
Data Structures and Algorithms

XMUT-COMP 103 - 2020 T1

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What's the course about?

- Using and understanding 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?
 - Measurements and Analysis

Concepts

- Fundamental principles:
 - collections, linked structures, algorithms, recursion, efficiency,
- Focusing on:
 - **Using** collections, rather than **implementing** collections.
 - Being general programmers, rather than library creators.
 - Becoming good, effective, efficient programmers

Observations about COMP 102

There is no gender divide. Female/male/other do just as well in this subject overall

- Many were uncomfortable about asking questions in 102:
 - in lectures, in labs, on the forumbecause 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: Kerese Manueli
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- Lecturer: Mohammad Nekooei
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- Course URL: http://ecs.victoria.ac.nz/Courses/XMUT103_2020T1

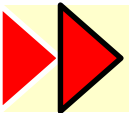
Prereqs

Prerequisite for COMP 103

- You need to have passed COMP102
- If you did not meet this, you would need to take 102 again

Prereqs

- 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
 - Files
 - Classes, Objects, Fields, Methods
 - Using GUI's (Graphical User Interface) with buttons, mouse, etc
 - ArrayLists and arrays



Revise these concepts if necessary!

Lectures

- Mon, Thu
- Slides
 - on course webpage (pdf for each week, pptx for each half – evolving!)
- Video recordings (sound and screen only)
- Questions:
 - WeChat, or
 - GoSoapBox.com: VUWXMUT103 : anonymous
- Goals
 - Provide a framework for your learning
 - Provide explanations/demonstrations

Assessment

- 6 Assignments [24%]
- Mid-term test [20%] 50 mins
- Final Exam [56%] 2 hours, in exam period

Mandatory Requirements

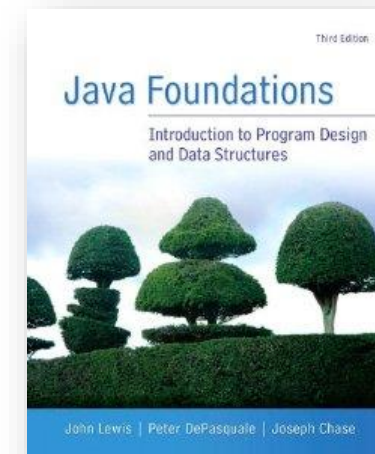
- submit reasonable attempts for **at least 5 out of 6 Assignments**
- Note: You have 24 hour grace period in total. Use them carefully!
 - If you are 24 hours and 1 minute late and without an approved extension.
 - DO NOT SUBMIT!
 - You **will** get 0% and loose all of your grace period!

Assignments

- Critical for your learning!
 - 6 Assignments → **total of 24%**
 - 2 weeks each
 - **out:** Sunday (19:00) **due:** Sunday (19:00) (2 weeks later)
 - Late assignments cannot be marked. Remember the 24 hour total grace period.
- Must be **individual** work. (not like COMP 102)
 - We will talk about how to collaborate and help each other without plagiarism
- 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 this week **SlideShow** and **Sokoban Undo**

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!

Course Structure

Topics:

- Programming with unstructured and linear collections
- Different Kinds of collections:
 - Lists, Sets, Bags, Maps, Stacks, Queues, Priority Queues
- Algorithms using collections.
- Complexity
- Recursion
- Programming with Linked collections
 - Building, traversing tree structured collections
 - ? Building, traversing graph/network structured collections
- More complex algorithms