



Welcome to COMPSCI 101

Principles of Programming

Lecture 1 – Introduction



Learning outcomes

At the end of this lecture, students should be able to:

- ▶ understand where to obtain information about COMPSCI 101
- ▶ understand which parts of the COMPSCI 101 assessment contribute to the invigilated practical mark
- ▶ understand which parts of the COMPSCI 101 assessment contribute to the theory mark
- ▶ understand that to pass COMPSCI 101, both the invigilated practical part of the course and the theory part of the course need to be passed
- ▶ understand an algorithm



We are using Canvas

We will be using the Canvas Learning Management system this system which can be accessed by logging onto the Canvas website:

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

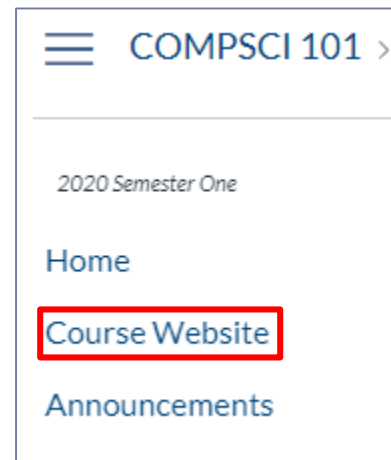
A screenshot of the Canvas Learning Management System interface for the course COMPSCI 101. The page title is 'COMPSCI 101 > Syllabus'. The main content area shows '2020 Semester One' and 'COMPSCI 101: Principles of Programming' with a 'Jump to today' link. Below this, the course title 'COMPSCI 101 Semester 1 2020' is displayed. A list of links is provided, including 'Course Information Document', 'Learning Outcomes', 'Teaching Staff', 'Lecture times and locations', 'Requirements for Passing CompSci101', 'First Invigilated Online Test', 'Second Invigilated Online Test', 'Final (Written) Exam', 'Labs', 'Timed CodeRunner Questions', 'Assignments', 'Checking Your Marks', and 'Plazza Discussion Forum'. A sidebar on the left contains navigation links: Home, Course Website, Announcements, Lectures, Lab Timetable, Recordings, Assignments, CodeRunner3, Grades, Classroom, Piazza, and Pages.



The COMPSCI 101 Website

As well as using Canvas, COMPSCI 101 has a course website:

- ▶ <https://www.cs.auckland.ac.nz/courses/compsci101s1c/>
- ▶ Here you will find information about how our course is set up.
- ▶ Get used to looking at this website for information about lecture slides, lab documents, assignment resources, assessments, people involved in the course and lots more.
- ▶ The COMPSCI 101 website can also be reached by through the COMPSCI 101 Canvas page.





The COMPSCI 101 Website

COMPSCI 101 > COMPSCI 101: Principles of Programming

2020 Semester One

Home

Course Website

Announcements

Lectures

Lab Timetable

Recordings

Assignments

CodeRunner3

Grades

Classroom

Piazza

Pages

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enter keywords Search

University home » Faculty of Science » Department of Computer Science » Archive » COMPSCI 101 S1 C »

Computer Science

Principles of Programming: COMPSCI 101 Semester 1, 2020

- » Course Information Document
- » Lecture times and locations
- » Requirements for passing the course
- » Lab Sessions
- » Timed CodeRunner Questions
- » Assignments
- » Marks
- » Invigilated Online Tests
- » Final Exam
- » Final Learning Outcomes

DETAILS

- » Course Page
- » Course Information
- » People
- » Lectures
- » Assignments
- » Labs
- » Tests and Exams
- » Resources
- » Archive
- » Rights & Responsibilities
- » Personal Portal
- » Forums

Course Information Document

People

Lectures

Assignments

Labs

Tests, Exams



People in this Course

Ann Cameron (Lab Supervisor)

Email: ann@cs.auckland.ac.nz

Phone: 9234947

Room: 303.413





People in this Course

Damir Azhar (Course Coordinator)

