

KIT107  
PROGRAMMING

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UNIVERSITY of  
TASMANIA

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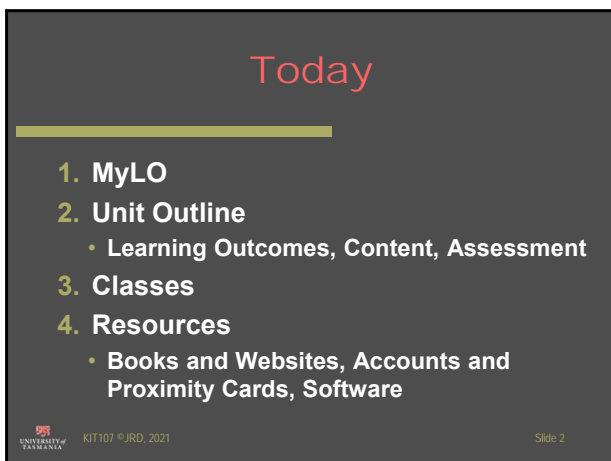
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Today

1. MyLO
2. Unit Outline
  - Learning Outcomes, Content, Assessment
3. Classes
4. Resources
  - Books and Websites, Accounts and Proximity Cards, Software

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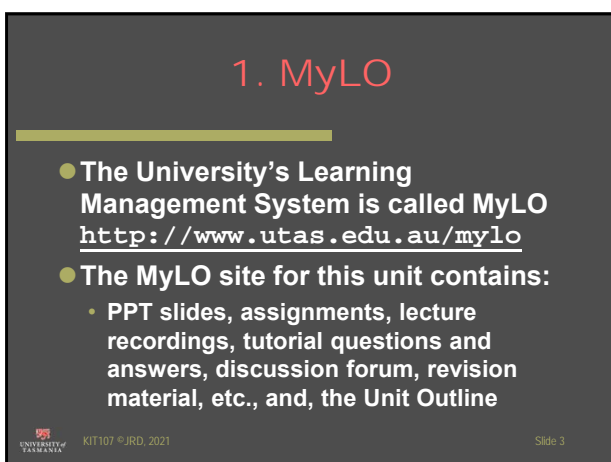
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1. MyLO

- The University's Learning Management System is called MyLO  
<http://www.utas.edu.au/mylo>
- The MyLO site for this unit contains:
  - PPT slides, assignments, lecture recordings, tutorial questions and answers, discussion forum, revision material, etc., and, the Unit Outline

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## 2. Unit Outline

- The Unit Outline is a 'contract' between us and you
- We promise to deliver what's in there at the times advertised in there
- We don't intend to deviate from that promise
  - But if we must, we won't unless we consult with you and have majority support



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## Introduction

"This unit extends the students' knowledge and experience of programming. It introduces dynamic data structures, foundational collection abstract data types, and simple object-based design, and rudimentary algorithm analysis. Programming is undertaken in Java and C and topics include: specifying and implementing abstract data types, enumerations, references and pointers, memory management, and self-referential data structures including linked lists."



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## Prerequisites

- KIT101 Programming Fundamentals or
- KIT103 Computational Science or
- HA/EA in TCE Computer Science (ITC315108 or ITC315113)



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## Teaching Pattern

- **Lectures:**
  - 3 x 50 minutes each week for 13 weeks
- **Tutorials:**
  - 1 x 50 minutes each week for 12 weeks (starting in Week 2)



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## COVID-19 (Corona Virus)

- All lectures are live-streamed and available on MyLO in the Learning Hub (look for a link entitled “Echo360 Recordings (ALP)”)
- Tutorials (from Week 2) will be held face-to-face (and for those unable to be on campus on-line via Zoom)



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## Learning Outcomes

- On successful completion of this unit, you will be able to:
  1. demonstrate...
  2. design, develop, and maintain...
  3. illustrate...
  4. practise...



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## Learning Outcomes

1. demonstrate foundational computing knowledge of abstract data types and how to implement them in both an object-oriented and a procedural programming context using —



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## Learning Outcomes

- a. UML to capture the features and advantages of various fundamental collection abstract data types;
- b. Java interfaces and C header files to express them in a programming language; and
- c. Java class files and C source files to implement them in a programming language.



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## Learning Outcomes

2. design, develop, and maintain programs containing data structures by —



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## Learning Outcomes

- a. determining appropriate algorithms and data structures in Java and C and justifying their selection;
- b. implementing them in good programming style and by adopting relevant coding conventions; and
- c. measuring their complexity and comparing them with other algorithms.



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## Learning Outcomes

3. illustrate initiative, and work independently in order to communicate effectively with a range of audiences.
4. practise pair-programming techniques and employ the skills of an effective team member.



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## Generic Graduate Attributes

1. Knowledge
2. Communication Skills
3. Problem-Solving Skills
4. Global Perspective
5. Social Responsibility



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## Content

"Programming will be undertaken in Java and C and topics include classes and objects, inheritance and class hierarchies, interfaces, events, references and pointers, printf and scanf, structures and unions, memory management, type conversions, bitwise operations, address arithmetic, single- and multi-dimensional arrays, procedural parameters, singly- and doubly-linked lists, linear collections (stacks, queues, priority queues, circular queues), non-linear collections (binary trees, search trees, general trees), Big O notation and simple time- and space-complexity determination and comparison, applications of scientific and engineering computation."



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## Content

Week 1

Week 13

Java

C

- Revision of Object-Oriented Programming and Java
- Introduction to ADTs
- Java Interfaces
- The Stack ADT and its implementation



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## Content

Week 1

Week 13

Java

C

- Procedural Programming and C
- The Stack ADT and its implementation
- The linked-list data structure
- Other collection ADTs
- Algorithm analysis



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## Unit Structure

- Introduction
  - 1 lecture
- Data Structures and Algorithms (Part 1)
  - 8 lectures, 3 tutorials
- C Programming
  - 8 lectures, 3 tutorials
- Data Structures and Algorithms (Part 2)
  - 19 lectures, 6 tutorials
- Exam Information and Revision
  - 3 lectures

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## Unit Structure

- KIT107 develops
  - Technical competency in (Java and) C programming, but it also develops
  - Understandings of conceptual, abstract, and design-oriented ideas and their application and synthesis
- As such KIT107 is not well suited for competence-based delivery

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## Assessment

- 40:60 Internal:Examination
- Internal:
 

Component	Weight	Due Date
Formative task (Java)	0%	10/3 (week 3)
Short pair-based program (Java)	5%	24/3 (week 5)
Individual exam-like program (C)	15%	28/4 (week 9)
Pair-based program (C)	20%	26/5 (week 13)
- Exam:
  - 3 hours, open-book, on-line (MyLO)

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## Learning Outcomes / 45% Rule

- **Note that in KIT units:**
  - the pass mark is 50% but
  - students must attain all Learning Outcomes (and get at least 45% in the combined internal and also in the exam) in order to be eligible to pass
  - we don't mark to a curve but some moderation/scaling is possible



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## Team Work

- **“Forming, Storming, and Norming”**
  - The stages of team work!
- **Advantages:**
  - Problem solving
  - Healthy competition
  - Developing relationships
  - Individual strengths



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## Team Work

- **Behaviours to adopt**
  - Trust and dependability
  - Respect and camaraderie
  - Clear and regular communication
  - Constructive interaction
  - Optimism and openness to diversity



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## Team Work

- **Behaviours to avoid**
  - Resentment from monitoring each other's performance/contribution
  - Ignorance about the work done by others
  - "Social loafing" — allowing your team members to do more than their share of the work
- **Recommendation**
  - Don't divide up tasks; work together



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## Pair Programming

- Pair programming is an agile software development technique in which two programmers work together at one workstation
- One, the driver, writes code while the other, the observer or navigator, reviews each line of code as it is typed in
- The two frequently switch roles



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## Advantages

- **Economics**
  - Reduced errors
- **Design Quality**
  - Greater diversity of solution
- **Satisfaction**
  - Increased enjoyment of the task



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## Advantages (cont.)

- Learning
  - Increased competence and confidence
- Team-building and Communication
  - Practising team skills

<https://www.wikihow.com/Pair-Program>

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## My Task or Your Task?



— Charles M. Schultz

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## What Kind of Learner are You?

*"I hear and I forget.  
I see and I remember.  
I do and I understand."*

- Do you learn best by reading, by listening, by watching, by writing, by discussing, or by doing?

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## How Will You Engage?

- Lectures and Tutorials are the best opportunity for structured, supported, and interactive learning
  - They are about gaining understanding, and not simply knowledge transfer
  - Please attend as many lectures and tutorials as you can even though:
    - All lectures are recorded (video & audio)
    - All lecture slides, notes, and programs are on MyLO



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## Attendance

- Attendance at tutorials will be taken and retained so that institutional queries can be responded to and so that engagement can be measured
- Assignment submission (including the formative Assignment 0) will be monitored for the same reason



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## 3. Classes

- Lectures:
  - Monday 12PM, Echo360 (MyLO)
  - Wednesday 11AM, Echo360 (MyLO)
  - Friday 2PM, Echo360 (MyLO)



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## Classes (cont.)

### ● Tutorial/Practicals:

- sign up for a tutorial ASAP  
<https://student-timetable.utas.edu.au/#Search>
- attend your tutorial; links will be on MyLO before the end of Week 1



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## 4. Resources

### ● Books and Websites:

- None specifically — but any 'C Programming', 'Java Programming', 'Data Structures in Java', and/or 'Data Structures in C' text books would be helpful
- Many websites of relevance...



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## Building, Lab, and Computer Access

### ● Student card

- Get one if you want after-hours access
- Complete the WH&S MyLO module

### ● Username and password

- Same username for 'central' and 'school' accounts but synchronisation required



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## Building, Lab, and Computer Access

- We provide file servers for your work
  - Reachable off-campus with VPN
  - Backed up by us
  - File loss is not a reason for an extension
- Printing available in the labs
  - deposit money through School or elsewhere



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## Software

- C
  - Visual Studio 2019 for C11/C18
    - available in our labs and 'Community' edition available at <https://www.visualstudio.com/downloads/>
    - see also <https://imagine.microsoft.com/en-us/institutions/access>
  - C online editor, IDE, compiler, interpreter, and REPL
    - <https://repl.it/languages/c>



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## Software

- Java
  - DrJava
    - available in our labs and also at <https://sourceforge.net/projects/drjava/>



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### Contact Details

- **Lecturer**
  - Name: \_\_\_\_\_
  - Email: \_\_\_\_\_
  - Telephone: \_\_\_\_\_
  - Office: \_\_\_\_\_
  - Consultation Hours with me (Tutors have their own times too):
    - \_\_\_\_\_
    - \_\_\_\_\_

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