In [ ]:

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import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
from sklearn.model_selection import train_test_split
from sklearn.linear_model import LinearRegression
from sklearn.preprocessing import LabelEncoder

data = pd.DataFrame({
    'Height': [1.80, 1.68, 1.82, 1.70, 1.87, 1.55, 1.50, 1.78, 1.67, 1.64],
    'Age': [35, 3, 25, 60, 27, 18, 89, 42, 16, 52],
    'Gender': ['Male', 'Male', 'Male', 'Male', 'Male', 'Female', 'Female', 'Fe
    'Weight': [79, 69, 73, 95, 82, 55, 69, 71, 64, 69]
})

print(data.head())
print(data.shape)
print(data.isnull().sum())

le = LabelEncoder()
data['Gender'] = le.fit_transform(data['Gender'])

x = data[['Height', 'Age', 'Gender']].values  # multiple features
y = data['Weight'].values.reshape(-1, 1)      # target variable

x_train, x_test, y_train, y_test = train_test_split(x, y, test_size=0.2, randc

model = LinearRegression()
model.fit(x_train, y_train)

y_pred = model.predict(x_test)

print("Predicted:", y_pred.flatten())
print("Actual:", y_test.flatten())

plt.scatter(x_train[:, 0], y_train, color='blue', label='Training Data')

mean_age = np.mean(x_train[:, 1])
mean_gender = np.mean(x_train[:, 2])
height_range = np.linspace(min(x_train[:, 0]), max(x_train[:, 0]), 100).reshap

x_plot = np.hstack((
    height_range,
    np.full_like(height_range, mean_age),
    np.full_like(height_range, mean_gender)
))

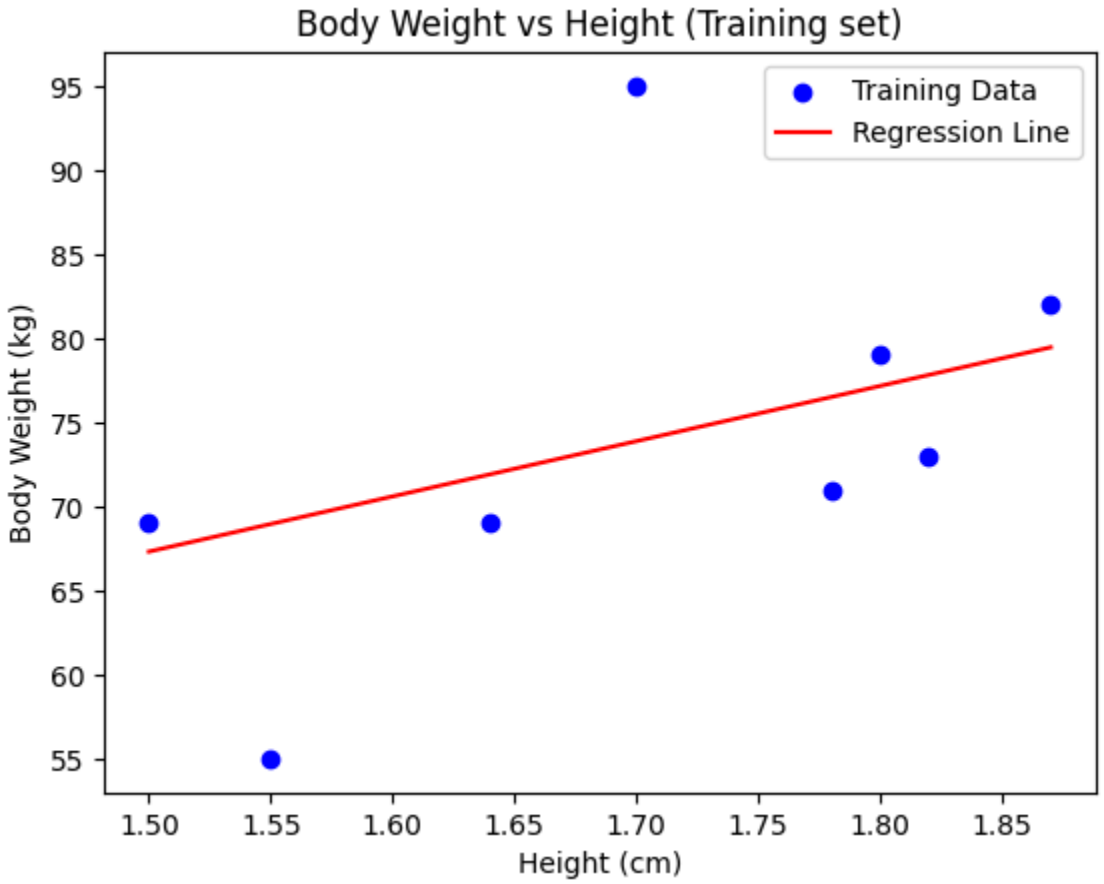
y_plot = model.predict(x_plot)

