Lab instructions

Laboratory work in Python and Matlab
(Examination modules LAB1 and LAB2)

1 Aim

The purpose of the lab course is to:

- get to know the basics of programming in Python and Matlab
- practice solving practical data manipulation problems using Python
- learn to apply good programming practices
- train explaining and motivating decisions made in own scripts

Lab 1–4 contribute to the courses' learning outcomes:

- Write scripts for data analysis using Python
- Use basic data structures for problem solving in Python
- Apply tools available in some commonly used Python packages

Lab 5–6 contribute to the courses' learning outcomes:

- Generalize programming skills in Python to other script languages, specifically Matlab

2 Organisation

The lab course is split in two parts:

- Lab 1–4 (examination module LAB1): Python basics and data manipulation
- Lab 5–6 (examination module LAB2): Matlab basics

2.1 Groups

The labs should be carried out in groups of two students. The course responsible or lab assistant can help to find an arrangement if you have trouble cannot find a lab partner.

Sign up for a group using the "Signup" function in Lisam. If you want to work in the same group for both modules, you just signup for one group. If you want to work in a different group for the different (LAB1 and LAB2) you can sign up for two groups (one for each module). You must have a group for the respective module before the deadlines found in the teaching plan.

2.2 Computer lab sessions

For each lab, a 4-hour lab session is scheduled in a computer room. There are two parallel sessions, make sure to find the one depending on which lab assistant your lab group belongs using the teaching plan on Lisam.

During each lab session, you are supposed to go through the lab material for the session and work on the practice exercises. If there is time left, you can also start working on the homework during the lab session.

2.3 Supervision

Supervision is given mainly during the scheduled lab sessions. A lab assistant will be available to answer questions. In case of urgent questions, it may be possible to get help in connection to the lectures. If this is not possible, contact the lab assistants (see course information for contact information)

2.4 Lab material and assignments

Before each lab session a pdf including the lab material will be provided via Lisam. The lab material for each lab session contains:

- Lab instructions to be followed during the lab session.
- Practice exercises to be solved during the lab session.
- Homework that you need to solve and hand-in (except LA1).

You don't need to submit answers for the practice exercises, but you are welcome to ask the lab assistant for feedback.

Module	Lab session	Homework	Examination session
UPG1	LA1	Homework 1[1]	-
	LA2	Homework 2	EX1
	LA3	Homework 3	
	LA4	Homework 4	
UPG2	LA5	Homework 5	EX2
	LA6	Homework 6	
UPG1/ UPG2	-	-	EX3 (re-examination)

2.5 Programming environment

Matlab and the recommended environment for Python (Anaconda including Jupyter Notebooks) are available in the computer rooms. More information on getting started with Python and using Jupyter Notebook is provided in the tutorial LE1.

To work on your own computer, you may:

1. Remotely login to a computer in the computer room using https://rdpklienter.edu.liu.se
2. Install the recommended environment (Anaconda) and Matlab on your own computer. Note that we cannot offer any technical support with installing software on your own computer. If you use your own setup, make sure to always use Python 3 (not Python 2).

3 Examination

The labs count towards the two examination models LAB1, LAB2 as follows:

Examination module	Grading	Assignments
LAB1: Laboratory work in Python	F/P	Homework 2–4
LAB2: Laboratory work in Matlab	F/P	Homework 5–6

To pass either of the two examination modules, all associated homework must be passed. Each homework is examined by a *written submission*. The whole module is also examined with an *oral examination*. Note that lab 1 is not examined.

[1] Homework 1 does not need to be submitted.

3.1 Written submission

For homework 2–6 a written submission is required at latest the day before the next lab session (see teaching plan for each individual deadline). The submission is made through Lisam and needs to include:

- Solutions to each lab exercise
- Explanations how each exercise has been solved
- The code used to answer the lab exercise

If not stated otherwise in the lab material, all exercises must be solved and submitted to pass.

You may submit the code in a separate file or as an attachment in the lab report. It is also possible to generate a pdf in Jupyter Notebook, but make sure that all of your code is included in the exported pdf.

Feedback will be given through Lisam. The feedback indicates if you have passed (P) or need to do a completion.

3.2 Oral examination

The homework is also examined orally. Typically, the oral examination takes no more than 15 minutes per group. You must register for an examination slot at latest the day before the examination session using the “Signup” in Lisam.

During the oral examination, the group needs to be prepared to briefly explain their solutions. The lab assistant may also ask additional questions related to the homework. Each individual group member must participate and show the ability to explain the solutions and answer questions. That means, it is possible that not all group members pass at the same time.

When the oral examination was successful it will be marked as passed (P) in Lisam in your “Assesment record”. Further feedback for the oral examination is only given if the oral examination needs to be repeated.

3.3 Examination criteria

Each examination module LAB1 and LAB2 is graded fail or pass (F/P). To get pass (P) for examination module LAB1 it is required to pass homework 2–4. For pass (P) for examination module LAB2 it is required to pass homework 5–6.

A homework set is passed when all the following criteria is met:

- The exercises in the assignment have been solved correctly.
- The code used to solve the exercises follows good programming practice.
- The group has demonstrated that they can explain the code and motivate choices made when solving the exercises.

3.4 Completions

If a completion is necessary, you will be notified through Lisam. In that case a new submission needs to be made on Lisam. The written submission must be passed before a new oral examination is possible.

If you missed the ordinary oral examination of a lab or need to re-take an oral examination, you are referred to the re-examination session EX3. For other alternatives, contact the responsible lab assistant to schedule new oral examination.

It is strongly recommended to submit completions as early as possible after receiving feedback. This way you do not get behind the schedule, maximize your chance to pass the labs during the ordinary course period and can use your learnings as preparation for the computer exam. For more information on completions and examination after the end of the course, see the procedures stated in the course information.

3.5 Cheating and plagiarism

The rules stated in the course information on plagiarism and cheating apply.

For all homework, no cooperation between lab groups is allowed. It is strictly forbidden to copy answers or parts of answers including code between groups or from other sources.

If in doubt, check with the course responsible.

Good luck!

The lab material for each lab will be made available on Lisam