

Final Project Submission

Please fill out:

- Student name: Kibandi Christine Wambui
- Student pace: full time
- Scheduled project review date/time:
- Instructor name: Mark Tiba
- Blog post URL:

Business Understanding:

The real estate agency aims to provide advice to homeowners on how home renovations can increase the estimated value of their homes and by what amount. The agency wants to identify the factors that contribute most significantly to the increase in house prices after renovations. By understanding these factors, they can guide homeowners in making informed decisions about renovations that will yield a higher return on investment.

Data Understanding:

The dataset used for this analysis is the King County House Sales dataset. It contains information about various features of houses.

The available columns in the dataset are as follows:

- id: A property identification number
- date: Date of transaction
- price: Price of the house
- bedrooms: Number of bedrooms
- bathrooms: Number of bathrooms
- sqft_living: Square footage of the living space
- sqft_lot: Square footage of the lot
- floors: Total floors in the house
- waterfront: Whether the house is on a waterfront (1: yes, 0: no)
- view: Special view
- condition: Condition of the house

- grade: Grading level around the house
- sqft_above: Square footage of the house apart from the basement
- sqft_basement: Square footage of the basement area
- yr_built: Year when the house was built
- yr_renovated: Year when the house was renovated
- zipcode: Zip code of the house
- lat: Latitude coordinate of the house
- long: Longitude coordinate of the house

The goal of the analysis is to build a multiple linear regression model that can predict the impact of home renovations on the estimated value of houses. By identifying the significant predictors, the real estate agency can provide homeowners with actionable recommendations on which renovations are most likely to yield a higher return on investment.

```
In [ ]: import pandas as pd
import numpy as np
from numbers import Number
import warnings
import sqlite3
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.model_selection import train_test_split
from sklearn import linear_model
from sklearn.neighbors import KNeighborsRegressor
from sklearn.preprocessing import PolynomialFeatures
from sklearn import metrics
from mpl_toolkits.mplot3d import Axes3D
from sklearn.preprocessing import LabelEncoder
from sklearn.metrics import mean_squared_error, r2_score
from sklearn.linear_model import LinearRegression
from sklearn.preprocessing import StandardScaler
from sklearn.model_selection import cross_val_score
from sklearn.model_selection import KFold
from sklearn.model_selection import GridSearchCV
from sklearn import linear_model
from sklearn.model_selection import train_test_split
from sklearn import metrics
import numpy as np

%matplotlib inline

warnings.filterwarnings('ignore')
```

loading the dataset , data showing and understanding

```
In [ ]: df = pd.read_csv('kc_house_data.csv')
df
```

```
Out[ ]:
```

	id	date	price	bedrooms	bathrooms	sqft_living	sqft_lot	flo	
0	7129300520	10/13/2014	221900.0		3	1.00	1180	5650	1
1	6414100192	12/9/2014	538000.0		3	2.25	2570	7242	2
2	5631500400	2/25/2015	180000.0		2	1.00	770	10000	1
3	2487200875	12/9/2014	604000.0		4	3.00	1960	5000	1
4	1954400510	2/18/2015	510000.0		3	2.00	1680	8080	1
...
21592	263000018	5/21/2014	360000.0		3	2.50	1530	1131	3
21593	6600060120	2/23/2015	400000.0		4	2.50	2310	5813	2
21594	1523300141	6/23/2014	402101.0		2	0.75	1020	1350	2
21595	291310100	1/16/2015	400000.0		3	2.50	1600	2388	2
21596	1523300157	10/15/2014	325000.0		2	0.75	1020	1076	2

21597 rows × 21 columns

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

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

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 21597 entries, 0 to 21596
Data columns (total 21 columns):
 #   Column      Non-Null Count  Dtype  
--- 
 0   id          21597 non-null   int64  
 1   date         21597 non-null   object  
 2   price        21597 non-null   float64 
 3   bedrooms     21597 non-null   int64  
 4   bathrooms    21597 non-null   float64 
 5   sqft_living  21597 non-null   int64  
 6   sqft_lot     21597 non-null   int64  
 7   floors       21597 non-null   float64 
 8   waterfront   19221 non-null   object  
 9   view         21534 non-null   object  
 10  condition    21597 non-null   object  
 11  grade        21597 non-null   object  
 12  sqft_above   21597 non-null   int64  
 13  sqft_basement 21597 non-null   object  
 14  yr_built     21597 non-null   int64  
 15  yr_renovated 17755 non-null   float64 
 16  zipcode      21597 non-null   int64  
 17  lat          21597 non-null   float64 
 18  long         21597 non-null   float64 
 19  sqft_living15 21597 non-null   int64  
 20  sqft_lot15   21597 non-null   int64  
dtypes: float64(6), int64(9), object(6)
memory usage: 3.5+ MB
```

In []: df.shape

Out[]: (21597, 21)

In []: df.isnull().any()

```
Out[ ]: id      False  
date     False  
price    False  
bedrooms False  
bathrooms False  
sqft_living False  
sqft_lot  False  
floors   False  
waterfront True  
view     True  
condition False  
grade    False  
sqft_above False  
sqft_basement False  
yr_built  False  
yr_renovated True  
zipcode  False  
lat      False  
long    False  
sqft_living15 False  
sqft_lot15  False  
dtype: bool
```

```
In [ ]: df.isnull().sum()
```

```
Out[ ]: id      0  
date     0  
price    0  
bedrooms 0  
bathrooms 0  
sqft_living 0  
sqft_lot  0  
floors   0  
waterfront 2376  
view     63  
condition 0  
grade    0  
sqft_above 0  
sqft_basement 0  
yr_built  0  
yr_renovated 3842  
zipcode  0  
lat      0  
long    0  
sqft_living15 0  
sqft_lot15  0  
dtype: int64
```

Checking for duplicates

```
In [ ]: df.duplicated().sum()
```

```
Out[ ]: 0
```

DATA PREPARATION

viewing the columns with null data, cleaning and handling outliers,dropping columns changing column,etc

DATA CLEANING

Waterfront

```
In [ ]: # viewing the waterfront column to see if it has any null values  
df['waterfront']
```

```
Out[ ]: 0      NaN  
1      NO  
2      NO  
3      NO  
4      NO  
...  
21592    NO  
21593    NO  
21594    NO  
21595    NaN  
21596    NO  
Name: waterfront, Length: 21597, dtype: object
```

```
In [ ]: df['waterfront'].value_counts()
```

```
Out[ ]: NO     19075  
YES     146  
Name: waterfront, dtype: int64
```

```
In [ ]: df['waterfront'].isnull().sum()
```

```
Out[ ]: 2376
```

```
In [ ]: df['waterfront'].fillna('No', inplace=True)
```

```
In [ ]: df['waterfront'].isnull().sum()
```

```
Out[ ]: 0
```

```
In [ ]: # change = {'No':0, 'Yes':1}  
# df['waterfront'] = df['waterfront'].replace({'No':0, 'Yes':1})  
label_encoder = LabelEncoder()  
df['waterfront'] = label_encoder.fit_transform(df['waterfront'])  
df['waterfront'].value_counts()
```

```
Out[ ]: 0     19075  
1     2376  
2     146  
Name: waterfront, dtype: int64
```

```
In [ ]: df['waterfront']
```

```
Out[ ]: 0      1  
       1      0  
       2      0  
       3      0  
       4      0  
       ..  
      21592    0  
      21593    0  
      21594    0  
      21595    1  
      21596    0  
Name: waterfront, Length: 21597, dtype: int32
```

View: Replace the null values with None

```
In [ ]: df['view'].head()
```

```
Out[ ]: 0      NONE  
       1      NONE  
       2      NONE  
       3      NONE  
       4      NONE  
Name: view, dtype: object
```

```
In [ ]: df['view'].value_counts()
```

```
Out[ ]: NONE      19422  
AVERAGE     957  
GOOD        508  
FAIR        330  
EXCELLENT   317  
Name: view, dtype: int64
```

```
In [ ]: df['view'].isnull().sum()
```

```
Out[ ]: 63
```

```
In [ ]: df['view'].fillna('None', inplace=True)
```

```
In [ ]: label_encoder = LabelEncoder()  
df['view'] = label_encoder.fit_transform(df['view'])  
df['view'].value_counts()
```

```
Out[ ]: 4      19422  
0      957  
3      508  
2      330  
1      317  
5      63  
Name: view, dtype: int64
```

```
In [ ]: df['view'].isnull().sum()
```

```
Out[ ]: 0
```

Viewing the grade column

```
In [ ]: df['grade']
```

```
Out[ ]: 0      7 Average
1      7 Average
2      6 Low Average
3      7 Average
4      8 Good
...
21592     8 Good
21593     8 Good
21594     7 Average
21595     8 Good
21596     7 Average
Name: grade, Length: 21597, dtype: object
```

Converting the grade column to a categorical column

```
In [ ]: df['grade'].value_counts()
```

```
Out[ ]: 7 Average    8974
8 Good       6065
9 Better      2615
6 Low Average 2038
10 Very Good 1134
11 Excellent   399
5 Fair        242
12 Luxury     89
4 Low         27
13 Mansion     13
3 Poor        1
Name: grade, dtype: int64
```

```
In [ ]: new_grades = {'7 Average':7, '8 Good': 8, '9 Better': 9, '6 Low Average':6, '10 Very Good':10}
df['grade'] = df['grade'].map(new_grades)
```

```
In [ ]: df['grade']
```

```
Out[ ]: 0      7
1      7
2      6
3      7
4      8
...
21592     8
21593     8
21594     7
21595     8
21596     7
Name: grade, Length: 21597, dtype: int64
```

```
In [ ]: df['grade'].value_counts()
```

```
Out[ ]: 7      8974
        8      6065
        9      2615
        6      2038
       10     1134
       11     399
       5      242
       12     89
       4      27
       13     13
       3      1
Name: grade, dtype: int64
```

Conditional column:

converting the data into a scale ranging from poor to very good

```
In [ ]: df['condition'].value_counts()
```

```
Out[ ]: Average      14020
        Good       5677
        Very Good   1701
        Fair        170
        Poor        29
Name: condition, dtype: int64
```

```
In [ ]: label_encoder = LabelEncoder()
df['condition'] = label_encoder.fit_transform(df['condition'])
df['condition'].value_counts()
```

```
Out[ ]: 0      14020
        2      5677
        4      1701
        1      170
        3      29
Name: condition, dtype: int64
```

```
In [ ]: df['condition']
```

```
Out[ ]: 0      0
        1      0
        2      0
        3      4
        4      0
        ..
21592    0
21593    0
21594    0
21595    0
21596    0
Name: condition, Length: 21597, dtype: int32
```

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

```
Out[ ]:      id      date    price  bedrooms  bathrooms  sqft_living  sqft_lot  floors  view
0  7129300520  10/13/2014  221900.0        3       1.00      1180     5650      1.0
1  6414100192  12/9/2014   538000.0        3       2.25      2570     7242      2.0
2  5631500400  2/25/2015   180000.0        2       1.00       770    10000      1.0
3  2487200875  12/9/2014   604000.0        4       3.00      1960     5000      1.0
4  1954400510  2/18/2015   510000.0        3       2.00      1680     8080      1.0
5 rows × 21 columns
```

Drop columns:

Some columns wont contribute much to our models.

```
In [ ]: dropping_columns = ["id", "date", 'yr_renovated', 'waterfront', 'sqft_basement', 'lat', 'long']
df.drop(dropping_columns, inplace=True, axis = 1)
```

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

```
Out[ ]: Index(['price', 'bedrooms', 'bathrooms', 'sqft_living', 'sqft_lot', 'floors',
       'view', 'condition', 'grade', 'yr_built'],
       dtype='object')
```

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

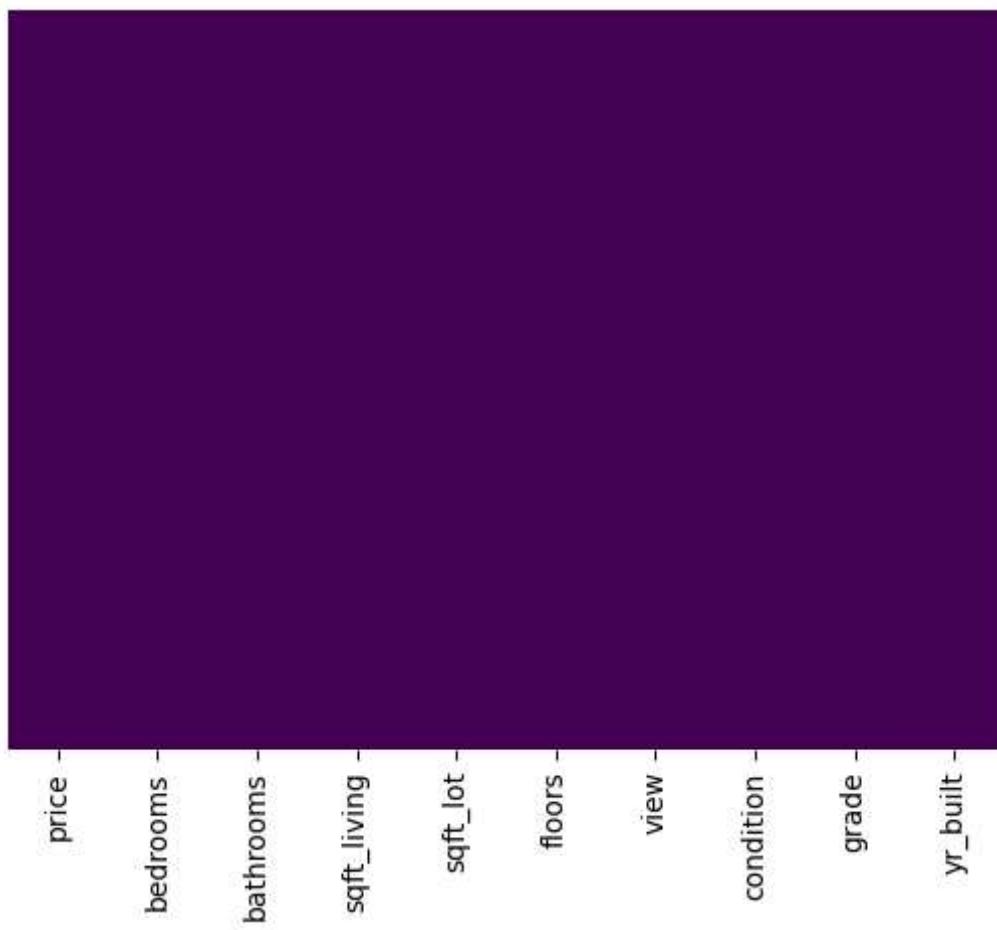
	price	bedrooms	bathrooms	sqft_living	sqft_lot	floor
count	2.159700e+04	21597.000000	21597.000000	21597.000000	2.159700e+04	21597.000000
mean	5.402966e+05	3.373200	2.115826	2080.321850	1.509941e+04	1.494090
std	3.673681e+05	0.926299	0.768984	918.106125	4.141264e+04	0.539680
min	7.800000e+04	1.000000	0.500000	370.000000	5.200000e+02	1.000000
25%	3.220000e+05	3.000000	1.750000	1430.000000	5.040000e+03	1.000000
50%	4.500000e+05	3.000000	2.250000	1910.000000	7.618000e+03	1.500000
75%	6.450000e+05	4.000000	2.500000	2550.000000	1.068500e+04	2.000000
max	7.700000e+06	33.000000	8.000000	13540.000000	1.651359e+06	3.500000

Data Visualization

To check missing values