Email: damir.azhar@auckland.ac.nz

Phone: 9232391

Room: 303.411





People in this Course

Adriana Ferraro

Email: adriana@cs.auckland.ac.nz

Phone: 9237113

Room: 303.415





People in this Course

Angela Chang

Email: a.chang@auckland.ac.nz

Phone: 9236620

Room: 303.413





Office Hours

Open door policy – Visit any time





Lecture Schedule

The course information document gives an overview of the course assessment course along with a lecture schedule. Note that this is preliminary and may be subject to change

Course Information Document

COMPSCI 101 > COMPSCI 101: Principles of Programming

2020 Semester One

Home

Course Website

Announcements

Lectures

Lab Timetable

Recordings

Assignments

CodeRunner3

Grades

Classroom

Piazza

Pages

THE UNIVERSITY OF AUCKLAND
NEW ZEALAND
Te Whare Wānanga o Tāmaki Makaurau

DETAILS

- Course Page
- Course Information
- People
- Lectures
- Assignments
- Labs
- Tests and Exams
- Resources
- Archive
- Rights & Responsibilities
- Personal Portal
- Forums

University home > Faculty of Science

Computer Science

Principles of Programming 2020

- Course Info
- Lecture timetable
- Requirements
- Lab Session
- Timed Code
- Assignment Marks
- Invigilated
- Final Exam
- Final Learning

COMPSCI 101, Semester 1, 2020				
Day	Date	Lecture	Schedule	Labs
Saturday/Sunday				
Monday	2-Mar			Where is the lab
Tuesday	3-Mar	1	Introduction	
Wednesday	4-Mar	2	Variables, program execution, doing calculations, print()	
Thursday	5-Mar			
Friday	6-Mar	3	Expressions, mathematical operators, the math module	
Saturday/Sunday				
Monday	9-Mar			LAB 1
Tuesday	10-Mar	4	Strings, objects, the len() function, string slices	
Wednesday	11-Mar	5	Manipulating strings, String methods, dot notation	
Thursday	12-Mar			
Friday	13-Mar	6	Getting user input, converting between types, generating random numbers	
Saturday/Sunday				
Monday	16-Mar			LAB 2
Tuesday	17-Mar	7	Defining functions 1	
Wednesday	18-Mar	8	Defining functions 2, functions can call other functions, scope of variables	
Thursday	19-Mar			
Friday	20-Mar	9	Code tracing, divide a program into separate tasks	
Saturday/Sunday				
Monday	23-Mar			LAB 3
Tuesday	24-Mar	10	Boolean expressions, if statements, equality and floats	
Wednesday	25-Mar	11	if...else, if...elif statements, nested ifs	
Thursday	26-Mar			
Friday	27-Mar	12	while loops	
Saturday/Sunday				
Monday	30-Mar			LAB 4
Tuesday	31-Mar	13	The Python range() function, for...in loops	
Wednesday	1-Apr	14	Lists, using for...in loops to iterate through the elements of a list	
Thursday	2-Apr			
Friday	3-Apr	15	The split() function, updating the elements of a list, lists are mutable objects	
Saturday/Sunday				
Monday	6-Apr			LAB 5
Tuesday	7-Apr	16	Slicing lists, list methods	
Wednesday	8-Apr	17	List revision - Assignment 3 Help	
Thursday	9-Apr			
Mid-semester Break				

<https://www.cs.auckland.ac.nz/courses/compsci101s1c/CourseInformation.pdf>



Lecture Slides

Lecture slides will be available on the web before each lecture.

