R computer assignment AM2080 2022-2023 **Assignment 1**

Before you start, first install and load the library `car` in your `R` workspace.

1. Use the dataframe `Freedman`[1]

   (a) Report what are the variables in the dataframe and of what type they are.

   (b) Using the methods described in Chapter 2 in Bijma, Jonker and van der Vaart, i.e., histogram, boxplot, (normal) QQ-plot, examine the distributions of the variables. Characterize the distribution of each variable in terms of symmetry or skewness; non-normality or apparent normality; number of modes; and the presence or absence of unusual values. You can use the functions `hist`, `boxplot`, `qqnorm`; if needed, check their syntax by using the help facility of `R`.

   For each variable produce one figure containing the plots of the above three methods. Use the function `par` with option `mfrow` to make this possible.

   (c) For the those variables that appear to be normally distributed, compute an estimate for the parameters μ and σ^2.

   (d) Investigate whether there is a reason to believe that crime rate differs with the percentage of nonwhite population, or differs with population density.

2. Use the dataframe `Leinhardt`[2] in the library `car`.

   (a) Report what are the variables in the dataframe and of what type they are.

   (b) Examine and characterize the relationship between the variables infant mortality rate and income. Produce a scatterplot with income as x-variable.

   (c) Examine and characterize the relationship between the variables infant mortality rate and each of the variables region and oil. Produce boxplots of infant mortality divided over the levels of the variable region, and similarly for the variable oil.

   You may use the command `plot`, or the command `boxplot` in combination with the function `split`. If needed, check the syntax by using the help facility of R.

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[1] *Source:* United States (1970) Statistical Abstract of the United States. Bureau of the Census.
[2] Leinhardt, S. and Wasserman, S. S. (1979) Exploratory data analysis: An introduction to selected methods. In Schuessler, K. (Ed.) *Sociological Methodology* 1979 Jossey-Bass.