Task 1 **Linear Regression**(House pricing DataSet)

```
import pandas as pd
data=pd.read_csv('/content/drive/MyDrive/ml docs /kc_house_data_NaN.csv')
data.head()
```

	Unnamed: 0	id	date	price	bedrooms	bathrooms	sqft_living	sqft_lot	floors	waterfront	...	grade	sqft_abov
0	0	7129300520	20141013T000000	221900.0	3.0	1.00	1180	5650	1.0	0	...	7	118
1	1	6414100192	20141209T000000	538000.0	3.0	2.25	2570	7242	2.0	0	...	7	217
2	2	5631500400	20150225T000000	180000.0	2.0	1.00	770	10000	1.0	0	...	6	77
3	3	2487200875	20141209T000000	604000.0	4.0	3.00	1960	5000	1.0	0	...	7	105
4	4	1954400510	20150218T000000	510000.0	3.0	2.00	1680	8080	1.0	0	...	8	168

5 rows × 22 columns

```
(sampleNum,featureNum)=data.shape

print('Number of samples',sampleNum)
print('Number of features',featureNum-1)
```

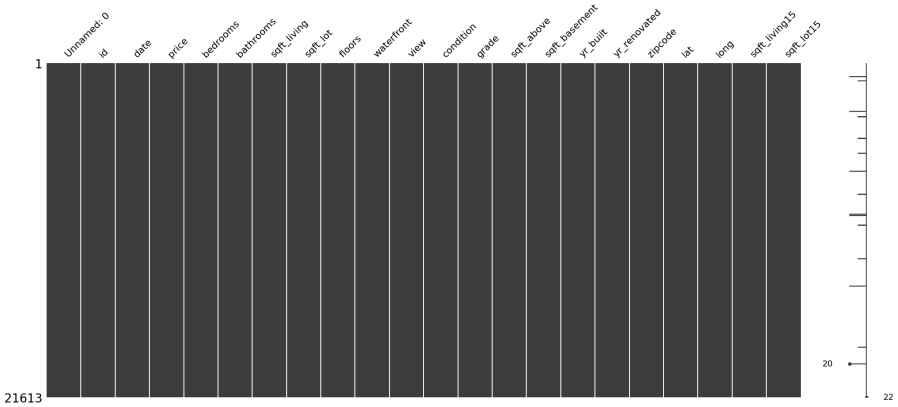
```
Number of samples 21613
Number of features 21
```

```
data.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 21613 entries, 0 to 21612
Data columns (total 22 columns):
 #   Column         Non-Null Count  Dtype
---  ------         --------------  -----
 0   Unnamed: 0     21613 non-null  int64
 1   id             21613 non-null  int64
 2   date           21613 non-null  object
 3   price          21613 non-null  float64
 4   bedrooms       21600 non-null  float64
 5   bathrooms      21603 non-null  float64
 6   sqft_living    21613 non-null  int64
 7   sqft_lot       21613 non-null  int64
 8   floors         21613 non-null  float64
 9   waterfront     21613 non-null  int64
 10  view           21613 non-null  int64
 11  condition      21613 non-null  int64
 12  grade          21613 non-null  int64
 13  sqft_above     21613 non-null  int64
 14  sqft_basement  21613 non-null  int64
 15  yr_built       21613 non-null  int64
 16  yr_renovated   21613 non-null  int64
 17  zipcode        21613 non-null  int64
 18  lat            21613 non-null  float64
 19  long           21613 non-null  float64
 20  sqft_living15  21613 non-null  int64
 21  sqft_lot15     21613 non-null  int64
dtypes: float64(6), int64(15), object(1)
memory usage: 3.6+ MB
```

```
import missingno as msno
%matplotlib inline
msno.matrix(data)
```

```
<Axes: >
```




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

```
Unnamed: 0        0
id                0
date              0
price             0
bedrooms         13
bathrooms        10
sqft_living       0
sqft_lot          0
floors            0
waterfront        0
view              0
condition         0
grade             0
sqft_above        0
sqft_basement     0
yr_built          0
yr_renovated      0
zipcode           0
lat               0
long              0
sqft_living15     0
sqft_lot15        0
dtype: int64
```

```
mode = dataset['bedrooms'].mode()
data['bedrooms'].fillna(mode[0], inplace =True)
mode1 = dataset['bathrooms'].mode()
data['bathrooms'].fillna(mode1[0], inplace =True)
```

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

```
Unnamed: 0       0
id               0
date             0
price            0
bedrooms         0
bathrooms        0
sqft_living      0
sqft_lot         0
```

```
floors          0
waterfront      0
view            0
condition       0
grade           0
sqft_above      0
sqft_basement   0
yr_built        0
yr_renovated    0
zipcode         0
lat             0
long            0
sqft_living15   0
sqft_lot15      0
dtype: int64
```

```
import numpy as np
xdata=np.array(xdata).reshape((-1,1))
xdata.shape
print(xdata)
```

```
[[1955]
 [1951]
 [1933]
 ...
 [2009]
 [2004]
 [2008]]
```

```
ydata
```

```
0        221900.0
1        538000.0
2        180000.0
3        604000.0
4        510000.0
           ...
21608    360000.0
21609    400000.0
21610    402101.0
21611    400000.0
21612    325000.0
Name: price, Length: 21613, dtype: float64
```

```
from sklearn.model_selection import train_test_split
xtrain,xtest,ytrain,ytest=train_test_split(xdata,ydata,test_size=0.20,random_state=1)
```

```
print("size of training samples",xtrain.shape)
print("size of test samples",xtest.shape)
print("size of training labels",ytrain.shape)
print("size of test labels",ytest.shape)
```

```
size of training samples (17290, 1)
size of test samples (4323, 1)
size of training labels (17290,)
size of test labels (4323,)
```

```
import matplotlib.pyplot as plt
from sklearn.linear_model import LinearRegression
from numpy.ma.core import nonzero
linear=LinearRegression()
linear.fit(xtrain,ytrain)
print("intercept is",linear.intercept_,"coef is",linear.coef_)
```

```
intercept is -808214.8941724668 coef is [682.979958]
```

```
ypred=linear.predict(xtest)
print("predicted value",ypred)
```

```
predicted value [557745.0218229  548183.30241093 561159.92161289 ... 546134.36253694
 542036.48278895 546817.34249494]
```

```
rsquare=linear.score(xtest,ytest)
print("r square value",rsquare)
```

```
r square value 0.001334799698434308
```

```
from sklearn.metrics import mean_squared_error
mse=mean_squared_error(ytest,ypred)
rmse=mean_squared_error(ytest,ypred,squared=False)
print("mse=",mse)
print("rmse",rmse)
print("r_Squared=",rsquare)
```

```
mse= 172370583344.17865
rmse 415175.36456800834
r_Squared= 0.001334799698434308
```