ ]:

In [6]:
```
#Multiple linear Regression

#Predicting_model - 2
```

In [7]:
```
#selected features based on correlation of different data with prices for which corr value is below 30%


features = ['view', 'sqft_basement', 'bedrooms', 'lat','waterfront','floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_b
uilt','condition', 'long', 'id', 'zipcode']

x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

ln_reg = LinearRegression()

ln_reg.fit(x_train,y_train)

print('intercept :',ln_reg.intercept_)

print('coefficient :',ln_reg.coef_)

print('score :',ln_reg.score(x_test,y_test))

y_pred = ln_reg.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['waterfront'] , y = y_test)

plt.scatter(x = x_test['waterfront'] , y = y_pred)

plt.show()
```

```
intercept : 61108032.55460237
coefficient : [ 1.22320007e+05  1.85461006e+02  6.17938267e+04  8.12760405e+05
  6.08038292e+05  1.91470958e+05  5.15105790e+01  4.50572435e-01
  3.13981323e-01 -4.11931285e+02  2.81520864e+04 -4.12203538e+04
 -1.16394889e-06 -1.06176698e+03]
score : 0.45792039820388875
predicted_value : [616287.15904412 262368.42299189 237153.73925196 ... 776550.11350901
 444252.9030326  812180.54941913]
MSE : 65112209989.217255
RMSE : 255170.9426819936
R2_score : 0.45792039820388875
```



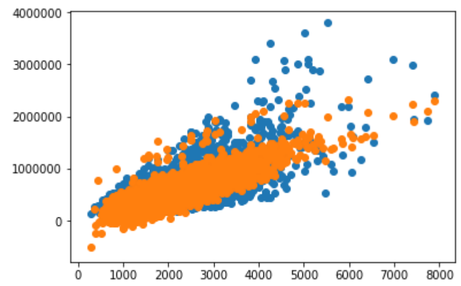
In [ ]:

In [8]:
```
#Multiple linear Regression
```

In [8]:
```
#multiple linear Regression

#predicting_model-3
```

In [9]:
```
#selected all features to find maximum score_value(Accurarcy)

features = ['sqft_living', 'grade', 'sqft_above', 'sqft_living15',
       'bathrooms', 'view', 'sqft_basement', 'bedrooms', 'lat', 'waterfront',
       'floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built',
       'condition', 'long', 'id', 'zipcode']

x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

ln_reg = LinearRegression()

ln_reg.fit(x_train,y_train)

print('intercept :',ln_reg.intercept_)

print('coefficient :',ln_reg.coef_)

print('score :',ln_reg.score(x_test,y_test))

y_pred = ln_reg.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'] , y = y_pred)

plt.show()
```

```
intercept : 6162078.490612427
coefficient : [ 1.15361014e+02  9.39442285e+04  7.45418278e+01  1.80900150e+01
  4.07998398e+04  5.02884826e+04  4.08191882e+01 -3.71616738e+04
  6.06390018e+05  6.17062197e+05  3.18581650e+03  2.00423515e+01
  1.62535480e-01 -4.58098836e-01 -2.59426453e+03  2.63428657e+04
 -2.20144931e+05 -1.31792331e-06 -5.85841363e+02]
score : 0.7220463522016294
predicted_value : [928849.95206973 491567.24458654 670202.89773245 ... 602898.52944604
 400887.2655282  230162.93282451]
MSE : 34200851064.32548
RMSE : 184934.72108916022
R2_score : 0.7220463522016294
```



In [ ]:
```
```

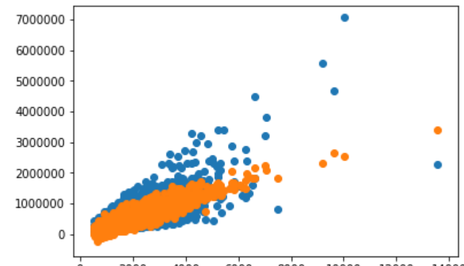
In [10]:
```
#Lasso Regression

#Prediction model - 1
```

In [11]:
```
#selected features based on correlation of different data with prices for which corr value is above 30%

features = [ 'sqft_living', 'grade', 'sqft_above', 'sqft_living15','bathrooms','view', 'sqft_basement', 'bedrooms', 'lat']

x_train,x_test,y_train,y_test = train_test_split(df[features],df[['price']],test_size = 0.20,shuffle = True)

lasso = Lasso(alpha=0.2, normalize=True)

lasso.fit(x_train,y_train)

print('intercept :',lasso.intercept_)

print('coefficient :',lasso.coef_)

print('score :',lasso.score(x_test,y_test))
```

```
y_pred = lasso.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test , y_pred)

print('MSE:',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'], y = y_pred)

plt.show()
```

```
C:\Users\user\Anaconda3\lib\site-packages\sklearn\linear_model\coordinate_descent.py:492: ConvergenceWarning: Objective d
id not converge. You might want to increase the number of iterations. Fitting data with very small alpha may cause precis
ion problems.
  ConvergenceWarning)
```

```
intercept : [-31953144.54258888]
coefficient : [ 2.12239946e+02  7.73743862e+04 -1.86085466e+01  6.75751855e+00
 -1.05247343e+04  9.56935855e+04 -1.24881344e+01 -2.63620792e+04
  6.63825400e+05]
score : 0.6363380667244176
predicted_value : [ 430876.74922309  572410.10372699 1579177.61920899 ...  516390.07275505
  322402.61355311  104366.23319896]
MSE: 49410653440.73236
RMSE : 222285.07246491467
R2_score : 0.6363380667244176
```

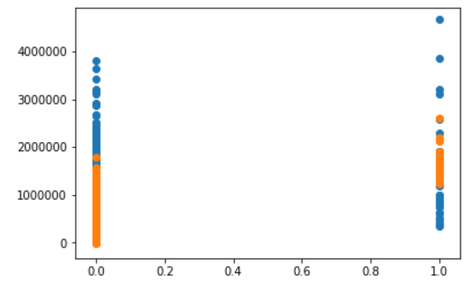


In [12]:
```
#Lasso Regression

#predicting model - 2
```

In [13]:
```
#selected features based on correlation of different data with prices for which corr value is below 30%

features = ['view', 'sqft_basement', 'bedrooms', 'lat','waterfront','floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_b
uilt','condition', 'long', 'id', 'zipcode']

x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

lasso = Lasso(alpha=0.2, normalize=True)

lasso.fit(x_train,y_train)

print('intercept :',lasso.intercept_)

print('coefficient :',lasso.coef_)

print('score :',lasso.score(x_test,y_test))

y_pred = lasso.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['waterfront'] , y = y_test)

plt.scatter(x = x_test['waterfront'] , y = y_pred)

plt.show()
```

```
intercept : 59084653.66586841
coefficient : [ 1.19238105e+05  1.88289301e+02  6.04206150e+04  8.17634032e+05
```

```
  6.33176149e+05  1.92565762e+05  5.78679400e+01  4.50911319e-01
  3.50092426e-01 -4.20103860e+02  2.93969996e+04 -2.90504815e+04
 -1.17464542e-06 -1.02819381e+03]
score : 0.442262026720842
predicted_value : [398758.20947908 182016.18964964 410751.76049195 ... 720329.50617071
 580535.09923501 673012.15375068]
MSE : 68591572884.2568
RMSE : 261899.92914137413
R2_score : 0.442262026720842
```

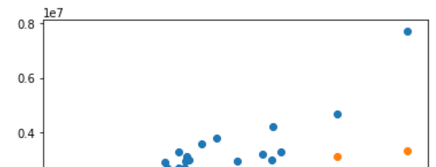


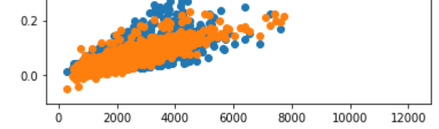
In [14]:
```
#Lasso Regression

#Predicting model - 3
```

In [15]:
```
#selected all features to find maximum score_value(Accurarcy)

features = ['sqft_living', 'grade', 'sqft_above', 'sqft_living15',
       'bathrooms', 'view', 'sqft_basement', 'bedrooms', 'lat', 'waterfront',
       'floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built',
       'condition', 'long', 'id', 'zipcode']

x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

lasso = Lasso(alpha=0.2, normalize=True)

lasso.fit(x_train,y_train)

print('intercept :',lasso.intercept_)

print('coefficient :',lasso.coef_)

print('score :',lasso.score(x_test,y_test))

y_pred = lasso.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'] , y = y_pred)

plt.show()
```

```
C:\Users\user\Anaconda3\lib\site-packages\sklearn\linear_model\coordinate_descent.py:492: ConvergenceWarning: Objective d
id not converge. You might want to increase the number of iterations. Fitting data with very small alpha may cause precis
ion problems.
  ConvergenceWarning)
```

```
intercept : 9374628.12907843
coefficient : [ 2.09957531e+02  9.59739587e+04 -2.96855185e+01  2.20532558e+01
  3.82531078e+04  5.32004884e+04 -6.12948479e+01 -3.34600154e+04
  6.08402235e+05  5.89426875e+05  7.23281885e+03  1.48372236e+01
  7.76524231e-02 -3.64087358e-01 -2.60688373e+03  2.72491343e+04
 -2.18697462e+05 -9.62488569e-07 -6.17739155e+02]
score : 0.6956319871663744
predicted_value : [ 921104.35713139 2193579.27752627  263369.21128458 ...  398454.32329531
  513363.45487505  395784.87371988]
MSE : 41735896255.30247
RMSE : 204293.6520191033
R2_score : 0.6956319871663744
```



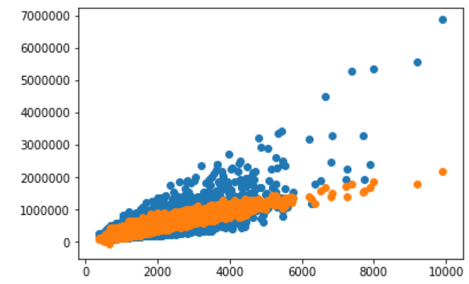


In [ ]:

