

Design and Analysis of Algorithms - Course Outline

COMP 303: 2012 Trimester 2

This document sets out the workload and assessment requirements for COMP 303. It also 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/or on the course web site. A printed copy of this document is held in the School Office.

Introduction

The goal of COMP 303 is to learn how to design correct and efficient algorithms to solve problems. There are two parts to this: finding a correct solution (*design*), and determining how efficient it is (*analysis*).

To achieve these goals, the course explores various general methods for designing algorithms, for demonstrating their correctness, and for analysing their efficiency. To illustrate the mechanisms and issues involved with each of the methods, we examine a number of well-known algorithms found in computer science and classify them according to the algorithm design technique used to develop them.

Objectives

By the end of the course, students should be able to:

1. Describe some important categories of algorithms (3(a)) (2);
2. Design an appropriate algorithm for a given problem (3(c), 3(f)) (2);
3. Demonstrate that an algorithm provides a correct solution to a given problem (2(b), 3(c), 3(d)) (2, 3);
4. Calculate and compare the efficiencies of different algorithms (3(a), 3(b), 3(c)) (2, 3, 4);
5. Explain the concepts of computational complexity and computability, and how they apply in practice (3(a), 3(b), 3(e)) (2, 4).

Your understanding will be assessed by written assignments, a programming project, and a final examination. Tutorial exercises and readings (not directly assessed) will reinforce lecture material.

Textbook

The textbook for COMP 303 is: *Kleinberg and Tardos, Algorithm Design, Addison-Wesley, 2006*. It is available at the VUW bookshop now, priced at approximately \$135. Two copies are available on the 3-day loan from the VUW library.

Other highly recommended books are:

Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, Introduction to algorithms, MIT Press, 2009 (the latest edition (2009) is on order at VUW library, but there are a few older editions available for loan there),

Robert Sedgewick, Algorithms in Java, Addison-Wesley, 2004 (one copy available in the library).

Lectures, Tutorials, Laboratories, and Practical work

A schedule of lecture topics, readings, and assignment due dates is available online. Major topics will include algorithm analysis, divide and conquer, greedy algorithms, dynamic programming, graph algorithms, complexity analysis, approximation and probabilistic algorithms.

Lectures for COMP 303 are:

Note that we have THREE lectures a week and we only have lectures in the first SEVEN weeks of the course since Alex Potanin is going to be away shortly after that.

- Mondays at 11:00am in CO118
- Wednesdays at 11:00am in CO118
- Fridays at 11:00am in CO118

Tutorials are going to be held in CO255 at a time determined in the first lecture. There is a tutorial every single week starting from the *second* week and going on for all TWELVE weeks of the trimester.

Assignments and Projects

There will be six pieces of assessment: five written assignments and one programming project with a substantial written component. There is a hand in box for the assignments and the project on the 2nd floor of Cotton Building marked

COMP 303. The programming part of the project will have to be submitted electronically using the [ECS Submission System](#).

The assessment will be related to the course objectives listed above. In particular, each piece of assessment will correspond to an important category of algorithms, including applying algorithms to solve problems, proving the algorithms correct and analysing their efficiency.

Workload

In order to maintain satisfactory progress in COMP 303, you should plan to spend an average of at least 10 hours per week on this paper. A plausible and approximate breakdown for these hours would be:

- Lectures and Tutorials: 3 hours,
- Readings: 2 hours,
- Assignments and Projects: 5 hours.

Note: A 15 point course maps to 150 hours over 15 weeks, where this includes the 12 weeks of lectures, 2 weeks of mid-trimester break, and 1 week of study period - all 15 weeks are expected to be full working (study) weeks for VUW students. As 300-level students, you are expected to take an increased level of responsibility for your work, including seeking out of appropriate research material to support your learning. Please refer to [ECS Expectations of Students](#) for more information.

School of Engineering and Computer Science

The School office is located on level three of the Cotton Building ([Cotton 358](#)).

Staff

The course organiser and lecturer for COMP 303 is [Alex Potanin](#). His contact details are:

- *Dr Alex Potanin*
- [Cotton 262](#)
- +64 4 463 5302
- Alex.Potanin@ecs.vuw.ac.nz

The tutorials will be ran by [Paley Li](#). His contact details are below and he can help with the course if [Alex Potanin](#) is away:

- *Paley Li*
- [Cotton 254](#)
- +64 4 463 5233 x8485
- Paley.Li@ecs.vuw.ac.nz

Announcements and Communication

The main means of communication outside of lectures will be the COMP 303 web area at http://ecs.victoria.ac.nz/Courses/COMP303_2012T2/. There you will find, among other things, this document, the [lecture schedule](#) and [assignment handouts](#), and the [COMP 303 Forum](#). The forum is a web-based bulletin board system. Questions and comments can be posted to the forum, and staff will read these posts and frequently respond to them.

Assessment

Your grade for COMP 303 will be determined based on the following assessment weightings:

<u>Item</u>	<u>Weight</u>
Written Assignment 1	5%
Written Assignment 2	5%
Programming Project	10%
Written Assignment 3	5%
Written Assignment 4	5%
Written Assignment 5	5%
Final Examination	65%

Typically, each assignment or project will cover the material presented in the corresponding weeks of the course. Each assessment item will address all or most of the course objectives.

Tests and Exams

The final examination will be three hours long. No computers, electronic calculators or similar devices will be allowed (or needed).

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. Paper non-English to English dictionaries will be permitted. The examination period for trimester 2 is 26 Oct - 17 Nov.

Practical Work

Work for marking should be placed in the COMP 303 assignment box in the corridor of level 2 of the Cotton Building. Additionally, Programming Project will need to be submitted using the [ECS Submission System](#). Marked assignments will be available at tutorials, or from the School Office ([Cotton 358](#)).

The assignments and the project are due on the following Mondays (and one Friday) at 11am (just before the normal lecture time slot):

<u>Item</u>	<u>Due Date</u>
Written Assignment 1	11am, Monday, 6th of August, 2012
Written Assignment 2	11am, Monday, 20th of August, 2012
Programming Project	11am, Monday, 10th of September, 2012
Written Assignment 3	11am, Monday, 24th of September, 2012
Written Assignment 4	11am, Monday, 8th of October, 2012
Written Assignment 5	11am, Friday, 19th of October, 2012

Late pieces of assessment will be accepted only in exceptional circumstances. Typically, appropriate documentation (e.g. a medical certificate) will be required. If the course coordinator did not give you a specific permission to hand in a late piece of work, you will receive 0 marks for that particular piece of assessment.

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.

Mandatory Requirements

1. *Achieve at least 40% average across all of the assignments (including the programming project).*
2. *Achieve at least 40% in exam.*

Passing COMP 303

To pass COMP 303, a student must satisfy mandatory requirements and gain at least a **C** grade overall.

Withdrawal

The last date for withdrawal from COMP 303 with entitlement to a refund of tuition fees is Friday 27 July 2012. The last date for withdrawal without being regarded as having failed the course is Friday 28 Sept 2012 -- though 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.