```
In [ ]: sns.heatmap(df.isnull(), cbar=False, yticklabels=False, cmap='viridis')
```

```
Out[ ]: <Axes: >
```

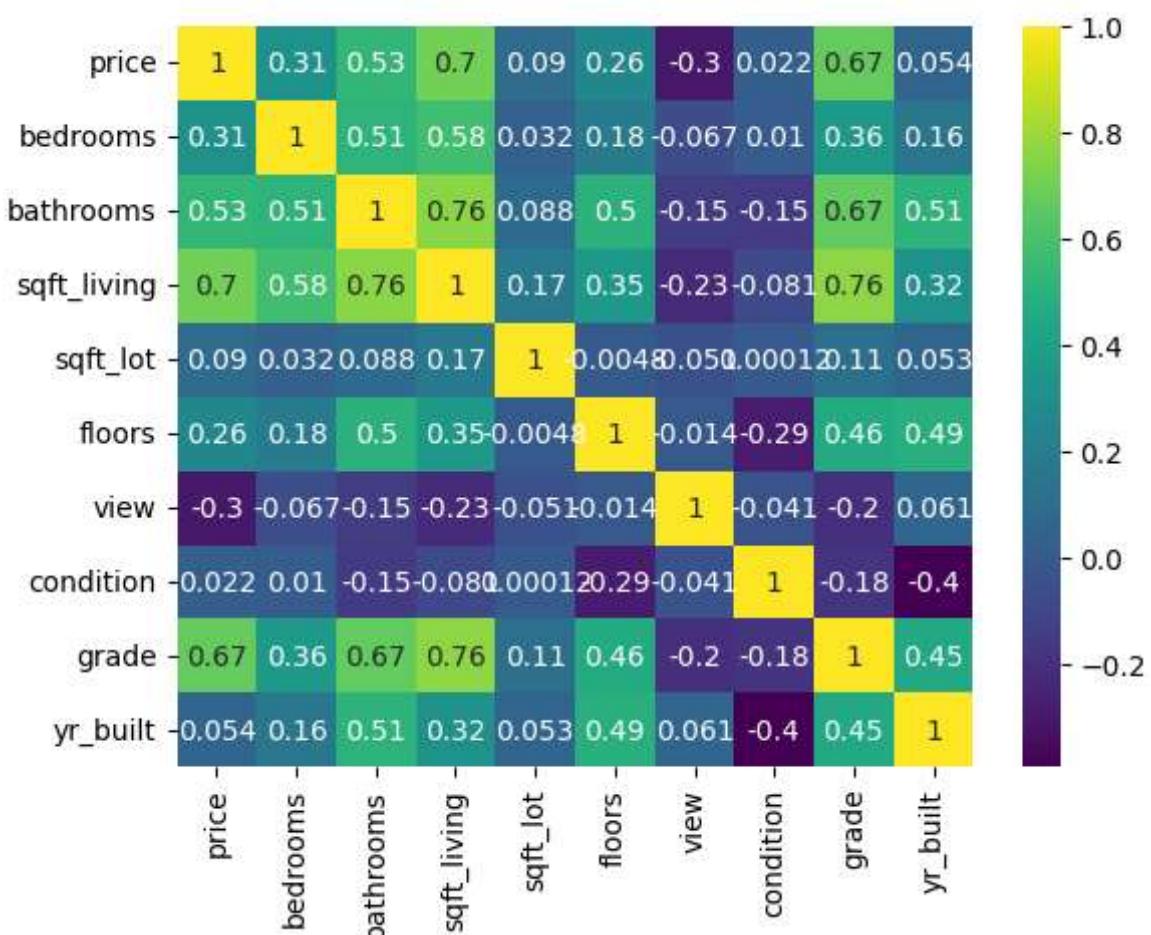


According to the above figure the dataset now has no missing values this is because the figure has only one shade.

To check the correlation between the variables

```
In [ ]: plt.Figure(figsize=(10,10))
sns.heatmap(df.corr(), annot=True, cmap='viridis')
```

```
Out[ ]: <Axes: >
```



Dark shades represents positive correlation while lighter shades represents negative correlation.

Here we can infer that "floors" and has weak negative correlation with "sqft_lot"

whereas "sqft_living" it has strong positive correlation with "bathrooms".

Checking for Outliers

```
In [ ]: # Selecting only the numerical columns
numerical_columns = ['price', 'bedrooms', 'bathrooms', 'sqft_living', 'sqft_lot', 'floors', 'view', 'condition', 'grade', 'yr_built']
numerical_df = df[numerical_columns]

# Calculating z-scores for all numerical columns
z_scores = (numerical_df - numerical_df.mean()) / numerical_df.std()

# Setting a threshold for outlier detection
threshold = 3

# Checking for outliers by identifying values with z-score greater than the threshold
outliers = df[(z_scores > threshold).any(axis=1)]

print(outliers)
```

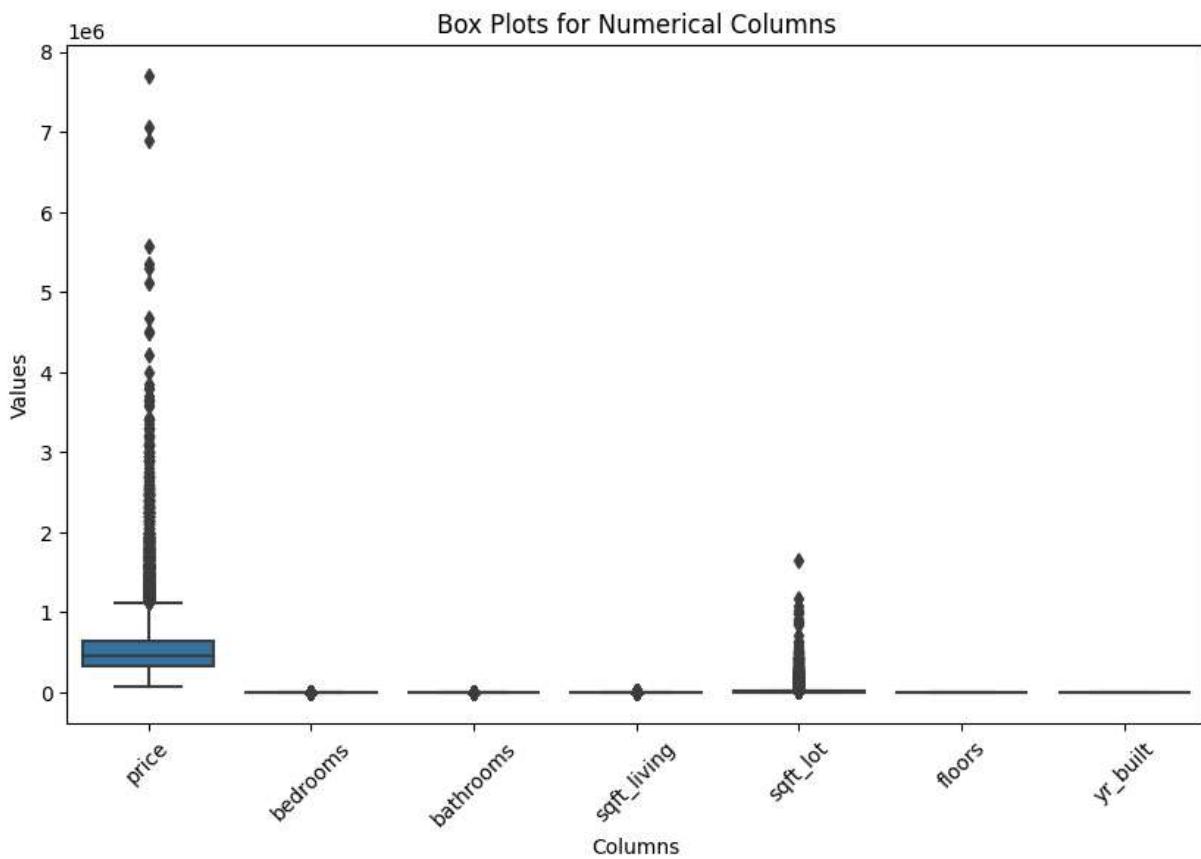
	price	bedrooms	bathrooms	sqft_living	sqft_lot	floors	view	\
5	1230000.0	4	4.50	5420	101930	1.0	4	
21	2000000.0	3	2.75	3050	44867	1.0	1	
145	921500.0	4	2.50	3670	315374	2.0	4	
153	2250000.0	4	3.25	5180	19850	2.0	3	
199	385000.0	3	1.75	1350	155073	1.0	4	
...
21532	1060000.0	2	1.50	2370	184231	2.0	4	
21535	1380000.0	5	4.50	4350	13405	2.0	4	
21552	1700000.0	4	3.50	3830	8963	2.0	4	
21560	3570000.0	5	4.50	4850	10584	2.0	1	
21574	1220000.0	4	3.50	4910	9444	1.5	4	
...
5	0	11	2001					
21	0	9	1968					
145	2	9	1994					
153	0	12	2006					
199	2	7	1969					
...					
21532	0	11	2005					
21535	0	11	2014					
21552	0	10	2014					
21560	0	10	2007					
21574	0	11	2007					

[963 rows x 10 columns]

Visualize the outliers

```
In [ ]: numerical_columns = ['price', 'bedrooms', 'bathrooms', 'sqft_living', 'sqft_lot', 'f
numerical_df = df[numerical_columns]

plt.figure(figsize=(10,6))
sns.boxplot(data=numerical_df)
plt.xticks(rotation=45)
plt.title("Box Plots for Numerical Columns")
plt.xlabel("Columns")
plt.ylabel("Values")
plt.show()
```



To check for skewness :

Skewness measures the asymmetry of the distribution.

close to 0 : indicates a symmetric distribution...ie bathrooms

positively skewed frequency curve: there are more observations below the mean....ie. sqft_lot

negative skewed frequency curve: there are more observations above the mean.....ie yr_built

```
In [ ]: skewness = df.skew(axis=0, skipna=True, numeric_only=True,)
```

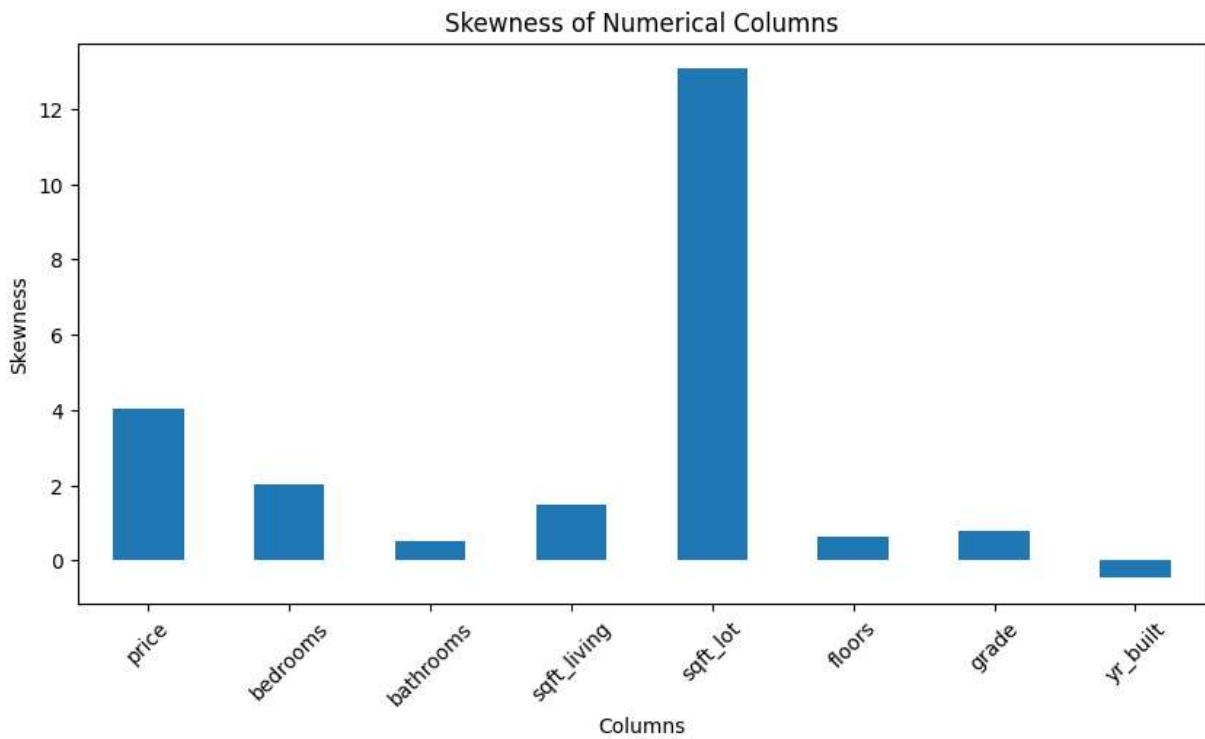
```
Out[ ]: price      4.023365
bedrooms    2.023641
bathrooms   0.519709
sqft_living 1.473215
sqft_lot     13.072604
floors      0.614497
view        -3.363849
condition    1.212104
grade        0.788237
yr_built    -0.469450
dtype: float64
```

Plotting the skewness of the columns in the dataset

```
In [ ]: numerical_columns = df.select_dtypes(include=['float64', 'int64'])

# Calculate skewness for each numerical column
skewness = numerical_columns.skew()

# Plotting the skewness
plt.figure(figsize=(10,5))
skewness.plot(kind='bar')
plt.title('Skewness of Numerical Columns')
plt.xlabel('Columns')
plt.ylabel('Skewness')
plt.xticks(rotation=45)
plt.show()
```

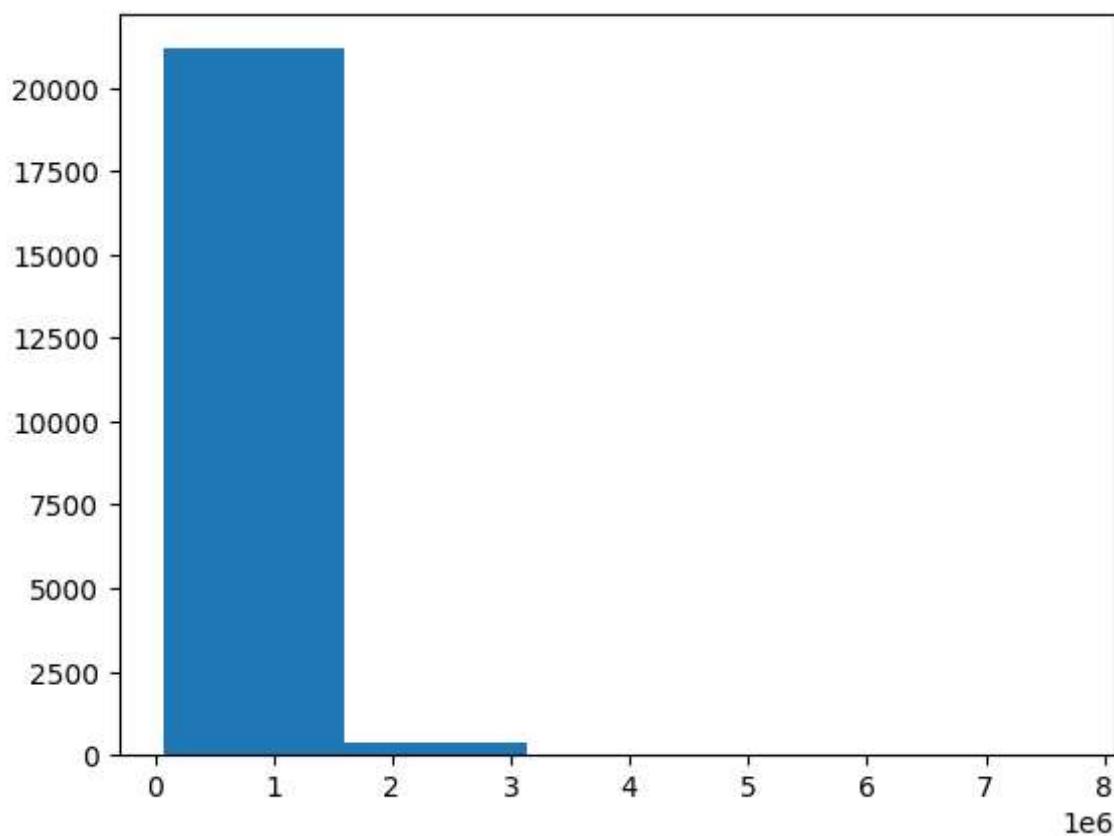


LINEAR REGRESSION

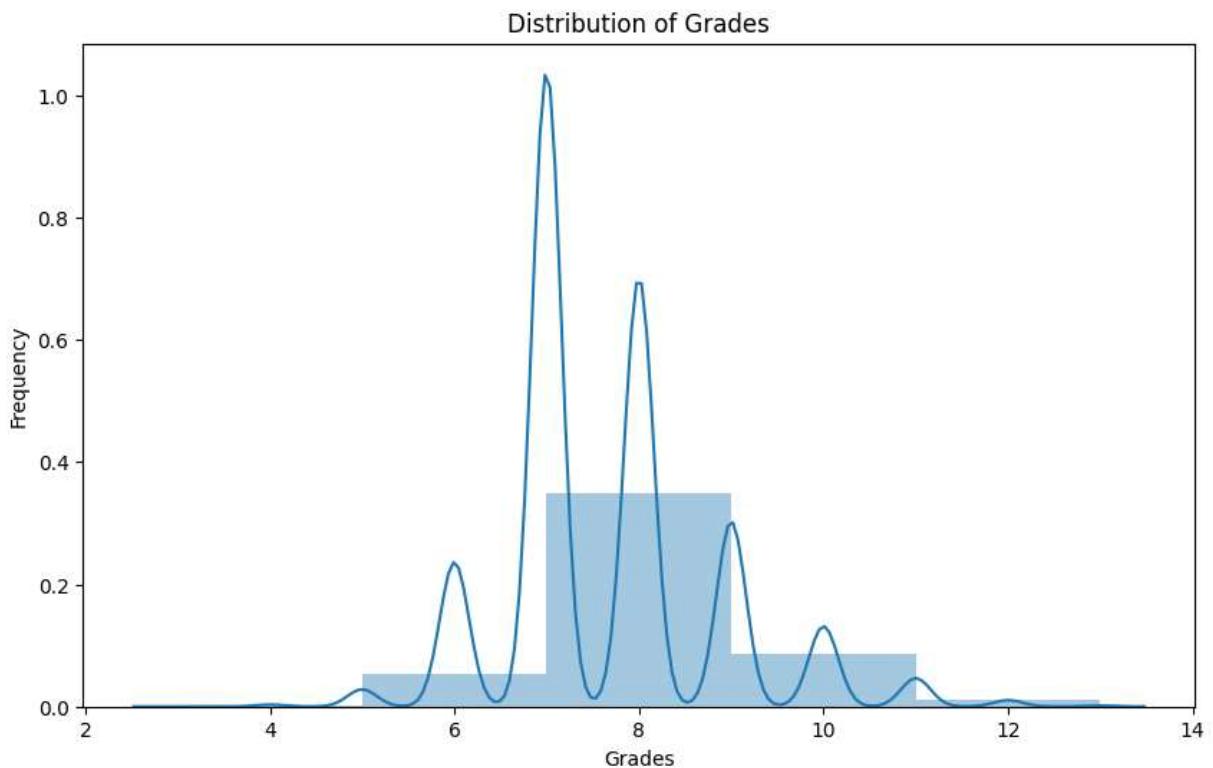
1). PRICE VS GRADE

There is a close relationship between the price of a house and the grade where the fact on whether a house is a graded as a mansion,luxury,excellent, better it will affect the price of the house.

```
In [ ]: # visualizing of the price column
plt.hist('price', data=df, bins=5)
plt.show()
```



```
In [ ]: # visualizing the distribution of the grade column
fig = plt.figure(figsize=(10,6))
sns.distplot(df['grade'], bins=5)
plt.title('Distribution of Grades')
plt.xlabel('Grades')
plt.ylabel('Frequency')
plt.show()
```



```
In [ ]: #visualize the relationship between the price and the grade
# Plotting the regression line
fig = plt.figure(figsize=(10,6))
plt.scatter(df['grade'], df['price'])
plt.xlabel('Grades')
plt.ylabel('Price')
plt.title('Relationship between grade and price')
plt.show()

# split the data into training and testing sets
X = df[['grade']]
y= df['price']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

#create an fit the Linear regression model
model = linear_model.LinearRegression()
model.fit(X_train, y_train)

#retrieve the intercept and the coefficient from the model
coefficients = model.coef_
intercept = model.intercept_
print("The coefficient for our model is ", coefficients)
print ("The intercept for our model is ", intercept)

#predict the prices
y_pred = model.predict(X_test)

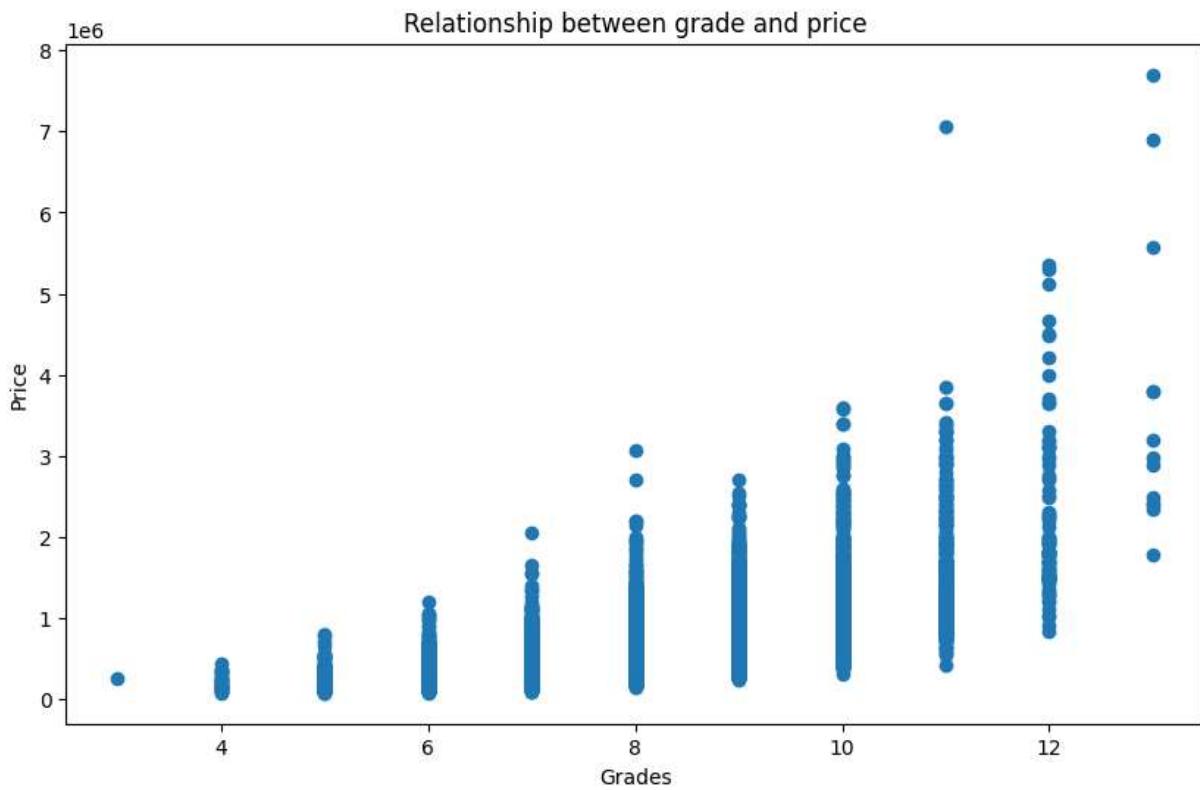
#evaluate the model
plt.scatter(y_test, y_test, color='red')
plt.plot(X_test, y_pred, color='Black', linewidth=3)
plt.xlabel('Grades')
plt.ylabel('Price')
```

```

plt.title('Relationship between grade and price')