In [16]:
```
#Ridge Regression

#Predicting model - 1
```

In [17]:
```
#selected features based on correlation of different data with prices for which corr value is above 30%

features = [ 'sqft_living', 'grade', 'sqft_above', 'sqft_living15','bathrooms','view', 'sqft_basement', 'bedrooms', 'lat']

x_train,x_test,y_train,y_test = train_test_split(df[features],df[['price']],test_size = 0.20,shuffle = True)

ridge = Ridge(normalize=True)

ridge.fit(x_train,y_train)

print('intercept :',ridge.intercept_)

print('coefficient :',ridge.coef_)

print('score :',ridge.score(x_test,y_test))

y_pred = ridge.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test , y_pred)

print('MSE:',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'], y = y_pred)

plt.show()
```

```
intercept : [-16988426.60466309]
coefficient : [[5.62798540e+01 4.66038979e+04 5.02425475e+01 5.16131045e+01
  3.12549072e+04 5.68297752e+04 6.53062136e+01 2.36962636e+03
  3.52294677e+05]]
score : 0.5737344259866168
predicted_value : [[547854.32506204]
 [505839.45491172]
 [520791.22794459]
 ...
 [599644.68607119]
 [446626.61744813]
 [564355.27192465]]
MSE: 62099959845.222565
RMSE : 249198.6353197436
R2_score : 0.5737344259866168
```



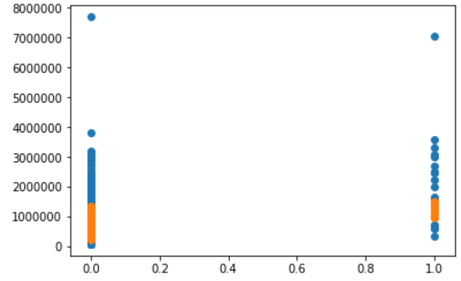
In [ ]:

In [18]:
```
#Ridge Regression

#Predicting model - 2
```

In [19]:
```
#selected features based on correlation of different data with prices for which corr value is below 30%

features = ['view', 'sqft_basement', 'bedrooms', 'lat','waterfront','floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built','condition', 'long', 'id', 'zipcode']
```

```
x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

ridge = Ridge(normalize=True)

ridge.fit(x_train,y_train)

print('intercept :',ridge.intercept_)

print('coefficient :',ridge.coef_)

print('score :',ridge.score(x_test,y_test))

y_pred = ridge.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['waterfront'] , y = y_test)

plt.scatter(x = x_test['waterfront'] , y = y_pred)

plt.show()
```

```
intercept : 9473266.252493434
coefficient : [ 7.19091156e+04  1.04389946e+02  4.44685148e+04  4.02268892e+05
  3.91183773e+05  8.41853012e+04  3.68250849e+01  2.76532424e-01
  3.43390429e-01  1.57501648e+02  1.36423024e+04  1.32572329e+04
 -6.47892912e-07 -2.76682715e+02]

score : 0.3467877631573886
predicted_value : [479233.44764893 646400.51155696 437584.48108086 ... 330309.91348794
 419820.64475679 345484.70391482]
MSE : 94332872228.8561
RMSE : 307136.5693447397
R2_score : 0.3467877631573886
```



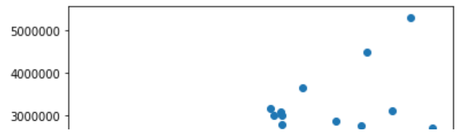
In [ ]:

In [20]:
```
#Ridge Regression

#Predicting model - 3
```

In [21]:
```
#selected all features to find maximum score_value(Accurarcy)

features = ['sqft_living', 'grade', 'sqft_above', 'sqft_living15',
       'bathrooms', 'view', 'sqft_basement', 'bedrooms', 'lat', 'waterfront',
       'floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built',
       'condition', 'long', 'id', 'zipcode']

x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

ridge = Ridge(normalize = True)

ridge.fit(x_train,y_train)

print('intercept :',ridge.intercept_)

print('coefficient :',ridge.coef_)

print('score :',ridge.score(x_test,y_test))

y_pred = ridge.predict(x_test)
```

```
print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'] , y = y_pred)

plt.show()
```

```
intercept : -21990272.780493986
coefficient : [ 5.68070906e+01  4.89997754e+04  5.42085924e+01  5.40663674e+01
  3.74100316e+04  4.56915390e+04  5.56291746e+01  3.02462099e+03
  3.36525950e+05  3.60066618e+05  1.92314076e+04  3.28074437e+01
  7.00057084e-02 -3.26536215e-02 -8.33066969e+02  2.05467465e+04
 -9.79893584e+04 -6.95521597e-07 -4.81646556e+01]
score : 0.6383741148295177
predicted_value : [505735.80459876 505081.9012797  506527.24489842 ... 724984.85057365
 250811.88407705 506844.23250743]
MSE : 44925284859.931526
RMSE : 211955.8559227169
R2_score : 0.6383741148295177
```



In [ ]:

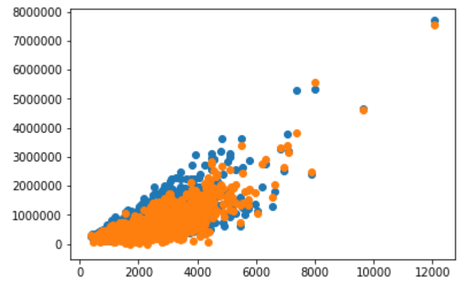
In [22]:
```
#Polymnomial Regression

#Predciting model - 1
```

In [ ]:

In [23]:
```
#selected features based on correlation of different data with prices for which corr value is above 30%

features = [ 'sqft_living', 'grade', 'sqft_above', 'sqft_living15','bathrooms','view', 'sqft_basement', 'bedrooms', 'lat']

x = df[features]

y = df['price']

x_train,x_test,y_train,y_test = train_test_split(x,y,test_size = 0.20,shuffle = True)

poly = PolynomialFeatures(degree = 4)

x_ = poly.fit_transform(x)

x_test_ = poly.fit_transform(x_test)

ln_reg = LinearRegression()

ln_reg.fit(x_,y)

#print('intercept :',ln_reg.intercept_)

#print('coefficient :',ln_reg.coef_)

print('score :',ln_reg.score(x_test_,y_test))

y_pred = ln_reg.predict(x_test_)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))
```

```
plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'] , y = y_pred)

plt.show()
```

```
score : 0.8101029635406374
predicted_value : [ 506930.5493663  538310.5493663 1445590.5493663 ...  929046.5493663
  681932.5493663  294072.5493663]
MSE : 29602930443.760143
RMSE : 172055.02155926792
R2_score : 0.8101029635406374
```

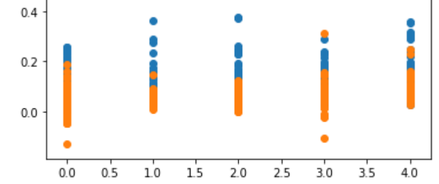


In [ ]:

In [24]:
```
#Polynomial Regression

#Prediction model - 2
```

In [25]:
```
#selected features based on correlation of different data with prices for which corr value is below 30%

features = ['view', 'sqft_basement', 'bedrooms', 'lat','waterfront','floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built','condition', 'long', 'id', 'zipcode']

x = df[features]

y = df['price']

x_train,x_test,y_train,y_test = train_test_split(x,y,test_size = 0.20,shuffle = True)

poly = PolynomialFeatures(degree = 4)

x_ = poly.fit_transform(x)

x_test_ = poly.fit_transform(x_test)

ln_reg = LinearRegression()

ln_reg.fit(x_,y)

#print('intercept :',ln_reg.intercept_)

#print('coefficient :',ln_reg.coef_)

print('score :',ln_reg.score(x_test_,y_test))

y_pred = ln_reg.predict(x_test_)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['view'] , y = y_test)

plt.scatter(x = x_test['view'] , y = y_pred)

plt.show()
```

```
score : 0.13924787477100253
predicted_value : [605847.2318553  561901.98371277 367990.3543248  ... 594971.52709775
 416109.80839718 595990.53372814]
MSE : 120711885076.7875
RMSE : 347436.15971396456
R2_score : 0.13924787477100253
```

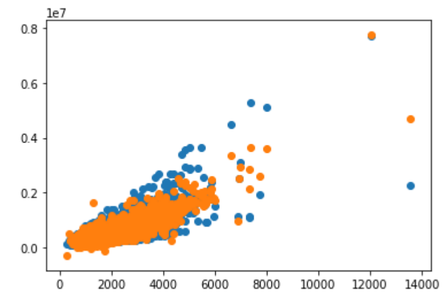


In [ ]:

In [26]:
```
#Polynomial Regression

#Predicting Model - 3
```

In [27]:
```
#selected all features to find maximum score_value(Accurarcy)

x = df[['sqft_living', 'grade', 'sqft_above', 'sqft_living15',
       'bathrooms', 'view', 'sqft_basement', 'bedrooms', 'lat', 'waterfront',
       'floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built',
       'condition', 'long', 'id', 'zipcode']]


y = df[['price']]


x_train,x_test,y_train,y_test = train_test_split(x,y,test_size = 0.20,shuffle = True)

poly = PolynomialFeatures(degree = 2)

x_ = poly.fit_transform(x)

x_test_ = poly.fit_transform(x_test)

ln_reg = LinearRegression()

ln_reg.fit(x_,y)

#print('intercept :',ln_reg.intercept_)

#print('coefficient :',ln_reg.coef_)

print('score :',ln_reg.score(x_test_,y_test))

y_pred = ln_reg.predict(x_test_)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'] , y = y_pred)

plt.show()
```

```
score : 0.7607128225548878
predicted_value : [[ 466317.25289707]
 [ 600979.60538703]
 [ 416782.97535372]
 ...
 [ 877646.9458754 ]
 [ 623242.93154822]
 [1562434.93673317]]
MSE : 34504664808.519966
RMSE : 185754.3130280424
R2_score : 0.7607128225548878
```



