

# Scientific Programming (Wissenschaftliches Programmieren)

## Exercise 7

### 1. Project start

- Create the **linsolver** project in the IDE (integrated development environment, e.g. VS Code).
- Add the empty files `solvers.py` and `test_solvers.py` to the project.
- Download the content of those two files from the course web site and add them to the corresponding files in your project.
- Execute the `test_solvers.py` script from your IDE.
- Execute the `test_solvers.py` script from the BASH / Conda shell.
- Initialize a Git-repository in the folder of the **linsolver** project.
- Add the two files to the Git-repository and commit them.
- Write a small readme file (`README.txt`) describing the purpose of the project.
- Add the readme file to the project and commit it.

### 2. Gaussian elimination

- Implement the Gaussian elimination algorithm in the `gaussian_eliminate()` function in the `solvers` module.
- Make sure by running `test_solvers.py` that it returns the right result for the first test case.
- Commit your changes.

### 3. \*Gaussian elimination with partial pivoting

- Extend the Gaussian elimination with [partial pivoting](#): Inspect the absolute values of the current column in the rows below the current one. Exchange the current row with the one containing the highest absolute value before doing the elimination.
- Make sure that the first two tests in `test_solvers.py` return the right values.
- Commit your changes.

### 4. \*Gaussian elimination with dependency detection

- Extend the Gaussian elimination with detection for linear dependency.

- Make sure that all three tests in `test_solvers.py` return the right values.
- Commit your changes.