

Exercise 1 on Machine Learning WS 2023/24  
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## Notes:

Make sure you follow these instructions to submit all your future exercises:

- 1) For questions that require you to describe or explain concepts, please present your responses in PDF format.
- 2) Organize all your files into a zip folder, then upload the zip folder as your submission.

## Task 1. Read out data (6 points)

In the folder *data* you will find a file named **hhu\_wikipedia.txt**. In this file, part of the Wikipedia article of the university is stored. Create a notebook where the following operations are performed:

- a) Open the file, output the complete text and then close the data stream (2 P.).
- b) Calculate how many times the word **Mathematics** occurs (2 P.).
- c) What are the 10 words that occur most often in the text? Print them out (2 P.).

## Task 2. (4 points)

A matrix can be represented in Python by two nested lists. e.g.:

$$\begin{pmatrix} 4 & 5 \\ 3 & 2 \end{pmatrix} = [[4, 5], [3, 2]] \quad (1)$$

Write Python functions that do the following tasks.

Provide an example for each task.

- a) Transposing a 3x3 matrix (1 P.).
- b) Calculating the determinant of a 3x3 matrix (1.5 P.).
- c) Multiplying two 3x3 matrices (1.5 P.).

Information matrix operations:

<https://www.mathebibel.de/transponierte-matrix>

<https://www.mathebibel.de/3x3-determinanten-berechnen>

<http://www.mathematrix.de/matrixmultiplikation>