The screenshot shows a navigation menu on the left with the following items: DETAILS, Course Page, Course Information, People, Lectures, Assignments, Labs, Tests and Exams, Resources, Archive, Rights & Responsibilities, Personal Portal, and Forums. A pink arrow points from the word 'Lectures' to the 'Lectures' menu item. The main content area shows the breadcrumb path: University home » Faculty of Science » Department of Computer Science » Courses » COMPSCI 101 S1 C » Lectures ». Below this is the heading 'Computer Science' and 'Lectures: COMPSCI 101 Semester 1, 2020'. Underneath are links for 'Python tutor online' and 'Week 1'. A section titled 'Lecture notes' contains the text: 'Slides used in lectures will be provided here. Lecture recordings are available on Canvas. If you miss a lecture, then please watch the lecture recording on Canvas.'

<https://www.cs.auckland.ac.nz/courses/compsci101s1c/lectures>



There is no Textbook for COMPSCI 101

There is **no textbook** but we do have an online reference book:

- ▶ **Think Python – How to think like a computer scientist.**

Please be aware that we are teaching the COMPSCI 101 material in a different order to the ordering in this book. This book is a reference book, not a textbook for this course.

Resources →

DETAILS
Course Page
Course Information
People
Lectures
Assignments
Labs
Tests and Exams
Resources
Archive
Rights & Responsibilities
Personal Portal
Forums

University home » Faculty of Science » Department of Computer Science » Courses » COMPSCI 101 S1 C » Resources »

Computer Science

Resources: COMPSCI 101 Semester 1, 2020

- » Python
- » Reference Book
- » Miscellaneous

Python

- Python Download (Remember to get version 3, not version 2 - the latest is version 3.8.2)
- Python Documentation
- The Python Tutorial

Reference Book

- Think Python (Version 1.1.24+Kart [Python 3.2])

Miscellaneous

- Additional resources maybe available from the University's Library.



Labs

You must attend **one** 2 hour tutorial lab sessions each week. You will have enrolled in your lab time through Student Services Online. You should attend the same lab time each week.

- ▶ Labs are held in room 279 (Building 303S) which is on the second floor of the Computer Science building.
- ▶ **Labs start in the second week: March 9th – 13th**



Labs

DETAILS	
▼	Course Page
▼	Course Information
▼	People
▼	Lectures
▼	Assignments
▼	Labs
▼	Tests and Exams
▼	Resources
▼	Archive
▼	Rights & Responsibilities
▼	Personal Portal
▼	Forums

University home » Faculty of Science » Department of Computer Science » Courses » COMPSCI 101 S1 C » Labs »

Computer Science

Labs: COMPSCI 101 Semester 1, 2020

- » Lab Supervisor
- » Location of Lab
- » Academic Honesty

Lab Supervisor

Any problems with the labs, please contact Ann Cameron.



More about labs

- ▶ **Labs start in the second week: March 9th – 13th**
- ▶ There are 9 labs worth 9% of your final mark.
 - ▶ At your lab time you will be given programming problems to solve within the 2 hours for your lab.



Labs

DETAILS	
▶	Course Page
▶	Course Information
▶	People
▶	Lectures
▶	Assignments
▶	Labs
▶	Tests and Exams
▶	Resources
▶	Archive
▶	Rights & Responsibilities
▶	Personal Portal
▶	Forums

University home » Faculty of Science » Department of Computer Science » Courses » COMPSCI 101 S1 C » Labs »

Computer Science

Labs: COMPSCI 101 Semester 1, 2020

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Lab Supervisor

Any problems with the labs, please contact [Ann Cameron](#).



<https://www.cs.auckland.ac.nz/courses/compsci101s1c/labs/>



Before the First Lab

Visit the lab on **Wednesday** between 1:30pm and 3pm.

- ▶ Before the first lab you need to complete the lab preparation sheet (I will hand this out).
- ▶ In order to fill the sheet you need to visit the COMPSCI 101 lab on Wednesday. Immediately after the lecture today I will be taking people across to the COMPSCI 101 lab.

