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

from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error, r2_score
```

```
C:\Users\patil\anaconda3\lib\site-packages\pandas\core\computation\expressions.py:21: UserWarning: Pandas requires vers
ion '2.8.4' or newer of 'numexpr' (version '2.8.3' currently installed).
  from pandas.core.computation.check import NUMEXPR_INSTALLED
C:\Users\patil\anaconda3\lib\site-packages\pandas\core\arrays\masked.py:61: UserWarning: Pandas requires version '1.3.
6' or newer of 'bottleneck' (version '1.3.5' currently installed).
  from pandas.core import (
```

In [5]:
```
df = pd.read_csv(r'D:\\Oasis\\TASK 5\\Housing.csv')
df.head()
```

Out[5]:

	price	area	bedrooms	bathrooms	stories	mainroad	guestroom	basement	hotwaterheating	airconditioning	parking	prefarea	fur
0	13300000	7420	4	2	3	yes	no	no	no	yes	2	yes	
1	12250000	8960	4	4	4	yes	no	no	no	yes	3	no	
2	12250000	9960	3	2	2	yes	no	yes	no	no	2	yes	s
3	12215000	7500	4	2	2	yes	no	yes	no	yes	3	yes	
4	11410000	7420	4	1	2	yes	yes	yes	no	yes	2	no	

In [7]:
```
df.describe()
```

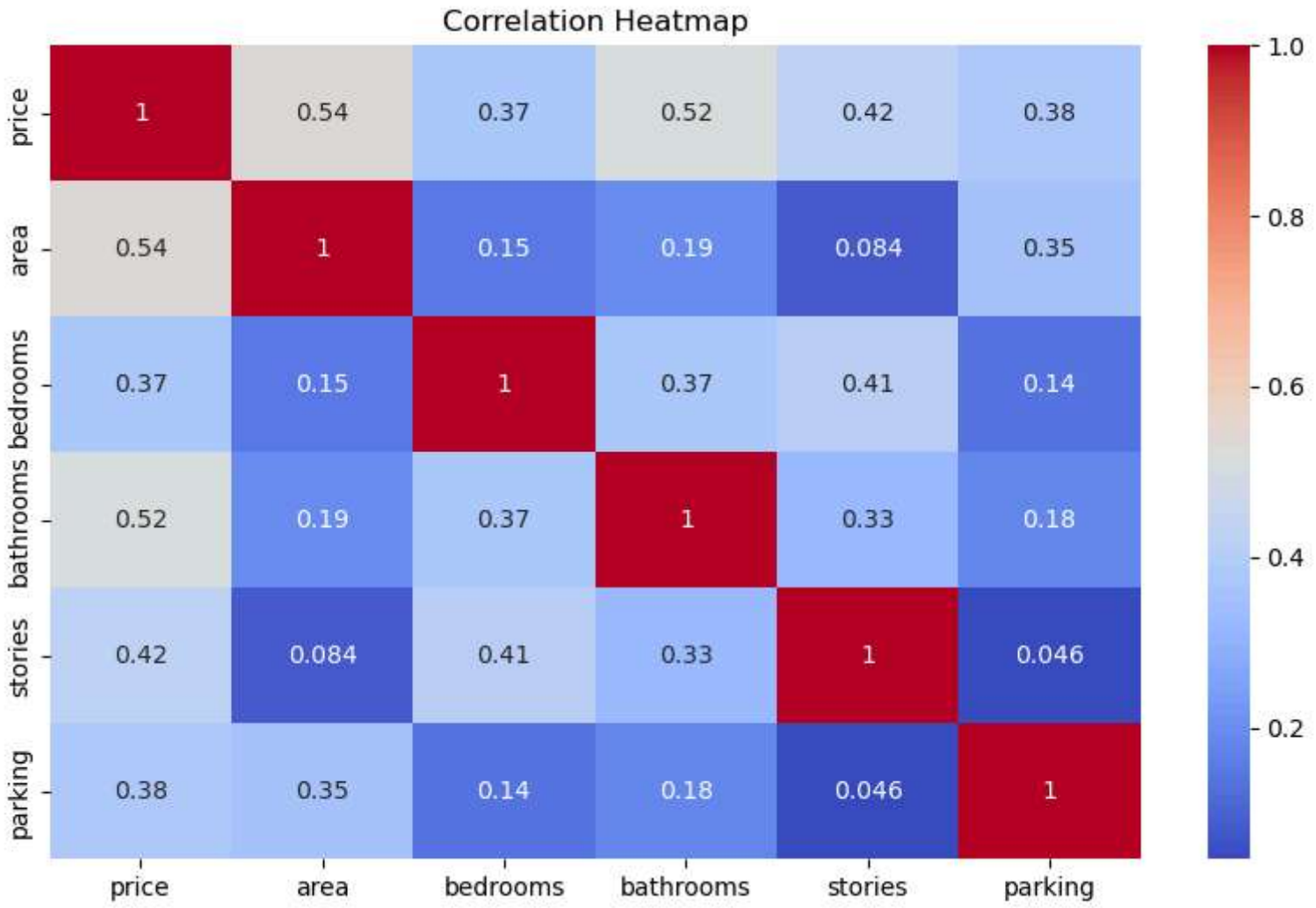
Out[7]:

	price	area	bedrooms	bathrooms	stories	parking
count	5.450000e+02	545.000000	545.000000	545.000000	545.000000	545.000000
mean	4.766729e+06	5150.541284	2.965138	1.286239	1.805505	0.693578
std	1.870440e+06	2170.141023	0.738064	0.502470	0.867492	0.861586
min	1.750000e+06	1650.000000	1.000000	1.000000	1.000000	0.000000
25%	3.430000e+06	3600.000000	2.000000	1.000000	1.000000	0.000000
50%	4.340000e+06	4600.000000	3.000000	1.000000	2.000000	0.000000
75%	5.740000e+06	6360.000000	3.000000	2.000000	2.000000	1.000000
max	1.330000e+07	16200.000000	6.000000	4.000000	4.000000	3.000000

In [8]:
```
df.isnull().sum()
```

Out[8]:
```
