Question 1

Explain Linear Regression in simple terms.

Solution

Linear regression is a method of modeling the relationship between a dependent variable and one or more independent variables. It is used to predict the value of the dependent variable based on the values of the independent variables.

$$y = mx + b$$

Where y is the dependent variable, x is the independent variable, m is the slope, and b is the y-intercept.

Multiple Linear Regression

$$y = m_1x_1 + m_2x_2 + ... + m_nx_n + b$$

Where y is the dependent variable, $x_1, x_2, ..., x_n$ are the independent variables, $m_1, m_2, ..., m_n$ are the slopes, and b is the y-intercept.

Implementation

```
def linear_regression(x, y):
    n = len(x)
    sum_x = sum(x)
    sum_y = sum(y)
    sum_xy = sum(x * y)
    sum_xx = sum(x ** 2)

    m = (n * sum_xy - sum_x * sum_y) / (n * sum_xx - sum_x ** 2)
    b = (sum_y - m * sum_x) / n

    return m, b
```

Question 2

What is Lasso regression?

Solution

Lasso regression is a method of modeling the relationship between a dependent variable and one or more independent variables. It is used to predict the value of the dependent variable based on the values of the independent variables. Lasso regression is a regularization technique that helps to reduce the complexity of the model and improve the generalization performance.