**Practical 3   
Q3b. Multiple Linear Regression: Extend linear regression to multiple features. Handle**

**feature selection and potential multicollinearity.**

**Aim:-** Multiple Linear Regression :Extend linear regression to multiple features. Handle feature selection and potential multicollinearity**.**

# Install required libraries

!pip install scikit-learn matplotlib

# Import necessary libraries

import numpy as np

import matplotlib.pyplot as plt

from sklearn.linear\_model import LinearRegression

from sklearn.model\_selection import train\_test\_split

# Sample dataset: features (X) = [number of rooms, house age], target (y) = house price

# X = number of rooms, house age, y = house price in thousands of dollars

X = np.array([[1, 10], [2, 15], [3, 20], [4, 25], [5, 30]]) # Features: [rooms, age]

y = np.array([100, 150, 200, 250, 300]) # House prices in thousands

# Install required libraries

# 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)

# Initialize and train the multiple linear regression model

model = LinearRegression()

model.fit(X\_train, y\_train)

# Make predictions on the test set

y\_pred = model.predict(X\_test)

# Visualize the actual vs predicted prices (for simplicity, we only plot one feature vs price)

plt.scatter(X\_test[:, 0], y\_test, color='blue', label='Actual data')

plt.scatter(X\_test[:, 0], y\_pred, color='red', label='Predicted data')

plt.xlabel('Number of Rooms')

plt.ylabel('House Price (in thousands)')

plt.title('Multiple Linear Regression - House Price Prediction')

plt.legend()

plt.show()

**OUTPUT:**

Requirement already satisfied: scikit-learn in /usr/local/lib/python3.12/dist-packages (1.6.1)

Requirement already satisfied: matplotlib in /usr/local/lib/python3.12/dist-packages (3.10.0)

Requirement already satisfied: numpy>=1.19.5 in /usr/local/lib/python3.12/dist-packages (from scikit-learn) (2.0.2)

Requirement already satisfied: scipy>=1.6.0 in /usr/local/lib/python3.12/dist-packages (from scikit-learn) (1.16.1)

Requirement already satisfied: joblib>=1.2.0 in /usr/local/lib/python3.12/dist-packages (from scikit-learn) (1.5.2)

Requirement already satisfied: threadpoolctl>=3.1.0 in /usr/local/lib/python3.12/dist-packages (from scikit-learn) (3.6.0)

Requirement already satisfied: contourpy>=1.0.1 in /usr/local/lib/python3.12/dist-packages (from matplotlib) (1.3.3)

Requirement already satisfied: cycler>=0.10 in /usr/local/lib/python3.12/dist-packages (from matplotlib) (0.12.1)

Requirement already satisfied: fonttools>=4.22.0 in /usr/local/lib/python3.12/dist-packages (from matplotlib) (4.59.2)

Requirement already satisfied: kiwisolver>=1.3.1 in /usr/local/lib/python3.12/dist-packages (from matplotlib) (1.4.9)

Requirement already satisfied: packaging>=20.0 in /usr/local/lib/python3.12/dist-packages (from matplotlib) (25.0)

Requirement already satisfied: pillow>=8 in /usr/local/lib/python3.12/dist-packages (from matplotlib) (11.3.0)

Requirement already satisfied: pyparsing>=2.3.1 in /usr/local/lib/python3.12/dist-packages (from matplotlib) (3.2.3)

Requirement already satisfied: python-dateutil>=2.7 in /usr/local/lib/python3.12/dist-packages (from matplotlib) (2.9.0.post0)

Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.12/dist-packages (from python-dateutil>=2.7->matplotlib) (1.17.0)