 CompSci101 Preparation for First Lab March, 2020	
<p>Welcome to CompSci101 ☺</p> <p>This sheet is designed to help you prepare for the laboratory. Read this handout carefully and complete the tasks before your lab session starts. This sheet must be completed before you attend your first lab in the week commencing March 9th and will be marked by the lab tutor when you get your lab exercises marked.</p>	<p>TASK 2: Log into a computer in Room 279 on Wednesday 4th March sometime between 1pm and 2:30pm.</p> <p>Sometime between 1pm and 2:30pm on Wednesday, 4th March, go along to the lab (Room 303S-279) and make sure that your login username and password work correctly in that lab.</p> <p>What is your username? <input type="text"/></p>
<p>AIMS</p> <p>The purpose of these preparation tasks is to:</p> <ul style="list-style-type: none">• ensure that you know where the CompSci101 lab is• ensure that you are able to log into a computer in the lab	<p>TASK 3: Know WHEN your lab sessions are</p> <p>Now that you know <i>where</i> your lab sessions are held and you are able to log into a computer, it is equally important that you <i>turn up on time</i>. Marks are awarded for arriving to your lab on time.</p> <p>You will have booked your lab time when you enrolled using Student Services Online. Check your lab times on Student Services Online, and write down the day and the time of the lab session that you will attend each week.</p>
<p>REQUIRED READING</p> <ul style="list-style-type: none">• Course Information document on the CompSci101 website (https://www.cs.auckland.ac.nz/courses/compsci1011c/)	<p>Your name: <input type="text"/> Surname: <input type="text"/> First name: <input type="text"/></p> <p>Your Lab Time: <input type="text"/> Lab Day: <input type="text"/> Lab Time: <input type="text"/></p>
<p>GETTING STARTED</p> <p>TASK 1: Know WHERE your lab sessions are held</p> <p>Every lab session is held in Room 303S-279 on Level 2 of the Computer Science Extension to the Maths and Physics Building (Building 303S). Please go along to Room 279 on Wednesday 4th March sometime between 1pm and 2:30pm.</p>  <p>What is the message on the door of Room 279 on Wednesday 4th March? <input type="text"/></p>	<p>TASK 4: Know what to bring to your first lab session in Week 2</p> <p>You need to bring along the following items to your first lab session in Week 2 (the week beginning Monday 9th March):</p> <ul style="list-style-type: none">✓ USB Flash Drive✓ This pre-lab sheet (completed)✓ A pen <p>Continued over page...</p>
<p>Page 1 of 4</p>	<p>Page 2 of 4</p>



Assignments

The assignments are worth 15% of your final mark.

Assignments give you the experience of solving problems **on your own.**

Assignments



The screenshot shows a navigation sidebar on the left with the following items: Course Page, Course Information, People, Lectures, Assignments, Labs, Tests and Exams, Resources, Archive, Rights & Responsibilities, Personal Portal, and Forums. The 'Assignments' item is highlighted. The main content area is titled 'Computer Science' and 'Assignments: COMPSCI 101 Semester 1, 2020'. It contains links for 'Dates', 'Assignment Dropbox', 'CodeRunner', and 'Plagiarism/Cheating on Assignments'. Below these links is a section titled 'Dates' with the following text: 'Assignments and the CodeRunner contribution will be worth 15% of the final grade. There will be 5 assignments with due dates (tentative) as follows:'. A list of five assignments follows, each with a due date and worth 3%: Assignment 1 (Due 24th March), Assignment 2 (Due 9th April), Assignment 3 (Due 11th May), Assignment 4 (Due 26th May), and Assignment 5 (Due 5th June). Each assignment has a sub-item 'TBA'. The page concludes with the instruction: 'Assignments must be submitted by the deadline 4:30pm on the due date.'

Solve the problem on your own – discuss the assignment with others but never share code.

