

Homework assignment

L1: Introduction

Assignment date: 2.10.2018
Deadline: 8.10.2018 23:59
Slides: <http://www.cs.cas.cz/martinkova/NMST570>
Note: Send answers and R script to drabinova@cs.cas.cz
Name:

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

- What is its name? (**Data**) [0.25pt]
- Of how many items does dataset consist? [0.25pt]
- How many observations does dataset contain? (**Data**) [0.25pt]
- How many observations do come from focal (females) and reference (males) group? (**Data**) [0.5pt]
- 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/drabinova/documents/LSAT7.csv>

Upload data into **ShinyItemAnalysis**. Provide proof (screenshot) [0.5pt]. Using uploaded data answer following questions.

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

- Calculate Z-score for student with total score 10. Provide whole calculation. (**Summary/Standard scores**) [1.5pt]

- Calculate T-score for student with total score 10. Provide whole calculation. (**Summary/Standard scores**) [1.5pt]

- How many points did student with 69th percentile receive? (**Summary/Standard scores**) [0.5pt]

4 Try it also in R

Create short R script including following tasks

- Upload data from previous section [0.5pt] and explore it [0.25pt].

HINT: Use function `read.csv("LSAT7.csv")` to upload data and for example `summary(data)`, `head(data)` and `dim(data)` to explore.

- Calculate total scores for uploaded dataset, their mean, median, standard deviation, skewness and kurtosis (**Summary/Total scores/Selected R code**) [0.5pt]
- Are total scores approximately normally distributed? Why? [0.5pt]

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