**Multiple Linear Regression Model**

**Problem:**

A data was collected to determine the relationship between the systolic blood pressure and two independent variables X1 and X2, where X1 is the age of the patient and X2 is the weight of the patient in pounds. Eleven patients were selected at random and the data is shown in the following table:

|  |  |  |
| --- | --- | --- |
| sysBPY | ageX1 | weightX2 |
| 132 | 52 | 173 |
| 143 | 59 | 184 |
| 153 | 67 | 194 |
| 162 | 73 | 211 |
| 154 | 64 | 196 |
| 168 | 74 | 220 |
| 137 | 54 | 188 |
| 149 | 61 | 188 |
| 159 | 65 | 207 |
| 128 | 46 | 167 |
| 166 | 72 | 217 |

Fit a multiple linear regression to the above data that involving the following steps by using R and interpret the outputs.

1. Estimate the values of the regression coefficients of a multiple linear regression model and establish the linear relationship between the dependent and independent variables.
2. Obtain the predicted values of Y.
3. Find the values of residuals.
4. Test the significance of the regression coefficients at 5% of level of significance.
5. Obtain the 95 percent and 99 percent confidence interval for partial regression coefficients and intercept term.
6. Is the overall regression model significant at 5% level of significance.
7. Obtain the adjusted coefficient of multiple determination and interpret the result.
8. Predict the systolic blood pressure for the age =40 and weight =200 and obtain the 95% CI for predicted BP.

The evaluation pattern is as follows:

|  |  |  |
| --- | --- | --- |
| Section | Parameters | Marks |
| A | Objective/Aim | 2 |
| B | Analysis | 3 |
| C | Interpretation | 3 |
| D | Timely submission | 2 |
| Total |  | 10 |