IMPORTANT NOTES. Please upload your homework to Canvas or email your homework to our TA: ys688 at stat.rutgers.edu. For the simulation and data analysis problems, please put the code you developed at the end of the homework report (no separated files).

The data set *Portfolios_Formed_on_ME_eqW.txt* contained portfolios constructed based on the market value of the company (total outstanding number of stock shares times the stock price). Columns 11 is the returns of the portfolio contains (equally weighted) the smallest 10% of the companies in terms of their market value.

Answer the following questions:

1. Calculate the market returns by taking the weighted average of columns 3 to 5, with weights 0.3, 0.4 and 0.3.
   (a) Plot the market return series (`plot(x,type='l')` will do).
   (b) Comment on the features you see in the figure
2. Use the data from 1965.01 to 1969.12 (rows 463:522) only to fit a simple linear regression using Column 11 (the small company portfolio) as the response variable and the market return you obtained in (1) as explanatory variable. Answer the following questions:
   (a) Draw a scatter plot and add the estimated regression line to the plot.
   (b) What is the standard error of b_1 for estimating β_1?
   (c) Obtain a 95% confidence interval for b_1. What does a confidence interval mean in general?
   (d) What is the p-value for testing $H_0 : \beta_0 = 0$ vs $H_1 : \beta_0 \neq 0$? What is your conclusion?
   (e) What is the p-value for testing $H_0 : \beta_1 = 0$ vs $H_1 : \beta_1 \neq 0$? What is your conclusion?
   (f) Perform a 5% level test for testing $H_0 : \beta_1 = 1$ vs $H_1 : \beta_1 \neq 1$? What is your conclusion?
   (g) Obtain the R^2 of this linear regression model. What does it mean? Comment on it.