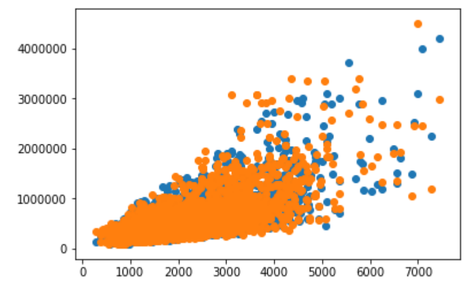
In [ ]:

In [28]:
```
#Decision tree Algorithm

#Predicting model - 1
```

In [29]:
```
#selected features based on correlation of different data with prices for which corr value is above 30%

features = [ 'sqft_living', 'grade', 'sqft_above', 'sqft_living15','bathrooms','view', 'sqft_basement', 'bedrooms', 'lat']

x_train,x_test,y_train,y_test = train_test_split(df[features],df[['price']],test_size = 0.20,shuffle = True)

dt_reg = DecisionTreeRegressor()

dt_reg.fit(x_train,y_train)

#print('intercept :',dt_reg.intercept_)

#print('coefficient :',dt_reg.coef_)

print('score :',dt_reg.score(x_test,y_test))

y_pred = dt_reg.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test , y_pred)

print('MSE:',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'], y = y_pred)

plt.show
```

```
score : 0.5859967009047213
predicted_value : [ 750000.  270000.  535000. ... 1960000.  470000. 1245000.]
MSE: 50255828527.17449
RMSE : 224178.117859827
R2_score : 0.5859967009047213
```

Out[29]: <function matplotlib.pyplot.show(*args, **kw)>



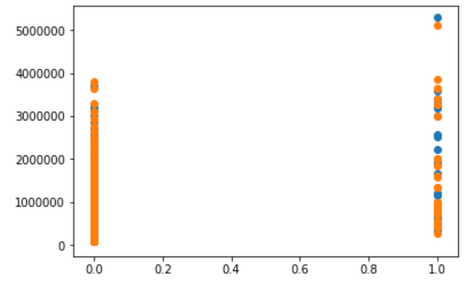
In [ ]:

In [30]:
```
#Decision tree Regression

#Predicting Model - 2
```

In [31]:
```
#selected features based on correlation of different data with prices for which corr value is below 30%

features = ['view', 'sqft_basement', 'bedrooms', 'lat','waterfront','floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built','condition', 'long', 'id', 'zipcode']

x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

dt_reg = DecisionTreeRegressor()

dt_reg.fit(x_train,y_train)

#print('intercept :',lasso.intercept_)

#print('coefficient :',lasso.coef_)

print('score :',dt_reg.score(x_test,y_test))

y_pred = dt_reg.predict(x_test)

print('predicted_value :',y_pred)
```

```
MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['waterfront'] , y = y_test)

plt.scatter(x = x_test['waterfront'] , y = y_pred)

plt.show()
```

```
score : 0.6294601497618314
predicted_value : [ 478000.  475000. 1300000. ...  435000.  277000. 1505000.]
MSE : 47017445153.46785
RMSE : 216835.0644002668
R2_score : 0.6294601497618314
```

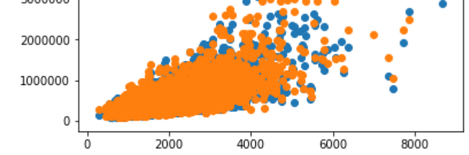


In [ ]:

In [32]:
```
#Decision tree Algorithm

#Predicting Model - 3
```

In [33]:
```
#selected all features to find maximum score_value(Accurarcy)

features = ['sqft_living', 'grade', 'sqft_above', 'sqft_living15',
       'bathrooms', 'view', 'sqft_basement', 'bedrooms', 'lat', 'waterfront',
       'floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built',
       'condition', 'long', 'id', 'zipcode']

x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

dt_reg = DecisionTreeRegressor()

dt_reg.fit(x_train,y_train)

#print('intercept :',dt_reg.intercept_)

#print('coefficient :',dt_reg.coef_)

print('score :',dt_reg.score(x_test,y_test))

y_pred = dt_reg.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'] , y = y_pred)

plt.show()
```

```
score : 0.7627012742616882
predicted_value : [ 290000. 1680000.  695000. ...  600000.  325000.  290000.]
MSE : 27308197515.38885
RMSE : 165251.92136670862
R2_score : 0.7627012742616881
```

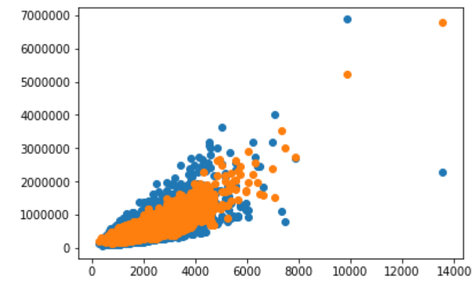


In [34]:
```
#K Nearest Neighbour

#Predicting Model - 1
```

In [35]:
```
#selected features based on correlation of different data with prices for which corr value is above 30%

features = [ 'sqft_living', 'grade', 'sqft_above', 'sqft_living15','bathrooms','view', 'sqft_basement', 'bedrooms', 'lat']

x_train,x_test,y_train,y_test = train_test_split(df[features],df[['price']],test_size = 0.20,shuffle = True)

knn_reg = KNeighborsRegressor(n_neighbors=3)

knn_reg.fit(x_train,y_train)

#print('intercept :',dt_reg.intercept_)

#print('coefficient :',dt_reg.coef_)

print('score :',knn_reg.score(x_test,y_test))

y_pred = knn_reg.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test , y_pred)

print('MSE:',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'], y = y_pred)

plt.show
```

```
score : 0.40917974396506884
predicted_value : [[1163333.33333333]
 [ 249983.33333333]
 [ 378500.        ]
 ...
 [ 501283.33333333]
 [ 292583.33333333]
 [ 435000.        ]]
MSE: 79414728733.57388
RMSE : 281806.1900199743
R2_score : 0.40917974396506884
```

Out[35]: <function matplotlib.pyplot.show(*args, **kw)>



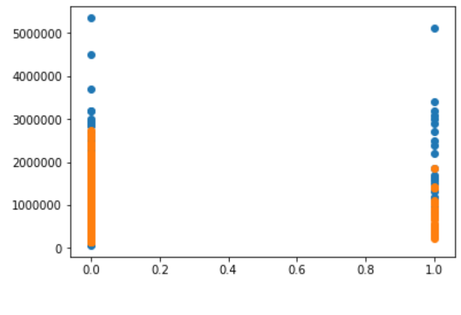
In [ ]:

In [36]:
```
#K Nearest Neighbour

#Predicting Model - 2
```

In [37]:
```
#selected features based on correlation of different data with prices for which corr value is below 30%

features = ['view', 'sqft_basement', 'bedrooms', 'lat','waterfront','floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built','condition', 'long', 'id', 'zipcode']

x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

knn_reg = KNeighborsRegressor(n_neighbors=3)
```

```
knn_reg.fit(x_train,y_train)

#print('intercept :',lasso.intercept_)

#print('coefficient :',lasso.coef_)

print('score :',knn_reg.score(x_test,y_test))

y_pred = knn_reg.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['waterfront'] , y = y_test)

plt.scatter(x = x_test['waterfront'] , y = y_pred)

plt.show()
```

```
score : 0.37809108876631303
predicted_value : [263500.         393333.33333333 431666.66666667 ... 331500.
 225316.66666667 485333.33333333]
MSE : 86618060679.66412
RMSE : 294309.4641353963
R2_score : 0.37809108876631303
```



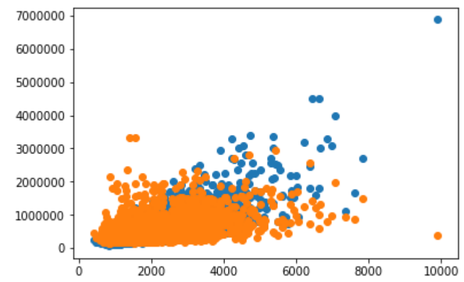
In [ ]:

In [38]:
```
#K Nearest Neighbour

#Predicting Model - 3
```

In [39]:
```
#selected all features to find maximum score_value(Accurarcy)

features = ['sqft_living', 'grade', 'sqft_above', 'sqft_living15',
       'bathrooms', 'view', 'sqft_basement', 'bedrooms', 'lat', 'waterfront',
       'floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built',
       'condition', 'long', 'id', 'zipcode']

x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

knn_reg = KNeighborsRegressor(n_neighbors=3)

knn_reg.fit(x_train,y_train)

#print('intercept :',poly.intercept_)

#print('coefficient :',poly.coef_)

print('score :',knn_reg.score(x_test,y_test))

y_pred = knn_reg.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)
```

```
print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'] , y = y_pred)

plt.show()
```

```
score : 0.3693743874312093
predicted_value : [306225.         604333.33333333 279466.66666667 ... 512516.66666667
 909333.33333333 786333.33333333]
MSE : 89015993623.68213
RMSE : 298355.48197357147
R2_score : 0.3693743874312093
```



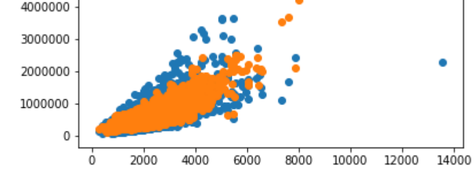
In [ ]:

In [40]:
```
#Random Forest

#Predicting Model - 1
```

In [41]:
```
#selected features based on correlation of different data with prices for which corr value is above 30%

features = [ 'sqft_living', 'grade', 'sqft_above', 'sqft_living15','bathrooms','view', 'sqft_basement', 'bedrooms', 'lat']

x_train,x_test,y_train,y_test = train_test_split(df[features],df[['price']],test_size = 0.20,shuffle = True)


knn_reg.fit(x_train,y_train)

#print('intercept :',dt_reg.intercept_)

#print('coefficient :',dt_reg.coef_)

print('score :',knn_reg.score(x_test,y_test))

y_pred = knn_reg.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test , y_pred)

print('MSE:',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'], y = y_pred)

plt.show
```

```
score : 0.4395006485218905
predicted_value : [[435000.        ]
 [434000.        ]
 [314333.33333333]
 ...
 [450166.66666667]
 [447666.66666667]
 [424333.33333333]]
MSE: 75908320736.23178
RMSE : 275514.64704482007
R2_score : 0.4395006485218905
```

Out[41]: <function matplotlib.pyplot.show(*args, **kw)>



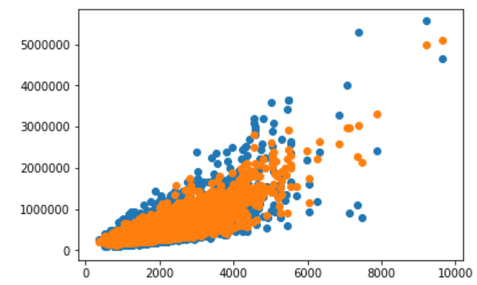
In [ ]:

In [42]:
```
#Random Forest Algorithm

#predicting model - 1
```

In [43]:
```
#selected features based on correlation of different data with prices for which corr value is above 30%

features = [ 'sqft_living', 'grade', 'sqft_above', 'sqft_living15','bathrooms','view', 'sqft_basement', 'bedrooms', 'lat']

x_train,x_test,y_train,y_test = train_test_split(df[features],df[['price']],test_size = 0.20,shuffle = True)

rf = RandomForestRegressor(n_estimators = 1000, random_state = 42)

rf.fit(x_train,y_train)

#print('intercept :',rf.intercept_)

#print('coefficient :',rf.coef_)

print('score :',rf.score(x_test,y_test))

y_pred = rf.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test , y_pred)

print(MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'], y = y_pred)

plt.show()
```

```
C:\Users\user\Anaconda3\lib\site-packages\ipykernel_launcher.py:9: DataConversionWarning: A column-vector y was passed wh
en a 1d array was expected. Please change the shape of y to (n_samples,), for example using ravel().
  if __name__ == '__main__':
```

```
score : 0.8102645545681287
predicted_value : [358380.583      217969.127      208458.55       ... 561069.45266667
 357653.07966667 194755.43      ]
25987428005.283955
RMSE : 161206.16615155872
R2_score : 0.8102645545681287
```



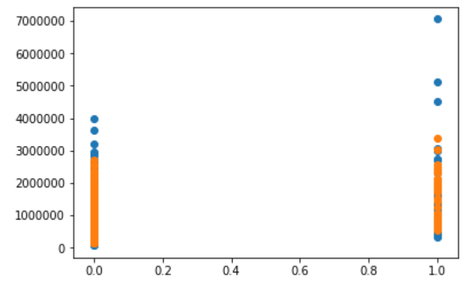
In [ ]:

In [44]:
```
#Random Forest ALgorithm

#Preddicting Model - 2
```

In [45]:
```
#selected features based on correlation of different data with prices for which corr value is below 30%

features = ['view', 'sqft_basement', 'bedrooms', 'lat','waterfront','floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_b
uilt','condition', 'long', 'id', 'zipcode']

x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

rf = RandomForestRegressor(n_estimators = 1000, random_state = 42)
```

```
rf.fit(x_train,y_train)

#print('intercept :',rf.intercept_)

#print('coefficient :',rf.coef_)

print('score :',rf.score(x_test,y_test))

y_pred = rf.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)

print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['waterfront'] , y = y_test)

plt.scatter(x = x_test['waterfront'] , y = y_pred)

plt.show()
```

```
score : 0.7890039922614402
predicted_value : [449073.7535     676477.34       531463.5        ... 971369.79
 420310.67883333 554993.339     ]
MSE : 28871159685.30032
RMSE : 169915.1543721169
R2_score : 0.7890039922614402
```



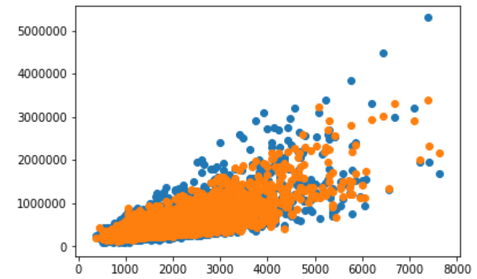
In [ ]:

In [46]:
```
#Random Forest Algorithm

#Predicting Model - 3
```

In [47]:
```
#selected all features to find maximum score_value(Accurarcy)

features = ['sqft_living', 'grade', 'sqft_above', 'sqft_living15',
       'bathrooms', 'view', 'sqft_basement', 'bedrooms', 'lat', 'waterfront',
       'floors', 'yr_renovated', 'sqft_lot', 'sqft_lot15', 'yr_built',
       'condition', 'long', 'id', 'zipcode']

x_train,x_test,y_train,y_test = train_test_split(df[features],df['price'],test_size = 0.20,shuffle = True)

rf = RandomForestRegressor(n_estimators = 1000, random_state = 42)

rf.fit(x_train,y_train)

#print('intercept :',rf.intercept_)

#print('coefficient :',rf.coef_)

print('score :',rf.score(x_test,y_test))

y_pred = rf.predict(x_test)

print('predicted_value :',y_pred)

MSE = mse(y_test,y_pred)

print('MSE :',MSE)
```

```
print('RMSE :',sqrt(MSE))

print('R2_score :',r2_score(y_test,y_pred))

plt.scatter(x = x_test['sqft_living'] , y = y_test)

plt.scatter(x = x_test['sqft_living'] , y = y_pred)

plt.show()
```

```
score : 0.8829590282019839
predicted_value : [350571.178      430883.024      564321.065      ... 600391.506
 279917.18833333 502502.39466667]
MSE : 15297435662.84082
RMSE : 123682.80261556503
R2_score : 0.8829590282019839
```



