Homework assignment
L1: Introduction

Assignment date:	**01.10.2019**
Deadline:	**07.10.2019 23:59**
Slides:	http://www.cs.cas.cz/martinkova/NMST570
Note:	Send answers and R script to hladka@cs.cas.cz
Name:	

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1   Install and run software

Open R or RStudio. `ShinyItemAnalysis` can be installed as a standard R package from CRAN with command:

```
install.packages("ShinyItemAnalysis")
```

You can download also the newest development version from GitHub with `devtools` package:

```
# install.packages("devtools")
devtools::install_github("patriciamar/ShinyItemAnalysis")
```

After installation, load library and run `ShinyItemAnalysis` application:

```
library(ShinyItemAnalysis)
startShinyItemAnalysis()
```

You can also access `ShinyItemAnalysis` online at page

> https://shiny.cs.cas.cz/ShinyItemAnalysis

2   Try basic data exploration

Run `ShinyItemAnalysis`. Using default dataset, answer following questions

1. What is its name? (**Data**) [0.25pt]

2. Of how many items does dataset consist? [0.25pt]

3. How many observations does dataset contain? (**Data**) [0.25pt]

4. How many observations do come from focal (females) and reference (males) group? (**Data**) [0.5pt]

5. What are the maximum and minimum values of criterion variable? (**Data/Basic summary**) [0.5pt]

3   Upload data and explore them

LSAT7 datasets from Bock & Lieberman (1970) contains 5 dichotomously scored items obtained from the Law School Admissions Test, section 7.

Download dataset from

> http://www.cs.cas.cz/hladka/documents/LSAT7.csv

1. Upload data into `ShinyItemAnalysis`. Provide proof (screenshot) [0.5pt]. Using uploaded data answer following questions.
   HINT: Use binary data type for upload.

2. What is mean and standard deviation of total scores? (**Summary/Total scores**) [0.5pt]

3. Calculate Z-score for a student with total score 3. Provide whole calculation. (**Summary/Standard scores**) [1.5pt]

4. Calculate T-score for a student with total score 3. Provide whole calculation. (**Summary/Standard scores**) [1.5pt]

5. How many points did student with 69th percentile receive? (**Summary/Standard scores**) [0.25pt]

4 Try it also in R

Create short `R` script including following tasks

1. Upload data from previous section [0.5pt] and explore it [0.5pt].
   HINT: Use function `read.csv("LSAT7.csv")` to upload data and for example `summary(data)`, `head(data)` and `dim(data)` to explore. What do these functions show?

2. Calculate total scores for uploaded dataset, their mean, median, standard deviation, skewness and kurtosis (**Summary/Total scores/Selected R code**) [0.5pt]

3. Are total scores approximately normally distributed? Why/Why not? [0.5pt]

4. Draw histogram of total scores. Values smaller than median should be red, values larger than median should be blue, median should be gray. (**Summary/Total scores/Selected R code**) [1pt]

5. Calculate Z-scores for all respondents. (**Summary/Standard scores/Selected R code**) [0.5pt]

6. Calculate T-scores for all respondents. (**Summary/Standard scores/Selected R code**) [0.5pt]

5 Provide feedback

Here you can provide feedback on lecture, lab session and/or materials (slides, HW assignment, ShinyItemAnalysis manual) [1pt bonus] :)