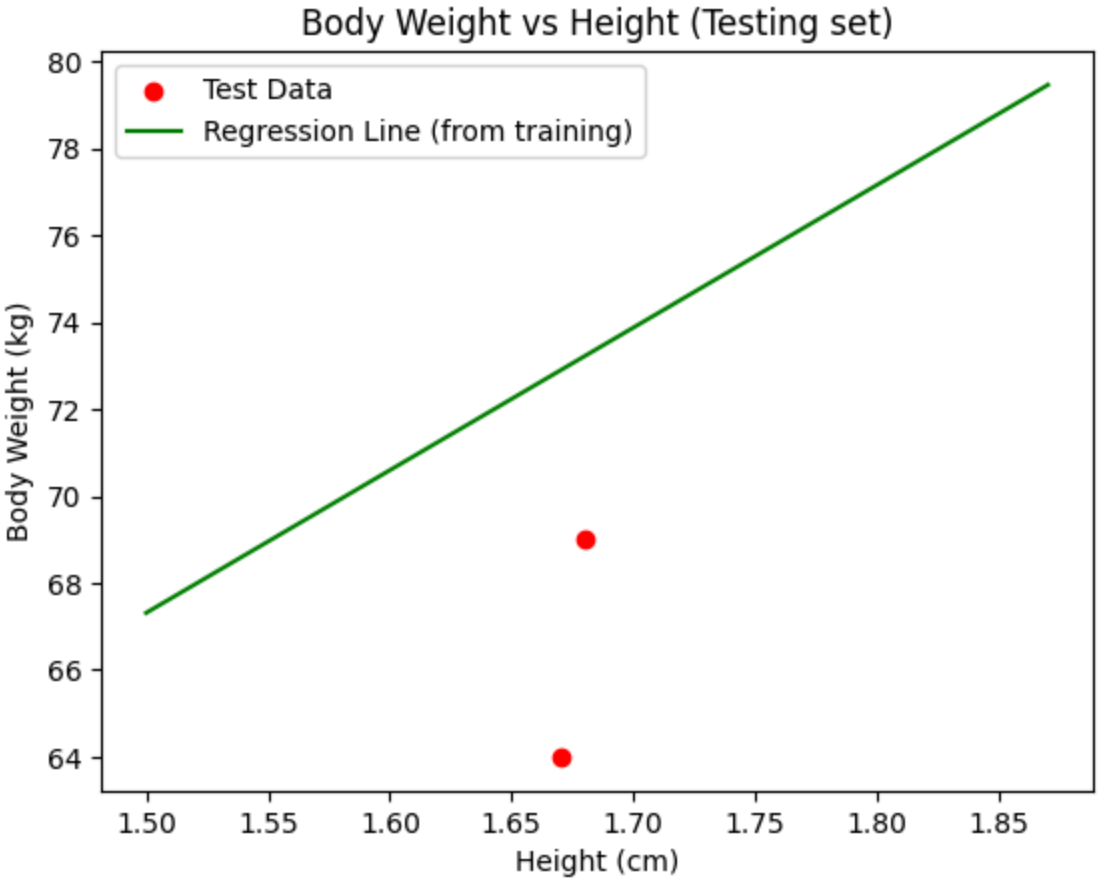
plt.plot(height_range, y_plot, color='red', label='Regression Line')
plt.title('Body Weight vs Height (Training set)')
plt.xlabel('Height (cm)')
plt.ylabel('Body Weight (kg)')
plt.legend()
```

```
plt.show()


plt.scatter(x_test[:, 0], y_test, color='red', label='Test Data')
plt.plot(height_range, y_plot, color='green', label='Regression Line (from tra
plt.title('Body Weight vs Height (Testing set)')
plt.xlabel('Height (cm)')
plt.ylabel('Body Weight (kg)')
plt.legend()
plt.show()
```

```
   Height  Age Gender  Weight
0    1.80   35   Male      79
1    1.68    3   Male      69
2    1.82   25   Male      73
3    1.70   60   Male      95
4    1.87   27   Male      82
(10, 4)
Height    0
Age       0
Gender    0
Weight    0
dtype: int64
Predicted: [56.85651025 67.68315045]
Actual: [64 69]
```




Body Weight vs Height (Testing set)
Test Data
Regression Line (from training)
Body Weight (kg)
Height (cm)
80
78
76
74
72
70
68
66
64
1.50
1.55
1.60
1.65
1.70
1.75
1.80
1.85