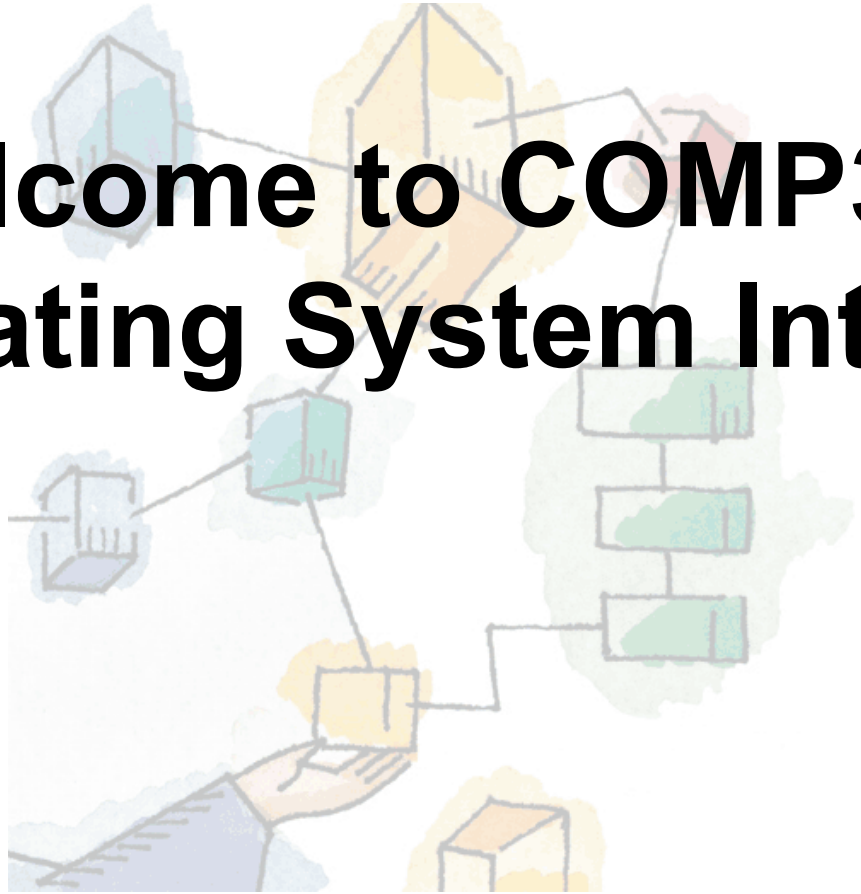
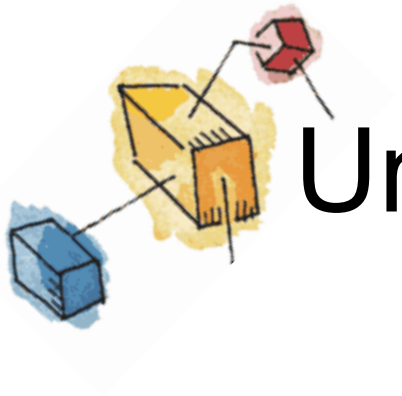
Welcome to COMP3520 Operating System Internals





Unit Coordinator/Lecturer

Dr. Bing Bing ZHOU

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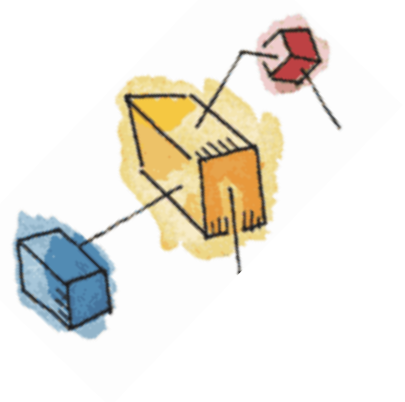


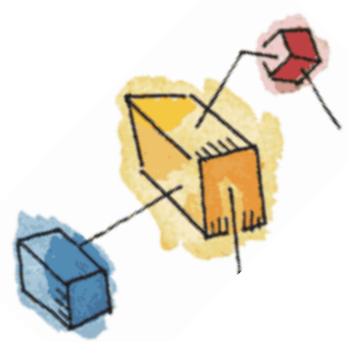
Tutors

- Name: Claire Hardgrove
- Email: clairehardgrove@gmail.com

- Name: Yun Sun
- Email: ysun9316@uni.sydney.edu.au

Course Delivery

- 4 hours per week class activities:
  - One 2 hr lecture:
    - Tuesday, 15:00 – 17:00,
  - One 2 hr tutorial:
    - Wednesday
  - They are all online activities using Zoom
  - You are expected to attend for all the scheduled hours.



Course Delivery (cont.)

- Lectures are pre-recorded and uploaded on the Canvas unit website each week before the lecture
- In the lecture I'll outline some key concepts for the week and provide hints to help you tackle the assignments and programming exercises.
- Tutorials mixed with
  - **Programming exercises** – assistance for assignments.
  - **Short answer questions** – OS concepts

Assessment

- The course has
  - 40% assignments
  - 60% exam.

- To pass the unit you must achieve
  - an overall mark of 50 or better, AND
  - at least 40% average in the assignments, AND
  - at least 40% of the available marks in the final examination

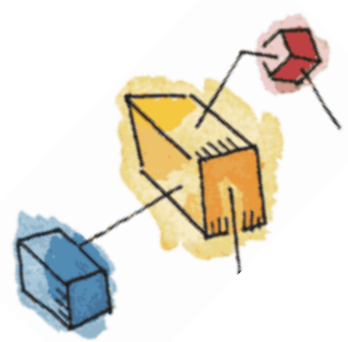
Assignments

- Three programming assignments (**using C**)
  - Assignment 1 (15%), due in week 5
  - Assignment 2 (10%), due in week 8
  - Assignment 3 (15%), due in week 12

- **Don’t expect to finish each assignment in just a few hours, or even a couple of days!**
- A set of programming exercises, to assist you for completing your assignments
- A lot of hints will be given in lectures/tutorials

Assignments

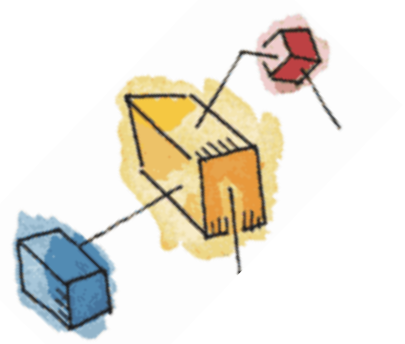
- Note: Your programs are required to run in the CS lab environment
  - if you work on a home machine, you must check it in the lab too
  - **Marks will be deducted if your programs cannot compile and run in the CS lab environment**!
- In fairness to all students, late work may incur penalties.
  - Consistent penalty of 5% of the full marks per day late
  - more than 10 days late get 0
- In exceptional cases, you must make an official application for Special consideration.
- Plagiarism is where you use the work of another person and present it as your own. This is NOT PERMITTED.



Special Consideration (University policy)

- If your performance on assessments is affected by illness or misadventure
- Follow proper bureaucratic procedures
  - A new centralised online application system to apply for special consideration and special arrangements.
  - Visit the university website for more information on eligibility and deadlines:

    http://sydney.edu.au/current_students/special_consideration/
- Also, notify coordinator by email as soon as anything begins to go wrong
- There is a similar process if you need special arrangements eg for religious observance, military service, representative sports



Academic Integrity (University policy)

- “The University of Sydney is unequivocally opposed to, and intolerant of, plagiarism and academic dishonesty.
- Academic dishonesty means seeking to obtain or obtaining academic advantage for oneself or for others (including in the assessment or publication of work) by dishonest or unfair means.
- Plagiarism means presenting another person’s work as one’s own work by presenting, copying or reproducing it without appropriate acknowledgement of the source.” http://sydney.edu.au/elearning/student/EI/index.shtml
- Penalties for academic dishonesty or plagiarism can be severe

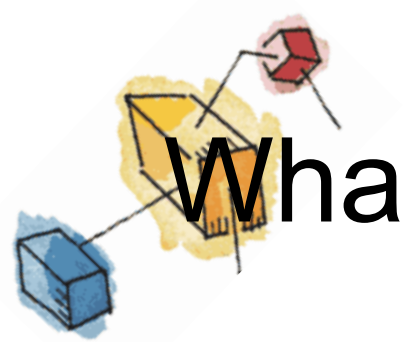
Exam

- Exam is two hrs on Canvas.
  - Concepts
  - No serious programming, but may need to write pseudo codes

Textbooks

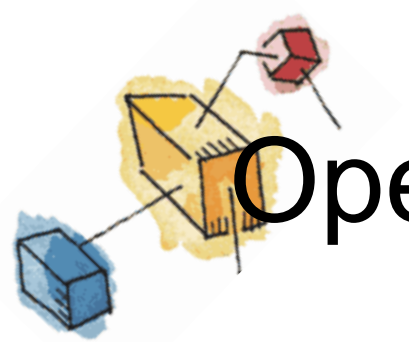
- **Essential:** *Operating Systems: Internals and Design Principles,* 9th Edition, William Stallings, Pearson Prentice Hall, 2018

- **Recommended:** *Operating System Concepts,* 10th Edition, A. Silberschatz, P. B. Galvin and G. Gagne, John Wiley & Sons, Inc, 2018



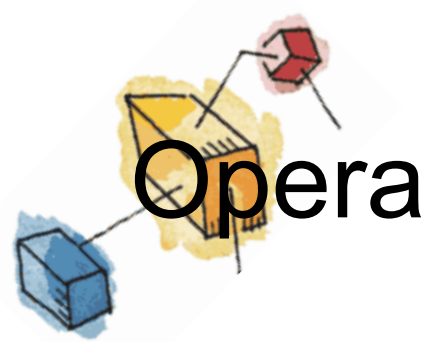
What is an Operating System?

- **An OS itself is a software program** that manages the hardware and software resources of a computer.
- An OS performs basic tasks, such as managing execution of other programs, controlling and allocating memory, controlling input and output devices, managing files and facilitating networking.
- Operating system goals:
  - Use the computer hardware in an efficient manner.
  - Make solving user problems easier.
  - Make the computer system convenient to use.



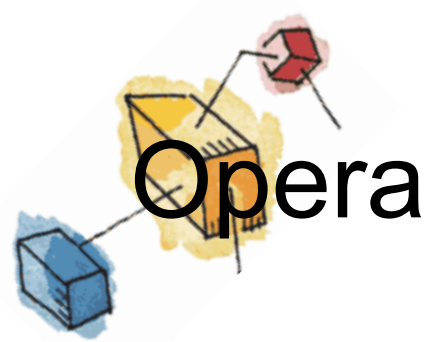
Operating System Definition

- **resource manager**
  - Manages all resources
  - Decides between conflicting requests for efficient and fair resource use
- **control program**
  - Controls execution of other programs to prevent errors and improper use of the computer
- **extended machine**
  - Turns complicated hardware into nice abstractions



Operating System Definition (cont.)

- No universally accepted definition
- “Everything a vendor ships when you order an operating system” is good approximation
  - But varies wildly
- “The one program running at all times on the computer” is the **kernel.** Everything else is either a system program (ships with the operating system) or an application program



Operating System Definition (cont.)

- The operating system is part of system software.
- However, it is distinguished from other system software:
  - interacts directly with the hardware to provide an interface used by other system/application software
  - domain independent, i.e., can be used to support a broad range of application domains
  - allows different applications to share the hardware resources
- Other system software, e.g., compilers, debuggers, system utilities

Why Studying Operating Systems?

- Operating systems are an essential part of any computer system – a course on OS is thus an essential part of any computer science education
- Easy to see how to effectively use the computer system
- Enable us to write efficient code
- Learn to develop new systems
- …

Main Topics

- The basic concepts on which all operating systems are built:
  - Process management
  - Memory management
  - I/O device management
  - File management
  - Protection and security