Computer Networks and Applications

COMP 3331/COMP 9331

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CysPri Lab

Course Outline & Logistics
Today’s Agenda

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

- http://www.cse.unsw.edu.au/~cs3331
- Everything is posted on the site
  - Course Outline (PLEASE READ THIS THOROUGHLY)
  - Lecture Notes
  - Echo 360 Recordings
  - Lab Schedules, Allocations and Locations
  - Assignments and Lab Exercises
  - Sample Problems
  - Information about Exams
  - Consultation Hours
  - Forum – For discussion
  - Notices Section: Your responsibility to check this from time to time (1-2 times per week) for important updates/changes to schedule
- Nothing will be handed out in class
Course Material

- Lecture Notes (on website)
- Links/articles on additional material
- Reference Books:
- Links to programming help
Teaching Strategies

• Lectures
• Labs
  • Hands-on learning
• Assignments
  • U learn basic network programming and protocol design
  • C or Java or Python
• Sample Problems
  • U will gain problem solving skills
Traditional Lectures

- Little opportunity for expert feedback and deeper insights
Interactive Classes with Peer Instruction

- Parts of the lecture will be reserved for interactive, customized experiences
- Research on how people learn:
  - Everyone constructs their own understanding
  - To learn, you must actively work with a problem and construct your own understanding of it
Peer Instruction

- I will pose carefully designed questions at various points of the lecture
- **Individually** – Think for yourself and select answer
- **Group discussions among students in teams of 3-4**
  - Analyse the problem
  - Discuss relevant solutions/challenges
  - Reach consensus – Entire group should select a common answer
  - Room should be LOUD
- **Class-wide discussion**
  - Led by you
  - Share answers with everyone
  - Your explanations are CRITICAL for fellow students’ learning
- Continue discussions on the online forum
Why Peer Instruction?

• You get a chance to think
• I get feedback as to what you understand
• It’s less boring!
• Research shows it promotes more learning that traditional lectures
Implications

• You will have to come prepared to the lecture by reading prescribed parts of the textbook/lecture notes (or watching videos)
• You will have to actively participate during lecture
• Certain (simpler) parts of the content will be left for self-study
• We will focus on challenging concepts, cutting-edge research, problem solving, etc. during the lectures
• You will get candy !!
Quiz: The most useful super power for a college student would be:

A. Invisibility
B. Lots of $$$
C. Telepathy
D. Weather

E: Some other power (be prepared to discuss)
Labs

• 2 hour lab sessions starting **Week 2**
• Hands-on experiments
• Variety of networking tools to understand protocol behaviour and evaluate network performance
• NEW: Ns-2 network simulator for some exercises
• 9 lab sessions:
  • 7 Lab Exercises:
    – Marked
    – Lab Report to be submitted one week after your lab
  • 2 Tutorials (Week 5 & 12)
    – Help with problem solving
    – Prep for exams
• Schedule/exercises on the course web page
• Finalise your slot by end of Week 1
Accounts

- 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
Getting help

- LiC’s consultations
  - Monday 14 – 15
  - Wed 15 -16
  - Location: 612, Level 6, K17 (CSE)

- Lab tutors

- Your fellow students

- Forum on course website – BEST OPTION
  - Fellow students benefit from your questions
  - Fellow students can answer your questions
  - Develop a community
  - I will check the forum frequently
Assessment

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labs</td>
<td>20%</td>
</tr>
<tr>
<td>Programming Assignments</td>
<td>25%</td>
</tr>
<tr>
<td>Mid-semester Exam</td>
<td>20%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>35%</td>
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</tbody>
</table>

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

lab = marks for lab exercises (scaled to 20)
assign = marks for the two programming assignments (scaled to 25)
midExam = mark for the mid-semester exam (out of 20 marks)
finalExam = mark for the final exam (out of 35 marks)
mark = lab + assign + midExam + finalExam
grade = HD|DN|CR|PS if mark >= 50 && finalExam >= 14
          = FL if mark < 50 || finalExam < 14
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
More about exams ….

- **Mid-semester Exam (20 marks)**
  - In-class during normal lecture hours (Week 6)
  - Includes material from Week 1 – Week 5
- **Final Exam (35 marks)**
  - Final Exam Period
  - Comprehensive coverage
- **Both exams – Closed book**
  - Critical thinking and problem solving questions
  - Not a memory test
  - Sample problem set released very 2 weeks
    - Please attempt these on your own, discuss with friends, forum
    - Solutions will be made available
- **Practice problems during lectures**
Pull back the curtain on the Internet
THE INTERNET IS A SERIES OF TUBES

AND THEY'RE FULL OF CATS
Why should you care?

- To know how the Internet works
  - What may be wrong with your networks
  - When was the last time you went 24 hours without going online?

- Network architects get respect
  - In high demand, get paid well
The Internet is Exciting!

- Rapid growth and success
  - 1977: 111 machines on Internet
  - 1981: 213
  - 1983: 562
  - 1986: 5000
  - 1989: 10,000
  - 1992: 1,000,000
  - 2001: 150-175 million
  - 2002 > 200 million
  - 2011 > 2 billion
  - 2015 > 4 billion
  - 2020 – 20 billion devices (projection)
The Internet is Exciting!

- Rapid growth and success
The Internet is Exciting!

• Rapid growth and success

• We’re here at the beginning
  • Most of the growth happened in our lifetime
  • Engine of economic growth
  • Still TONS of untapped potential

Google
Founded in 1998

Facebook
Founded in 2004
The Internet is Exciting!

- Rapid growth and success
- We’re here at the beginning
- Communication is empowering
The Internet is Exciting!

- Rapid growth and success
- We’re here at the beginning
- Communication is empowering

(Late 60s)
What is this course about?

1. To learn how the Internet works
   - What really happens when you “browse the Web”?
   - What are TCP/IP, DNS, HTTP, NAT, VPNs, 802.11, …. anyway?
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1. To learn how the Internet works
   - 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 hard problems must they solve?
   - What design strategies have proven valuable?
   - How do we evaluate network performance?
Why learn the fundamentals?

- Applicable to all computer networks
- Intellectual interest
- Change/reinvention
  - Today’s Internet is different from yesterday’s
  - And tomorrow’s will be different again
  - But the fundamentals remain the same
Pre-requisites

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

This is a first course in computer networks
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 Experimental Design Studio
- Thesis Projects
- Research (Master’s, PhD)
LET'S GET READY TO RUMBLE
memegenerator.net