Design and Analysis of Algorithms - Course Outline
COMP 361: 2016 Trimester 2

This document sets out the workload and assessment requirements for COMP 361. 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 361 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 assignments and a final examination. Tutorial exercises and readings will reinforce lecture material and may be assessed in the examination.

Textbook

There is no official textbook for COMP 361. However, we highly recommend: *Kleinberg and Tardos, Algorithm Design, Addison-Wesley, 2006.* It was used as a textbook for the previous version of this course and some [second hand] copies might still be available. 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 361 are: *Tuesdays and Fridays at 9am in FT77/306*.

Tutorials for COMP 361 are: *Mondays 1:10pm - 2:00pm in FT83/203* and *Wednesdays 12:00pm - 12:50pm in AM106* (starting in the second week).

Assignments and Projects

There are going to be four assignments each worth 10% of the final grade. The exam will be worth the remaining 60%. All assignments will have to be submitted electronically using the ECS Submission System by the due date and time.

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 361, 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: 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 361 is Alex Potanin. His contact details are:
- *Dr Alex Potanin*
- Cotton 262
- +64 4 463 5302
- alex@ecs.vuw.ac.nz

NB! Alex runs office hours during Term 2: *Tuesdays 10:00am - 12:00pm*. Please only see Alex during these hours as there are a number of other large courses and commitments that he has in T2.

The tutorials will be run by Harry Ross (Mondays) and Paul Mathews (Wednesdays).

The assignments will be marked by the same two tutors.

The class representative is Adrian Cochrane.

Announcements and Communication

The main means of communication outside of lectures will be the COMP 361 web area at http://ecs.victoria.ac.nz/Courses/COMP361_2016T2/. There you will find, among other things, this document, the lecture schedule and assignment handouts, and the COMP 361 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 361 will be determined based on the following assessment weightings:

Item	Weight
Assignment 1	10%
Assignment 2	10%
Assignment 3	10%
Assignment 4	10%
Final Examination	60%

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

Tests and Exams

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 two 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 21 October - 12 November.

Practical Work

The assignments are due on the following Mondays (and one Friday) mostly just before the normal lecture time slot.

Item	Due Date
Assignment 1	8:30am, Monday, 15 August 2016
Assignment 2	8:30am, Monday, 5 September 2016
Assignment 3	8:30am, Monday, 26 September 2016
Assignment 4	11:59pm (just before midnight), Friday, 14 October 2016

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.

CHANGED IN WEEK 3: We will now allow 3 late days (to be discussed during lecture 5 in class) with 0 marks given after 3 late days are used up. The late days will be tracked by the ECS submission system. Please email Alex Potanin if you are not sure about any part of this.

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% in exam.*

Passing COMP 361

To pass COMP 361, a student must satisfy mandatory requirements and gain at least a **C-** grade overall.

Withdrawal

The last date for withdrawal from COMP 361 with entitlement to a refund of tuition fees is Friday 22 July 2016. The last date for withdrawal without being regarded as having failed the course is Friday 23 September 2016 -- 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

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