CS 716: Introduction to communication networks

- 1st class; 22rd July 2011

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Introduction to CS 716

- Eligibility for taking this course in credit mode.
  - Course is for non-CSE, non-ECE, PG students.
  - CSE/ECE PG students should take CS 653 or CS 641.
  - UG students should take CS 348.

- Objective of the course:
  - Introduction to communication networks.
  - Institute elective offered by CSE dept.

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 leading to topics requirements specification for instructor.
  - …

- Note: There is no lab associated with this course. So do not expect to do programming or lab work.

Emphasis of the course

- The course will not go into much excruciating details; It will not be too top-level either.
- The course will focus on concepts that are 'broadly useful', in networking and elsewhere.
- Mostly we will try to understand: “How does X work?”, with emphasis on “Why is X designed this way?”

- Technical topics: Internet, TCP/IP, WiFi, GSM, etc.
- Textbook: Instructor will draw from many sources;
  - You can refer to the book by **Kurose and Ross**.

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”.

Schedule, Exams, etc

- Take a look at the last year's lecture schedule
  - www.cse.iitb.ac.in/~cs716
- Ensure that you are registered on Moodle page
  - http://moodle.iitb.ac.in/course/view.php?id=2290
- Exams:
  - At least 2 quizzes and some homeworks.
  - One midsem and one endsem.

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!