

# Computer Networks and Applications

COMP 3331/COMP 9331

Lecturer-in-Charge (LIC): Mahbub Hassan

Course Outline & Logistics

# Lecturer Snapshot



- Professor of Computer Networking at UNSW
- PhD in Computer Networking (Monash Uni)
- 25 yrs teaching experience in Computer Networking
- Computer Networking books authored:
  - High Performance TCP/IP Networking, Prentice Hall
  - Engineering Internet Quality of Service, Artech House
- Winner of Teaching Excellence Award
- More details from personal website:
  - <https://www.cse.unsw.edu.au/~mahbub/>

# Today's Agenda

- Course (non-technical) details
- Logistics: How we will roll
- What is this course about?
- Introduction to Computer Networks (Chapter 1)

# WebCMS Portal

- <https://webcms3.cse.unsw.edu.au/COMP3331/20T1/>
- Everything is posted on the course website
  - **Course Outline (PLEASE READ THIS THOROUGHLY)**
  - Lecture Notes
  - Video Recordings
  - Lab Schedules, Allocations and Locations
  - Assignment and Lab Exercises
  - Homework Problems
  - Consultation hours
  - **Announcement:** Your responsibility to check the announcement forum on regular basis for important updates/changes to schedule, etc.
  - Nothing will be handed out in the class
  - **Your active participation and interaction is crucial to ensure that all of us get the most out of this course**

Very  
important



# Quiz: The most useful super power for a UNSW student would be:



A

Invisibility



B

Flight



C

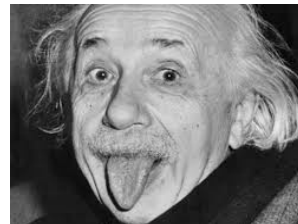
Telepathy



D

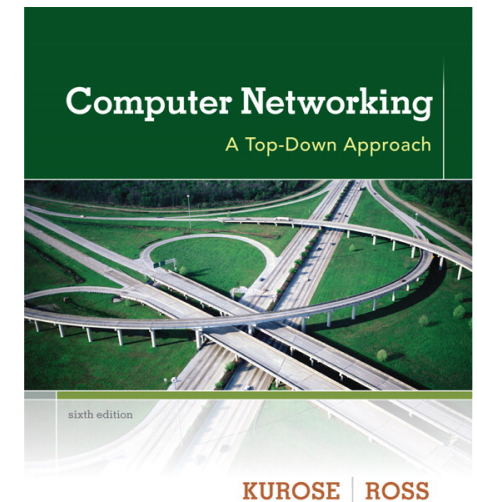
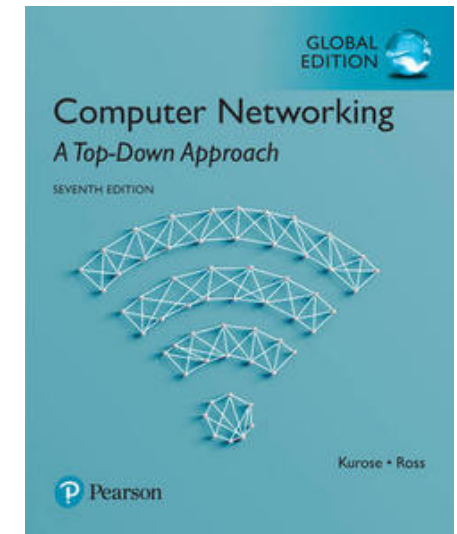
Time Travel

E: Some other power??



# Course Material

- *Computer Networking: A Top Down Approach*, Jim Kurose, Keith Ross, Addison-Wesley(Pearson), 7<sup>th</sup> Edition, 2016 (6<sup>th</sup> Edition will suffice for most part).
- Lecture Notes (on WebCMS)
- Links/articles on additional material
- Reference Books:
  - *Computer Networks: A Systems Approach*, Larry Peterson and Bruce Davie, Morgan Kaufmann, Fourth Edition, 2007.
  - *Unix Network Programming Volume 1 - Networking APIs: Sockets and XTI*, W. Richard Stevens, Prentice Hall, Second Edition, 1998 (Third edition also available)
  - *Java Network Programming*, E. R. Harold, O'Reilly, Third Edition, 2004.
- Links to programming help



# Course Aims

- To gain in-depth introduction to a wide range of topics in the field of computer networks, including the Internet
- To obtain hands-on understanding of networking protocols
- To gain skills in network programming, designing and implementing network protocols, evaluating network performance and problem solving
- To build necessary foundational knowledge required in more advanced networking courses

# Teaching/Learning Strategies

- Lectures: 36 hours (~4-hr per week for 9 weeks)
- Labs: 14 hours (2-hr per week for 7 weeks)
  - Hands-on learning
- Programming Assignment
  - Network programming and protocol design
  - C or Java or Python
- Weekly Homework (Self-assessed)
  - Problem solving skills



# Lectures

- Lectures (9 weeks, 4-hr per week)
- We will focus on most important concepts and supplement with
  - Problem solving exercises
  - Discussions
  - Additional material
- Certain material will be left for self study
  - These will be indicated on the lecture notes

# Labs

- 2-hour lab sessions starting **Week 2**
- Hands-on experiments related to concepts covered in lectures
  - Wireshark packet sniffer, ns-2 network simulator, other network measurement tools
- 9 lab sessions:
  - 7 Practical Lab Exercises (on-site tutors for help)
    - 5 best performing labs out of 7 will be used for assessment
    - Lab report to be submitted (no demos)
    - Highly encouraged to attempt lab tasks before attending labs
  - 2 Problem-based learning sessions (Tutorials in Week 5 & 10)
    - No marks
    - Prep for exams

# Assessment

- **Hands-on – 40%**
  - Labs 20%
  - Assignment 20%
    - Assignment released before Week 3, due in Week 10
    - Implement networked application (C/Java/Python)
- **Concepts and theory – 60%**
  - Mid-term test (20%)
    - In Week 6 (includes material from Week 1 to Week 5)
    - Closed book multiple-choice-questions (MCQ)
  - Final Exam (40%)
    - Closed-book written exam, End of semester
    - Critical thinking and problem solving questions
    - **Hurdle component – must obtain at least 40% to clear**

# Assessment

**NOTE:** To pass the course, a student MUST receive at least 40% marks on the final exam

lab = marks for lab exercises (20 marks)

assign = mark for the programming assignment (20 marks)

midTerm = mark for the mid-semester exam (20 marks)

scaledfinalExam = scaled mark for the final exam (out of 40 marks)

mark = lab + assign + midTerm + scaledfinalExam

Grade:

= HD|DN|CR|PS if mark >= 50 && scaledfinalExam >= 16

= FL if mark < 50 || scaledfinalExam < 16

**NOTE:** *If you cannot clear the final exam hurdle (after scaling), reported grade would be 'UF' with maximum marks reported as 40*

# Getting help



- Use discussion forum for labs, assignment, and other matters at WebCMS
  - Fellow students benefit from your questions
  - Fellow students can answer your questions
  - Develop a community
- Use [cs3331@cse.unsw.edu.au](mailto:cs3331@cse.unsw.edu.au) for communication with the course authorities. DO NOT email LiC/admin on personal email address
- Consultation hours
  - Lecture-related help - 2 hr/wk for 11 weeks (with LIC)
  - Lab-related help – 2 hr/wk for 7 weeks (with Tutors)
  - Assignment-related help – C/Java/Python (based on demand)

# Accounts for accessing lab machines

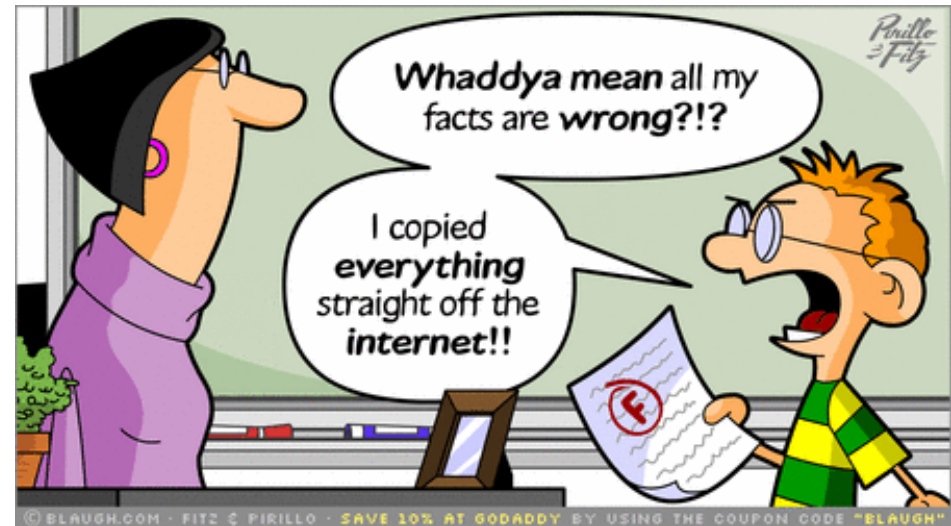
- Use your zid/zpass to log into CSE computers
- New to UNSW -  
<https://it.unsw.edu.au/students/zpass/index.html>
- You will be automatically added as a student to the course website. Log on using zid/zpass

# VLAB

- Access CSE lab environment on your own machine remotely
- Go to - <https://taggi.cse.unsw.edu.au/FAQ/VLAB> - The technical details/

# Be original !!

- Collaboration
  - You may discuss approaches, not solutions
  - You must submit your own work
  - We strongly support discussions
- Plagiarism
  - Zero tolerance, don't do it



<https://my.unsw.edu.au/student/academiclife/Plagiarism.pdf>  
<https://student.unsw.edu.au/plagiarism>



# What is this course about ?

- Introductory course in computer network
  - Learn *principles* and *practice* of computer networking
- We use the Internet as a vehicle to understand the core concepts of networking

# What is this course about ?



## 1. To learn how the Internet works

- Internet is a complex global infrastructure
- What are the organising principles behind the Internet?
- What really happens when you “browse the Web”?
- What are TCP/IP, DNS, HTTP, NAT, VPNs, 802.11,..... anyway?

# What is this course about ?

1. To learn how the Internet works
  - Internet is a complex global infrastructure
  - What are the organising principles behind the Internet?
  - What really happens when you “browse the Web”?
  - What are TCP/IP, DNS, HTTP, NAT, VPNs, 802.11,..... anyway?
2. To learn the fundamentals of computer networks
  - What issue you need to take into consideration to make a computer network work well?
  - What design strategies have proven valuable?
  - How do we evaluate network performance?

# Pre-requisites



- Good understanding of algorithms, data structures and basic probability
- Proficient in programming: C, Java or Python

# Where do I go from here?

- COMP 9332: Network Routing and Switching
- COMP 9334: System Capacity and Planning
- COMP 3441/9441: Security Engineering
- COMP 4336/9336: Mobile Data Networking
- COMP 4337/9337: Securing Wireless Networks
- COMP6733: Internet of Things Design Studio
- Thesis Projects
- Research Degree (MPhil, PhD)