

COMPSCI 105, Summer Semester, 2017

Principles of Computer Science

Course Information

What is Computer Science?

Computer Science has revolutionised virtually all aspects of human enterprise. A large part of the subject involves techniques for making software development simpler and more reliable, but fundamentally Computer Science is about *abstraction*. Abstraction refers to finding an appropriate model that can be used to solve a particular problem. Computer Scientists create abstractions of real-world problems that can be efficiently represented and manipulated inside a computer.

What is COMPSCI 105?

This course extends the programming skills obtained from the first programming course (COMPSCI 101) emphasising good software design through an appreciation of data structures and code efficiency. COMPSCI 105 provides an introduction to objects and classes, exception handling, algorithm analysis and recursion. The importance of abstraction and abstract data types is illustrated through the study of fundamental data structures (such as linked lists, stacks, queues, trees and hash tables). The performance characteristics of different implementations of these data structures are studied, aided by an introduction to the performance of searching and sorting algorithms.

Learning outcomes

A student who successfully completes this course will be able to:

- Define a class to model and represent an object
- Write code which handles important exception types
- Use a standard data interchange format for reading and writing complex data types
- Write programs that store and manipulate data in standard linear data structures (arrays, linked lists, stacks, queues) and non-linear data structures (hash tables, trees)
- Compare the efficiency of algorithms using standard big-O notation
- Implement recursive solutions to simple problems
- Implement recursive data structures such as linked lists and trees
- Explain the basic algorithm for any of the studied sorting methods

Teaching staff

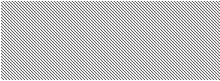
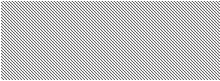
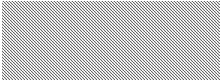



Paul Denny (Course Coordinator)

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COMPSCI 105 - Course schedule - Summer, 2017

Lectures: 11am - Large Chemistry (Mon, Tue, Wed, Fri) and Old Govt. House, Room G36 (Thu)

Monday	Tuesday	Wednesday	Thursday	Friday
<i>2 Jan</i> 	<i>3 Jan</i> 	<i>4 Jan</i> 	<i>5 Jan</i> Lect 1 (11am) Intro, Python lists	<i>6 Jan</i> Lect 2 (11am) Recap: slicing, loops, comprehensions Lab 0: online (recap / practice)
<i>9 Jan</i> Lect 3 (11am) Equality, references, mutability	<i>10 Jan</i> Lect 4 (11am) Classes (Part 1)	<i>11 Jan</i> Lect 5 (11am) Classes (Part 2) Lab 1: 12, 1, 2, 3 <i>Strings, lists, and equality</i>	<i>12 Jan</i> Lect 6 (11am) Classes (Part 3) and JSON Lab 2: 12, 1, 2, 3 <i>Classes</i>	<i>13 Jan</i> Lect 7 (11am) Exceptions (Part 1)
<i>16 Jan</i> Lect 8 (11am) Exceptions (Part 2)	<i>17 Jan</i> Lect 9 (11am) Complexity (Part 1)	<i>18 Jan</i> Lect 10 (11am) Complexity (Part 2) Lab 3: 12, 1, 2, 3 <i>Exceptions</i>	<i>19 Jan</i> Lect 11 (11am) ADTs and Stacks (using Python lists) Lab 4: 12, 1, 2, 3 <i>Complexity</i>	<i>20 Jan</i> Lect 12 (11am) Queues (using Python lists) <div>ASST ONE DUE</div>
<i>23 Jan</i> Lect 13 (11am) Queues (using Python lists)	<i>24 Jan</i> Lect 14 (11am) Linked lists (Part 1)	<i>25 Jan</i> Lect 15 (11am) Linked lists (Part 2) Lab 5: 12, 1, 2, 3 <i>Stacks and Queues</i>	<i>26 Jan</i> Lect 16 (11am) List variations and iterators Lab 6: 12, 1, 2, 3 <i>Linked lists, iterators</i>	<i>27 Jan</i> Lect 17 (11am) Recursion (Part 1) <div>* Test *</div> <div>* 6:30pm *</div>
<i>30 Jan</i> 	<i>31 Jan</i> Lect 18 (11am) Recursion (Part 2) and binary search	<i>1 Feb</i> Lect 19 (11am) Hashtables (Part 1) Lab 7: 12, 1, 2, 3 <i>Recursion</i>	<i>2 Feb</i> Lect 20 (11am) Hashtables (Part 2) NO LAB	<i>3 Feb</i> Lect 21 (11am) Sorting - simple sorts
<i>6 Feb</i> 	<i>7 Feb</i> Lect 22 (11am) Sorting - faster sorts	<i>8 Feb</i> Lect 23 (11am) Intro to trees Lab 8: 12, 1, 2, 3 <i>Searching, hashing</i>	<i>9 Feb</i> Lect 24 (11am) Binary search trees Lab 9: 12, 1, 2, 3 <i>Sorting</i>	<i>10 Feb</i> Lect 25 (11am) Binary expression trees
<i>13 Feb</i> Lect 26 (11am) Priority queues and heaps	<i>14 Feb</i> Lect 27 (11am) Regular expressions	<i>15 Feb</i> Lect 28 (11am) Revision Lab 10: 12, 1, 2, 3 <i>Trees and regex</i>	<i>16 Feb</i> 	<i>17 Feb</i> <div>ASST TWO DUE</div>

Assessment

Your final grade will be calculated based on the following four assessments:

- Labs (worth 10%)
- Assignments (worth 15%)
- Test (worth 15%)
- Final exam (worth 60%)

Your combined mark for the Labs and Assignments is worth 25% and is referred to as your “Practical” component. Your combined mark for the Test and Final exam is worth (75%) and is referred to as your “Theory” component.

