

CS 925

Advanced Computer Networks

Spring 2024

CS 925

Lecture 1

Course Introduction

Tuesday, January 23, 2024

Objectives

- ▶ Computer networking technologies
 - “why” vs “how”
- ▶ Design methods and principles
- ▶ System-level thinking
- ▶ Research and problem solving
- ▶ Methods, tools, and skills

Motivation

- ▶ Regardless of your ultimate area of professional specialization, you will be designing **distributed systems** consisting of components that **communicate using a network**.
- ▶ The key performance measures of a system include **responsiveness, scalability, robustness, resiliency, and security**. Making sure that an implementation is “correct”, is not sufficient.
- ▶ Understanding the properties of an underlying network is as important as understanding of hardware and system-level software.

Coursework & Evaluation

- ▶ Five homework assignments: 40%
 - Assuming no major schedule disruption, the assignments will be due February 8 and 22, March 7, April 14 and 11.
- ▶ Two in-class exams: 30%
 - Thursdays March 14 and April 18
- ▶ Final project: 30%
 - initial paper submission: Tuesday, April 30
 - project presentations: last two meetings of the class (presentation document will be due on Thursday, May 2)
 - final paper submission: Monday, May 13

Assignments

- ▶ Assignments will have a form of a mini research paper, both with respect to structure and format:
 - context
 - problem
 - question (hypothesis)
 - answer
 - verification of answer
 - conclusion

Tools

- ▶ Learning and making effective use of appropriate tools is critical for success:
 - operating system
 - development environment
 - software version control
 - document preparation tools
 - plotting and data visualization
 - vector graphics

Tools

- ▶ Learning and making effective use of appropriate tools is critical for success:
 - operating system: [Unix-based with standard dev tools](#)
 - development environment: [a solid text editor or an IDE](#)
 - software version control: [Git and related tools](#)
 - document preparation tools: [LaTeX](#)
 - plotting and data visualization: [matplotlib](#), [gnuplot](#), [Matlab](#)
 - vector graphics: [draw.io](#), [Inkscape](#), [SVG-edit](#), [Adobe Illustrator](#)

Assignment 0

- ▶ Setup **CS GitLab** project for the code submission
 - the setup is slightly different from CS 825 (read the instructions)
 - edit name and email in all README.md files, commit and push
- ▶ Get ready to **create documents using LaTeX**
 - available on department server
 - local install on your own machine
 - cloud-based editor: [Overleaf \(overleaf.com\)](https://overleaf.com)
 - will be using [IEEE conference paper template](#)

Assignment 1

▶ Task

- Throughput testing tool
- Design and development
- Functionality
- Verification and calibration

▶ Deliverable

- Paper