For Tuesday:

Topic:	Assumptions and Transformations
Text:	Chapter 3 in Linear Regression by P. Martin

Exercises:

1. Biological Pest Control. In a study of the effectiveness of biological control of the exotic weed tangsy ragwort, researchers manipulated the exposure to the ragwort flea beetle on 15 plots that had been planted with a high density of ragwort. Harvesting the plots the next season, they measured the average dry mass of ragwort remaining (grams/ plant) and the flea beetle load (beetles/ gram of ragwort dry mass) to see if the ragwort plants in plots with high flea beetle loads were smaller as a result of herbivore by the beetles (data from P. McEvoy and C. Cox, "Successful Biological Control of Ragwort, Senecio jacobaea, by Internatioal insects in Orego", Ecological Applications 1(4) (1991): 430-42). Data set can be found in this weeks folder Data Sets.

   (a) Use scatterplots of the raw data, along with trial and error, to determine transformations of $Y = ragwortdrymass$ and of $X = Fleabeetleload$ that will produce an approximate linear relationship (Search the net of how to make transformations of a variable).

   (b) Fir a linear regression model on the transformed scale; calculate residuals and fitted values.

   (c) Look at the residual plot. Do you want to try other transformations? What do you suggest?

2. Ecosystem Decay. In the following we will consider a data set from a study about the effect of Amazon forest clearing. The publication is from 1984 where there is a requirement in Brazil that at least 50 % of the land in any development project remain in forest and tree cover. As a consequence of this requirement, "islands" of forest of various sizes remain in otherwise cleared areas. In the data set Ecosystem Decay you will find a table with the number of butterfly species in such islands. Analyze the role of area in the distribution of number of butterfly species. Where should such an analysis

begin, what should be in such an analysis, what should the order of such statistical methods be? (Take some notes, you will use this on Thursday)

For Thursday:

Topic:	LaTeX
Text:	The Not so Short Introduction to LaTeX 2

Please follow this guide to set up LaTeX and a front end text editor.

Exercises: Elementary LaTeX:
In the following tasks you should do your LaTeX-work in the same working file (this will make sense in exercise 4).

1. Write your first piece of LaTeX by copy-pasting the texts on page 8.
2. Use the Not So Short Introduction to LaTeX 2 and figure out how to write the following:
   (a) $\hat{Y}_i = \alpha + \beta X_i$
   (b)
   $$\begin{aligned} \epsilon_i &= Y_i - (\alpha + \beta X_i) \\ &= Y - i - \hat{Y}_i \end{aligned}$$
   (c)

Average temperature	Number of pirates	Year
14.2	35000	1820
14.3	45000	1860
14.6	20000	1880
14.9	15000	1920
15.2	5000	1940
15.6	400	1980
15.9	17	2000

3. First find in the LaTeX guide the section about inserting images and graphics. Take one of your plots from RStudio, export it -in an appropriate file format, and insert it in your LaTeX document.
4. Find in the LaTeX guide and implement how one can divide a document into sections and subsections. Divide your working document into sections and subsections.

5. Find in the LaTeX guide and implement how to make a table of content.
6. Make a structural skeletal ($\sim$ LaTeX template) for the statistical analysis of Tuesday Exercise 2.
7. Have fun with making (or copy-pasting) a professional looking front page for a student project at ITU -it might come in handy.

Collaborating in LaTeX (Overleaf):

1. Follow this guide to make an account and learn to make your first document in Overleaf.