Data Structures and Algorithms

XMUT-COMP 103 - 2025 T1

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Welcome!

- COMP 103 = 2nd core course for COMP, CGRA, SWEN, CYBR, EEEN, NWEN
- Core principles of Computer Science and essential programming skills
- Builds on COMP 102
- Basis for all the 200-level COMP, SWEN, NWEN, CGRA, and CYBR courses.

What's the course about?

- Programming with collections of data:
  - Using and understanding standard Collections
    - lists, sets, maps, stacks, queues, …
  - Writing code with Trees and linked structures.
  - How to write code using collections efficiently
  - Designing and implementing algorithms
  - Using recursion

Recurring theme: Efficiency

- How fast is it?
- How much memory does it take?

Concepts

- Fundamental principles:
  - collections, linked structures, algorithms, recursion, efficiency,

- Focusing on:
  - Using collections, rather than implementing collections.
  - Becoming good, effective, efficient programmers.
  - Building your tool box of data structures and algorithms

Observations about COMP 102

- Not engaging in lectures is dangerous for your learning!

- Many were uncomfortable about asking questions in 102:
  - in lectures, in labs and on WeChat

  because other students put them down

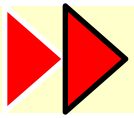
  Putting people down for asking questions or for trying to learn is
  - unprofessional
  - obnoxious
  - unacceptable
  - not what the university is about

Admin: People

- Coordinator and Lecturer: Felix Yan
  felix.yan@vuw.ac.nz
- Lecturer: TBD
  TBD
- Co-teacher Dr Zhiying Xie (XMUT)
- Programmer Dr Monique Damitio (VUW)
- Tutors XMUT and VUW
- Course URL: https://ecs.wgtn.ac.nz/Courses/XMUT103_2025T1/

Preregs

- What is assumed from COMP102?
  - Programming in Java
  - Methods, parameters and variables
  - Conditionals, loops (if, if...else, for, while)
  - UI for getting input, output, drawing shapes
  - Using GUI's (Graphical User Interface) with buttons, mouse, etc
  - **Files**
  - **Classes, Objects, Fields, Methods**
  - **ArrayLists and arrays**



Revise these concepts if necessary!

Lectures

- Mondays, Wednesdays
- Slides
  - on course webpage (pdf for each week)
- Video recordings
- Questions:
  - WeChat, or
  - Emails
- Goals
  - Provide a framework for your learning
  - Provide key content/explanations/demonstrations

Assessment

- Attendance [10%]
- 6 Assignments [18%]
- Test [20%] lecture time
- Final Exam [52%] 2 hours, in exam period (mark will “boost” the mark for test)

Mandatory Requirements

- 1 day after the deadline will receive a maximum mark of 90%,
- 2 days after the deadline will receive a maximum mark of 80%,
- 3 days after the deadline will receive a maximum mark of 70%,
- 4 days after the deadline will receive a maximum mark of 60%.
- 5 days after the deadline will receive a maximum mark of 50%.
- **No work will be accepted after releasing the solutions unless previously arranged with the course organizer.**

Assignments

- Critical for your learning!
  - 6 Assignments ! total of 18%
  - 2 weeks each
  - **out**: Monday (09:00) **due**: Saturday (19:00) (2 weeks later)
  - Late assignments cannot be marked.

- Must be your work.
- Won't be as constraining as COMP 102 assignments
  - You may need to do more of the design of the structure of the program
- Programming Style will be a component of the marks (up to 5% off for bad style)
- First Assignment: starts next week DeShredder and Sokoban Undo

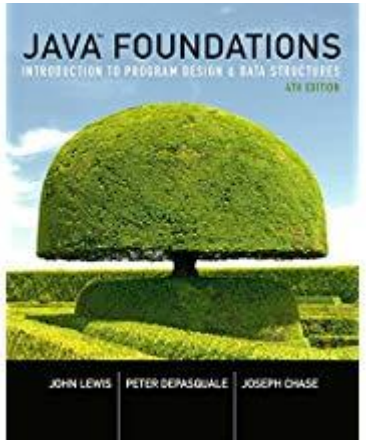
Getting Help.

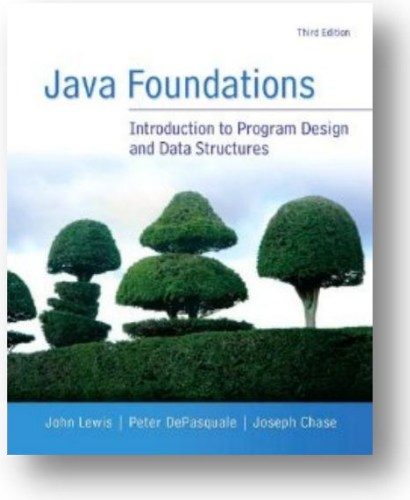
Co-teacher and Lecturer

- Ask questions and answers (During lectures or labs, emails and WeChat)
- NO posting chunks of ANSWERS to assignments!

Text Book (optional)

- *JAVA FOUNDATIONS:*
  Introduction to Program Design & Data Structures
  by Lewis, DePasquale and Chase
  - 4th edition is best
  - Same textbook as comp 102/112 ☺
  - We don't follow the text, but helpful complement to lectures and assignments





PLAGIARISM UNACCEPTABLE

- We want you to LEARN, TALK to each other, learn TOGETHER, and HELP each other, but

PLAGIARISM is UNACCEPTABLE!

- Got help from anybody other than lecturer or tutor?

STATE IT ON THE ASSIGNMENT!

- Copied bits of code from anywhere other than lecture slides or textbook?

STATE IT ON THE ASSIGNMENT!