CS 348: Computer Networks
CS 378: Computer Networks lab

- Introduction; 23rd July 2012

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Introduction to CS 348, CS 378

• Eligibility for taking this course in Credit mode:
  • Course is for CSE UG students – 3rd year (+ 4th year)
    – Others need to talk to the instructor before registering
  • Course has an associated lab – cs 378.

• Taking this course in Audit mode:
  • Talk to the instructor after class, within the first week.
  • Taking the exams is an audit requirement for cs 348.
  • The lab, cs 378, is not open for Audit.
Discussion of student expectations

• Why are you here?
  – What do you expect to learn from this course?
  – How do you think it will be useful to you?

• Discussion of student expectations from this course.
  – I want to do research in networks
  – I want to learn networks because I am a CSE student
  – I didnt have a choice; it is a compulsory course
  – I dont know what I expect to get from this course
  – I have nothing else to do
  – I think this course will be a waste of my time
  – …
My Goals for this course

- To help you learn some concepts (and problem-solving principles) that are 'broadly useful', in networking and elsewhere. Hopefully you will be able to recognize and apply these concepts in your chosen area of work!

- To help you understand the internals of computer and communication networks, since you are CSE students

- For any networking technology X, mostly we will try to understand: “How does X work?”, with emphasis on “Why is X designed this way?”
Teaching-Learning methods

This course is oriented towards being:

• learner-centric:
  • I will not be simply lecturing.
  • You will have to do a lot of thinking during class!

• collaborative-learning:
  • You will do many group discussion activities.
  • You will teach and learn from each other!

• analogy-based reasoning:
  • I will pose problems from familiar areas (analogy).
  • You will solve them and apply the solution to Networking.
Problem for today's class

- There are two companies A and B, located in cities about 200 km apart.

- The CEO of company A wants to send a document, of about 100 pages, to the CEO of company B.

- What is your opinion on how can this be done, given the following constraints:
Constraints

- There is no email, no fax, no phone, no post office - no form of modern communication whatsoever.
- The only means of communication are some messenger boys.
- The messenger boys are very weak. Each can carry only 10 pages at a time!
- The messenger boys are very fickle. They may decide to quit without notice, at any time, even in the middle of carrying some pages!
Activity: Think-Group-Share

- Think.
  - Take 2 minutes to think about it individually.
  - Record your ideas for the solution in your notebook.

- Group.
  - Discuss your ideas with others in your group.
  - Then, work out the solution in detail, as a group. You can take 5-10 minutes for doing this.

- Share.
  - Share your group's solution with the entire class.
  - Other groups to identify pros and cons of each.
Problem-Solving: ABCDE Process

A) Assume a simple, favourable case of given scenario
   • State your assumptions clearly (and later relax them)

B) Brainstorm for possible solutions
   • Evaluate pros and cons of each wrt given scenario constraints

C) Choose one solution that satisfies the given constraints
   • Avoid attempts for premature optimization
   • Avoid including “additional features” that are not asked for

D) Do the detailing of the chosen solution
   • Do not go back to brainstorming for evaluating other ideas

E) Examine correctness and completeness
   • Carry out 'What-if' scenarios on various boundary conditions and see if your solution needs to be modified
Why does this course have emphasis on ...

• Your idea of the “solution”:
  – To help you see that most technology evolves from simple ideas; You already know many such ideas!

• Group discussions:
  – That is how details of most technologies are worked out.
  – Evaluate pros and cons of solutions, within 'constraints'.

• Analogies:
  – That is how scientists attempt to solve new problems.
  – Analogies may help you to see conceptual similarities in various areas of your work (and adapt solutions).

• Fun:
  – That is when you learn; See last year's students' comments.
Repeat: This course will not have ...

- Instructor-centric lecturing
  - You cannot come to class, simply sit there and expect me to “tell” you all the “relevant details”.
  - For any topic, I will mostly pose some questions.
    - You will learn by reflecting on how you “think” the solution should be implemented.
    - You will learn by discussing your “solution details” with peers.

- Note:
  - If you participate, you are likely to learn networking concepts and also develop thinking skills of broad applicability.
  - If you do not participate, this course can seem boring and “not having enough depth”.

Book, Schedule, Exams

• Book:
  • Computer Networks: A systems Approach, 5th Ed.
  • by Larry Petersen and Bruce Davie.
• Course Slot:
  • Theory – Slot 1 – Mon 8:30; Tue 9:30; Thu 10:30
  • Lab – L1 – Mon 2 pm – 5 pm
• Exams:
  • 2 quizzes (20%) + Midsem (35%) + Endsem (45%)
  • Around 8 lab sessions + 2 hands-on, in-lab quizzes
Homework - 1

• Continue to think about the CEO problem.
• Start with the general ideas of your solution.
• List down “what-if” scenarios:
  • What if X happens? How will my solution take care of it.
• Work out details for each step of your solution.

• Submit your detailed solution in the next class!