

TND004: course information

This course information is valid from [VT2/2021](#) to [VT2/2022](#).

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Aim of the course

The course gives a solid knowledge of fundamental data structures, and their accompanying algorithms, such as stacks, queues, lists, trees, hash tables, and graphs. Sorting and performance analysis are also important topics discussed in the course. An important course goal is

- “To motivate **objectively** the choices made, concerning chosen data structures, and **relate to the known scientific results** in the field.”

The course goals are described in the [studieinfo](#).

Course responsible

[Aida Nordman](#).

Pre-requisites

The course requires knowledge in programming in C++ (e.g. as given by the [TNG033](#) course) and mathematical analysis (e.g. as given in the course [TNA001](#)).

Course points and workload

This course awards 6 ECTS credits. According to university regulations, one credit corresponds to 27 hours of work (i.e. 3 days of 9h/day). Thus, the course implies about 162 hours of work (i.e. ~4 weeks).

How to contact us

E-mail addresses for the course staff are available from the [course website](#). All communication with the course staff (e.g. questions related to the course) must be done via LiU email or by talking to the staff during the scheduled labs and office hours. There are no other alternative channels of communication.

To guarantee that all student e-mails are answered, the following rules must be followed when sending an e-mail about the course. E-mails not following these rules are simply ignored.

- Use your LiU e-mail address when contacting the course staff by e-mail.
- The course code and your study programme must be given in the e-mail's subject (e.g. “TND004: ...”).

Programming code cannot be sent by e-mail.

We may need to send information about the course to all registered students. To this end, the course e-mail list with the **registered** students is used.

Course website

All relevant course information (such as deadlines, plan for the lectures, labs, old exams, etc) is posted on the [course website](#).

The course website is updated during the course. Moreover, access to parts of this site requires a password. All registered students receive the password by e-mail when the course starts. The password is also available in the [Lisam](#) course room.

How is Lisam used in the course

[Lisam](#) course room is used for the following.

- Lab group registrations (use the *Signup* function).
- Post pre-recorded videos for lectures.
- Quizzes and final exam
- Request to meet course staff during scheduled [office hours](#).
- Course schedule with Zoom links for e.g. lessons in distance mode.

Recall that course material is posted from the [course website](#).

Zoom: a tool for distance education

The course has no physical meetings in the university classrooms. Virtual meetings will take place for labs (e.g. labs *redovisning*), lessons, some lectures, and office hours. Zoom is the tool used for distance meetings in the course. In the LiU webpage “[Zoom: a tool for distance education](#)”, you can find information and videos about how to use Zoom.

Late course registrations

A course registration is considered to be late, if it's received after the course start (i.e. 29 of March).

- Course registrations after 30 of March imply that you cannot participate in the lab sessions.
- Course registrations after 12 of April may imply that you are denied access to the quizzes in the course.

Organization

The course consists of

- 1 information session of (at most) 2h.
- 14 lectures. Each lecture is 2h.

- 6 lessons two of which are reserved for the quizzes. Each lesson is 2h.
- Office hours (2h per week).
- 4 “*handledning*” (**HA**) lab sessions. Each **HA** lab session is 4h.
- 5 “*redovisning*” (**RE**) lab sessions. Each **RE** lab session is 4h.

Lectures and lessons are given in English. Swedish and English may be used in the labs.

The course has no physical meetings in the university classrooms. [Virtual meetings via Zoom](#) will take place for info sessions, lectures, lessons, labs, and office hours.

Literature

The course book - in English - is given below.

[Data Structures and Algorithm Analysis in C++](#)

Mark A. Weiss. 4th edition, 2013.

We stress that it is very difficult to succeed in this course without the course book. Thus, make sure you have the course book from the course start.

Course software

- [Visual Studio 2019](#), with desktop development for C++. In particular, Live Share functionality of Visual Studio is used during labs.
- [CMake](#).
- [Clang](#) compiler for windows.
- [DrMemory](#).

The software above is installed in the lab rooms. Note that you can connect to computers in LiU's computer rooms and, in this way, have remote access to the software installed in the computers of the lab rooms. To this end, you can use RDP client to connect or *Thinlinc*. More information can be obtained from this LiU web page about [remote login](#).

Note that it is not the duty of the course staff to install any software in private computers.

Examination

This course awards 6 ECTS credits. To get the points, you need to complete successfully laboratory work and a final **individual** examination. You have three chances to take the computer exam during the academic year.

- You get 3 ECTS points, if you complete all lab exercises and demonstrate them before any set deadlines expire.

- You get 3 ECTS points, if you pass the final individual examination.

During the course, students also have the possibility to do two non-mandatory **individual** quizzes. Two bonus points are awarded for the final exam, upon approval on each quiz (see section “[Quizzes](#)” for more information).

Note that both the final examination and the quizzes are **individual**, though done in distance mode. This means that is **forbidden** to discuss **any** aspect related to the course with other humans with exception of the university staff on duty during the exam/quiz. Put in other words, students doing the final exam or quizzes should consider that the same restrictions about communication with other students, or other persons outside the university staff, apply as if doing the exam/quiz at the university campus under supervision of exam watchers. Thus, **zero** communication related to the exercises in the final exam or quizzes is tolerated outside the university staff (e.g. course staff, LiU-IT) until the set deadlines have expired.

If you borrow any ideas from a web page, or book, and use them in your solution for an exam (non-multiple choice) exercise, then you must explicitly indicate that fact and write the web page address, or give the book reference plus page numbers.

Final course grade

The final grade in this course can be either **3**, or **4**, or **5** and it is decided by the final individual examination which is composed of two parts.

- **Part 1** awarding max 20 points.
- **Part 2** consisting of two exercises each awarding max 5 points.

You can find below how is decided your course grade.

Final Grade	Requirements
3	<ul style="list-style-type: none"> • ≥ 12 points in exam's Part 1, including quizzes bonus points. • Fulfill the requirements for grade 3 and
4	<ul style="list-style-type: none"> • ≥ 4 points in one of the exercises in Part 2 • Fulfill the requirements for grade 3 and
5	<ul style="list-style-type: none"> • both exercises in Part 2 are awarded ≥ 4 points

Quizzes

The course has two **non-mandatory individual** quizzes. Each quiz should be seen as an opportunity for self-assessment.

The quizzes will take place on the 23 of April and 24 of May (see also course schedule).

- Each quiz consists of 8 exercises awarding 1p each.
- Each quiz is graded as either passed (**G**) or failed (**U**).
- To get approved (**G**) in a quiz you need 4p. In this case, you are also awarded 2 bonus points for the **Part 1** of the final exam.
- For every multiple-choice question, a wrong answer implies to deduce 1p from the total points. Not providing an answer to this type of questions implies no penalty at all (i.e. 0p is awarded).
- Only students registered in the course can do the quizzes.
- Quizzes bonus points can only be used during the academic year.
- Each quiz duration is 45 minutes.
- Quizzes are done using the quiz functionality available from the course room in Lisam.

Which aid material can be used

- Any books. If you borrow ideas from a book then you must clearly indicate that fact by writing the book reference, plus page numbers.
- Internet resources can be used. If you borrow any ideas from a web page then you must clearly indicate that fact and write the web page address.
- All course material posted from the course website (*e.g.* lecture slides).

Note that quizzes and the final examination are **individual**. This means that is **forbidden** to discuss any aspect of the exam or quizzes with other humans with exception of the university staff on duty.

Finally, we cannot guarantee that any website, including the course website, is available during the exam. Problems with the servers can occur at any time, though not frequently, and are out of our control.

Suspicious of academic dishonesty are reported to the disciplinary board who can decide on a suspension from university studies up to six months.

Examples of academic dishonesty

The use of electronic platforms to post, share, or discuss any exam/quiz related issues with persons outside the course staff or LiU-IT, is strictly forbidden, until the last submission deadline for the exam/quiz has expired. Examples of such electronic platforms are:

- Email
- Phone: sms or phone call

- Slack
- Discord
- Github
- OneDrive
- Google drive
- Chat rooms
- Skype
- Zoom
- Facebook

Improving your course grade (“*plussa*”)

If you have already been approved in the course, but want to improve your grade, then you do not need to do the final exam’s Part 1 (i.e. you only need to do the exercises in Part 2).

In case of suspicion of academic dishonesty

Quizzes and final examination must be solved **individually**. **Zero** communication related to the quizzes/exam contents is tolerated outside the university staff (e.g. course staff, LiU-IT) until the last submission deadline is closed.

Any suspicions of attempted cheating are reported to the disciplinary board, who can decide on a suspension up to six months. We also stress that is not the teachers’ duty to take a final decision of whether there was cheating. For more information, please see the LiU website “[Disciplinary measures](#)”.

De lösningar som du skickar in i samtliga former av examination (laborationer, quizzes och tenta) ska vara ett resultat av ditt eget arbete. Det är inte tillåtet att lämna in lösningar som har kopierats från andra studenter, även om modifieringar har gjorts. Vi ser mycket allvarligt på alla tendenser till fusk. Det är dock inte lärarnas uppgift att avgöra om fusk förekommer. Vid misstanke lämnas ärendet till universitetets disciplinnämnd som, om de anser att fusk föreligger, kan besluta om avstängning upp till sex månader. För mer information, se LiU website “[Disciplinära åtgärder](#)”

Lectures

You can find a preliminary plan for the lectures in the [course website](#). The corresponding course book sections, for each lecture, are also indicated. You are expected to read the indicated **book** sections. Those sections include also extra (course related) material that you need to read and understand.

Slides and code used in the lectures will be made available from the [course website](#) soon after each lecture. The slides are complementary course material that does not replace the book.

A set of short pre-recorded videos are also made available through Lisam course room, for each lecture.

Lessons

The main aim of the lessons is to give you opportunity to enhance your understanding of the concepts introduced in the course through a set of practical exercises. To this end, a **compendium of practical exercises** is also available from the [course website](#).

Lessons are held as online meetings via Zoom. Written solutions for some of the practical exercises are posted from the course website and you are expected to try the exercises on your own.

There is opportunity for putting **questions** about the exercises during office (see course schedule) and lessons. More information is given during the course.

Labs

This course includes **four sets of lab exercises**. For each set of exercises, 2 lab sessions, *HAndledare* and *REdovisning*, are scheduled. The course has no physical labs in lab rooms.

You are awarded 3p (1p = 27h of work), if you are approved in all 4 sets of exercises. Thus, you are expected to spend about 80h of work for the lab exercises (i.e. at least 2 full weeks of work) of which at least 60h should be spent working in the exercises outside the scheduled lab hours.

Note also that

- You work in groups of two persons.
- You need to register for the lab sessions (see "[How to register for the labs](#)").
- Note that lab 1 has a strict deadline.
- A late lab can be presented during a RE session provided there is time during the 4h scheduled time.
- During the **HA lab sessions** you can get help from your lab assistant with the code, if you have questions or want feedback.
- You must demonstrate your solutions for lab exercises during the **RE lab sessions**. Note that these lab sessions include an individual examination and, consequently, each member of the group must be prepared to answer questions about the presented solution.

- Your solutions to the lab exercises can neither be presented in an HA session nor be sent by email.

In the end of the course, you will receive an e-mail when the lab points are ready to register in Ladok. You then have until **16 of August, 2021**, to report to the course responsible that you have not received your points. Any complaints about non-registered lab points received after 16 of August will be dealt when the course responsible has the time.

How to register for the labs

- You work in groups of **two persons**.
- There are four parallel lab classes (A, B, C, or D). Each lab class has 7 student groups.
- You must register your lab group in one of the lab classes until **31 of March, 12:00**.
- Registrations are done via Lisam (use the *Signup* function).

Presenting your solutions for lab exercises

You should present orally your solutions to the lab exercises during a virtual RE lab session (~20 minutes are usually enough). For each of the four sets of exercises, the course schedule indicates when you should present your solutions. Moreover,

- Programs that do not compile or fail to execute correctly are not accepted.
- We do not accept copied code that you neither understand nor are able to explain.
- Your code should be readable, well-indented, and use good programming practices.
- Programs with global variables are not accepted, although global constants can be used.
- Programs that use statements that are not part of the ISO C++ are not accepted.
- Code for the lab exercises cannot be sent for final approval by e-mail.
- A late lab can only be presented provided there is time during a RE session and the deadline has not expired.
- At most one late lab can be presented during a RE session.
- Some lab exercises require that you submit written answers to specific questions. Scanned handwritten answers are accepted. Unreadable or unclear written answers are rejected.

If you fail to present all labs of the course until **25 of May** then you can present late labs during the re-exams (*om-tenta*) period in January 2022. To this end, you must **email**

the course responsible not later than the end of week 49, so that we have the time to prepare the staff and allocate the time. You have no other occasions until the course starts again (VT2/2022) to present late labs.

Office hours

During the scheduled office hours, students have the opportunity to meet a course teacher and discuss questions related to the course.

We strongly encourage you to work, during the entire course, with the exercises in the course compendium of practical exercises. Office hours can then be used to get feedback about your solutions for the exercises.

If you want to meet us during office hours you need to write your LiU-id in a document available in the [Lisam](#) course room (under “*Collaborative workspace*”) prior the office hours take place. You’ll then receive an invitation for a Zoom meeting. Office hours are visible in the course schedule.

Note that during office hours we do not offer repetition of lectures or extensively debug your code. Office hours cannot be used as replacement for lab sessions, either.

IT-support for students

If you experience problems with your LiU account, equipment or software in the lab rooms then you should contact the [LiU IT-services and support](#). Note that as user of the lab rooms, it is your duty to report to the LiU IT-services any problems you detect with the equipment or software installed in these rooms. You can also call **013-285898** or email the [helpdesk](#).

If you need help with the Lisam system then visit this [web page](#) or call the helpdesk service.

There is no point to contact the staff of the course about Lisam or other IT-related problems because we cannot help you with this type of issues. Thus, these emails are simply ignored.

Important dates and deadlines

Important dates for the course and deadlines are summarized on the table below and also posted on the [course website](#).

Event	Deadline
Course start	29 of March
Register lab group	31 of March, 12:00
Course registration	Registration after 30 of March imply that you cannot take part on lab sessions Registration after 12 of April may imply that you cannot do the quizzes
Lab 1	RE lab session on week 14, 9 of April, strict deadline
Presenting labs 2-4	RE lab session on week 21, 25 of May
Quiz 1	23 of April, 15:15-16:00
Quiz 2	24 of May, 10:15-11:00
Final computer exam	1 of June, 8:00-12:00
Claim lab points	16 of August, 2021
Presenting late labs after course ending	om-tenta period in January 2022 Email the course responsible not later than the end of week 49, 2021