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
```

In [16]:
```
plt.figure(figsize=(10,6))
sns.heatmap(df.select_dtypes(include='number').corr(), annot=True, cmap='coolwarm')
plt.title("Correlation Heatmap")
plt.show()
```



In [17]:
```
df.columns
```

Out[17]:
```
Index(['price', 'area', 'bedrooms', 'bathrooms', 'stories', 'mainroad',
       'guestroom', 'basement', 'hotwaterheating', 'airconditioning',
       'parking', 'prefarea', 'furnishingstatus'],
      dtype='object')
```

In [18]:
```
x = df.drop("price", axis=1)
y = df["price"]
```

In [20]:
```
x = pd.get_dummies(x, drop_first = True)
```

In [22]:
```
x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2, random_state=42)
```

In [24]:
```
model = LinearRegression()
model.fit(x_train, y_train)
```

Out[24]:
```
LinearRegression()
```

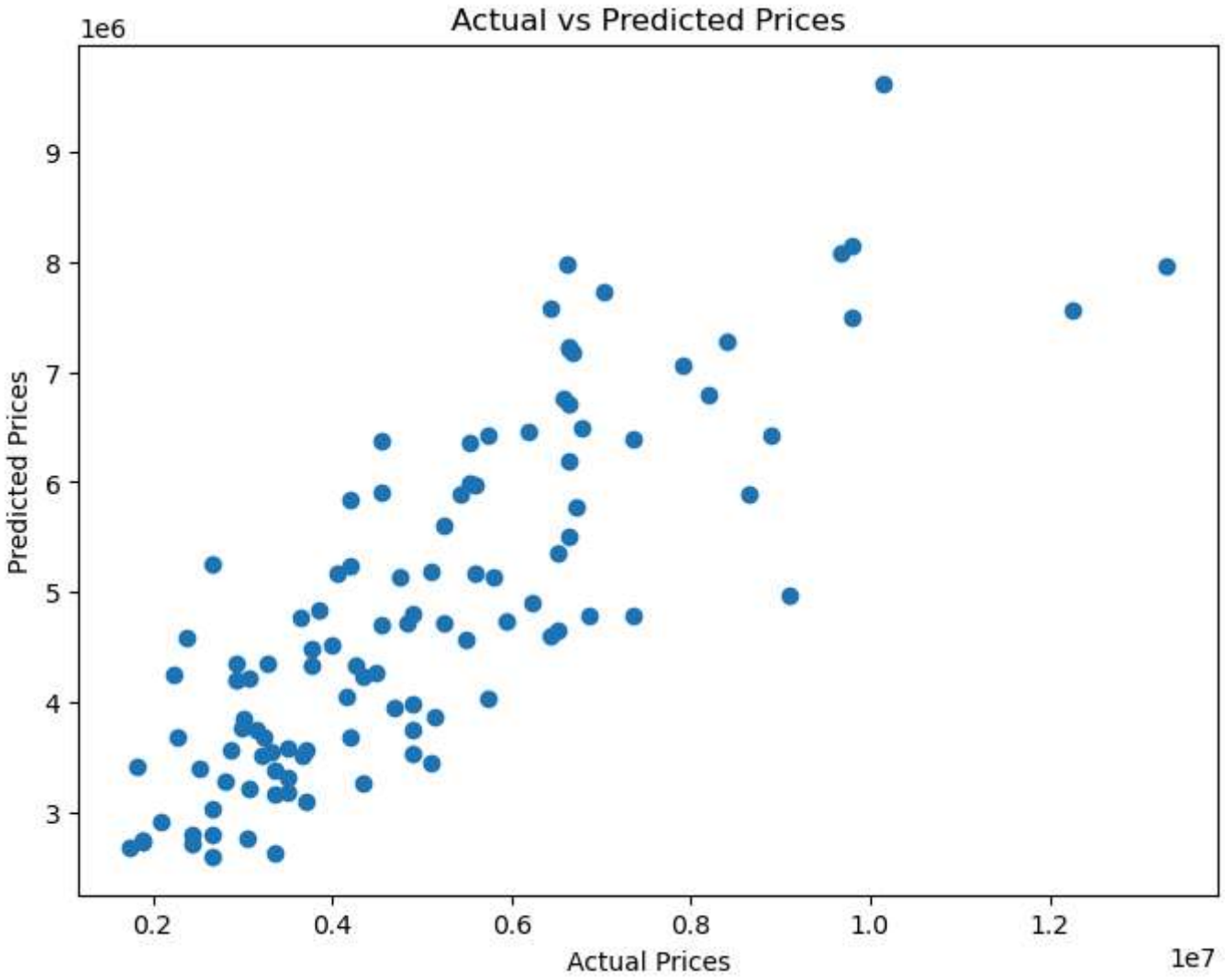
In [25]:
```
y_pred = model.predict(x_test)
```

In [26]:
```
mse = mean_squared_error(y_test, y_pred)
rmse = np.sqrt(mse)
r2 = r2_score(y_test, y_pred)

print("Mean Squared Error:", mse)
print("Root Mean Squared Error:", rmse)
print("R² Score:", r2)
```

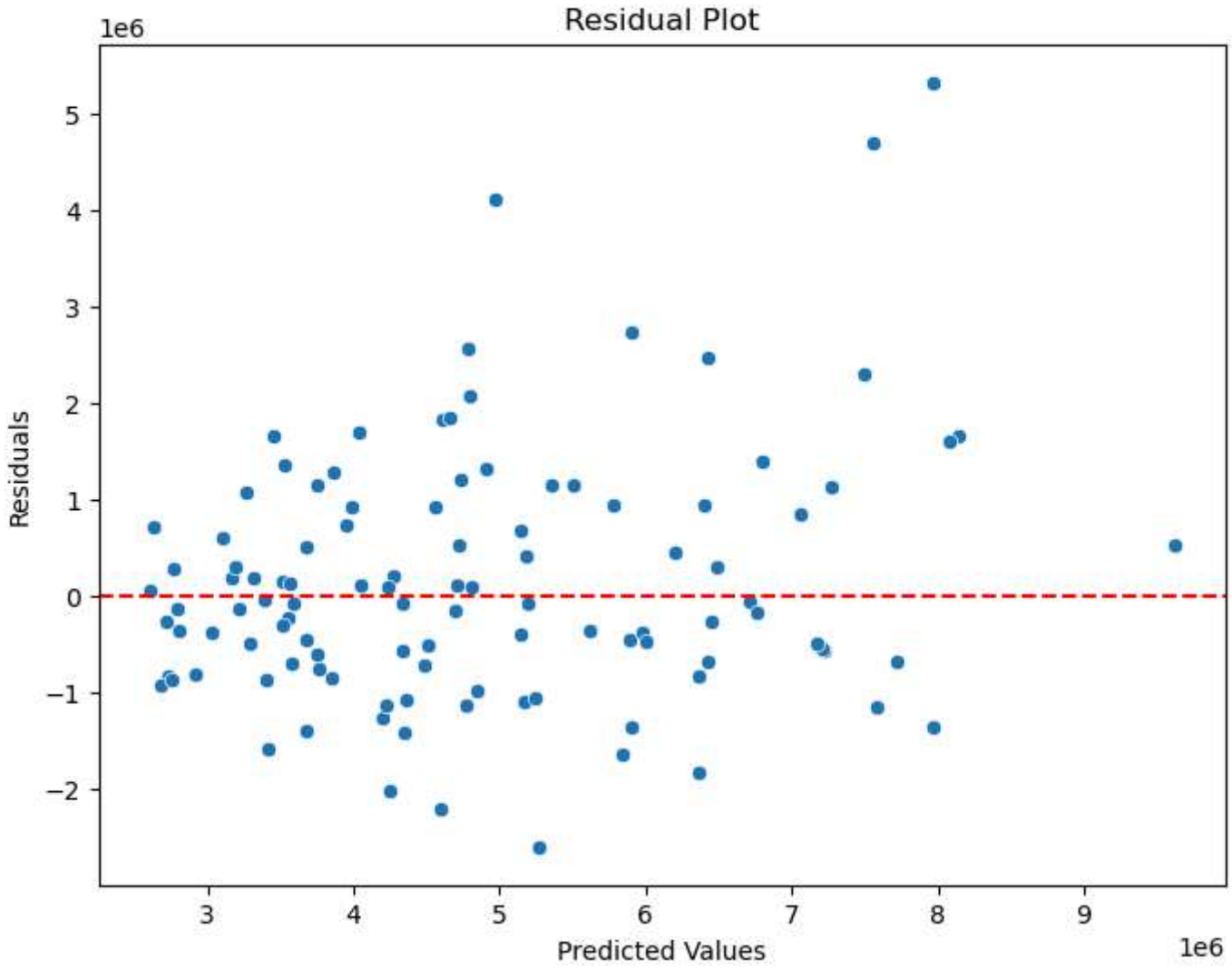
```
Mean Squared Error: 1754318687330.6643
Root Mean Squared Error: 1324506.9600914388
R² Score: 0.6529242642153184
```

In [27]:
```
plt.figure(figsize=(8,6))
plt.scatter(y_test, y_pred)
plt.xlabel("Actual Prices")
plt.ylabel("Predicted Prices")
plt.title("Actual vs Predicted Prices")
plt.show()
```



In [28]:
```
residuals = y_test - y_pred

plt.figure(figsize=(8,6))
sns.scatterplot(x=y_pred, y=residuals)
plt.axhline(0, color='red', linestyle='--')
plt.xlabel("Predicted Values")
plt.ylabel("Residuals")
plt.title("Residual Plot")
plt.show()
```


Residual Plot
1e6
5
4
3
2
1
0
−1
−2
Residuals
3
4
5
6
7
8
9
Predicted Values
1e6

In [ ]: