NUS National University of Singapore

School of Computing

CS2040 Data Structures and Algorithms

Lecture Note #0

Course Admin

(AY2019/20 Semester 2)

Lecturer

- Module coordinator

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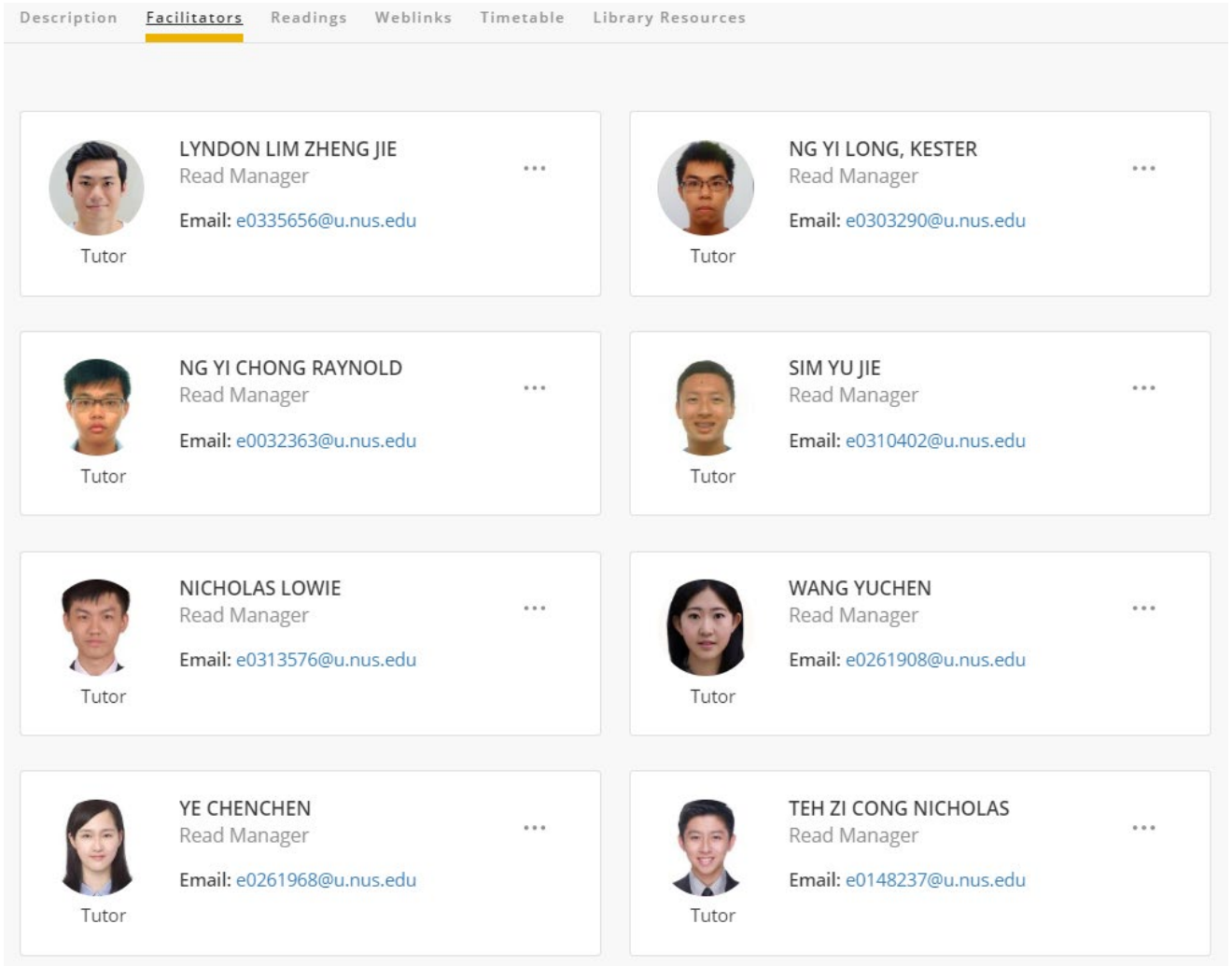
Tutors

- Lots of TAs for this course !



Stuff you need

JDK (Java Development Kit) 12.0.1

(Need it to compile and run Java programs)

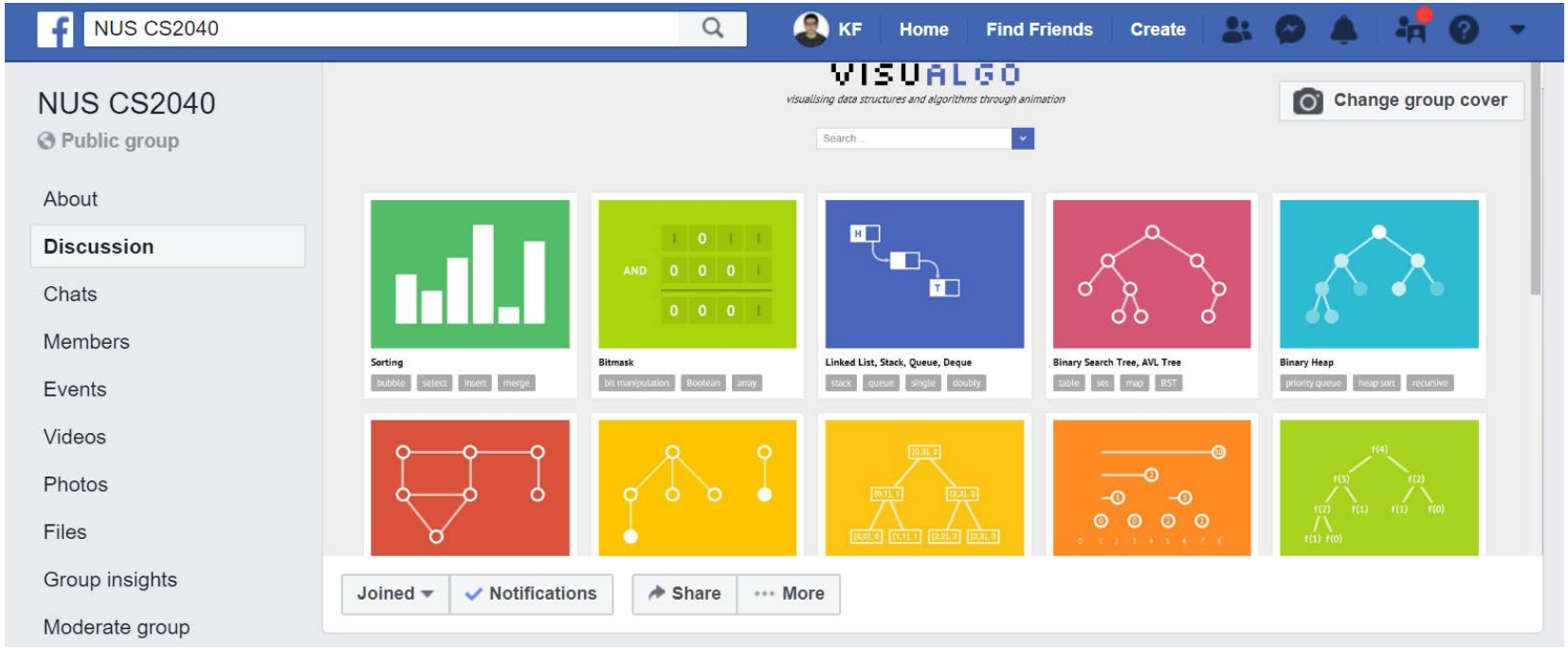
- https://www.oracle.com/technetwork/java/javase/downloads/jdk12-downloads-5295953.html

Installation Guide for Windows/Linux/Mac OS

- https://docs.oracle.com/en/java/javase/12/install/overview-jdk-installation.html#GUID-8677A77F-231A-40F7-98B9-1FD0B48C346A

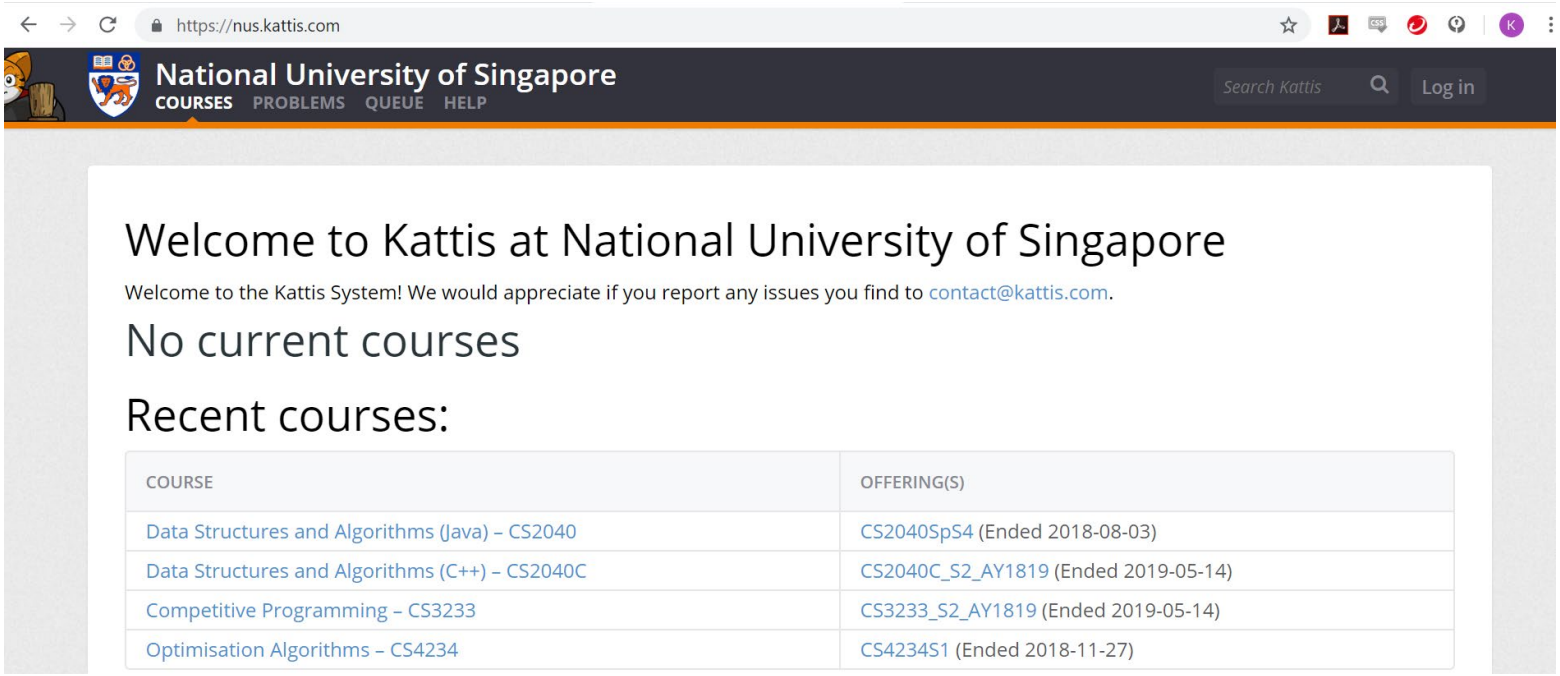
LUMINUS https://luminus.nus.edu.sg

- Announcements: Check regularly
- Workbin: For Lecture notes and tutorials
- Forums: Use Facebook group
  - https://www.facebook.com/groups/241724769269875



Kattis

https://nus.kattis.com/



- **If you don't have an account DON'T make it yet (will do this during lab 1)**

Other Important Links

Java API Specification Edition 8

(need to refer to it regularly in the course)

https://docs.oracle.com/javase/8/docs/api/

StackOverFlow

(find answers to most programming questions you have, but need to filter through a lot of information)

http://stackoverflow.com/

IDE for program development

http://www.sublimetext.com/3

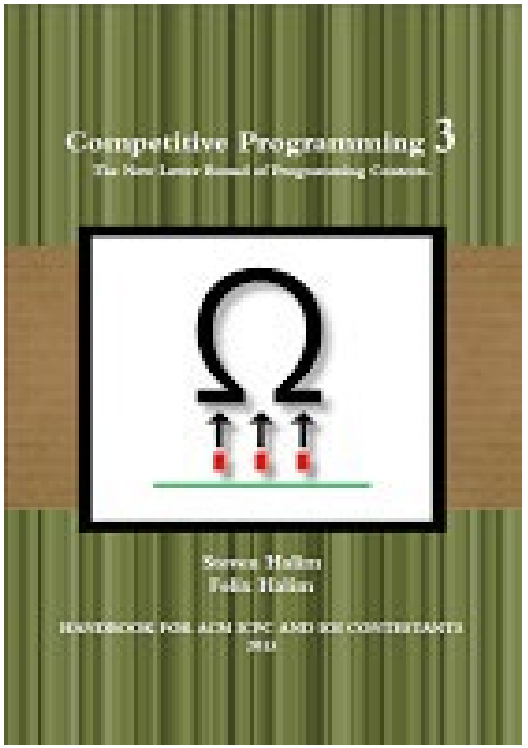
Sublime Text is a simple general purpose IDE you may use for Java programming. If you have experience with other IDE's you can use those too.

Reference Text

- CP3: Competitive Programming

  Not compulsory (actually a CS3233 text book)

  Written by Dr Steven Halim and his brother Felix Halim



- $22 per copy - Indicate your interest in buying by filling the following form

https://docs.google.com/forms/d/1-KyyaWnoC2iwZ8jSWSkCHm8UcDBL3oqC7nXLzAAu4Bg

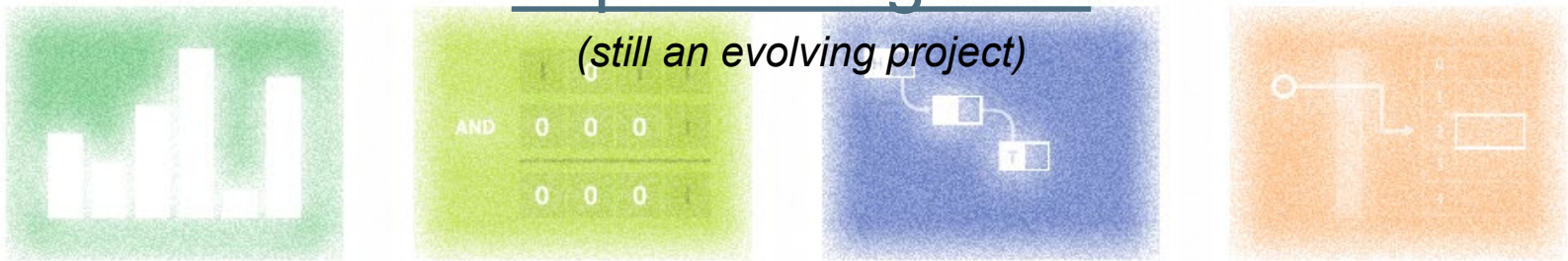
Will announce when you can come to my office to collect once the copies are printed

Introducing VisuAlgo

Dr Steven Halim's data structures & algorithms visualization Tool:

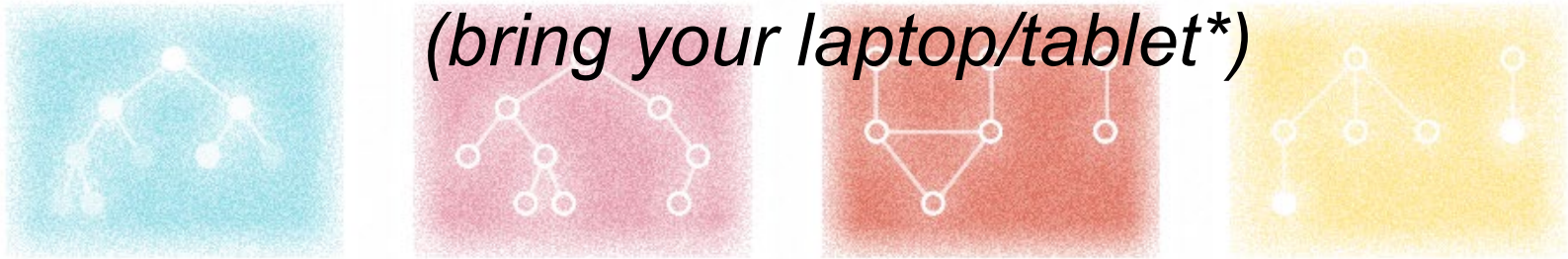
http://visualgo.net

(still an evolving project)



VisuAlgo will be very heavily used especially in 2nd half of the lectures and tutorials

(bring your laptop/tablet)*



VisuAlgo Online Quiz Tool

There will be short online quizzes using Visualgo, (completely machine graded)

http://visualgo.net/training.html ⟸ Do lots of training on Visualgo !

Make VisuAlgo as your personal tutor ☺

Bookmark the base URL; tell the world it exists!

Not quite at Skynet level yet …

Lectures, Tutorial, Lab Timings

- Lectures (There will be webcast)
  - Monday 4pm-6pm (LT19/LT15)
  - Thursday 2pm-3pm (LT19/LT15)
- Tutorials
  - Monday & Tuesday (check your tutorial group timing)
- Labs
  - Friday 8am to 6pm (check your lab group timing)
- Course Schedule
  - Check schedule on Luminus under Module Details → Description → Schedule

Assessments: Overview

- 10 graded **1 day** lab assignments (starting from lab 2) which will be released 8am on Friday and ends at 8am on Saturday of the next day. (Solve 1 problem)
  - You can start doing when the problem is released
  - Everyone will have a lab on that day where the TA will talk about the problem, show Java classes to solve the problem and help you with the assignment (without directly giving you the answer)

- 4 graded take home lab assignments (Check schedule when they are released)
  - Will be released on Friday 8am
  - Deadline is due Friday 8am 2 weeks later
  - Solve 2 problems

- 2 online quiz (30 mins)
  - Happen during lab (6th March and 17th April)

Assessments: Overview

- 1 Midterm (Tentatively 7th March, time and venue to be determined)
- 1 MCQ Quiz (13th April, 30min-40min short quiz during lecture)
- 1 Final (4th May Monday, 5pm-7pm)

Assessments: Overview

Activities	Weightages
Tutorial attendance/participation	3%
Lab attendance	2%
In-lab Assignments	10% (1%/problem)
Take Home Assignments	8% (1%/problem)
Online Quiz	8% (4% each)
Midterm	20%
MCQ Quiz	9%
Final Exam	40%

- Tutorials and Labs start on the 3rd week.
- Midterm and Final exam are open-book (can bring in any notes/books but no mobile phones/tablet/laptops)
- Visualgo quiz is also open book
- MCQ quiz … not decided yet

Lab Assignment: Marking Scheme (1/2)

- Will use Kattis for autograding

- Calculation of grades for assignments (same day/take home) =

$$\left\lceil \frac{\#\ correct\ test\ cases}{total\ test\ cases} \times 1.0 \right\rceil$$-(programming style violations)

Lab Assignment: Marking Scheme (2/2)

- Programming style:
  1. Modularity
  2. Meaningful comments
     - Student particulars and program description
     - A description for each user-defined method
     - Appropriate pre- and post-conditions
     - Other comments to explain complex codes (where necessary)
  3. Meaningful/descriptive identifiers
  4. Proper indentation

- **0.5 mark** deducted if programming style is terrible (*make our eyes bleed*) on all of 4 main categories

- This means you should not have marks deducted unless your coding style is really terrible

Lab Assignment: Rules (1)

- You can discuss algorithms (English description/ pseudo-code level) to solve the assignments (1 day or take home)
- List down all your collaborators in your program file
- However you **CANNOT**
  - **Copy another person's code**.
  - **Look at another person's code**.
  - **Use another person's code as the base to code your own code**.
- Doesn't matter if the code is from a fellow student or somewhere on the internet
- You have to write the Java code yourself ! Labs are all about implementation of algorithmic solution

Lab Assignment: Rules (2)

- **Offender caught cheating will be referred to the NUS Board of Discipline**
- There is **automatic and manual plagiarism checking** and **students have been caught before …**

Assumptions

Or what we assume you should have learned in CS1010/CS1010J/CS1010S/CS1101S

Topics in C / Java / Python / Javascript

Program development

- Writing pseudocodes
- "Edit – compile – execute" cycle
- Step-wise refinement
- Hand-tracing codes
- Incremental coding
- Testing
- Debugging

Problem solving

- Class exercises
- Practice exercises
- Lab assignments

Programming environment/tools

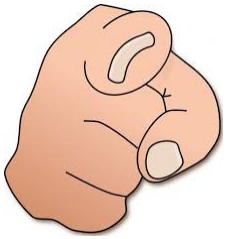
- Operating system: UNIX/Windows
- Editor: vim
- Debugger: (eg: gdb)

Summary and advice (1/2)

- The labs focus more on your programming skills:
  - Ability to translate idea/algorithm into actual program
- Online quiz test your basic to intermediate understanding of the working of the algo/DS
- Midterm/Final exam focus more on your problem-solving skills:
  - Ability to understand and reason about the problem
  - Ability to apply your knowledge to formulate solution
- You need to spend time on:
  - Actually coding to improve your programming skill
  - Thinking deep/exploring/do all your tutorials to hone your problem-solving skills as memorization does not help much
  - Asking questions! (Use the facebook group.)

Summary and advice (2/2)

- *Ultimately…*



must be prepared and willing to

put in a lot of effort!

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