#Calculating the models metrics
print("The model performance for training set")
print("-----")
print('RMSE is {}'.format(np.sqrt(metrics.mean_squared_error(y_test, y_pred))))
print('R2 score is {}'.format(metrics.r2_score(y_test, y_pred)))
print('Mse is {}'.format(metrics.mean_squared_error(y_test, y_pred)))
print("\n")
print("The model performance for testing set")
print("-----")
print('RMSE is {}'.format(np.sqrt(metrics.mean_squared_error(y_test, y_pred))))
print('R2 score is {}'.format(metrics.r2_score(y_test, y_pred)))
print('Mse is {}'.format(metrics.mean_squared_error(y_test, y_pred)))
print("\n")

```



The coefficient for our model is [211516.22123553]

The intercept for our model is -1078219.9856528589

The model performance for training set

RMSE is 271483.82054584136

R2 score is 0.43399193438808736

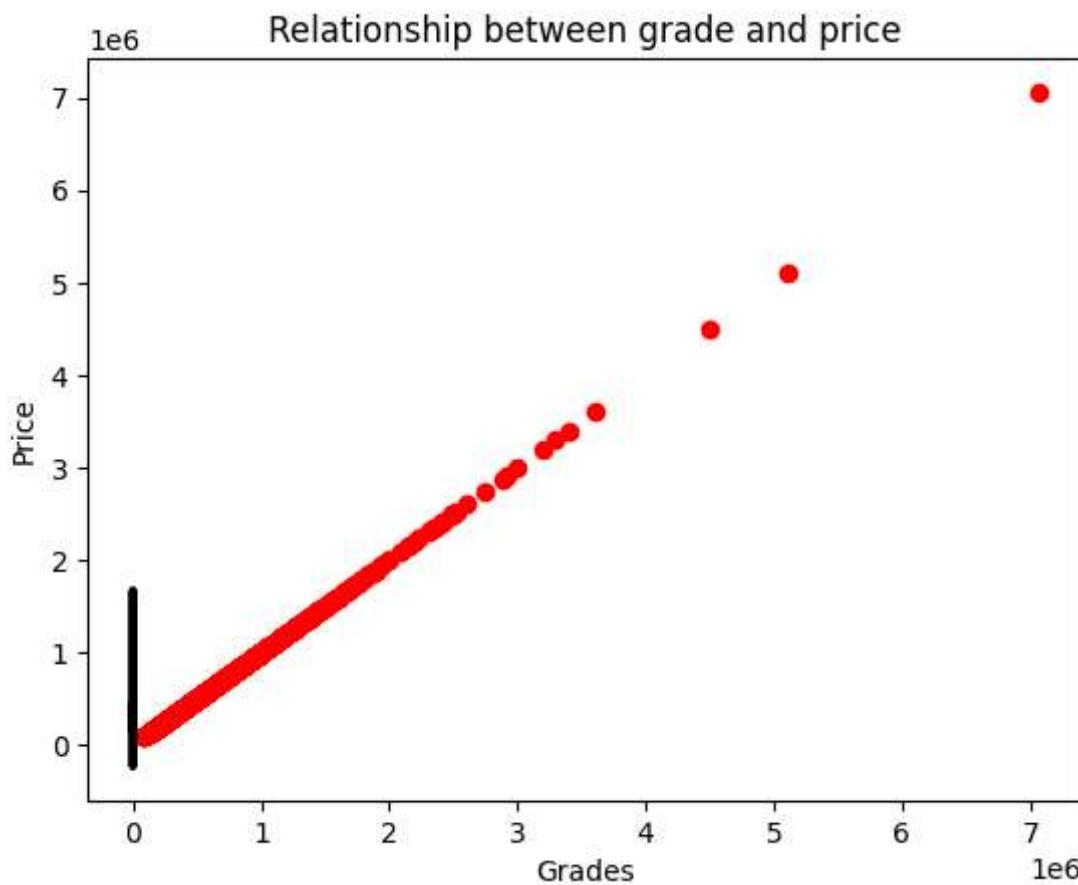
Mse is 73703464818.1666

The model performance for testing set

RMSE is 271483.82054584136

R2 score is 0.43399193438808736

Mse is 73703464818.1666



1. Coefficient and Intercept: The coefficient for the grade variable is 211,516.22123553, indicating that for every unit increase in the grade, the price is expected to increase by approximately 211,516. The intercept is -1,078,219.9856528589, suggesting that when the grade is 0, the price is approximately -1,078,220.

2. Model Performance (Training Set):

- RMSE (Root Mean Squared Error): The RMSE value is 271,483.82054584136. It represents the average difference between the predicted and actual price values. Lower RMSE values indicate better predictive performance. In this case, the RMSE suggests that, on average, the model's predictions deviate from the actual prices by approximately \$271,484.
- R2 score: The R2 score is 0.43399193438808736. This metric measures the proportion of variance in the target variable (price) explained by the predictor variable (grade). An R2 score closer to 1 indicates a better fit, where higher values signify that more of the variation in the price can be attributed to the grade. In this case, the R2 score suggests that approximately 43.4% of the price variation can be explained by the grade variable.
- MSE (Mean Squared Error): The MSE value is 73,703,464,818.1666. Similar to RMSE, MSE represents the average squared difference between predicted and actual price values. Higher

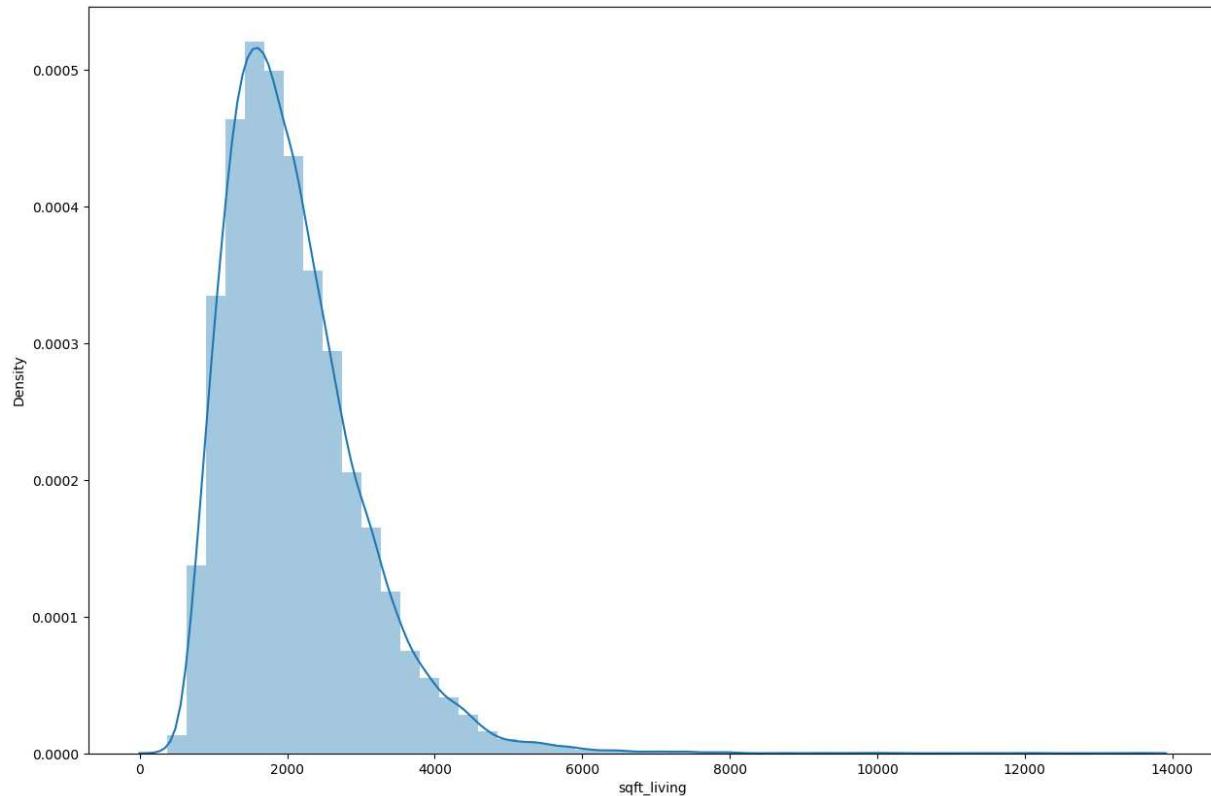
MSE values indicate larger prediction errors. In this case, the MSE is quite large, reflecting significant variability between predicted and actual prices.

Interpretation: Based on these results, the linear regression model doesn't appear to be a strong fit for the data. The relatively high RMSE and MSE values indicate that there is substantial prediction error, with the model's predictions deviating from the actual prices by a considerable amount. Additionally, the R2 score of 0.433 suggests that only around 43.4% of the price variability can be explained by the grade variable alone. Therefore, it may be necessary to explore additional variables or consider more complex modeling techniques to improve the model's performance and achieve a better fit to the data.

2): LINEAR REGRESSION MODEL OF PRICE AND SQFT_LIVING

```
In [ ]: # viewing the sqft_living column
# plt.hist('sqft_living',data=df,bins=5)
# plt.show()
fig,axes=plt.subplots(nrows=1,ncols=1,figsize=(15,10))
sns.distplot(df['sqft_living'],hist=True,kde=True,rug=False,label='sqft_living',norm_
```

Out[]: <Axes: xlabel='sqft_living', ylabel='Density'>



```
In [ ]: # Splitting the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(df[['sqft_living']], df['price'],

# Creating and fitting the Linear regression model object using the training data
reg = linear_model.LinearRegression()
reg.fit(X_train, y_train)
```

```
# Making predictions on the testing data
pred = reg.predict(X_test)

# Printing the results
print('Linear Model')
mse = metrics.mean_squared_error(y_test, pred)
print('Mean Squared Error:', round(mse, 2))
rmse = np.sqrt(mse)
r2_train = reg.score(X_train, y_train)
print('R-squared (Training):', round(r2_train, 3))
r2_test = reg.score(X_test, y_test)
print('R-squared (Testing):', round(r2_test, 3))

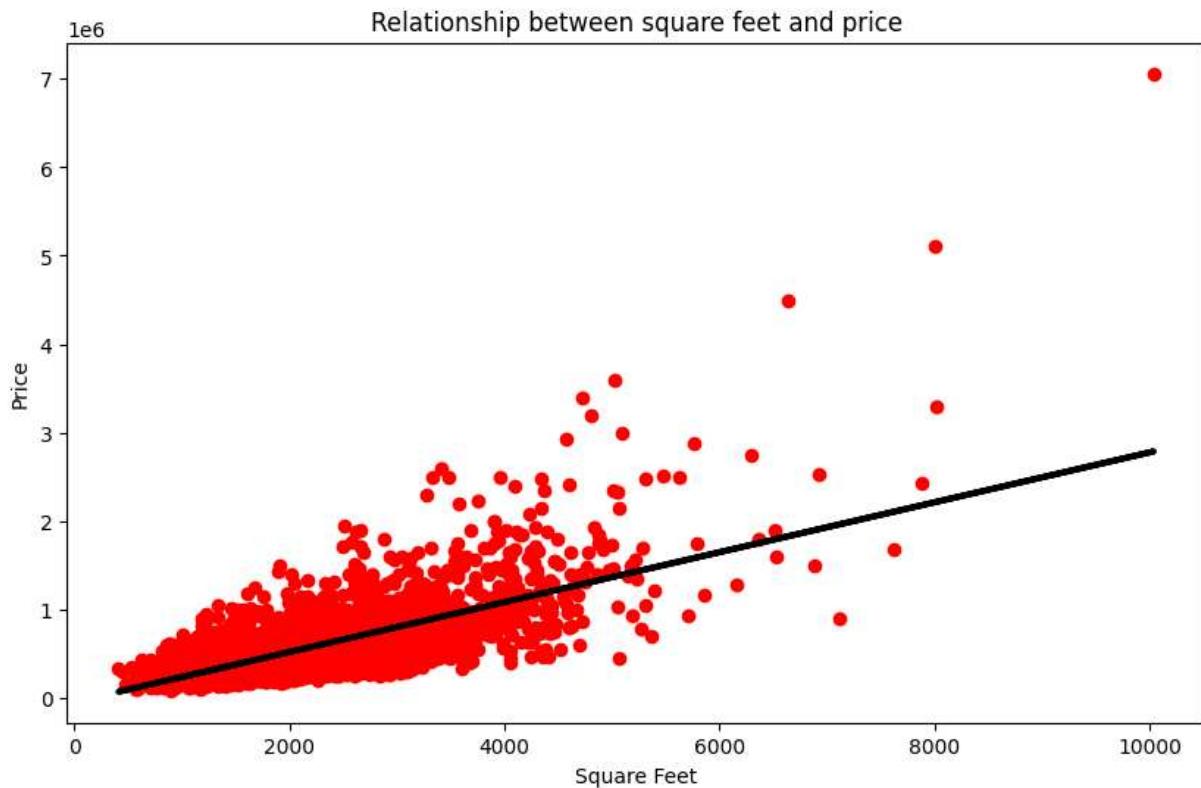
print('Root Mean Squared Error (RMSE):', round(rmse, 2))
print('R-squared (Training):', round(r2_train, 3))
print('R-squared (Testing):', round(r2_test, 3))
print('Intercept:', reg.intercept_)
print('Coefficient:', reg.coef_)
```

Linear Model

Mean Squared Error: 65977373783.62
R-squared (Training): 0.492
R-squared (Testing): 0.493
Root Mean Squared Error (RMSE): 256860.61
R-squared (Training): 0.492
R-squared (Testing): 0.493
Intercept: -46447.34551807004
Coefficient: [282.20150555]

In []: # Plotting the regression line

```
plt.figure(figsize=(10,6))
plt.scatter(X_test, y_test, color='red')
plt.plot(X_test, pred, color='black', linewidth=3)
plt.xlabel('Square Feet')
plt.ylabel('Price')
plt.title('Relationship between square feet and price')
plt.show()
```



Based on the metrics provided:

1. Mean Squared Error (MSE): The MSE value is 65,977,373,783.62. Since the MSE represents the average squared difference between the predicted and actual values, a lower value is desirable. In this case, the high MSE suggests that the model's predictions have a large average deviation from the actual values, indicating poorer model fit.
2. R-squared: The R-squared values for both the training and testing sets are 0.492 and 0.493, respectively. R-squared measures the proportion of variance in the target variable that can be explained by the model. A higher R-squared indicates a better fit. In this case, the R-squared values are relatively low, suggesting that only about 49.2% - 49.3% of the variance in the target variable is explained by the linear model.
3. Root Mean Squared Error (RMSE): The RMSE value is 256,860.61. Similar to the MSE, a lower RMSE is preferred as it represents a smaller average prediction error. However, the given value of RMSE is quite high, indicating significant deviations between the predicted and actual values.
4. Intercept and Coefficient: The intercept is -46447.35, and the coefficient is 282.20150555. These represent the y-intercept and slope, respectively, of the linear equation. They indicate the baseline value and the effect of the independent variable on the dependent variable. Considering all these metrics, the model does not appear to be a good fit for the data. The high MSE and RMSE suggest substantial prediction errors, while the relatively low R-squared values indicate that the model explains only a small portion of the variance in the target variable. Therefore, further model improvement or exploration may be necessary to achieve a better fit.

MULTIPLE LINEAR REGRESSION MODEL

multiple linear regression model to predict the price of a house based on the following variables: bathrooms, bedrooms, sqft_lot, floors, waterfront, view, condition, grade, sqft_above, sqft_basement, yr_built, and yr_renovated.

```
In [ ]: X = df[['bathrooms', 'bedrooms', 'sqft_lot', 'sqft_living','floors', ]]
y= df['price']
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)

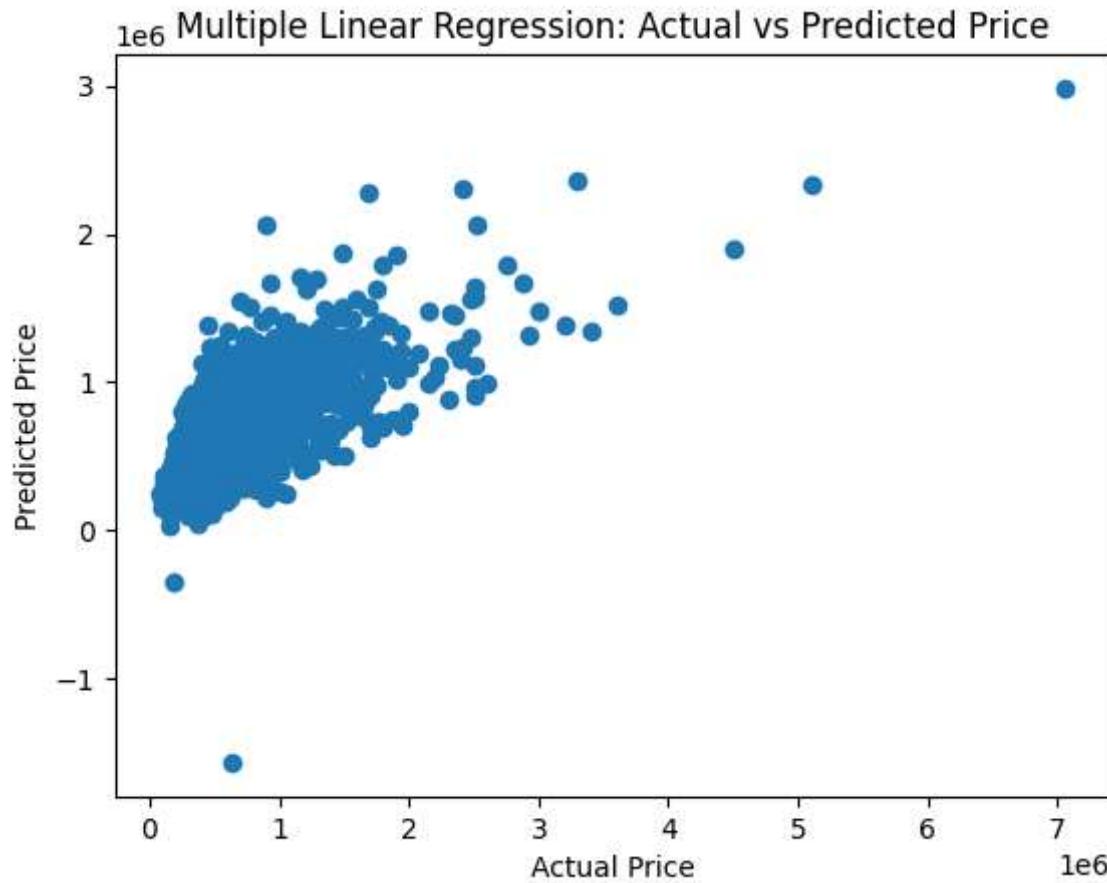
reg=linear_model.LinearRegression()
reg.fit(X_train,y_train)
pred=reg.predict(X_test)

print('Multiple Linear Regression')
mean_squared_error=metrics.mean_squared_error(y_test,pred)

print('mean squared error(MSE)', round(np.sqrt(mean_squared_error),2))
print('R squared training',round(reg.score(X_train,y_train),3))
print('R squared training', round(reg.score(X_test,y_test),3))
print('Intercept: ', reg.intercept_)
print('Coefficient:', reg.coef_)
print("\n")
```

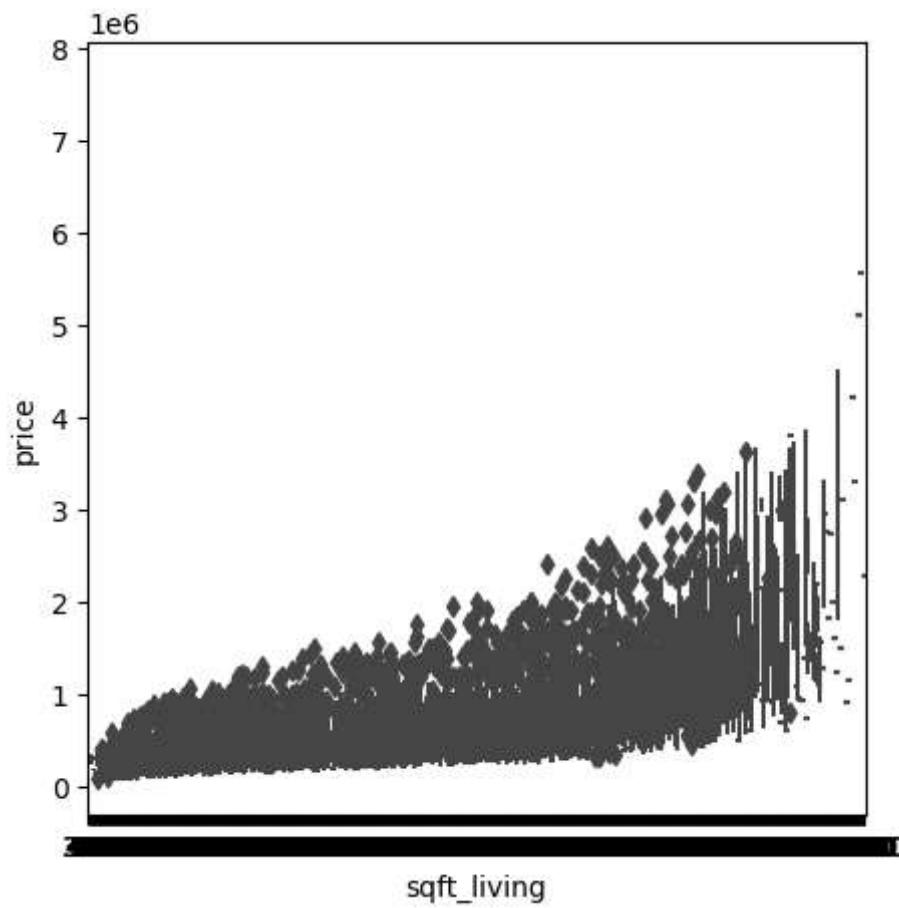
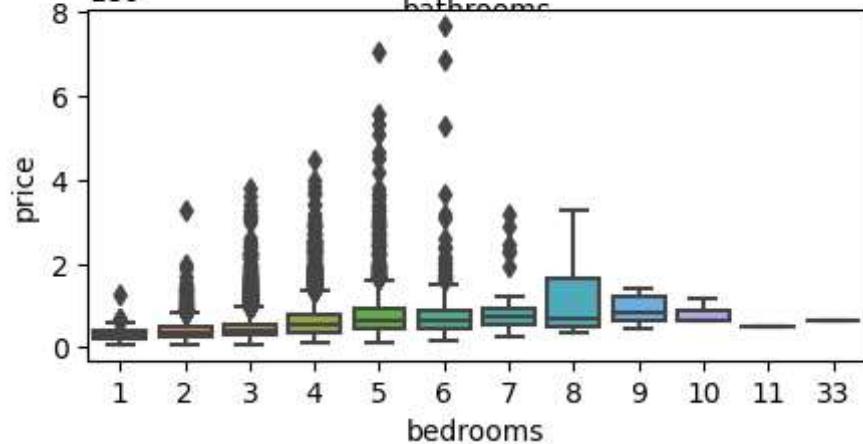
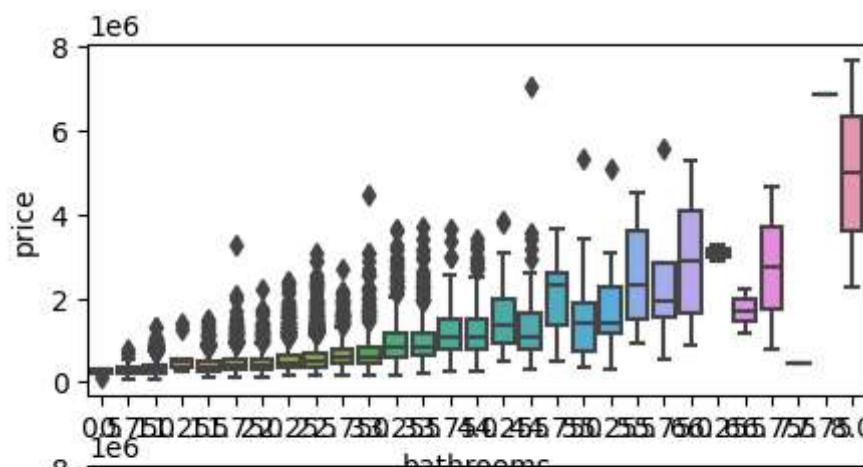
```
Multiple Linear Regression
mean squared error(MSE) 255315.14
R squared training 0.511
R squared training 0.499
Intercept: 89732.72526580625
Coefficient: [ 8.60216010e+03 -6.61937453e+04 -4.58141974e-01  3.19248248e+02
-8.64614668e+02]
```

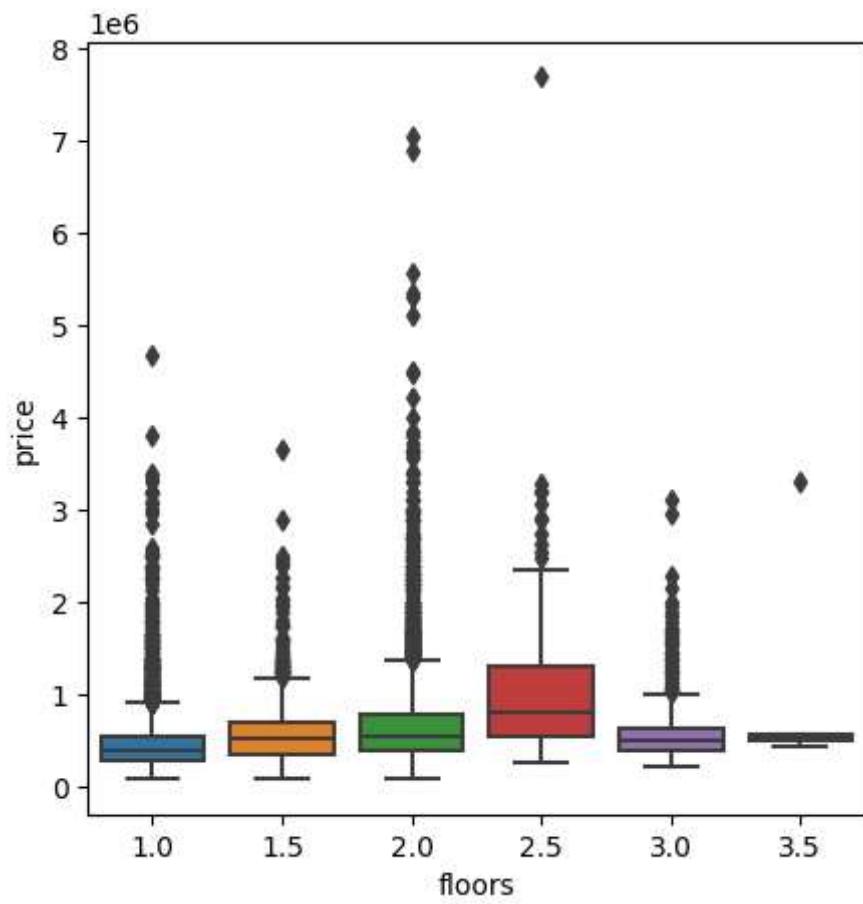
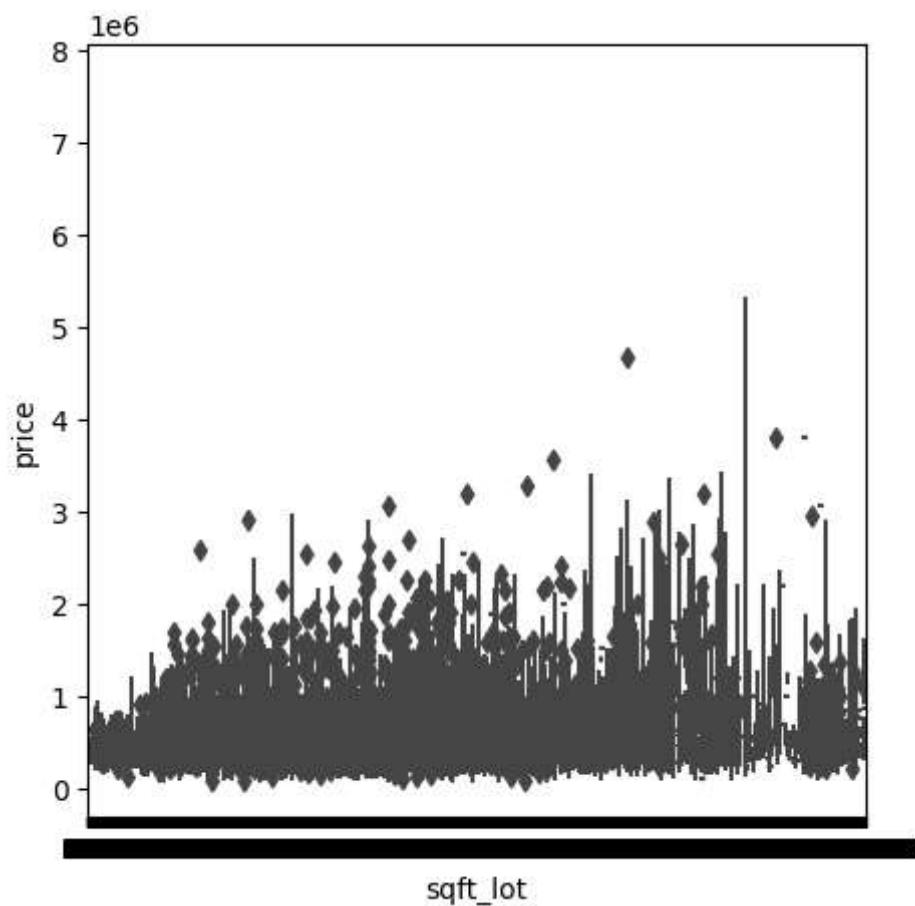
```
In [ ]: plt.scatter(y_test, pred)
plt.xlabel('Actual Price')
plt.ylabel('Predicted Price')
plt.title('Multiple Linear Regression: Actual vs Predicted Price')
plt.show()
```



```
In [ ]: fig,ax=plt.subplots(2,1,figsize=(5,5))
sns.boxplot(x=df['bathrooms'],y=df['price'],ax=ax[0])
sns.boxplot(x=df['bedrooms'],y=df['price'],ax=ax[1])
_, axes = plt.subplots(1, 1, figsize=(5,5))
sns.boxplot(x=df['sqft_living'],y=df['price'])
_, axes = plt.subplots(1, 1, figsize=(5,5))
sns.boxplot(x=df['sqft_lot'],y=df['price'])
_, axes = plt.subplots(1, 1, figsize=(5,5))
sns.boxplot(x=df['floors'],y=df['price'])
```

```
Out[ ]: <Axes: xlabel='floors', ylabel='price'>
```



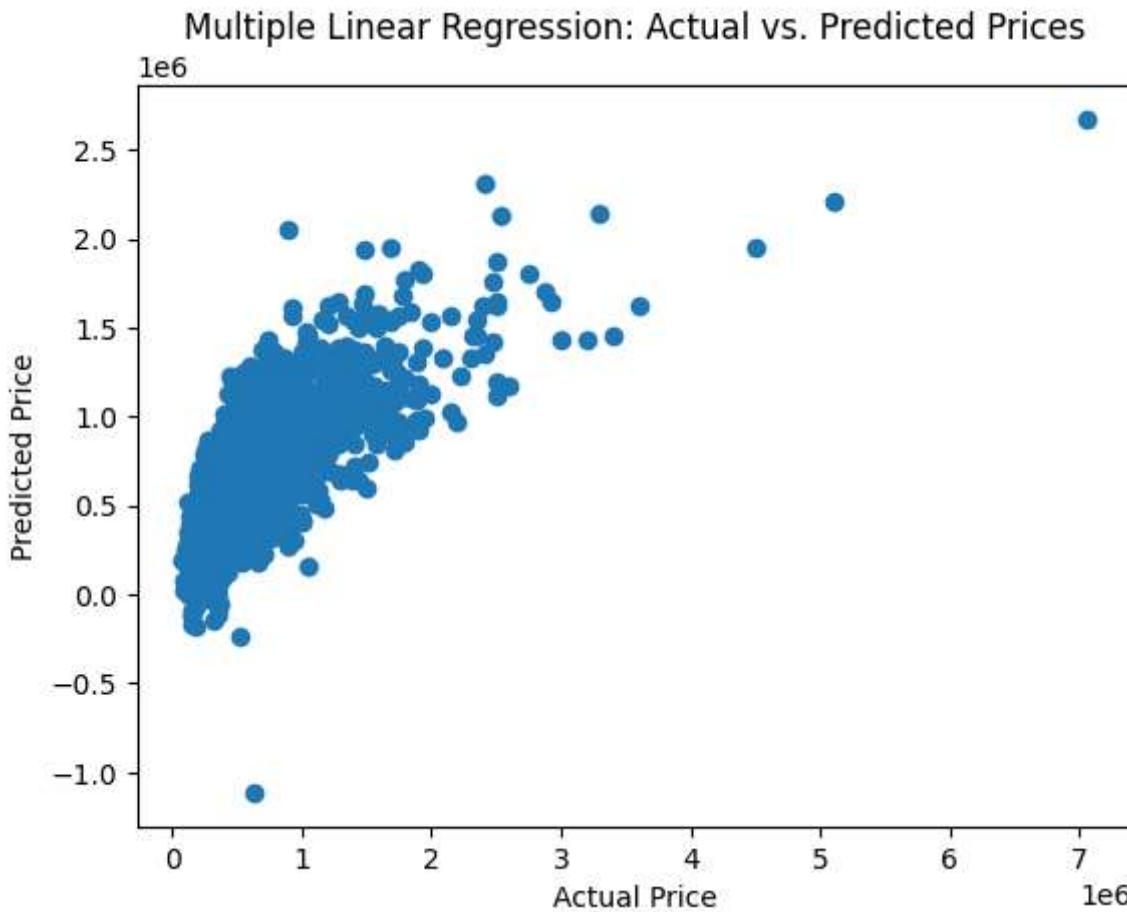


```
In [ ]: x = df[['bathrooms', 'bedrooms', 'sqft_lot', 'sqft_living','floors', 'bedrooms', 'grade']]
y = df['price']
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2, random_state=42)

model = linear_model.LinearRegression()
model.fit(x_train, y_train)
pred = model.predict(x_test)
print('Multiple Linear Regression 2')
mean_squared_error=metrics.mean_squared_error(y_test,pred)
print('mean squared error(MSE)', round(np.sqrt(mean_squared_error),2))
print('R squared training',round(model.score(x_train,y_train),3))
print('R squared testing', round(model.score(x_test,y_test),3))
print('Intercept: ', model.intercept_)
print('Coefficient:', model.coef_)
```

```
Multiple Linear Regression 2
mean squared error(MSE) 229016.19
R squared training 0.621
R squared testing 0.597
Intercept: 7478566.369777217
Coefficient: [ 5.75708783e+04 -2.62628339e+04 -2.99281298e-01  1.88941352e+02
   1.85176618e+04 -2.62628339e+04  1.32271986e+05 -4.21685708e+03]
```

```
In [ ]: plt.scatter(y_test, pred)
plt.xlabel('Actual Price')
plt.ylabel('Predicted Price')
plt.title('Multiple Linear Regression: Actual vs. Predicted Prices')
plt.show()
```



1. Mean Squared Error (MSE): The MSE is a measure of the average squared difference between the predicted values and the actual values. In this case, the MSE is 229,016.19, indicating that, on average, the predicted values from the regression model deviate from the actual values by approximately 229,016.19 squared units.
2. R-squared (Training): The R-squared value measures the proportion of variance in the dependent variable that can be explained by the independent variables in the model. The R-squared value of 0.621 for training data means that approximately 62.1% of the variance in the dependent variable is accounted for by the independent variables in the model.
3. R-squared (Testing): The R-squared value of 0.597 for testing data indicates that around 59.7% of the variance in the dependent variable is explained by the independent variables in the model when evaluated on unseen/testing data.
4. Intercept: The intercept term represents the estimated value of the dependent variable when all independent variables are set to zero. In this case, the intercept is 7,478,566.37. It suggests that even when all other predictors are zero, the dependent variable is estimated to have a value of 7,478,566.37.
5. Coefficients: The coefficients represent the estimated effect of each independent variable on the dependent variable, holding other variables constant. The provided coefficients are:
 - Variable 1: 57,570.88
 - Variable 2: -26,262.83
 - Variable 3: -0.299
 - Variable 4: 188.94
 - Variable 5: 18,517.66
 - Variable 6: -26,262.83
 - Variable 7: 132,271.99

Variable 8: -4,216.86 The coefficients show how a one-unit change in each independent variable influences the dependent variable while holding other variables constant. For example, a one-unit increase in Variable 1 is associated with an estimated increase of 57,570.88 units in the dependent variable, and so on for the other variables. Negative coefficients suggest a negative relationship, while positive coefficients indicate a positive relationship between the corresponding independent variables and the dependent variable.

POLYNOMIAL REGRESSION

```
In [ ]: from sklearn.preprocessing import PolynomialFeatures
from sklearn import linear_model
from sklearn.model_selection import train_test_split
from sklearn import metrics
import numpy as np

x = df[['bathrooms', 'bedrooms', 'sqft_lot', 'sqft_living', 'floors', 'bedrooms', 'gr
y = df['price']
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2, random_state=42)

# Perform polynomial feature transformation
poly = PolynomialFeatures(degree=2)
x_train_poly = poly.fit_transform(x_train)
x_test_poly = poly.transform(x_test)

model = linear_model.LinearRegression()
model.fit(x_train_poly, y_train)
pred = model.predict(x_test_poly)
print('Polynomial Regression')

mean_squared_error = metrics.mean_squared_error(y_test, pred)
print('Mean squared error (MSE):', round(np.sqrt(mean_squared_error), 2))
print('R-squared training:', round(model.score(x_train_poly, y_train), 3))
print('R-squared testing:', round(model.score(x_test_poly, y_test), 3))
print('Intercept:', model.intercept_)
print('Coefficients:', model.coef_)
```

Polynomial Regression

Mean squared error (MSE): 216141.78

R-squared training: 0.69

R-squared testing: 0.641

Intercept: 54025131.58579482

Coefficients: [-8.50729462e+00 -1.44667341e+06 3.18161740e+05 -3.75362293e+01

1.92690630e+03 -2.28106320e+06 3.18160281e+05 2.17253839e+06

-5.95587992e+04 -3.10813011e+03 1.56839025e+03 -6.64019473e-02

1.95925563e+01 -3.06954294e+04 1.56839116e+03 2.33545600e+04

6.72654880e+02 1.53166479e+03 7.07442386e-02 -8.38359845e+00

9.56858907e+03 1.53166479e+03 -1.73210623e+03 -1.70067982e+02

6.95213500e-07 -7.21930625e-04 3.24480907e-01 7.07840674e-02

-1.13841177e-01 1.97224262e-02 2.82678886e-03 -2.11144028e+01

-8.38420241e+00 4.44221520e+01 -1.05927049e+00 4.45074614e+04

9.56858907e+03 -1.15927114e+04 1.15089787e+03 1.53166478e+03

-1.73210622e+03 -1.70068249e+02 4.22699964e+03 -1.13086568e+03

1.64267873e+01]

In the given polynomial regression model, we have the following interpretations for the provided information:

1. Mean squared error (MSE): 216141.78 • The MSE is a measure of the average squared difference between the predicted values and the actual values. In this case, the MSE indicates that, on average, the predictions of the model are off by approximately 216141.78 units squared. A lower MSE would suggest a better fit of the model to the data.
2. R-squared training: 0.69 • The R-squared value represents the proportion of the variance in the dependent variable (target) that can be explained by the independent variables used in the model. In this case, the training R-squared value of 0.69 suggests that about 69% of the variability in the target variable can be explained by the predictor variables included in the model.
3. R-squared testing: 0.641 • The R-squared testing value indicates the goodness of fit of the model on unseen or test data. With a value of 0.641, it suggests that the model explains approximately 64.1% of the variability observed in the test dataset.
4. Intercept: 54025131.58579482 • The intercept term represents the estimated value of the dependent variable when all independent variables are set to zero. In this case, the intercept is approximately 54025131.586, implying that when all the predictors are zero, the predicted value of the dependent variable is around 54025131.586.
5. Coefficients: [-8.50729462e+00, -1.44667341e+06, 3.18161740e+05, ...] • The coefficients indicate the effect of each predictor variable on the dependent variable in the polynomial regression equation. Each coefficient represents the change in the dependent variable associated with a unit change in the corresponding independent variable, while holding other variables constant. The coefficients provided in the list correspond to the respective predictor variables in the same order.

In []: pip install jupyter_contrib_nbextensions

Note: you may need to restart the kernel to use updated packages.

```
[notice] A new release of pip is available: 23.1 -> 23.1.2
[notice] To update, run: python.exe -m pip install --upgrade pip
```

```
Collecting jupyter_contrib_nbextensions
  Downloading jupyter_contrib_nbextensions-0.7.0.tar.gz (23.5 MB)
    ----- 23.5/23.5 MB 726.1 kB/s eta 0:00:00
      Preparing metadata (setup.py): started
      Preparing metadata (setup.py): finished with status 'done'
Requirement already satisfied: ipython_genutils in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from jupyter_contrib_nbextensions) (0.2.0)
Collecting jupyter_contrib_core>=0.3.3 (from jupyter_contrib_nbextensions)
  Downloading jupyter_contrib_core-0.4.2.tar.gz (17 kB)
    Preparing metadata (setup.py): started
    Preparing metadata (setup.py): finished with status 'done'
Requirement already satisfied: jupyter_core in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter_contrib_nbextensions) (5.3.1)
Collecting jupyter_highlight_selected_word>=0.1.1 (from jupyter_contrib_nbextensions)
  Downloading jupyter_highlight_selected_word-0.2.0-py2.py3-none-any.whl (11 kB)
Collecting jupyter_nbextensions_configurator>=0.4.0 (from jupyter_contrib_nbextensions)
  Downloading jupyter_nbextensions_configurator-0.6.3-py2.py3-none-any.whl (466 kB)
    ----- 466.9/466.9 kB 105.5 kB/s eta 0:00:00
Requirement already satisfied: nbconvert>=6.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from jupyter_contrib_nbextensions) (7.3.1)
Requirement already satisfied: notebook>=6.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from jupyter_contrib_nbextensions) (6.5.4)
Requirement already satisfied: tornado in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter_contrib_nbextensions) (6.2)
Requirement already satisfied: traitlets>=4.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter_contrib_nbextensions) (5.9.0)
Requirement already satisfied: lxml in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter_contrib_nbextensions) (4.9.2)
Requirement already satisfied: setuptools in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter_contrib_core>=0.3.3->jupyter_contrib_nbextensions) (65.6.3)
Requirement already satisfied: pyyaml in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from jupyter_nbextensions_configurator>=0.4.0->jupyter_contrib_nbextensions) (6.0)
Requirement already satisfied: beautifulsoup4 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (4.11.1)
Requirement already satisfied: bleach in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (6.0.0)
Requirement already satisfied: defusedxml in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (0.7.1)
Requirement already satisfied: jinja2>=3.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (3.1.2)
Requirement already satisfied: jupyterlab-pygments in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (0.2.2)
Requirement already satisfied: markupsafe>=2.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (2.1.1)
Requirement already satisfied: mistune<3,>=2.0.3 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (2.0.5)
Requirement already satisfied: nbclient>=0.5.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (0.8.0)
Requirement already satisfied: nbformat>=5.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (5.9.0)
Requirement already satisfied: packaging in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (23.0)
```

Requirement already satisfied: pandocfilters>=1.4.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (1.5.0)

Requirement already satisfied: pygments>=2.4.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (2.14.0)

Requirement already satisfied: tinycc2 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.0->jupyter_contrib_nbextensions) (1.2.1)

Requirement already satisfied: platformdirs>=2.5 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter_core->jupyter_contrib_nbextensions) (2.5.2)

Requirement already satisfied: pywin32>=300 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter_core->jupyter_contrib_nbextensions) (305)

Requirement already satisfied: pyzmq>=17 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from notebook>=6.0->jupyter_contrib_nbextensions) (25.1.0)

Requirement already satisfied: argon2-cffi in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from notebook>=6.0->jupyter_contrib_nbextensions) (21.3.0)

Requirement already satisfied: jupyter-client>=5.3.4 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from notebook>=6.0->jupyter_contrib_nbextensions) (8.3.0)

Requirement already satisfied: nest-asyncio>=1.5 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from notebook>=6.0->jupyter_contrib_nbextensions) (1.5.6)

Requirement already satisfied: ipykernel in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from notebook>=6.0->jupyter_contrib_nbextensions) (6.15.0)

Requirement already satisfied: Send2Trash>=1.8.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from notebook>=6.0->jupyter_contrib_nbextensions) (1.8.2)

Requirement already satisfied: terminado>=0.8.3 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from notebook>=6.0->jupyter_contrib_nbextensions) (0.15.0)

Requirement already satisfied: prometheus-client in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from notebook>=6.0->jupyter_contrib_nbextensions) (0.16.0)

Requirement already satisfied: nbclassic>=0.4.7 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from notebook>=6.0->jupyter_contrib_nbextensions) (0.5.6)

Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter-client>=5.3.4->notebook>=6.0->jupyter_contrib_nbextensions) (2.8.2)

Requirement already satisfied: jupyter-server>=1.8 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from nbclassic>=0.4.7->notebook>=6.0->jupyter_contrib_nbextensions) (1.23.6)

Requirement already satisfied: notebook-shim>=0.2.3 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from nbclassic>=0.4.7->notebook>=6.0->jupyter_contrib_nbextensions) (0.2.3)

Requirement already satisfied: fastjsonschema in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbformat>=5.1->nbconvert>=6.0->jupyter_contrib_nbextensions) (2.17.1)

Requirement already satisfied: jsonschema>=2.6 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbformat>=5.1->nbconvert>=6.0->jupyter_contrib_nbextensions) (3.2.0)

Requirement already satisfied: pywinpty>=1.1.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from terminado>=0.8.3->notebook>=6.0->jupyter_contrib_nbextensions) (2.0.10)

Requirement already satisfied: argon2-cffi-bindings in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from argon2-cffi->notebook>=6.0->jupyter_contrib_nbextensions) (21.2.0)

Requirement already satisfied: soupsieve>1.2 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from beautifulsoup4->nbconvert>=6.0->jupyter_contrib_nbextensions) (2.3.2.post1)

Requirement already satisfied: six>=1.9.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from bleach->nbconvert>=6.0->jupyter_contrib_nbextensions) (1.1

6.0)

Requirement already satisfied: webencodings in c:\users\krsty\appdata\roaming\python\python310\site-packages (from bleach->nbconvert>=6.0->jupyter_contrib_nbextensions) (0.5.1)

Requirement already satisfied: debugpy>=1.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipykernel->notebook>=6.0->jupyter_contrib_nbextensions) (1.5.1)

Requirement already satisfied: ipython>=7.23.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipykernel->notebook>=6.0->jupyter_contrib_nbextensions) (8.12.0)

Requirement already satisfied: matplotlib-inline>=0.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipykernel->notebook>=6.0->jupyter_contrib_nbextensions) (0.1.6)

Requirement already satisfied: psutil in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipykernel->notebook>=6.0->jupyter_contrib_nbextensions) (5.9.0)

Requirement already satisfied: backcall in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipython>=7.23.1->ipykernel->notebook>=6.0->jupyter_contrib_nbextensions) (0.2.0)

Requirement already satisfied: decorator in c:\users\krsty\appdata\roaming\python\python310\site-packages (from ipython>=7.23.1->ipykernel->notebook>=6.0->jupyter_contrib_nbextensions) (5.1.1)

Requirement already satisfied: jedi>=0.16 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipython>=7.23.1->ipykernel->notebook>=6.0->jupyter_contrib_nbextensions) (0.18.2)

Requirement already satisfied: pickleshare in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipython>=7.23.1->ipykernel->notebook>=6.0->jupyter_contrib_nbextensions) (0.7.5)

Requirement already satisfied: prompt-toolkit!=3.0.37,<3.1.0,>=3.0.30 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipython>=7.23.1->ipykernel->notebook>=6.0->jupyter_contrib_nbextensions) (3.0.38)

Requirement already satisfied: stack-data in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipython>=7.23.1->ipykernel->notebook>=6.0->jupyter_contrib_nbextensions) (0.6.2)

Requirement already satisfied: colorama in c:\users\krsty\appdata\roaming\python\python310\site-packages (from ipython>=7.23.1->ipykernel->notebook>=6.0->jupyter_contrib_nbextensions) (0.4.6)

Requirement already satisfied: attrs>=17.4.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jsonschema>=2.6->nbformat>=5.1->nbconvert>=6.0->jupyter_contrib_nbextensions) (22.1.0)

Requirement already satisfied: pyrsistent>=0.14.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jsonschema>=2.6->nbformat>=5.1->nbconvert>=6.0->jupyter_contrib_nbextensions) (0.19.2)

Requirement already satisfied: anyio<4,>=3.1.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from jupyter-server>=1.8->nbclassic>=0.4.7->notebook>=6.0->jupyter_contrib_nbextensions) (3.6.2)

Requirement already satisfied: websocket-client in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter-server>=1.8->nbclassic>=0.4.7->notebook>=6.0->jupyter_contrib_nbextensions) (1.4.2)

Requirement already satisfied: cffi>=1.0.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from argon2-cffi-bindings->argon2-cffi->notebook>=6.0->jupyter_contrib_nbextensions) (1.15.1)

Requirement already satisfied: idna>=2.8 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from anyio<4,>=3.1.0->jupyter-server>=1.8->nbclassic>=0.4.7->notebook>=6.0->jupyter_contrib_nbextensions) (3.4)

Requirement already satisfied: sniffio>=1.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from anyio<4,>=3.1.0->jupyter-server>=1.8->nbclassic>=0.4.7->notebook>=6.0->jupyter_contrib_nbextensions) (3.4)

```
ook>=6.0->jupyter_contrib_nbextensions) (1.3.0)
Requirement already satisfied: pycparser in c:\users\krsty\appdata\roaming\python\pyth
on310\site-packages (from cffi>=1.0.1->argon2-cffi-bindings->argon2-cffi->notebook>=6.
0->jupyter_contrib_nbextensions) (2.21)
Requirement already satisfied: parso<0.9.0,>=0.8.0 in c:\users\krsty\anaconda3\envs\le
arn-env\lib\site-packages (from jedi>=0.16->ipython>=7.23.1->ipykernel->notebook>=6.0-
>jupyter_contrib_nbextensions) (0.8.3)
Requirement already satisfied: wcwidth in c:\users\krsty\anaconda3\envs\learn-env\lib
\site-packages (from prompt-toolkit!=3.0.37,<3.1.0,>=3.0.30->ipython>=7.23.1->ipykerne
l->notebook>=6.0->jupyter_contrib_nbextensions) (0.2.6)
Requirement already satisfied: executing>=1.2.0 in c:\users\krsty\anaconda3\envs\learn
-env\lib\site-packages (from stack-data->ipython>=7.23.1->ipykernel->notebook>=6.0->ju
pyter_contrib_nbextensions) (1.2.0)
Requirement already satisfied: asttokens>=2.1.0 in c:\users\krsty\anaconda3\envs\learn
-env\lib\site-packages (from stack-data->ipython>=7.23.1->ipykernel->notebook>=6.0->ju
pyter_contrib_nbextensions) (2.2.1)
Requirement already satisfied: pure-eval in c:\users\krsty\anaconda3\envs\learn-env\li
b\site-packages (from stack-data->ipython>=7.23.1->ipykernel->notebook>=6.0->jupyter_c
ontrib_nbextensions) (0.2.2)
Building wheels for collected packages: jupyter_contrib_nbextensions, jupyter_contrib_
core
  . Building wheel for jupyter_contrib_nbextensions (setup.py): started
  . Building wheel for jupyter_contrib_nbextensions (setup.py): finished with status 'do
ne'
  . Created wheel for jupyter_contrib_nbextensions: filename=jupyter_contrib_nbextension
s-0.7.0-py2.py3-none-any.whl size=23428802 sha256=64d1a2afec0f719f36ef7e58939ac75adaf3
0e89df27711569e2fe88005154f4
  . Stored in directory: c:\users\krsty\appdata\local\pip\cache\wheels\ea\cc\7d\99ef154f
984726b1201c0f72cfe9c9d7c5132c1a2ae4d8677f
  . Building wheel for jupyter_contrib_core (setup.py): started
  . Building wheel for jupyter_contrib_core (setup.py): finished with status 'done'
  . Created wheel for jupyter_contrib_core: filename=jupyter_contrib_core-0.4.2-py2.py3-
none-any.whl size=17498 sha256=09420acd5e013df0b1608ac0491b14e97d45c7bb6d76d08734a7109
c7a801589
  . Stored in directory: c:\users\krsty\appdata\local\pip\cache\wheels\9a\52\88\0e0643cdf
d68f0562087918c37dd583378648dbc3df68b907f7
Successfully built jupyter_contrib_nbextensions jupyter_contrib_core
Installing collected packages: jupyter_highlight_selected_word, jupyter_contrib_core,
jupyter_nbextensions_configurator, jupyter_contrib_nbextensions
Successfully installed jupyter_contrib_core-0.4.2 jupyter_contrib_nbextensions-0.7.0 j
upyter_highlight_selected_word-0.2.0 jupyter_nbextensions_configurator-0.6.3
```

In []: jupyter nbextensions_configurator enable --user

```
Cell In[20], line 1
  jupyter nbextensions_configurator enable --user
  ^
SyntaxError: invalid syntax
```

In []: pip install nbconvert[webpdf]

```
Requirement already satisfied: nbconvert[webpdf] in c:\users\krsty\appdata\roaming\python\python310\site-packages (5.6.1)
Requirement already satisfied: mistune<2,>=0.8.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert[webpdf]) (0.8.4)
Requirement already satisfied: jinja2>=2.4 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert[webpdf]) (3.1.2)
Requirement already satisfied: pygments in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert[webpdf]) (2.14.0)
Requirement already satisfied: traitlets>=4.2 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert[webpdf]) (5.9.0)
Requirement already satisfied: jupyter-core in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert[webpdf]) (5.3.1)
Requirement already satisfied: nbformat>=4.4 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert[webpdf]) (5.9.0)
Requirement already satisfied: entrypoints>=0.2.2 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert[webpdf]) (0.4)
Requirement already satisfied: bleach in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert[webpdf]) (6.0.0)
Requirement already satisfied: pandocfilters>=1.4.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert[webpdf]) (1.5.0)
Requirement already satisfied: testpath in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert[webpdf]) (0.6.0)
Requirement already satisfied: defusedxml in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert[webpdf]) (0.7.1)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jinja2>=2.4->nbconvert[webpdf]) (2.1.1)
Requirement already satisfied: fastjsonschema in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbformat>=4.4->nbconvert[webpdf]) (2.17.1)
Requirement already satisfied: jsonschema>=2.6 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbformat>=4.4->nbconvert[webpdf]) (3.2.0)
Requirement already satisfied: six>=1.9.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from bleach->nbconvert[webpdf]) (1.16.0)
Requirement already satisfied: webencodings in c:\users\krsty\appdata\roaming\python\python310\site-packages (from bleach->nbconvert[webpdf]) (0.5.1)
Requirement already satisfied: platformdirs>=2.5 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter-core->nbconvert[webpdf]) (2.5.2)
Requirement already satisfied: pywin32>=300 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter-core->nbconvert[webpdf]) (305)
Requirement already satisfied: attrs>=17.4.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jsonschema>=2.6->nbformat>=4.4->nbconvert[webpdf]) (22.1.0)
Requirement already satisfied: pyrsistent>=0.14.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jsonschema>=2.6->nbformat>=4.4->nbconvert[webpdf]) (0.19.2)
Requirement already satisfied: setuptools in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jsonschema>=2.6->nbformat>=4.4->nbconvert[webpdf]) (65.6.3)
Note: you may need to restart the kernel to use updated packages.
```

WARNING: nbconvert 5.6.1 does not provide the extra 'webpdf'

[notice] A new release of pip is available: 23.1 -> 23.1.2

[notice] To update, run: python.exe -m pip install --upgrade pip

```
In [ ]: jupyter nbconvert --to webpdf --allow-chromium-download your-notebook-file.ipynb
```

```
Cell In[16], line 1
jupyter nbconvert --to webpdf --allow-chromium-download your-notebook-file.ipynb
^
SyntaxError: invalid syntax
```

```
In [ ]: pip install mercury
```

```
Requirement already satisfied: mercury in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (2.3.1)
Requirement already satisfied: django==4.2 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (4.2)
Requirement already satisfied: djangorestframework==3.14.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from mercury) (3.14.0)
Requirement already satisfied: django-filter==21.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (21.1)
Requirement already satisfied: markdown==3.3.6 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (3.3.6)
Requirement already satisfied: celery>=5.1.2 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (5.3.1)
Requirement already satisfied: sqlalchemy==1.4.27 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (1.4.27)
Requirement already satisfied: gevent in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (22.10.2)
Requirement already satisfied: nbconvert>=6.5.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (7.3.1)
Requirement already satisfied: ipython-genutils in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (0.2.0)
Requirement already satisfied: pyyaml==6.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (6.0)
Requirement already satisfied: django-cors-headers==3.10.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (3.10.1)
Requirement already satisfied: ipython>=7.30.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (8.12.0)
Requirement already satisfied: ipykernel>=6.6.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (6.15.0)
Requirement already satisfied: psutil>=5.8.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (5.9.0)
Requirement already satisfied: whitenoise>=5.3.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (6.5.0)
Requirement already satisfied: python-dotenv>=0.19.2 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (1.0.0)
Requirement already satisfied: django-drf-filepond==0.4.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (0.4.1)
Requirement already satisfied: croniter>=1.3.5 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (1.4.1)
Requirement already satisfied: pypeteer==1.0.2 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (1.0.2)
Requirement already satisfied: channels[daphne]>=4.0.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (4.0.0)
Requirement already satisfied: websocket-client>=1.4.2 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from mercury) (1.4.2)
Requirement already satisfied: execnb in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (0.1.5)
Requirement already satisfied: ipywidgets==8.0.3 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (8.0.3)
Requirement already satisfied: dj-rest-auth[with_social]==3.0.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (3.0.0)
Requirement already satisfied: boto3==1.26.83 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (1.26.83)
Requirement already satisfied: cryptography in c:\users\krsty\appdata\roaming\python\python310\site-packages (from mercury) (38.0.4)
Requirement already satisfied: pyopenssl>=23.1.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from mercury) (23.2.0)
```

Requirement already satisfied: botocore<1.30.0,>=1.29.83 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from boto3==1.26.83->mercury) (1.29.165)
Requirement already satisfied: jmespath<2.0.0,>=0.7.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from boto3==1.26.83->mercury) (0.10.0)
Requirement already satisfied: s3transfer<0.7.0,>=0.6.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from boto3==1.26.83->mercury) (0.6.0)
Requirement already satisfied: django-allauth<0.53.0,>=0.40.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from dj-rest-auth[with_social]==3.0.0->mercury) (0.52.0)
Requirement already satisfied: asgiref<4,>=3.6.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from django==4.2->mercury) (3.7.2)
Requirement already satisfied: sqlparse>=0.3.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from django==4.2->mercury) (0.4.3)
Requirement already satisfied: tzdata in c:\users\krsty\appdata\roaming\python\python310\site-packages (from django==4.2->mercury) (2022.7)
Requirement already satisfied: requests>=2.20.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from django-drf-filepond==0.4.1->mercury) (2.28.1)
Requirement already satisfied: six>=1.14.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from django-drf-filepond==0.4.1->mercury) (1.16.0)
Requirement already satisfied: shortuuid>=0.5.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from django-drf-filepond==0.4.1->mercury) (1.0.11)
Requirement already satisfied: django-storages>=1.9.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from django-drf-filepond==0.4.1->mercury) (1.13.2)
Requirement already satisfied: pytz in c:\users\krsty\appdata\roaming\python\python310\site-packages (from djangorestframework==3.14.0->mercury) (2022.5)
Requirement already satisfied: traitlets>=4.3.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from ipywidgets==8.0.3->mercury) (5.9.0)
Requirement already satisfied: widgetsnbextension~=4.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipywidgets==8.0.3->mercury) (4.0.8)
Requirement already satisfied: jupyterlab-widgets~=3.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipywidgets==8.0.3->mercury) (3.0.8)
Requirement already satisfied: appdirs<2.0.0,>=1.4.3 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from pypeteer==1.0.2->mercury) (1.4.4)
Requirement already satisfied: certifi>=2021 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from pypeteer==1.0.2->mercury) (2022.9.24)
Requirement already satisfied: importlib-metadata>=1.4 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from pypeteer==1.0.2->mercury) (6.0.0)
Requirement already satisfied: pyee<9.0.0,>=8.1.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from pypeteer==1.0.2->mercury) (8.2.2)
Requirement already satisfied: tqdm<5.0.0,>=4.42.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from pypeteer==1.0.2->mercury) (4.65.0)
Requirement already satisfied: urllib3<2.0.0,>=1.25.8 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from pypeteer==1.0.2->mercury) (1.26.12)
Requirement already satisfied: websockets<11.0,>=10.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from pypeteer==1.0.2->mercury) (10.4)
Requirement already satisfied: greenlet!=0.4.17 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from sqlalchemy==1.4.27->mercury) (2.0.2)
Requirement already satisfied: billiard<5.0,>=4.1.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from celery>=5.1.2->mercury) (4.1.0)
Requirement already satisfied: click-didyoumean>=0.3.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from celery>=5.1.2->mercury) (0.3.0)
Requirement already satisfied: click-plugins>=1.1.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from celery>=5.1.2->mercury) (1.1.1)
Requirement already satisfied: click-repl>=0.2.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from celery>=5.1.2->mercury) (0.3.0)
Requirement already satisfied: click<9.0,>=8.1.2 in c:\users\krsty\appdata\roaming\pyt

```
hon\python310\site-packages (from celery>=5.1.2->mercury) (8.1.3)
Requirement already satisfied: kombu<6.0,>=5.3.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from celery>=5.1.2->mercury) (5.3.1)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from celery>=5.1.2->mercury) (2.8.2)
Requirement already satisfied: vine<6.0,>=5.0.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from celery>=5.1.2->mercury) (5.0.0)
Requirement already satisfied: daphne>=4.0.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from channels[daphne]>=4.0.0->mercury) (4.0.0)
Requirement already satisfied: debugpy>=1.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipykernel>=6.6.0->mercury) (1.5.1)
Requirement already satisfied: jupyter-client>=6.1.12 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from ipykernel>=6.6.0->mercury) (8.3.0)
Requirement already satisfied: matplotlib-inline>=0.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipykernel>=6.6.0->mercury) (0.1.6)
Requirement already satisfied: nest-asyncio in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipykernel>=6.6.0->mercury) (1.5.6)
Requirement already satisfied: packaging in c:\users\krsty\appdata\roaming\python\python310\site-packages (from ipykernel>=6.6.0->mercury) (23.0)
Requirement already satisfied: pyzmq>=17 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from ipykernel>=6.6.0->mercury) (25.1.0)
Requirement already satisfied: tornado>=6.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from ipykernel>=6.6.0->mercury) (6.2)
Requirement already satisfied: backcall in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipython>=7.30.1->mercury) (0.2.0)
Requirement already satisfied: decorator in c:\users\krsty\appdata\roaming\python\python310\site-packages (from ipython>=7.30.1->mercury) (5.1.1)
Requirement already satisfied: jedi>=0.16 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipython>=7.30.1->mercury) (0.18.2)
Requirement already satisfied: pickleshare in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipython>=7.30.1->mercury) (0.7.5)
Requirement already satisfied: prompt-toolkit!=3.0.37,<3.1.0,>=3.0.30 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipython>=7.30.1->mercury) (3.0.38)
Requirement already satisfied: pygments>=2.4.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from ipython>=7.30.1->mercury) (2.14.0)
Requirement already satisfied: stack-data in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from ipython>=7.30.1->mercury) (0.6.2)
Requirement already satisfied: colorama in c:\users\krsty\appdata\roaming\python\python310\site-packages (from ipython>=7.30.1->mercury) (0.4.6)
Requirement already satisfied: beautifulsoup4 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.5.0->mercury) (4.11.1)
Requirement already satisfied: bleach in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.5.0->mercury) (6.0.0)
Requirement already satisfied: defusedxml in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.5.0->mercury) (0.7.1)
Requirement already satisfied: jinja2>=3.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.5.0->mercury) (3.1.2)
Requirement already satisfied: jupyter-core>=4.7 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.5.0->mercury) (5.3.1)
Requirement already satisfied: jupyterlab-pygments in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.5.0->mercury) (0.2.2)
Requirement already satisfied: markupsafe>=2.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.5.0->mercury) (2.1.1)
Requirement already satisfied: mistune<3,>=2.0.3 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from nbconvert>=6.5.0->mercury) (2.0.5)
Requirement already satisfied: nbclient>=0.5.0 in c:\users\krsty\appdata\roaming\python
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n\python310\site-packages (from nbconvert>=6.5.0->mercury) (0.8.0)
Requirement already satisfied: nbformat>=5.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.5.0->mercury) (5.9.0)
Requirement already satisfied: pandocfilters>=1.4.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.5.0->mercury) (1.5.0)
Requirement already satisfied: tinycc2 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbconvert>=6.5.0->mercury) (1.2.1)
Requirement already satisfied: cffi>=1.12 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from cryptography->mercury) (1.15.1)
Requirement already satisfied: fastcore>=1.5.5 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from execnb->mercury) (1.5.29)
Requirement already satisfied: zope.event in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from gevent->mercury) (5.0)
Requirement already satisfied: zope.interface in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from gevent->mercury) (6.0)
Requirement already satisfied: setuptools in c:\users\krsty\appdata\roaming\python\python310\site-packages (from gevent->mercury) (65.6.3)
Requirement already satisfied: typing-extensions>=4 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from asgiref<4,>=3.6.0->django==4.2->mercury) (4.4.0)
Requirement already satisfied: pycparser in c:\users\krsty\appdata\roaming\python\python310\site-packages (from cffi>=1.12->cryptography->mercury) (2.21)
Requirement already satisfied: twisted[tls]>=22.4 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from daphne>=4.0.0->channels[daphne]>=4.0.0->mercury) (22.1.0.0)
Requirement already satisfied: autobahn>=22.4.2 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from daphne>=4.0.0->channels[daphne]>=4.0.0->mercury) (23.6.2)
Requirement already satisfied: python3-openid>=3.0.8 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from django-allauth<0.53.0,>=0.40.0->dj-rest-auth[with_social]==3.0.0->mercury) (3.2.0)
Requirement already satisfied: requests-oauthlib>=0.3.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from django-allauth<0.53.0,>=0.40.0->dj-rest-auth[with_social]==3.0.0->mercury) (1.3.1)
Requirement already satisfied: pyjwt[crypto]>=1.7 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from django-allauth<0.53.0,>=0.40.0->dj-rest-auth[with_social]==3.0.0->mercury) (2.6.0)
Requirement already satisfied: pip in c:\users\krsty\appdata\roaming\python\python310\site-packages (from fastcore>=1.5.5->execnb->mercury) (23.1)
Requirement already satisfied: zipp>=0.5 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from importlib-metadata>=1.4->pypeteer==1.0.2->mercury) (3.11.0)
Requirement already satisfied: parso<0.9.0,>=0.8.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from jedi>=0.16->ipython>=7.30.1->mercury) (0.8.3)
Requirement already satisfied: platformdirs>=2.5 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter-core>=4.7->nbconvert>=6.5.0->mercury) (2.5.2)
Requirement already satisfied: pywin32>=300 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jupyter-core>=4.7->nbconvert>=6.5.0->mercury) (305)
Requirement already satisfied: amqp<6.0.0,>=5.1.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from kombu<6.0,>=5.3.1->celery>=5.1.2->mercury) (5.1.1)
Requirement already satisfied: fastjsonschema in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbformat>=5.1->nbconvert>=6.5.0->mercury) (2.17.1)
Requirement already satisfied: jsonschema>=2.6 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from nbformat>=5.1->nbconvert>=6.5.0->mercury) (3.2.0)
Requirement already satisfied: wcwidth in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from prompt-toolkit!=3.0.37,<3.1.0,>=3.0.30->ipython>=7.30.1->mercury) (0.2.6)
Requirement already satisfied: charset-normalizer<3,>=2 in c:\users\krsty\appdata\roam
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ing\python\python310\site-packages (from requests>=2.20.1->django-drf-filepond==0.4.1->mercury) (2.1.1)
Requirement already satisfied: idna<4,>=2.5 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from requests>=2.20.1->django-drf-filepond==0.4.1->mercury) (3.4)
Requirement already satisfied: soupsieve>1.2 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from beautifulsoup4->nbconvert>=6.5.0->mercury) (2.3.2.post1)
Requirement already satisfied: webencodings in c:\users\krsty\appdata\roaming\python\python310\site-packages (from bleach->nbconvert>=6.5.0->mercury) (0.5.1)
Requirement already satisfied: executing>=1.2.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from stack-data->ipython>=7.30.1->mercury) (1.2.0)
Requirement already satisfied: asttokens>=2.1.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from stack-data->ipython>=7.30.1->mercury) (2.2.1)
Requirement already satisfied: pure-eval in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from stack-data->ipython>=7.30.1->mercury) (0.2.2)
Requirement already satisfied: txai>=21.2.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from autobahn>=22.4.2->daphne>=4.0.0->channels[daphne]>=4.0.0->mercury) (23.1.1)
Requirement already satisfied: hyperlink>=21.0.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from autobahn>=22.4.2->daphne>=4.0.0->channels[daphne]>=4.0.0->mercury) (21.0.0)
Requirement already satisfied: attrs>=17.4.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jsonschema>=2.6->nbformat>=5.1->nbconvert>=6.5.0->mercury) (22.1.0)
Requirement already satisfied: pyrsistent>=0.14.0 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from jsonschema>=2.6->nbformat>=5.1->nbconvert>=6.5.0->mercury) (0.19.2)
Requirement already satisfied: oauthlib>=3.0.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from requests-oauthlib>=0.3.0->django-allauth<0.53.0,>=0.40.0->dj-rest-auth[with_social]==3.0.0->mercury) (3.2.2)
Requirement already satisfied: constantly>=15.1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from twisted[tls]>=22.4->daphne>=4.0.0->channels[daphne]>=4.0.0->mercury) (15.1.0)
Requirement already satisfied: incremental>=21.3.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from twisted[tls]>=22.4->daphne>=4.0.0->channels[daphne]>=4.0.0->mercury) (22.10.0)
Requirement already satisfied: Automat>=0.8.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from twisted[tls]>=22.4->daphne>=4.0.0->channels[daphne]>=4.0.0->mercury) (22.10.0)
Requirement already satisfied: twisted-iocpsupport<2,>=1.0.2 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from twisted[tls]>=22.4->daphne>=4.0.0->channels[daphne]>=4.0.0->mercury) (1.0.3)
Requirement already satisfied: service-identity>=18.1.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from twisted[tls]>=22.4->daphne>=4.0.0->channels[daphne]>=4.0.0->mercury) (23.1.0)
Requirement already satisfied: pyasn1 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from service-identity>=18.1.0->twisted[tls]>=22.4->daphne>=4.0.0->channels[daphne]>=4.0.0->mercury) (0.5.0)
Requirement already satisfied: pyasn1-modules in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from service-identity>=18.1.0->twisted[tls]>=22.4->daphne>=4.0.0->channels[daphne]>=4.0.0->mercury) (0.3.0)
Note: you may need to restart the kernel to use updated packages.

[notice] A new release of pip is available: 23.1 -> 23.1.2
[notice] To update, run: python.exe -m pip install --upgrade pip
```

In []:

In []: `import mercury as mr`

```
ModuleNotFoundError Traceback (most recent call last)
Cell In[17], line 1
----> 1 import mercury as mr

File c:\Users\krsty\anaconda3\envs\learn-env\lib\site-packages\mercury\__init__.py:4
      2 __version__ = "2.3.1"
----> 4 from mercury.mercury import *

File c:\Users\krsty\anaconda3\envs\learn-env\lib\site-packages\mercury\mercury.py:12
      9 import webbrowser
     11 from glob import glob
----> 12 from django.core.management.utils import get_random_secret_key
     14 CURRENT_DIR = os.path.dirname(os.path.dirname(os.path.abspath(__file__)))
     15 BACKEND_DIR = os.path.join(CURRENT_DIR, "mercury")

ModuleNotFoundError: No module named 'django.core'
```

In []: `pip install --upgrade django`

```
Requirement already satisfied: django in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (4.2)
Collecting django
  Downloading Django-4.2.3-py3-none-any.whl (8.0 MB)
    ..... 8.0/8.0 MB 752.2 kB/s eta 0:00:00
Requirement already satisfied: asgiref<4,>=3.6.0 in c:\users\krsty\anaconda3\envs\learn-env\lib\site-packages (from django) (3.7.2)
Requirement already satisfied: sqlparse>=0.3.1 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from django) (0.4.3)
Requirement already satisfied: tzdata in c:\users\krsty\appdata\roaming\python\python310\site-packages (from django) (2022.7)
Requirement already satisfied: typing-extensions>=4 in c:\users\krsty\appdata\roaming\python\python310\site-packages (from asgiref<4,>=3.6.0->django) (4.4.0)
Installing collected packages: django
  Attempting uninstall: django
    Found existing installation: Django 4.2
    Uninstalling Django-4.2:
      ..... Successfully uninstalled Django-4.2
Successfully installed django-4.2.3
Note: you may need to restart the kernel to use updated packages.
```

ERROR: pip's dependency resolver does not currently take into account all the packages that are installed. This behaviour is the source of the following dependency conflicts.

mercury 2.3.1 requires django==4.2, but you have django 4.2.3 which is incompatible.

[notice] A new release of pip is available: 23.1 -> 23.1.2

[notice] To update, run: python.exe -m pip install --upgrade pip

In []: