Dataset

```
import numpy as np
import pandas as pd

# Set random seed for reproducibility
np.random.seed(42)

# Number of data points
num_samples = 1000

# Generate random values for square footage, bedrooms, and bathrooms
square_footage = np.random.randint(800, 3500, size=num_samples)
bedrooms = np.random.randint(1, 6, size=num_samples)
bathrooms = np.random.uniform(1, 4, size=num_samples)

# Generate prices based on the equation: price = 100 * square_footage + 20000 * bedrooms + 15000 * bathrooms + random_noise
random_noise = np.random.normal(0, 20000, size=num_samples)  # Random noise with normal distribution
prices = 100 * square_footage + 20000 * bedrooms + 15000 * bathrooms + random_noise

# Create a DataFrame to store the data
data = pd.DataFrame({
    'Square Footage': square_footage,
    'Bedrooms': bedrooms,
    'Bathrooms': bathrooms,
    'Price': prices
})

# Save the dataset to a CSV file
data.to_csv('house_prices_dataset.csv', index=False)

# Display the first few rows of the dataset
print(data.head())
```

```
   Square Footage  Bedrooms  Bathrooms          Price
0            1660         5   3.519584  318817.868136
1            2094         5   3.700069  348559.267932
2            1930         5   2.060264  337088.875437
3            1895         4   1.710612  313910.577906
4            2438         4   3.341577  341772.450899
```

Linear Regression

```
import pandas as pd
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.metrics import mean_squared_error


# Load the dataset
data = pd.read_csv('house_prices_dataset.csv')

data
```

	Square Footage	Bedrooms	Bathrooms	Price
0	1660	5	3.519584	318817.868136
1	2094	5	3.700069	348559.267932
2	1930	5	2.060264	337088.875437
3	1895	4	1.710612	313910.577906
4	2438	4	3.341577	341772.450899
...	...	...	...	...
995	1614	2	3.843064	241838.260953
996	3075	1	1.216949	337482.130718
997	2700	2	3.865346	405733.937475
998	3063	2	2.567730	395947.009461
999	2862	1	1.898697	307970.824126

1000 rows × 4 columns

Next steps: Generate code with `data` View recommended plots

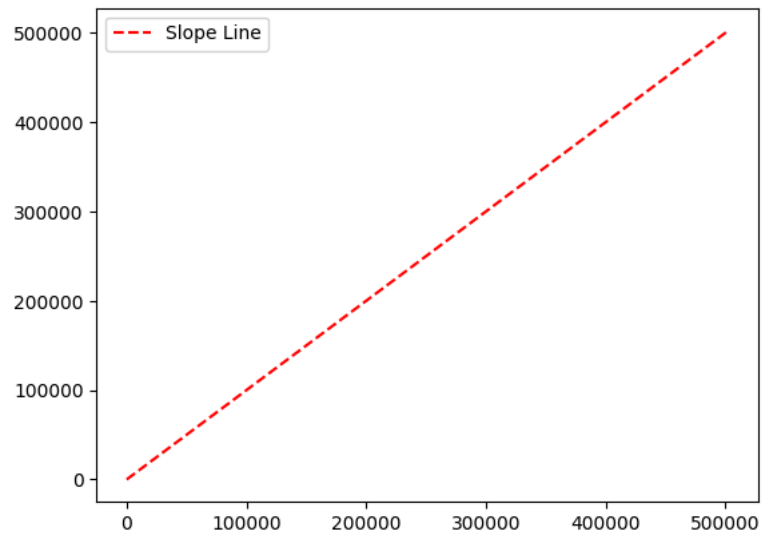
```
# Separate features and target variable
X = data[['Square Footage', 'Bedrooms', 'Bathrooms']]
y = data['Price']


# Split the data into training and testing sets
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.2, random_state=42)



# Create and fit the linear regression model
model = LinearRegression()
model.fit(X_train, y_train)
```

```
LinearRegression
LinearRegression()
```

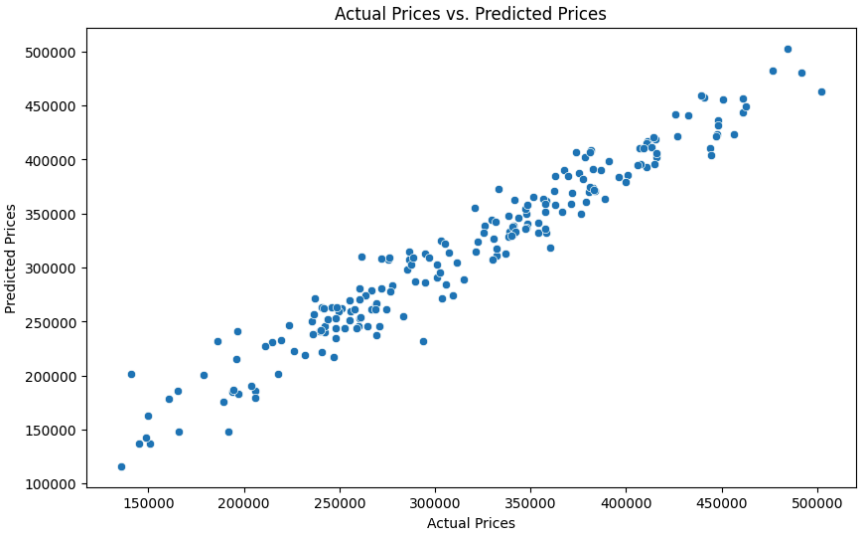
```
# Make predictions on the testing set
y_pred = model.predict(X_test)



# Evaluate the model
mse = mean_squared_error(y_test, y_pred)
print("Mean Squared Error:", mse)


example_house = [[1800, 3, 2]]
predicted_price = model.predict(example_house)
print("Predicted Price:", predicted_price[0])
```

```
Mean Squared Error: 357321032.8104223
Predicted Price: 269140.5768620823
/usr/local/lib/python3.10/dist-packages/sklearn/base.py:439: UserWarning: X does not have valid feature names, but LinearRegression
  warnings.warn(
```

```
import matplotlib.pyplot as plt
import seaborn as sns


# Plot the slope line
max_price = max(y_test.max(), y_pred.max())
plt.plot([0, max_price], [0, max_price], color='red', linestyle='--')  # Slope line
plt.legend(['Slope Line', 'Predictions'])
plt.show()
```




```
# Visualize actual vs. predicted prices
plt.figure(figsize=(10, 6))
sns.scatterplot(x=y_test, y=y_pred)
plt.xlabel('Actual Prices')
plt.ylabel('Predicted Prices')
plt.title('Actual Prices vs. Predicted Prices')
plt.show()
```


Actual Prices vs. Predicted Prices
Predicted Prices
Actual Prices
500000
450000
400000
350000
300000
250000
200000
150000
100000
150000
200000
250000
300000
350000
400000
450000
500000