

Introduction to Data Structures and Algorithms - Course Outline

COMP 103: 2013 Trimester 2

This document sets out the workload and assessment requirements for COMP 103 Introduction to Data Structures and Algorithms, and provides contact information for staff involved in the course. If the contents of this document are altered during the course, you will be advised of the change by an announcement in lectures, and on the course web site.

The Course

COMP 103 builds on COMP 102, focusing on the techniques for designing, building, and analysing computer programs that deal with large collections of data. The course addresses techniques for programming with collections of data, and the data structures and algorithms that are needed to implement these collections. The course expands students' programming skills, and provides an understanding of the principles of data abstraction, algorithm design, and the analysis of algorithms that are fundamental to computer science.

The prerequisite for COMP 103 is COMP 102. It is very important that you have a COMP 102 level of experience in writing computer programs in Java. If you have not taken COMP 102 recently you should contact the Course Organiser as soon as possible.

Objectives

Students who pass Introduction to Data Structures and Algorithms:

1. are able to read pseudocode. (3(d),1,2,4)
2. understand a range of basic algorithms: linear search, binary search, several standard sorting algorithms, hashing, tree traversal algorithms, and insertion / deletion in binary trees and priority trees. (3(b),3(d),2)
3. understand the principles of designing programs with collection types, and using alternative implementations of the same type. (3(d),1,2)
4. have good working knowledge of the properties and differences of a range of collection data types (including sets, bags, maps, stacks, queues, priority queues, trees, and partially ordered trees) and a range of data structures for implementing such data types, based on arrays and on linked structures. (3(b),3(d),1,2)
5. are able to use and implement a range of basic generic collection types in Java. (3(d),3(f))
6. are able to explain the concepts relating to the complexity analysis of algorithms, apply them to the algorithms discussed in the course, and use the results of the analysis to make good design decisions in building programs. (3(b),3(f),1,2,3,4)
7. have some experience of testing.(3(f))

Assignments will allow students to practice the practical aspects of these topics, and help them to understand the basic concepts. The tests and final examination will assess understanding of the topics of the course.

Textbook

The textbook for COMP 103 is: *Lewis, DePasquale and Chase, "Java Foundations: Introduction to Program Design and Data Structures" (2nd Edition)*.



(Note: some printings have different cover images)

Lectures, Laboratories, Helpdesk and Tutorials

COMP 103 is a trimester 2 course. The trimester starts on 15 July. The examination period at the end of the course is 25 October - 16 November,

There is a [timetable](#) on the course website showing the times of the lectures and tutorials.

Lectures are on

- Mondays, Thursdays, Friday at 10:00 am-10:50 am, in New Kirk lecture theatre LT 301.

A schedule of lecture topics, readings, and assignment due dates will be available online. Copies of the lecture slides will be distributed at the lecture, but will also be available via the schedule page.

Tutorials Attendance at the tutorials is mandatory, and will be recorded. The format of the tutorials may vary, but we intend for them all to involve some time working through problems and issues in small groups.

The goal of the tutorials is to get students to engage with the content of the course in an interactive group environment. The tutorials will particularly focus on concepts, algorithms, and analysis techniques, whereas the assignments focus more on the programming techniques associated with the data structures and algorithms. So the COMP 103 tutorials will not be simply review sessions going over the lecture material again, but will work on new problems and discuss issues at greater depth than is possible in the lectures. Best of all, it's a chance to see how other students understand and approach the same material.

The tutorial times and places can't be finalised before the first week because it involves coordination between not just the timetables of COMP103 students, but those of the teaching assistants as well.

Once tutorial times and places have be announced you must sign up for one of the tutorial slots at signups.victoria.ac.nz as soon as possible.

Laboratories There are no fixed laboratory sessions for COMP103, and you are able to use computers in a variety of places to work on the assignments. Apart from times when particular labs are booked for exclusive use by another course, you are free to use computers in any of several available ECS laboratories (these are on level 2 of the Cotton Building).

Helpdesk We will run "Help Desk" sessions for students who want to discuss their assignment work in some detail with an experienced tutor. As with the tutorials, the times can't be sorted out before term starts, so watch for an announcement on this.

The timetable page gives details of times and places for all the above. The details will be finalised in the first week of teaching.

Workload

COMP103 is a 15 point course, and you should plan to spend an average of at least 10 hours per week on it. A plausible breakdown for these hours would be:

- Lectures and tutorials: 4
- Reading/revision: 1
- Assignments: 5

School of Engineering and Computer Science

Staff in the School of Engineering and Computer Science are on levels 2 and 3 of the Cotton building and level 2 of the Alan McDiarmid building.

The undergraduate labs are mostly on level 2, though one lab is on level 1. The School office is on level 3: Cotton 358. The head of the School is Professor Dale Carnegie, and the Dean of Engineering is Professor John Hine.

Staff

The course organiser and lecturer for the first half of COMP 103 is

- Marcus Frean
- Cotton 227
- +64 4 463 5672
- Marcus.Frean@ecs.vuw.ac.nz

The lecturer for the second half of the course is

- Thomas Kühne
- Cotton 233
- +64 4 463 5045
- Thomas.Kuehne@ecs.vuw.ac.nz

The Senior Tutor is

- Zarinah Amin
- Cotton 343
- +64 4 463 5936
- Zarinah.Amin@ecs.vuw.ac.nz See Zarinah in the first instance for issues related to tutoring and the operation of the labs.

Announcements and Communication

The main means of communication outside of lecture will be the COMP 103 web area at http://ecs.victoria.ac.nz/Courses/COMP103_2013T2/. There you will find, among other things, this document, the [lecture schedule](#) and [assignment handouts](#), and the [COMP 103 Forum](#). The forum is a web-based bulletin board system. Questions and comments can be posted to the forum, and students and staff will read these posts and respond to them as needed.

Practical Work

The [assignments](#) constitute the practical work for this course. There are 10 assignments and they make up 20% of the total assessment, and are worth 2% each. Doing the programming in the assignments is essential part of the learning of the course, and therefore doing the assignments is a mandatory requirement: you must make reasonable attempts at 7 out of 10 assignments.

Remember that there are no scheduled labs for COMP103 and that you can use the computers in the labs at any time the labs are open.

Each assignment (except 5 and 10) will be due at 10 am on the Friday of the week after the assignment was handed out. Assignment 5 will be due 9 Sept (during mid-trimester break) and assignment 10 will be due 18 Oct (the day before study week starts).

Model solutions to the assignments are generally posted shortly after the assignment deadline (usually about 1 hour later), so that you can review and assess your own work, and also build on the model solutions for the next assignment. Comparing your work to the provided solutions is an important part of the learning. Note that this also means that assignments submitted after the solutions are posted will **generally not be marked**, (or contribute to the mandatory requirements) unless you have made arrangements on the basis of exceptional circumstances with a course lecturer or senior tutor. Even if you haven't finished the assignment, submit whatever you have done by the deadline.

When you have completed them, the assignments should be submitted via the online submission system. This means that you can submit assignments from the ECS labs or from a computer at home (or anywhere on the internet). You may resubmit as many times as you wish, *but the most recent submission of a file will always overwrite previous submissions*.

Tests and Exams

There will be two 45 minute in-term tests worth 15% each, held on

- Fri, 9 Aug, and
- Mon, 7 Oct

Unless we advise otherwise, these will be held in the usual lecture place and time.

You should contact the course organiser or the senior tutor as early as possible if you are not going to be able to attend a test at the scheduled time, or if you missed a test.

The [timetable for final examinations](#) will be available from the University web site and will be posted on a notice board outside the faculty office. The final examination will be three hours long. No computers, electronic calculators or similar device will be allowed in the final examination, but paper foreign language dictionaries will be permitted. The study and examination period for trimester 2 is 25 October - 16 November.

Assessment

Your grade for COMP 103 will be determined based on the following assessment weightings:

<u>Item</u>	<u>Weight</u>
Ten assignments (2% each)	20%
Two 45 mins tests (15% each)	30%
Final Examination (3 hours)	50%

The [assignments](#) deliberately have a low weight, because their primary function is for learning as opposed to assessment. The tutorials are not assessed at all. However, doing the assignments and participating in the tutorials will be very important for passing the tests and the exam. Furthermore, we consider that the assignments and tutorials are so important that *submitting the assignments and attending the tutorials is a mandatory requirement* of the course (see below).

For many students, a good understanding is reached only late in this course: we want that *final* understanding to be what dominates the grade. Accordingly, if you beat either of your test mark percentages in the final exam, we will boost your test mark up to your exam mark.

Passing COMP 103

To pass COMP 103, a student must

- submit reasonable attempts for at least **7 assignments**, out of the 10 (or obtain an exemption by speaking with the course

- coordinator).
- attend at least 7 of the 10 tutorial sessions.
- gain at least a **C** grade overall.

Plagiarism

Working Together and Plagiarism

We encourage you to discuss the principles of the course and assignments with other students, to help and seek help with programming details, problems involving the lab machines. However, any work you hand in must be your own work.

The [School policy on Plagiarism](#) (claiming other people's work as your own) is available from the course home page. Please read it. We will penalise anyone we find plagiarising, whether from students currently doing the course, or from other sources. Students who knowingly allow other students to copy their work may also be penalised. If you have had help from someone else (other than a tutor), it is always safe to state the help that you got. For example, if you had help from someone else in writing a component of your code, it is not plagiarism as long as you state (eg, as a comment in the code) who helped you in writing the method.

Withdrawals

The last date for withdrawal from COMP 103 with entitlement to a refund of tuition fees is Friday 26 July. The last date for withdrawal without being regarded as having failed the course is Friday 27 September. Later withdrawals may be approved by the Dean in special circumstances.

Rules & Policies

Find key dates, explanations of grades and other useful information at <http://www.victoria.ac.nz/home/study>.

Find out about academic progress and restricted enrolment at <http://www.victoria.ac.nz/home/study/academic-progress>.

The University's statutes and policies are available at <http://www.victoria.ac.nz/home/about/policy>, except qualification statutes, which are available via the Calendar webpage at <http://www.victoria.ac.nz/home/study/calendar> (See Section C).

Further information about the University's academic processes can be found on the website of the Assistant Vice-Chancellor (Academic) at <http://www.victoria.ac.nz/home/about/avcacademic>

All students are expected to be familiar with the following regulations and policies, which are available from the school web site:

[Grievances](#)

[Student and Staff Conduct](#)

[Meeting the Needs of Students with Disabilities](#)

[Student Support](#)

[Academic Integrity and Plagiarism](#)

[Dates and Deadlines including Withdrawal dates](#)

[School Laboratory Hours and Rules](#)

[Printing Allocations](#)

[Expectations of Students in ECS courses](#)

The School of Engineering and Computer Science strives to anticipate all problems associated with its courses, laboratories and equipment. We hope you will find that your courses meet your expectations of a quality learning experience.

If you think we have overlooked something or would like to make a suggestion feel free to talk to your course organiser or lecturer.

[Course Outline as PDF](#)
