For this assignment you will use the dataset *Children\_Lung.csv*. The data contains a biomarker that is associated with lung volume in randomly selected and unrelated children ages 6-22 who were seen in the Childhood Respiratory Disease Study in 1980 in East Boston, Massachusetts. In this assignment, we will explore the association between a child’s BMI and biomarker lung volume through simple linear regression while checking model validity. The table below describes the variables in the dataset.

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Coding/Unit** | **Type** |
| ID | Subject ID |  | Numeric |
| Sex | Sex of child | 1= male, 0=female | Numeric |
| Age | Age of child | Years | Numeric |
| Lung\_v | Biomarker associated with lung volume | Litres | Numeric |
| BMI | BMI of child | kg/m2 | Numeric |
| Asthma | Asthma status of child | 1=asthma, 0=no asthma | Numeric |

1. Use SAS to plot histograms of Lung\_v and BMI. Be sure to include these histograms in your answer. Assess whether you think the distributions are normally distributed. (2 points)
2. Perform simple linear regression analysis with Lung\_v as your dependent variable and BMI as your independent variable and answer the following questions: (6 points)
   1. State the null and alternative hypotheses.
   2. Report the test statistic and degrees of freedom.
   3. Using the p-value and α=0.05, give a one sentence conclusion on whether Lung\_v is significantly associated with BMI.
3. Using the plots provided by SAS, assess whether or not the following assumptions are met. Be sure to provide EVIDENCE of your conclusions (6 points):
   1. Normality
   2. Homoscedasticity
   3. Linearity

1. Perform a simple logistic regression predicting asthma from the sex of the child. [6 points]
   1. Report the null and alternative hypotheses.
   2. What is the test statistic?
   3. Report the p-value and your conclusion regarding the relationship between sex and asthma status of the child. What parameter quantifies the relationship?

Paste full SAS Code here: