Practical Exercises for **Day 4**

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Exercise 11

- Apply the two-sided two sample t-test to suitable variables of the data set `ToothGrowth`.
- Interpret the results.
- Apply the two-sided t-test to the `perulang_ems` data set

Exercise 12

- Apply the Chi-square Test and the fisher exact test to the whole `bacteria` data set.
- Apply the Chi-square Test and the fisher exact test to the subset of `bacteria` containing only the observations taken in week 2. Are there any issues?
- Repeat this exercise by using the (previously defined) combined `trt.new` variable with the two levels `treated` and `drug`.
- Could you also obtain the odds ratios?
- Try also a logistic regression in R. Ask Google for help!

Exercise 13A: Outside plot frame

- Type `demo(graphics)` in your console and press enter. This command shows you a nice demonstration of possible R graphics.

```
# After the demonstration us the following commands:
dev.off()
par(mfrow=c(1,1))
```

- Change the x-axis and y-axis labelling of a boxplot plotting the `len` variable of the `ToothGrowth` data set.

- How do you set a main title for your above plot?
- What does the following command do?

```
par(mfrow=c(2,2))
```

- We have six different feed types in `chickwts`. Try to plot two separate boxplots for `casein` and `horsebean` and set the same minimum and maximum for the y-axis. Use the function `subset` for doing so.

```
sub.casein <- subset(chickwts, feed == "casein")
sub.casein <- droplevels(sub.casein)
sub.horsebean <- subset(chickwts, feed == "horsebean")
sub.horsebean <- droplevels(sub.horsebean)
```

- How do you enlarge the font size of the axis as well as the axis labels of the following plot with the `perulung` data set?

```
plot(lung$fev1, lung$height)
```

- Label the x-axis of the following plot with "Vitamin C in μg". Use the greek letter for μ.

```
plot(ToothGrowth$dose, ToothGrowth$len)
```

- Read `http://www.statmethods.net/advgraphs/parameters.html`.

Exercise 13B: Inside the square of the plot

- Type `demo(graphics)` in your console and press enter.
- Add a legend to the following barplot. Are there several different solutions for this?

```
barplot(prop.table(table(bacteria$y, bacteria$trt),margin=1),
        beside=FALSE, ylim = c(0,0.8))
```

- Add a density line to this histogram.

```
hist(ToothGrowth$len, prob = TRUE, col = "grey", ylim = c(0, 0.05))
```

- Add a **dotted red** linear regression line to the following plot.

```
plot(lung$height, lung$fev1)
```

- Color the points in the following plot according to the `sex` variable.

```
plot(lung$height, lung$fev1)
```

- Add two linear regression lines separately for `female` and `male`to the following plot.

```
plot(lung$height, lung$fev1)
```

- Color the points in the following plot according to the `supp` variable. Use different point characters (`pch`) based on the `supp` variable.

```
plot(ToothGrowth$len, ToothGrowth$dose)
```

- Read `http://www.statmethods.net/advgraphs/parameters.html`.