# Scientific Programming
# (Wissenschaftliches Programmieren)

# Exercise 6

## 1. Project start

- Create the **linsolver** project in your IDE (integrated development environment, e.g. VS Code).
- Download the two project files from the course web site and put them into your project folder.
- 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 straightforward Gaussian elimination algorithm in the `gaussian_eliminate()` function in the `solvers` module.
- Make sure by running `test_solvers.py` that `test_elimination_3()` is successful.
- Add a test for a bigger system of equations (e.g. with 4 variables). Make sure, that your algorithm delivers also for this test the right result.
- 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 also `test_pivot_3()` returns the correct value.
- Commit your changes.

## 4. *Gaussian elimination with dependency detection

- Extend the Gaussian elimination with detection for linear dependency.
- Make sure that all tests in `test_solvers.py` return the correct values.
- Commit your changes.