<https://www.cs.auckland.ac.nz/courses/compsci101s1c/assignments/>



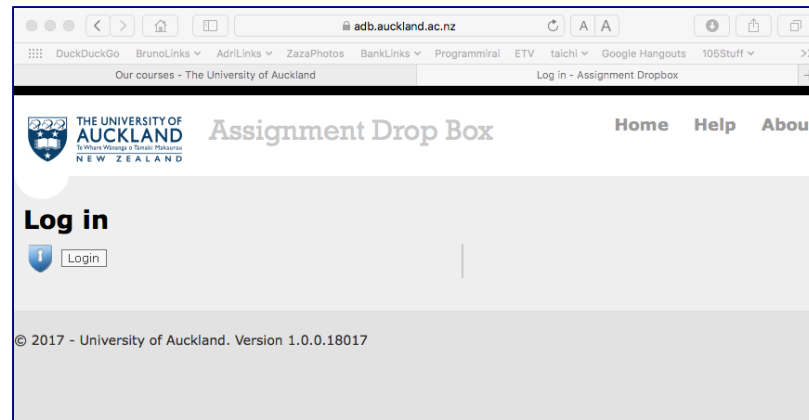
Assignments – Assignment Drop Box

There are 5 assignments in total worth 15% of your final mark.

All assignments are due at **4:30pm on the due date.**

For **parts** of these five assignments you are required to write and submit one or more programs.

- ▶ These parts of the five assignments are handed in using the **Assignment Drop Box**



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



Assignments – CodeRunner 3

For **parts** of these five assignments (a total of 6%), you are required to use **CodeRunner 3**.

<https://coderunner3.auckland.ac.nz/moodle>

The CodeRunner 3 tool is designed to help you practice by presenting you with a set of coding and other exercises. Submissions are graded by running a series of test cases on your code (or short answers) and comparing the output of your code (or short answers) with the expected output. CodeRunner3 uses the Moodle learning system.

Information about using CodeRunner 3 is available on COMPSCI 101 assignments web page:

<https://www.cs.auckland.ac.nz/courses/compsci101s1c/assignments/>



Timed CodeRunner Exercises

There are 9 timed CodeRunner 3 exercises. Each exercise consists of 1 or more questions and is worth 1%.

- ▶ Only the best 6 marks will be counted towards your final grade.

These exercises are timed which means that you will have to develop and implement your solution within a certain amount of time.

- ▶ Usually 15 minutes are allocated per question.

The timed CodeRunner exercises will become available after the end of the sessions for each lab (i.e. after 7pm on Fridays) and each exercise will be available for 24 hours only.

- ▶ These exercises are **closely aligned** to their corresponding lab



Plagiarism

Plagiarism: Any work that you take credit for, but which is done by someone else. This is treated very seriously in an academic environment.

Academic Integrity

Any work that you take credit for, but which is done by someone else. This is treated very seriously in an academic environment.

Policy

- All assignments will be checked for copying
- *Everyone* involved is penalised
- Disciplinary action will be taken in all cases of plagiarism



Advice

- Don't ever copy an assignment (or part of an assignment) from anyone
- Don't ever allow anyone to copy your assignment

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



Academic Integrity

Academic Integrity - Home

www.academicintegrity.auckland.ac.nz

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ACADINT A01
Academic Integrity

enter keywords search

Site Map Glossary Help

All students starting a new programme at the university are required to complete the Academic Integrity course. For more information, go to [Academic Integrity-information for students.](#)

Academic Integrity

Click here for course assessment

To view this online course, we recommend using the latest versions of your web browser.
Click on the browser name below to download the latest version from the appropriate website.

[Firefox](#) | [Chrome](#) | [Internet Explorer](#) | [Safari](#) | [Opera](#)

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Two Invigilated Online Tests

There are two practical invigilated tests. The tests are answered and validated on CodeRunner 3.

Test 1: Morning of Saturday 2nd May – 20% of your final mark

Test 2: Morning of Saturday 6th June – 25% of your final mark

The tests are 90 minutes. You should arrive 15 minutes before the test start time.

There is more information about the invigilated tests on the “Tests and Exams” web page:

<https://www.cs.auckland.ac.nz/courses/compsci101s1c/exams/>



Written Exam

The exam is worth 25% of your final mark.

*Information about
missed exams,
aegrotats, etc.*



Aegrotat and compassionate consideration

Find out what to do if personal
circumstances have affected your exam
performance or preparation.

[See details >](#)



Missed exam

Find out what to do if you have missed an
exam.

[More information >](#)

<https://www.auckland.ac.nz/en/students/academic-information/exams-and-final-results/during-exams.html>



Passing COMPSCI 101

Assignments, Timed Exercises, Labs – 30%	
Labs	9%
Assignments	15%
Timed Exercises	6%

Two online tests – 45%	
Test 1	20%
Test 2	25%

Exam – 25%	
Exam	25%

To pass the course you need:

- ▶ To **pass the invigilated online test component**. You need to obtain at least 22.5 marks out of 45 as the combined total mark for both tests.
- ▶ To **pass the invigilated final written exam**. You need to obtain at least 12.5 marks out of 25 marks for the exam.
- ▶ An **overall mark of at least 50%** out of the full course total of 100%

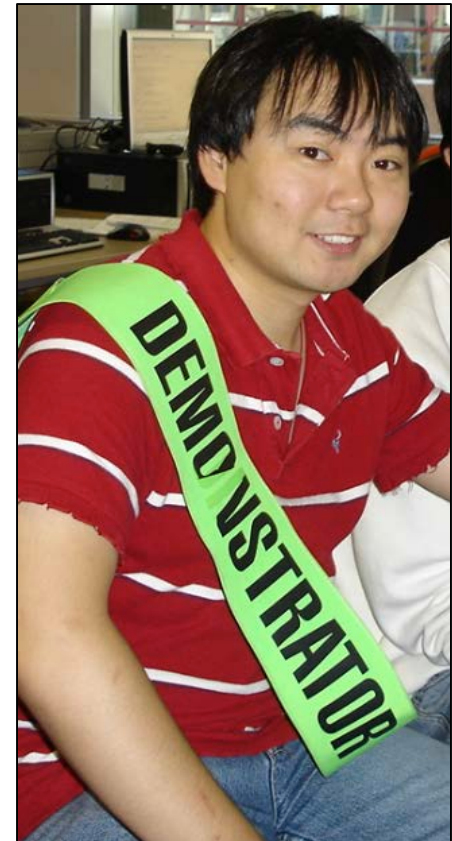


Computing Resources

Undergraduate Labs

- ▶ There are demonstrators in these labs to help you

GCL (room 303S.G91) – Ground Floor
Computer Lab





Piazza

Piazza is a Q&A web service integrated into Canvas.

You can use Piazza to ask questions that the lecturers and your classmates can discuss and answer.

Please never post your own code up on Piazza!

The screenshot shows the Piazza interface for the course COMPSCI 101, Semester 1 2019. The top navigation bar includes 'Q & A', 'Resources', 'Statistics', and 'Manage Class'. The user 'Damir Azhar' is logged in. The main content area displays a post titled 'Welcome to COMPSCI 101, Semester 1 2019' with 2 views. The post includes a video of a man saying 'WELCOME, WELCOME, WELCOME, WELCOME.' and a text message from the instructor, Damir Azhar, welcoming the class and explaining the purpose of the Piazza page. The post is tagged 'general' and has an 'edit' button at the bottom.



Learning Outcomes for COMPSCI 101

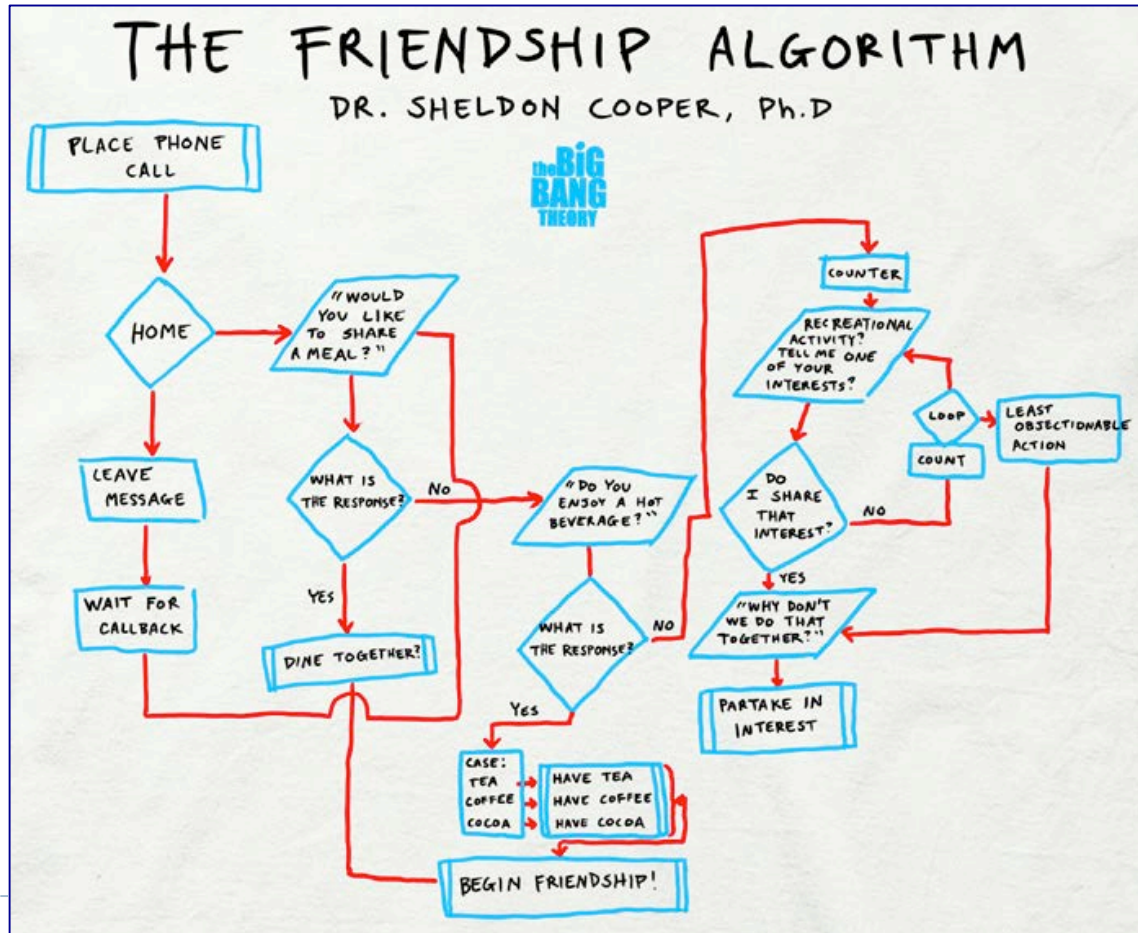
- ▶ Determine the state of the program both during and after execution, given a code listing that may include functions and parameters, loops, conditionals and sequences.
- ▶ Implement a given algorithm using Python,
- ▶ Show that a program meets given specifications by writing appropriate tests.
- ▶ Provide a useful level of documentation, in the form of program comments, for all programs developed.
- ▶ Decompose a simple problem into several smaller tasks, given a brief textual description of the problem.
- ▶ Compose functions that perform specified tasks into a program that solves a given problem.



Algorithms

A finite set of steps that specify a sequence of operations to be carried out in order to solve a specific problem.

A better definition:
An algorithm is a well-defined, unambiguous sequence of steps



Algorithms – What Kind of Steps?

**HOW TO
GET TO
UNI**

An algorithm is a well-defined,
unambiguous sequence of steps

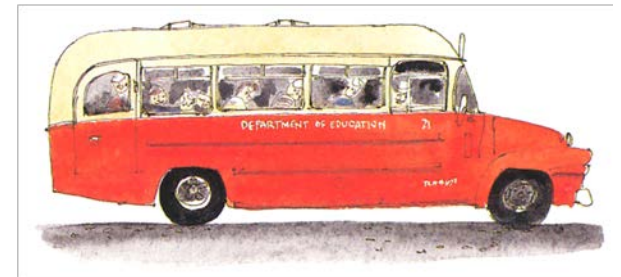
Walk to the bus stop at the shops up the road

Get on bus number "101"

Pay the bus driver \$4.50

Get off at the Symonds St bus stop

Walk 200m to the Computer Science building



sequential
operations



Algorithms – What Kind of Steps?

HOW TO WALK TO THE BUS STOP

An algorithm is a well-defined,
unambiguous sequence of steps

conditional
operations



Open the front door

IF it is raining **THEN**

take an umbrella



Walk down the driveway and turn left

Walk 50m down the street

Algorithms – What Kind of Steps?

HOW TO PAY THE BUS FARE

An algorithm is a well-defined, **unambiguous** sequence of steps

iterative
operations

Open wallet

WHILE you still haven't paid enough

give the driver another coin

Take a seat



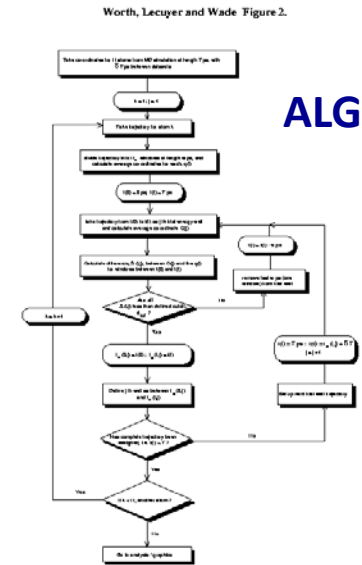
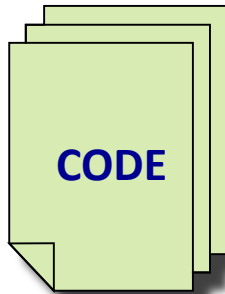
Basic Programming Steps



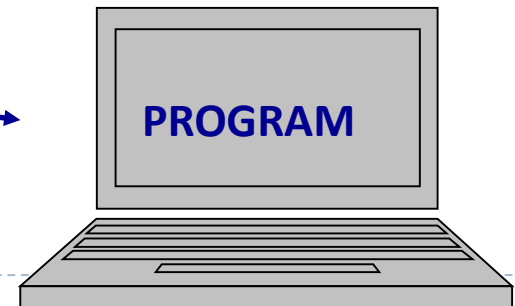
1. design

2. coding

3. testing



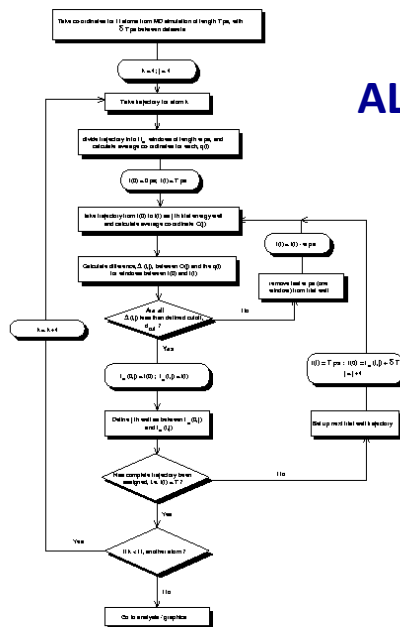
ALGORITHM



Programming - Step 2 - write the code

We will use the **Python programming language** to implement our algorithms

Worth, Lecuyer and Wade Figure 2.



ALGORITHM

2. coding