In [ ]:

In [48]:
```
#selected features based on correlation of different data with prices for which corr value is above 30%

df = {'Score(Accurarcy)':[0.614713,0.634076,0.58728,0.8054212,0.624900,0.3990286,0.800343],
      'MSE':[53723220510.556854,49585162257.67463,54630709938.33841,30667616090.1828,55638806133.4993,70882920360.99797,76295
409639.09573],
     'RMSE':[231782.701059,2226777.260306,233732.132875089,175121.7179,235878.79542,266238.465216,276216.237102],
     'R2_Score':[0.6147138,0.607209,0.582401,0.8054212,0.525848,0.4477927,0.473591]}

tabular_columns = pd.DataFrame(df,index = ['Multi LinearRegression','LassoRegression','RidgeRegressio
n','DecisionTree','KNN','RandomForest'])

tabular_columns
```

Out[48]:

	Score(Accurarcy)	MSE	RMSE	R2_Score
Multi LinearRegression	0.614713	5.372322e+10	2.317827e+05	0.614714
LassoRegression	0.634076	4.958516e+10	2.226777e+06	0.607209
RidgeRegression	0.587280	5.463071e+10	2.337321e+05	0.582401
Polynomial Regression	0.805421	3.066762e+10	1.751217e+05	0.805421
DecisionTree	0.624900	5.563881e+10	2.358788e+05	0.525848
KNN	0.399029	7.088292e+10	2.662385e+05	0.447793
RandomForest	0.800343	7.629541e+10	2.762162e+05	0.473591

In [ ]:

In [49]:
```
#selected features based on correlation of different data with prices for which corr value is below 30%

df = {'Score(Accurarcy)':[0.446240,0.442055,0.374787,0.1410729,0.549232,0.352832,0.757698],
     'MSE':[800884319674.01427,86932165591.86632,71054807845.94592,129386096436.02902,58754656722.18002,95460929334.0827,3102
6527332.387535],
     'RMSE':[282991.730752,294842.61156,266561.07713,242393.598704,359702.78903,308967.521487,176143.485069],
     'R2_Score':[0.446424,0.442055,0.374787,0.1410729,0.549232,0.352832,0.757698]}

tabular_columns = pd.DataFrame(df,index = ['Multi LinearRegression','LassoRegression','RidgeRegression','Polynomial Regressio
n','DecisionTree','KNN','RandomForest'])

tabular_columns
```

Out[49]:

	Score(Accurarcy)	MSE	RMSE	R2_Score
Multi LinearRegression	0.446240	8.008843e+11	282991.730752	0.446424
LassoRegression	0.442055	8.693217e+10	294842.611560	0.442055
RidgeRegression	0.374787	7.105481e+10	266561.077130	0.374787
Polynomial Regression	0.141073	1.293861e+11	242393.598704	0.141073
DecisionTree	0.549232	5.875466e+10	359702.789030	0.549232
KNN	0.352832	9.546093e+10	308967.521487	0.352832
RandomForest	0.757698	3.102653e+10	176143.485069	0.757698

In [ ]:

In [50]:
```
#selected all features to find maximum score_value(Accurarcy)

df = {'Score(Accruarcy)':[0.7047502,0.705713,0.622769,0.7335769,0.7164402,0.364693,0.877208],
     'MSE':[38485734905.8983,38877792132.0693,40791625772.69038,34001294191.5747,29561431904.85068,98519442596.76712,18166593
711.779396],
     'RMSE':[196177.814509,197171.52201,235471.554557,184394.3984,193253.14349,313878.0693,134783.506824],
     'R2_Score':[0.704750,0.705713,0.622769,0.7335796,0.7164402,0.364649,0.877208]}

tabular_columns = pd.DataFrame(df,index = ['Multi LinearRegression','LassoRegression','RidgeRegression','Polynomial Regressio
n','DecisionTree','KNN','RandomForest'])

tabular_columns
```

Out[50]:

	Score(Accruarcy)	MSE	RMSE	R2_Score
Multi LinearRegression	0.704750	3.848573e+10	196177.814509	0.704750
LassoRegression	0.705713	3.887779e+10	197171.522010	0.705713
RidgeRegression	0.622769	4.079163e+10	235471.554557	0.622769
Polynomial Regression	0.733577	3.400129e+10	184394.398400	0.733580
DecisionTree	0.716440	2.956143e+10	193253.143490	0.716440
KNN	0.364693	9.851944e+10	313878.069300	0.364649
RandomForest	0.877208	1.816659e+10	134783.506824	0.877208

In [ ]:

In [ ]: