Problem statement

predicting the house price in USA.To create a model to help him estimate of what the house would sell for.

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

In [2]:
```
df=pd.read_csv("Iris")
```

To display top 10 rows

In [3]:
```
df.head(10)
```

Out[3]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm	Species
0	1	5.1	3.5	1.4	0.2	Iris-setosa
1	2	4.9	3.0	1.4	0.2	Iris-setosa
2	3	4.7	3.2	1.3	0.2	Iris-setosa
3	4	4.6	3.1	1.5	0.2	Iris-setosa
4	5	5.0	3.6	1.4	0.2	Iris-setosa
5	6	5.4	3.9	1.7	0.4	Iris-setosa
6	7	4.6	3.4	1.4	0.3	Iris-setosa
7	8	5.0	3.4	1.5	0.2	Iris-setosa
8	9	4.4	2.9	1.4	0.2	Iris-setosa
9	10	4.9	3.1	1.5	0.1	Iris-setosa

Data Cleaning And Pre-Processing

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

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 150 entries, 0 to 149
Data columns (total 6 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Id             150 non-null    int64
 1   SepalLengthCm  150 non-null    float64
 2   SepalWidthCm   150 non-null    float64
 3   PetalLengthCm  150 non-null    float64
 4   PetalWidthCm   150 non-null    float64
 5   Species        150 non-null    object
dtypes: float64(4), int64(1), object(1)
memory usage: 7.2+ KB
```

In [5]:
```
1 # Display the statistical summary
2 df.describe()
```

Out[5]:

	Id	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
count	150.000000	150.000000	150.000000	150.000000	150.000000
mean	75.500000	5.843333	3.054000	3.758667	1.198667
std	43.445368	0.828066	0.433594	1.764420	0.763161
min	1.000000	4.300000	2.000000	1.000000	0.100000
25%	38.250000	5.100000	2.800000	1.600000	0.300000
50%	75.500000	5.800000	3.000000	4.350000	1.300000
75%	112.750000	6.400000	3.300000	5.100000	1.800000
max	150.000000	7.900000	4.400000	6.900000	2.500000

In [6]:
```
# To display the col headings
df.columns
```

Out[6]:
```
Index(['Id', 'SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm',
       'Species'],
      dtype='object')
```

In [7]:
```
cols=df.dropna(axis=1)
```

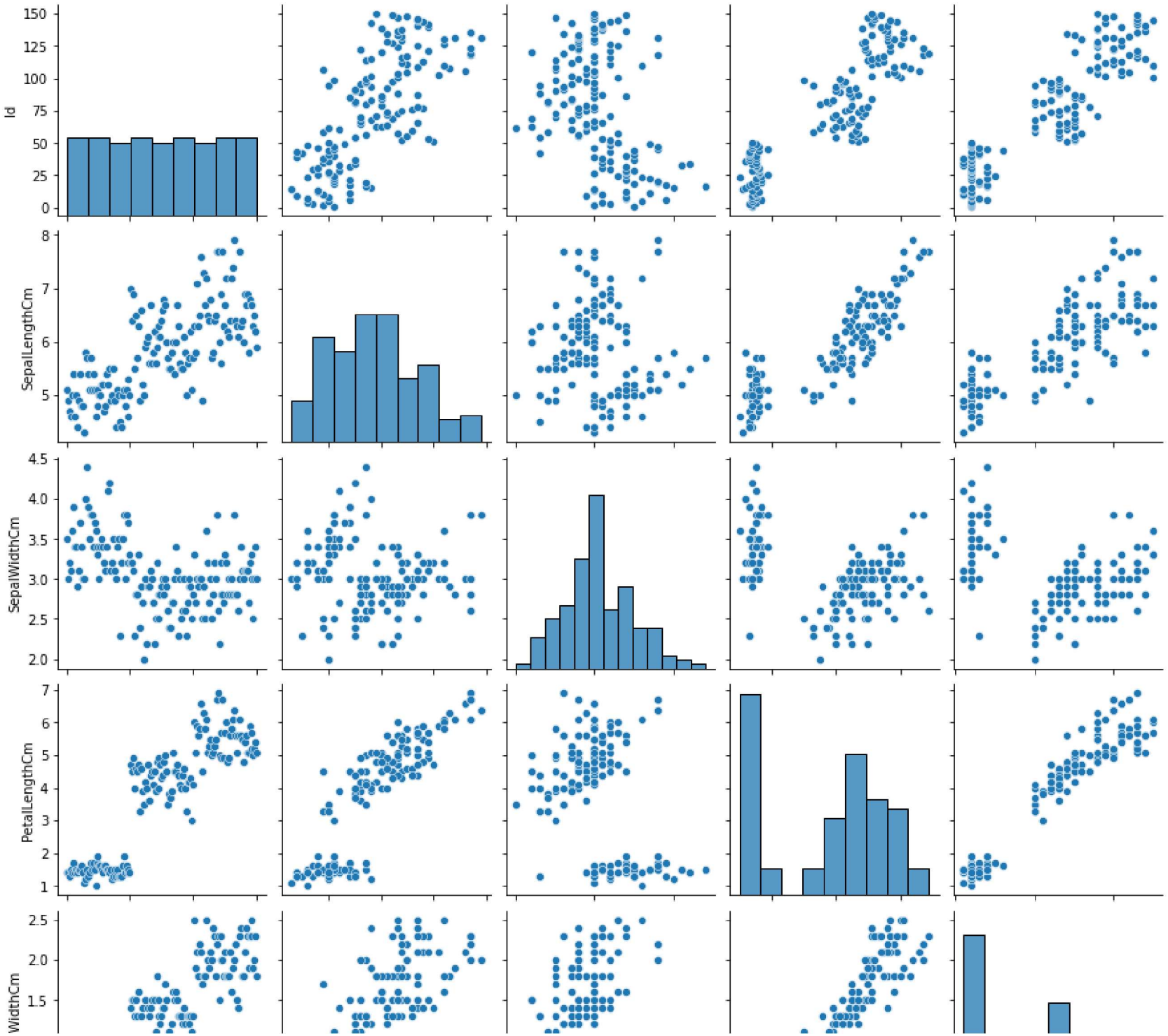
In [8]:
```
cols.columns
```

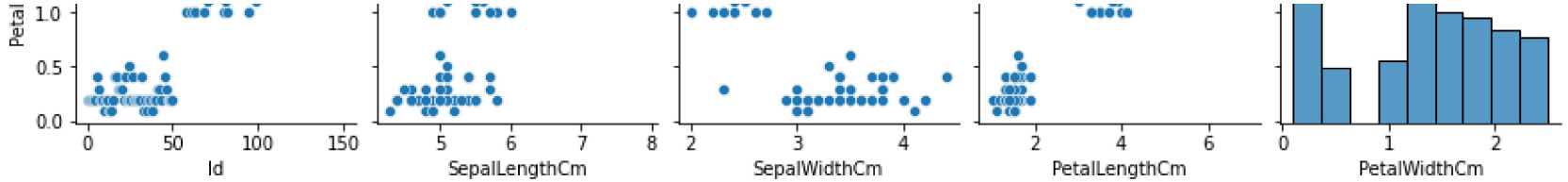
Out[8]:
```
Index(['Id', 'SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm',
       'Species'],
      dtype='object')
```

EDA and Visualization

In [9]:
```
1 sns.pairplot(cols)
```

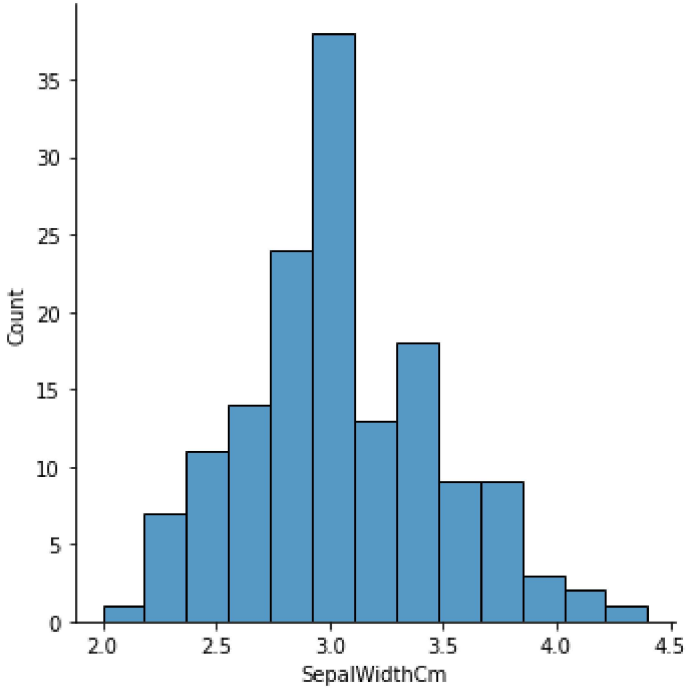
Out[9]:
```
<seaborn.axisgrid.PairGrid at 0x2af2f5f2850>
```


Id
SepalLengthCm
SepalWidthCm
PetalLengthCm
WidthCm



In [10]:
```
1 sns.displot(df['SepalWidthCm'])
```

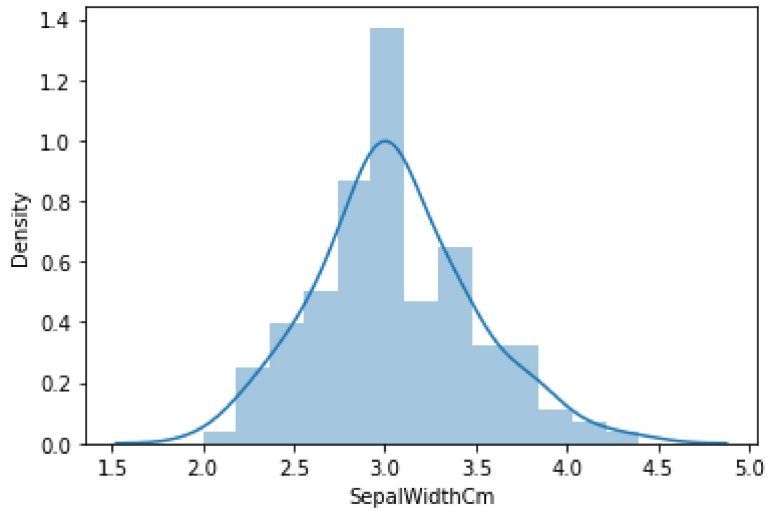
Out[10]: <seaborn.axisgrid.FacetGrid at 0x2af319a86d0>



In [11]:
```
# We use displot in older version we get distplot use displot
sns.distplot(df['SepalWidthCm'])
```

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

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



In [12]:
```
df1=cols[['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']]
df1
```

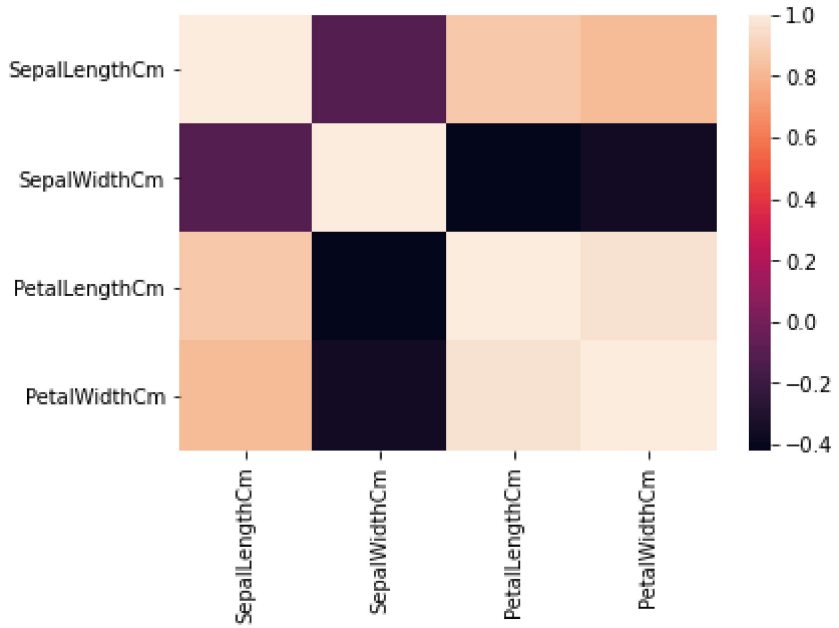
Out[12]:

	SepalLengthCm	SepalWidthCm	PetalLengthCm	PetalWidthCm
0	5.1	3.5	1.4	0.2
1	4.9	3.0	1.4	0.2
2	4.7	3.2	1.3	0.2
3	4.6	3.1	1.5	0.2
4	5.0	3.6	1.4	0.2
...	...	...	...	...
145	6.7	3.0	5.2	2.3
146	6.3	2.5	5.0	1.9
147	6.5	3.0	5.2	2.0
148	6.2	3.4	5.4	2.3
149	5.9	3.0	5.1	1.8

150 rows × 4 columns

In [13]:
```
1 sns.heatmap(df1.corr())
```

Out[13]: <AxesSubplot:>



To train the model - MODEL BUILD

Going to train linear regression model;We split our data into 2 variables x and y where x is independent var(input) and y is dependent on x(output), we could ignore address col as it is not required for our model

In [14]:
```
1 x=df1[['SepalLengthCm', 'SepalWidthCm', 'PetalLengthCm', 'PetalWidthCm']]
2 y=df1[['SepalWidthCm']]
```

To split the dataset into test data

In [15]:
```
# importing lib for splitting test data
from sklearn.model_selection import train_test_split
```

In [16]:
```
x_train,x_test,y_train,y_test = train_test_split(x,y,test_size=0.3)
```

In [17]:
```
from sklearn.linear_model import LinearRegression

lr=LinearRegression()
lr.fit(x_train,y_train)
```

Out[17]:
```
LinearRegression()
```

In [18]:
```
print(lr.intercept_)
```

```
[4.4408921e-16]
```

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

```
1.0
```

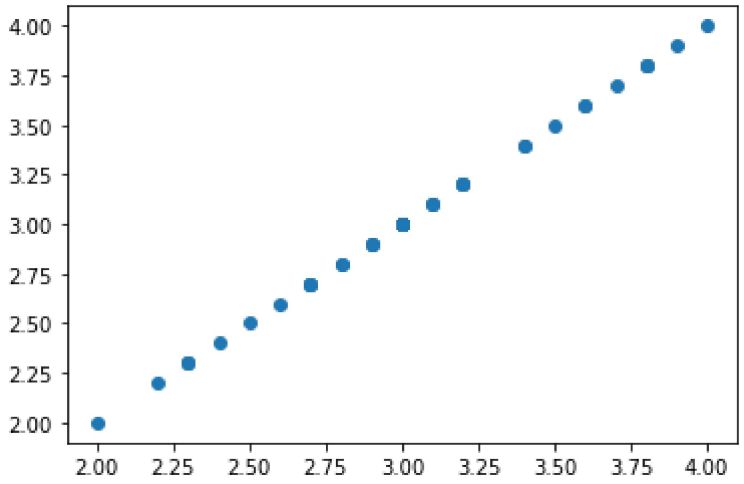
In [20]:
```
coeff=pd.DataFrame(lr.coef_)
coeff
```

Out[20]:

	0	1	2	3
0	2.084342e-16	1.0	-2.071490e-16	4.252351e-16

In [21]:
```
1 pred = lr.predict(x_test)
2 plt.scatter(y_test,pred)
```

Out[21]: <matplotlib.collections.PathCollection at 0x2af326e3760>



In [22]:
```
1 from sklearn.linear_model import Ridge,Lasso
```

In [23]:
```
1 rr=Ridge(alpha=10)
2 rr.fit(x_train,y_train)
```

Out[23]: Ridge(alpha=10)

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

Out[24]: 0.8686777240045266

In [25]:
```
1 la=Lasso(alpha=10)
2 la.fit(x_train,y_train)
```

Out[25]: Lasso(alpha=10)

In [26]:
```
1 la.score(x_test,y_test)
```

Out[26]: -0.005783732171845912

ELASTIC NET

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

Out[27]:
```
ElasticNet()
```

In [28]:
```
print(en.coef_)
```

```
[-0.  0. -0. -0.]
```

In [29]:
```
print(en.intercept_)
```

```
[3.0647619]
```

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

Out[30]:
```
array([3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619,
       3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619,
       3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619,
       3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619,
       3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619,
       3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619,
       3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619, 3.0647619,
       3.0647619, 3.0647619, 3.0647619])
```

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

```
-0.005783732171845912
```

EVALUATION METRICS

In [32]:
```
1 from sklearn import metrics
```

In [33]:
```
1 print("Mean Absolute Error:",metrics.mean_absolute_error(y_test,prediction))
```

```
Mean Absolute Error: 0.3662857142857143
```

In [34]:
```
1 print("Mean Squared Error:",metrics.mean_squared_error(y_test,prediction))
```

```
Mean Squared Error: 0.22378563869992438
```

In [35]:
```
1 print("Root Mean Squared Error:",np.sqrt(metrics.mean_squared_error(y_test,prediction)))
```

```
Root Mean Squared Error: 0.47305986798704913
```