In December, 2022, Gaesser, Poole and Angadi published an article in the British Medical Journal titled "Quantifying the benefits of inefficient walking: Monty Python inspired laboratory based experimental study." The authors conducted a laboratory based experimental study to compare the rate of energy expenditure of low efficiency walking with high efficiency walking. Here is a brief description of their experiment. In this study, participants were asked to perform three, five-minute walking trials around an indoor 30 m course. The first trial consisted of walking at a freely chosen walking speed in the participant's usual style. The next two trials consisted of low efficiency walks in which participants were asked to duplicate the walks of Mr. Teabag and Mr. Putey in the legendary Monty Python Ministry of Silly Walks sketch. Various measurements were made and determined from this experiment. More specifically, ventilation and gas exchange were collected throughout to determine oxygen uptake and energy expenditure (EE; kcal/kg/min). Since the published article does not contain the original measurements, use the constructed data set based on the summary information provided in the article. Use the significance level $\alpha = 0.05$ for all the tests to be conducted. Analysis and report should include at least the following parts:

I.   Provide side-by-side boxplots of energy expenditure (EE) for each walking style. How do you interpret your findings from these boxplots?

II.   To test if the mean energy expenditure (EE) is the same for all walking styles, perform the analysis of variance and related multiple comparisons (if you deem necessary).

III.   Perform the multiple linear regression of energy expenditure (EE) corresponding to Mr. Teabag walking on the body mass index (BMI) and gender (male is coded as 1 and female is coded as 0 in WalkData4650.csv).

IV.   To assess if your fitted multiple linear regression model is appropriate, plot the residuals and obtain the Q-Q plot of the residuals.