Very important: to pass the course, you must pass your “Practical” component (i.e. score at least 12.5 out of 25) and you must also pass your “Theory” component (i.e. score at least 37.5 out of 75). Failing either your “Practical” or your “Theory” component, regardless of your performance in the other component, will result in failing the course.

Labs

There are 10 labs, held on Wednesdays and Thursdays throughout summer school (from 12-4pm). The first lab starts on Wed 11th January. Lab completion is compulsory (and counts towards your final grade), however lab attendance is voluntary - but encouraged. You should attend the lab session/times that you have booked.

Most of the Labs use the CodeRunner tool, which is designed to help you practice writing code by presenting you with a set of short online exercises. Submissions are graded by running a series of test cases of the code in a sandbox and comparing the output with the expected output. You access CodeRunner by logging into:

<https://www.coderunner.auckland.ac.nz/>

In total, the Labs contribute 10% towards your final grade.

Assignments

There are two assignments (worth a total of 15%) for which you are required to write one or more programs. Both assignments are to be submitted to the assignment dropbox:

<https://adb.auckland.ac.nz/>

Test

The Test contributes 15% towards your final mark, and will be held between 6 pm - 8 pm on Friday 27th January. Please ensure you are available to sit the Test - if you are enrolled in another course that has a test scheduled for the same time (or if you are unable to attend this test time for another valid reason), then please contact the course coordinator, Paul Denny, as soon as possible.

Exam

The Exam contributes 60% towards your final mark. Please check Student Services Online for the exam time and date. The exam is closed book, and calculators and watches are not permitted. Provisional exam results can be obtained from Student Services Online.

How to seek assistance

We want everybody to succeed. The labs are a good place to seek one on one assistance with a lab tutor. Labs are held on Wednesdays and Thursdays at 12:00 noon, 1:00pm, 2:00pm and 3:00pm throughout summer school.

If you have an administrative problem (e.g. you have been ill, you have a timetable clash with your lab or test, your marks have been incorrectly recorded, etc.), or any other sort of problem that you need help with, please see the course coordinator (Paul Denny). Students are asked to discuss privately any impairment related requirements face-to-face and/or in written form with the course coordinator. If you need extra help with understanding the course material, or preparing for the test or exam, you are very welcome to visit the teaching staff or any lab tutor at a time when they are available.

There are many other resources available within the University, e.g. the Student Learning Centre, the library, DELNA (to identify where you may need help with your academic English) and ELE (English Language Enrichment - a set of resources to help you improve your English).

Webmail

All students have a university email account. Your university email address is: USERNAME@aucklanduni.ac.nz, e.g. abcd001@aucklanduni.ac.nz. You can access your email from anywhere you have Internet access, by logging into

<http://webmail.ec.auckland.ac.nz>

You must read email sent to your university email address regularly, as staff members often send important messages to students via their university email address. When emailing staff members, please use your university email address.

Class Website

Although we will be using Canvas during summer school for lecture notes, recordings and assessment resources, the COMPSCI 105 website contains some basic information about the course:

<https://www.cs.auckland.ac.nz/courses/compsci105ssc/>

Lecture Recordings

Recorded lectures can be found on Canvas.

Missed exam

If you miss the exam for any valid reason, or you sit the exam but believe that your performance was impaired for some reason, then you may be able to apply for an aegrotat, compassionate or special pass consideration. For more detailed information, refer to the University of Auckland's Calendar.

Checking your marks on Canvas

You can check your marks by logging onto Canvas

<https://canvas.auckland.ac.nz>

If there are any problems with your Lab, Assignment or Test marks, please contact Paul Denny.

Policy on Cheating and Plagiarism

Cheating is viewed as a very serious offence by the University of Auckland. Penalties are administered by the Discipline Committee of the Senate, and may include suspension or expulsion from the university. Do not copy anyone else's work, or allow anyone else to copy from you.

For more information on the University's policy on cheating, please refer to the web page:

<https://www.auckland.ac.nz/en/about/learning-and-teaching/policies-guidelines-and-procedures/academic-integrity-info-for-students.html>

Do not ever copy anyone else's work, or allow anyone else to copy from you.

Print Quota

You can add credit to your print quota at the library or the IC Helpdesk on Level 2 of the Kate Edger Information Commons, 11 Symonds St.

Enjoy the course!