```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score
from sklearn.model_selection import train_test_split, cross_val_score,GridSearchCV
import plotly.express as px
import plotly.graph_objects as go
from sklearn.linear_model import Ridge
```

```
df=pd.read_csv('/content/Housing.csv')
df
```

	price	area	bedrooms	bathrooms	stories	mainroad	guestroom	basement	hotwaterheating	airconditioning	parking	prefarea	furnishingst
0	13300000	7420	4	2	3	yes	no	no	no	yes	2	yes	furn
1	12250000	8960	4	4	4	yes	no	no	no	yes	3	no	furn
2	12250000	9960	3	2	2	yes	no	yes	no	no	2	yes	semi-furn
3	12215000	7500	4	2	2	yes	no	yes	no	yes	3	yes	furn
4	11410000	7420	4	1	2	yes	yes	yes	no	yes	2	no	furn
...	...	...	...	...	...	...	...	...	...	...	...	...	
540	1820000	3000	2	1	1	yes	no	yes	no	no	2	no	unfurn
541	1767150	2400	3	1	1	no	no	no	no	no	0	no	semi-furn
542	1750000	3620	2	1	1	yes	no	no	no	no	0	no	unfurn
543	1750000	2910	3	1	1	no	no	no	no	no	0	no	furn
544	1750000	3850	3	1	2	yes	no	no	no	no	0	no	unfurn

545 rows × 13 columns

Next steps: Generate code with df | View recommended plots

```
df.isnull().sum()
```

```
price             0
area              0
bedrooms          0
bathrooms         0
stories           0
mainroad          0
guestroom         0
basement          0
hotwaterheating   0
airconditioning   0
parking           0
prefarea          0
furnishingstatus  0
dtype: int64
```

```
#duplicate values
duplicates= df.duplicated().sum()
duplicates
#no duplicates row
```

```
0
```

```
df.columns
```

```
Index(['price', 'area', 'bedrooms', 'bathrooms', 'stories', 'mainroad',
       'guestroom', 'basement', 'hotwaterheating', 'airconditioning',
       'parking', 'prefarea', 'furnishingstatus'],
      dtype='object')
```

```
px.scatter(df,x = 'area', y='bedrooms')
```

```
#categorical to integers
from sklearn.preprocessing import LabelEncoder
```

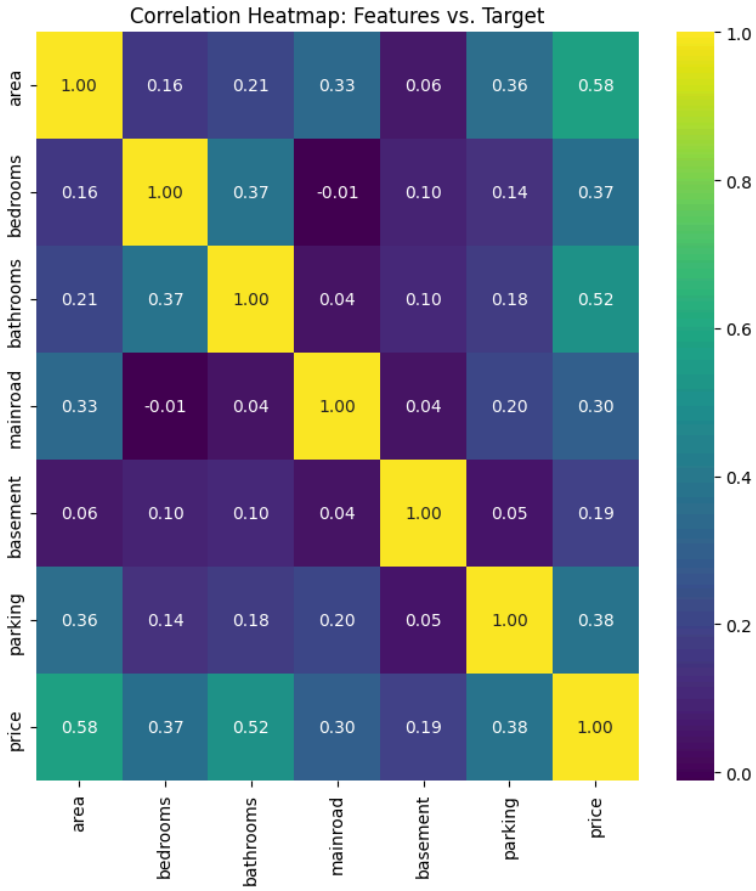
```
le=LabelEncoder()
```

```
df['area']=le.fit_transform(df['area'])
df['bedrooms']=le.fit_transform(df['bedrooms'])
df['bathrooms']=le.fit_transform(df['bathrooms'])
df['mainroad']=le.fit_transform(df['mainroad'])
df['basement']=le.fit_transform(df['basement'])
df['parking']=le.fit_transform(df['parking'])
```

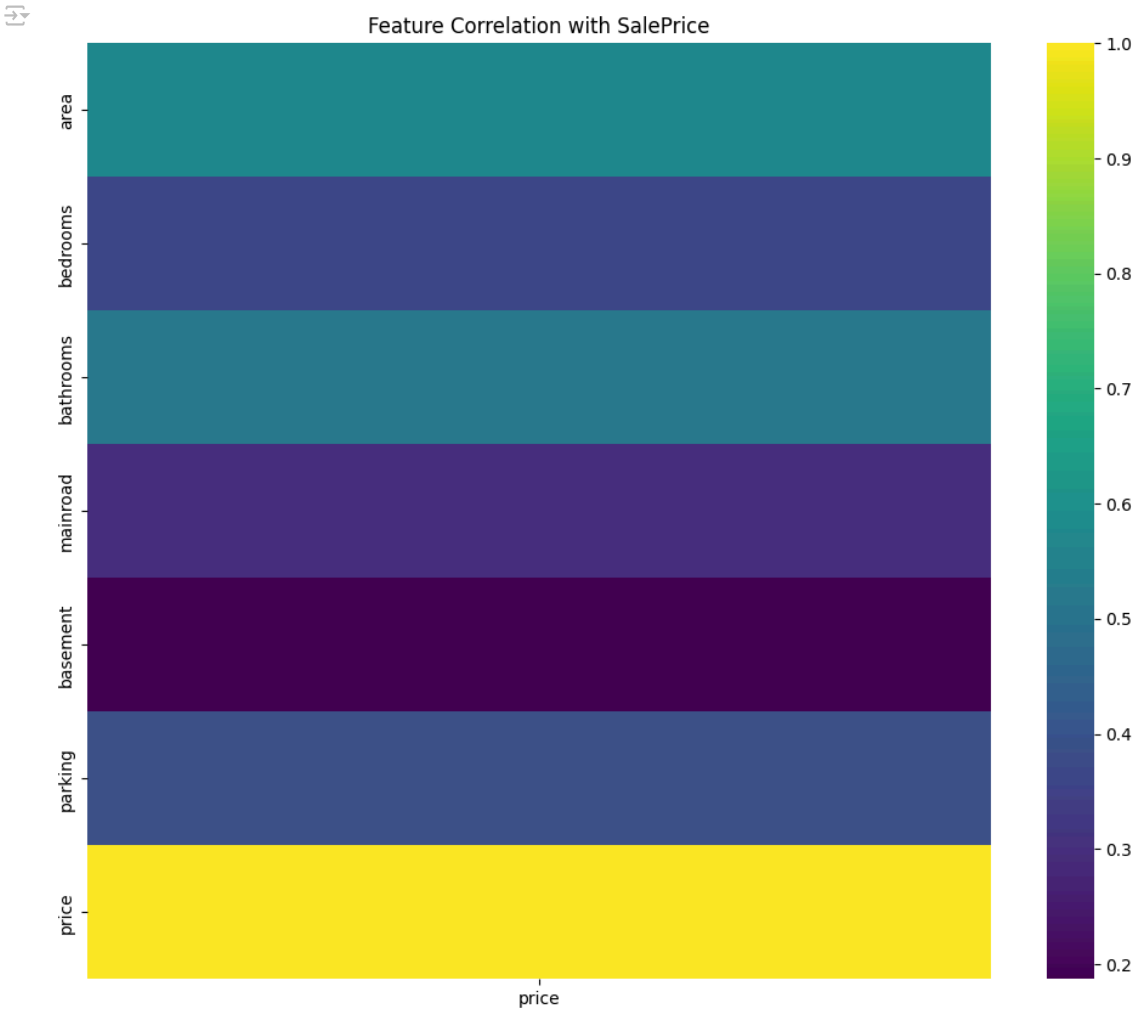
```
x = df[['area','bedrooms','bathrooms','mainroad','basement','parking']]
y = df[['price']]
x_train,x_test,y_train,y_test=train_test_split(x,y,test_size=0.2,random_state=42)


features = df[['area','bedrooms','bathrooms','mainroad','basement','parking']]
target = df[['price']]


# Create a new DataFrame with only the selected columns
data_new= pd.concat([features, target], axis=1)
corr_matrix = data_new.corr()


corr_matrix
```

	area	bedrooms	bathrooms	mainroad	basement	parking	price
area	1.000000	0.163235	0.211224	0.329097	0.060676	0.360925	0.575107
bedrooms	0.163235	1.000000	0.373930	-0.012033	0.097312	0.139270	0.366494
bathrooms	0.211224	0.373930	1.000000	0.042398	0.102106	0.177496	0.517545
mainroad	0.329097	-0.012033	0.042398	1.000000	0.044002	0.204433	0.296898
basement	0.060676	0.097312	0.102106	0.044002	1.000000	0.051497	0.187057
parking	0.360925	0.139270	0.177496	0.204433	0.051497	1.000000	0.384394
price	0.575107	0.366494	0.517545	0.296898	0.187057	0.384394	1.000000

```
plt.figure(figsize=(8, 8))
sns.heatmap(corr_matrix, annot=True, cmap='viridis', fmt=".2f")
plt.title("Correlation Heatmap: Features vs. Target")
plt.show()
```




```
#heatmaps
plt.figure(figsize=(12, 10))
sns.heatmap(corr_matrix[['price']], cmap='viridis')
plt.title("Feature Correlation with SalePrice")
plt.show()
```




```
#create a linear regression model
model = LinearRegression()
# Fit the model to the training data
model.fit(x_train, y_train)
```

```
▾ LinearRegression
LinearRegression()
```

```
# Make predictions on the test data
y_pred = model.predict(x_test)
```

```
model.score(x_train,y_train)
```

```
0.5763925019994292
```

```
# Evaluate the model
mse = mean_squared_error(y_test, y_pred)
r2 = r2_score(y_test, y_pred)
```

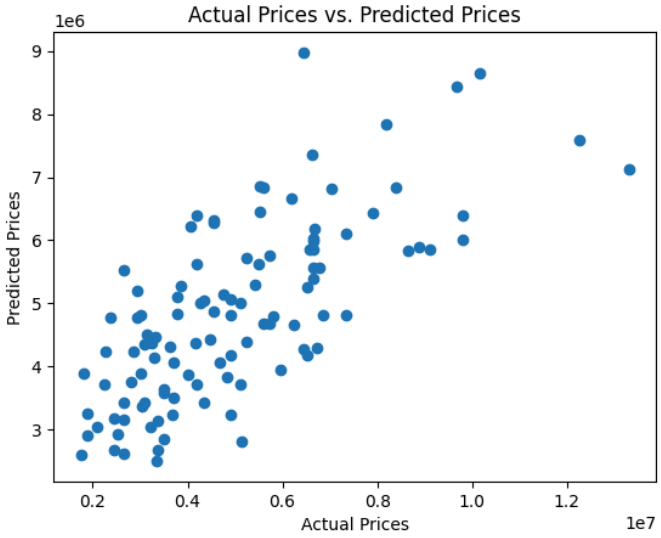
```
print(f"Mean Squared Error: {mse:.2f}")
print(f"R-squared: {r2:.2f}")
```

```
Mean Squared Error: 2498570953172.19
R-squared: 0.51
```

```
model.predict([[7420,4,2,0,1,0]])
```

```
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439: UserWarning:

X does not have valid feature names, but LinearRegression was fitted with feature names

array([[72871543.50583132]])
```

```
plt.scatter(y_test, y_pred)
plt.xlabel("Actual Prices")
plt.ylabel("Predicted Prices")
plt.title("Actual Prices vs. Predicted Prices")
plt.show()
```


Actual Prices vs. Predicted Prices
1e6
9
8
7
6
5
4
3
Predicted Prices
0.2
0.4
0.6
0.8
1.0
1.2
1e7
Actual Prices