

1 Vorbereitung

1.1 Software installations

Install the required software on a workstation of your choice. You need for the lecture:

1. A git client, e.g. `tortoise git` under Windows or `git` under Linux.
2. Python 3.11 or higher
3. A Latex installation, e.g. `miktex` and `texworks` under Windows or a corresponding distribution under Linux
4. An installation of Jupyter Lab

1.2 Create and Register Repository (5 points)

Check out the exercise file `Exercise_01.zip` from the canvas course. During the semester, the assignment sheets as well as the associated data and sample solutions will be checked into the course.

I needed the following time to complete the task:

2 Working with Images

2.1 File Input and Output for Images (10 Points)

Now edit the Jupyter Notebook `File_Access.ipynb`. The notebook loads a grayscale image and displays it.

- a) Extend the image, such that it stores the file without modifications under the name `result_a.png` in the directory of the notebook.
- b) Explain the dimensions of the loaded data: what are rows and columns, and how do you index a specific pixel?
- c) Change the notebook to load the color version of the image. Display the color version.
- b) Explain the dimensions of the loaded data: what are rows and columns, and how do you index a specific pixel? How are color channels treated?

I needed the following time to complete the task:

2.2 Pixel Access (10 Points)

Now edit the Jupyter Notebook `Pixel_Access.ipynb`.

- a) Modify the image by creating a black border. The border should frame the image on all four sides, and be three pixels wide. Store the image under the name `result_b.png`
- b) Now create a border that is 10 pixels wide, but semi-transparent. You can achieve transparency by blending pixel values. Store the result with the file name `result_c.png`

I needed the following time to complete the task: