Exercise Sheet 2

Exercise 5   Tabular and Graphical Representations of Data

Let the following data set be given (sample size 60):

4, 3, 2, 5, 4, 6, 3, 7, 4, 1, 4, 0, 6, 4, 3, 5, 2, 3, 5, 1, 4, 4, 9, 5, 4, 3, 3, 5, 2, 4,
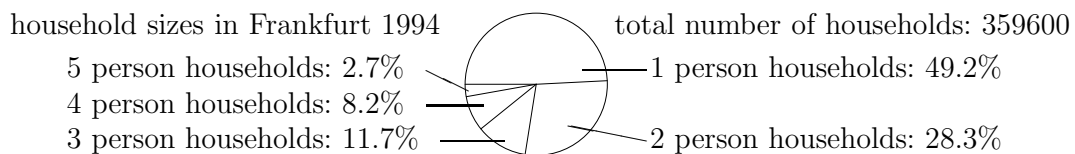3, 6, 5, 2, 6, 2, 4, 5, 5, 1, 5, 4, 4, 2, 7, 1, 3, 3, 4, 7, 3, 4, 4, 6, 6, 3, 3, 2, 6, 1.

Display these data as a frequency table and as a

- pole/bar chart,
- pie chart,
- frequency polygon,
- area chart (with squares) and
- volume chart (with cubes)!

Which graphical representations are well suited, which not so well?

Exercise 6   Confusing Graphical Representations

Under the headline "One out of two people lives alone" the following pie chart appeared
in the German newspaper "Süddeutsche Zeitung". What is wrong with this headline?

household sizes in Frankfurt 1994   total number of households: 359600

    5 person households: 2.7%   1 person households: 49.2%
    4 person households: 8.2%
    3 person households: 11.7%   2 person households: 28.3%

What percentage of all people in Frankfurt did actually live alone?

Exercise 7   Mean/Average Values

In his book "So lügt man mit Statistik", Walter Krämer reports the following statistics
about the safety of trains and airplanes:

$$\begin{array}{ll} \text{train:} & 0.07 \text{ deaths per 1 million passenger hours} \\ \text{airplane:} & 0.24 \text{ deaths per 1 million passenger hours} \end{array}$$

Can one infer from these data that it is more dangerous to fly than to take a train?
Which other mean/average values would be better suited to compare the safety of the
two means of transportation?

Exercise 8   Mean/Average Values

The stock value of a certain company rises 60% in one year. In the following year, however, it drops 50%. In the third year it goes up 70%, while in the fourth it drops 40% again. Therefore the average development of the stock value of this company is

$$\frac{60\% + (-50\%) + 70\% + (-40\%)}{4} = 10\%.$$

In other words, the stock value has increased an average of 10% per year.
Would you trust an investment consultant who presented this argument to you? What is the true average development of the stock value (in percent) in these four years and which mean value is the correct one to compute it?

Additional Exercise   Business Cheating

Imagine you are the newly appointed CEO of multi-national enterprise. Your company is consisting of 8 different units that are each accounted for separately in two groups $\mathcal{A} = \{U_1, U_2, U_3, U_4\}$ and $\mathcal{B} = \{U_5, U_6, U_7, U_8\}$. Your bonus depends on the average percentaged increase in revenue of these two groups. The revenue $R(U)$ for each unit is: $R(U_1) = 1000, R(U_2) = R(U_3) = 900, R(U_4) = 100, R(U_5) = R(U_6) = R(U_7) = R(U_8) = 10$.

Your first year as CEO is almost over and it has been quite a slow year. The revenue of each unit has not changed and you fear that you will lose your bonus. What can you do to still receive a good bonus?