KIT107
PROGRAMMING

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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

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

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

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."

Prerequisites

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

Teaching Pattern

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

COVID-19 (Corona Virus)

- All lectures are live-streamed and available on MyLO in the Learning Hub (look for a link entitled “Lectures - Live and Recorded (Echo360)”
- Tutorials (from Week 2) will be held face-to-face

Learning Outcomes

- On successful completion of this unit, you will be able to:
  1. specify and implement…
  2. develop and analyse…
  3. employ...

Learning Outcomes

1. specify abstract data types and implement them in both an object-oriented and a procedural programming context using —

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.

Learning Outcomes

2. develop and analyse programs containing dynamic data structures through the application of knowledge of computing principles and technical skills by —

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.

Learning Outcomes

3. employ pair-programming techniques while collaborating with peers

Generic Graduate Attributes

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

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."

Content

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

Content

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

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

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

Assessment

- 60:40 Internal:Examination
- Internal:

Component	Weight	Due Date)
Formative task (Java)	0%	27/7 (week 3)
Short pair-based program (Java)	12%	10/8 (week 5)
Individual exam-like program (C)	24%	21/9 (week 10)
Pair-based program (C)	24%	12/10 (week 13)

- Exam:
  - 3 hours, open-book, on-line (MyLO)

Final Mark

- Note that in KIT units:
  - the pass mark is 50%
  - you must attain the ILOs
  - we don't mark to a curve but some moderation/scaling is possible

Team Work

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

Team Work

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

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

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

Advantages

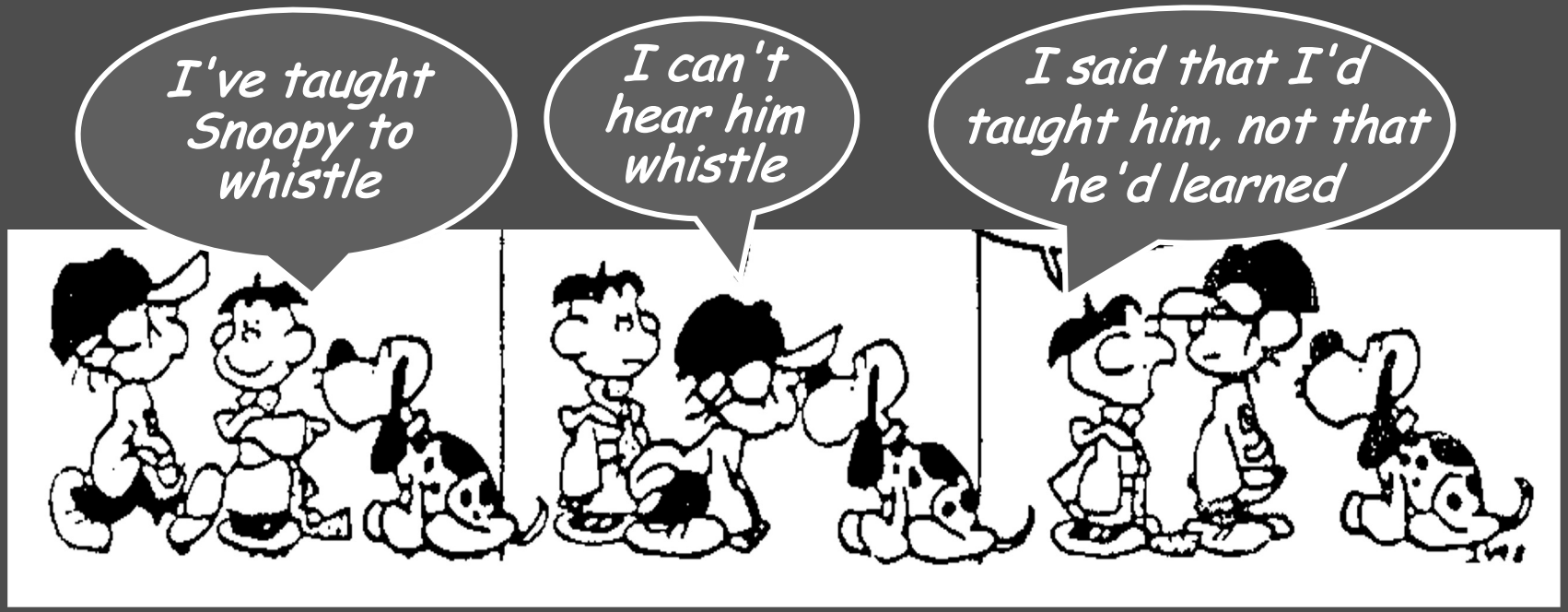
- Economics
  - Reduced errors
- Design Quality
  - Greater diversity of solution
- Satisfaction
  - Increased enjoyment of the task

Advantages (cont.)

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

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

My Task or Your Task?



— Charles M. Schultz

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?

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

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

3. Classes

- Lectures:
  - Tuesday 1PM, Echo360 (MyLO)
  - Thursday 4PM, Echo360 (MyLO)
  - Friday 12PM, Echo360 (MyLO)

  All times are local time in Tasmania.

Classes (cont.)

- Tutorial/Practicals from week 2:
  - sign up for a tutorial ASAP `https://student-timetable.utas.edu.au/#Search`
  - (links for on-line classes will be on MyLO before the end of Week 1)

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…

Building, Lab, and Computer Access

- Student card
  - Get one from https://universitytasmania.sharepoint.com/sites/studentportal/sitepages/welcome.aspx
  - Complete the WH&S MyLO module
- Username and password
  - Same username for ‘central’ and ‘school’ accounts

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
  - Monitor your balance and deposit funds via `https://myprint.utas.edu.au/user`

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`

Software

- Java
  - VS Code
    - available in our labs and also at https://sourceforge.net/projects/drjava/ and https://code.visualstudio.com/docs/languages/java#_install-visual-studio-code-for-java
  - Java online editor, IDE, compiler, interpreter, and REPL
    - https://repl.it/languages/java

Contact Details

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  - Zoom Consultation Hours with me (Tutors have their own times too):
    - Monday 2PM–4PM
    - Wednesday 10AM–12PM