National University of Computer & Emerging Sciences

CS 3001 - COMPUTER NETWORKS

Lecture 01

Introduction

23rd August, 2022

Nauman Moazzam Hayat

nauman.moazzam@lhr.nu.edu.pk

Office Hours: 02:30 pm till 06:00 pm (Every Tuesday & Thursday)

About the Instructor

Education

- FSc (Government College, Lahore)
- BS EE (University of Engineering & Technology, Lahore - Session '94)
- MS EE (University of Southern California, Los Angeles, USA – Class of '01)

Work Experience

- Senior Manager, Engineering Core Networks, Mobilink, Islamabad (9 Years)
- Regional Service Delivery Manager, Ericsson Region Middle East & Africa (6 Years)
- Adjunct Assistant Professor, FAST – Lahore (Spring 2020 till Date)

Course Administration

- **Course Prerequisites:**
  - Passion and dedication to the course
  - Basic knowledge of Digital Logic, Signals and Systems, Computer Organization
  - Programming Skills (C/C++)
  - CS 218 – Data Structures

Course Administration

- **Attendance Policy:**
  - As per the University Policy & Guidelines
- **Dishonesty, Cheating, Plagiarism:**
  - As per the University Policy & Guidelines
- **Important Points:**
  - Course outline may change 10%-20% as we proceed in the semester
  - No retakes of exams or quizzes
  - Submission deadlines will strictly be enforced. (Homework, Assignments, Project etc.)
  - 2 lectures of 1.5 hours per week + lab per week

Course Administration

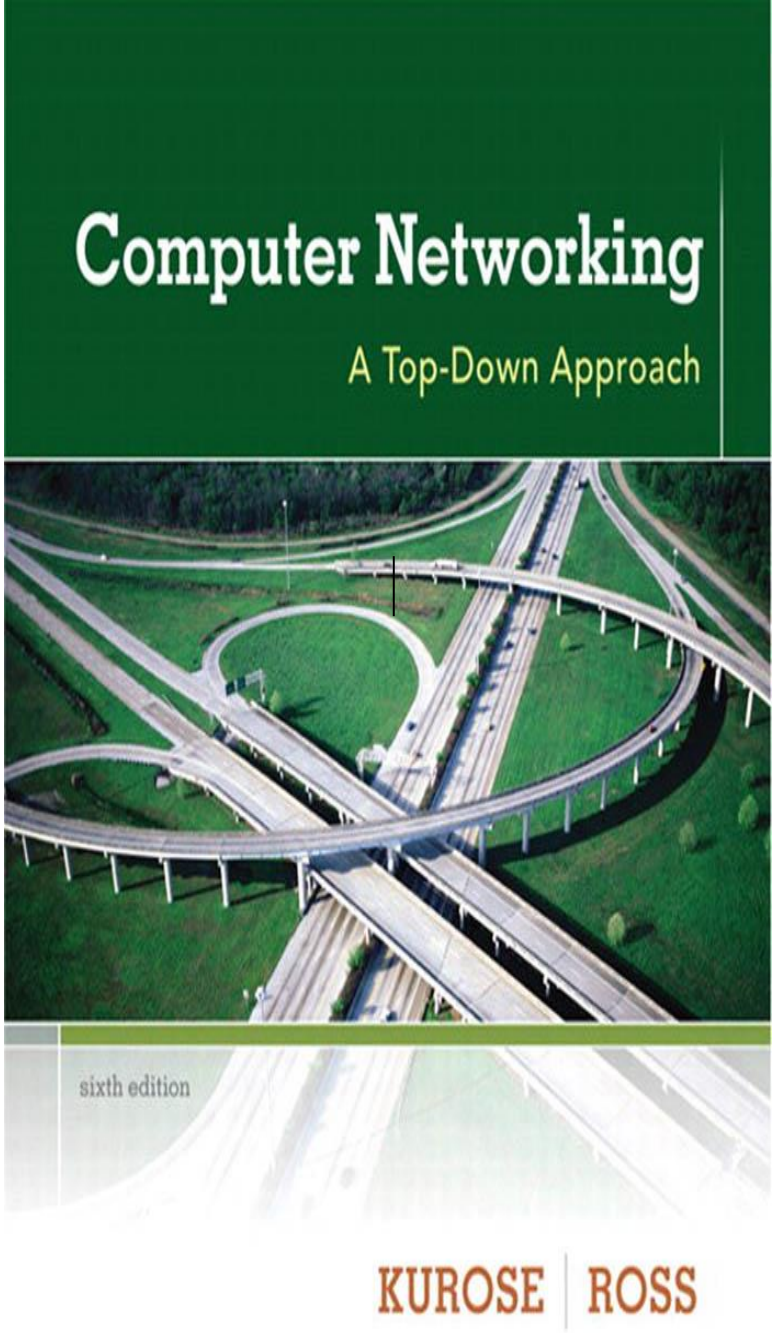
Course Policies

- Course outline may change 10-20% as we proceed in the semester
- Important: It is strived & intended to have uniform & similar weightages of different course components & grade assigning policy across all the sections for this course for the semester, but there may be variations owing to various factors, for example different number / types of assessments like assignments, home works, quizzes and/or projects.
- Assignment deadlines for both class and lab are hard.
- Quizzes might be announced or unannounced.
- There will be **no re-take** of quizzes or exams. Special consideration may be given only for mid or final exam for an emergency on per case basis subject to approval from the department administration & the instructor. In approved circumstances, percentage of mid will be awarded for final or vise versa.
- Integrity in the assignments/quizzes is expected; otherwise result would be an F grade in the course or the case may be forwarded to the Disciplinary Committee.
- The lectures will be of 1.5 hours duration + there will be one 3 hours lab/week.
- (80%) Attendance for the student is a MUST which needs to be ensured according to the University policy to avoid disqualification.
- You may request an appointment according to my schedule by emailing me on the aforementioned email.

Course Administration

- **Course Textbook:**
  - Computer Networking
    A Top-Down Approach
    (6th edition, Kurose & Ross)

- **Reference Textbooks:**
  - Computer Networks
    (5th edition, Tanenbaum)
  - Data Communications and Networking
    (4th Edition, Behrouz A. Forouzan)
  - Other Support & Reading Material
    (Will be posted)



Why study Networking?

- *It's hard to name an area of computer science that has produced more tangible changes for the average person over the last 25 years than networking.*

- *It is the plumbing of computing.*

- *Globally, devices are growing faster than both the population and the internet users. A growing number of M2M applications like video surveillance, health monitoring systems, traffic monitoring systems, smart meters, package or asset tracking are contributing in a major way in this growth.*

What is Networking?

Networking is…

the World-Wide Web

Networking is…

Skype

Networking is…

Facetime

Networking is…

Netflix

Networking is…

YouTube

Networking is…

Napster

Networking is…

BitTorrent

Networking is…

Bitcoin

Networking is…

Fortnite Battle Royale

Networking is…

Gmail

Networking is…

Dropbox

Networking is…

Facebook

Networking is…

Snapchat

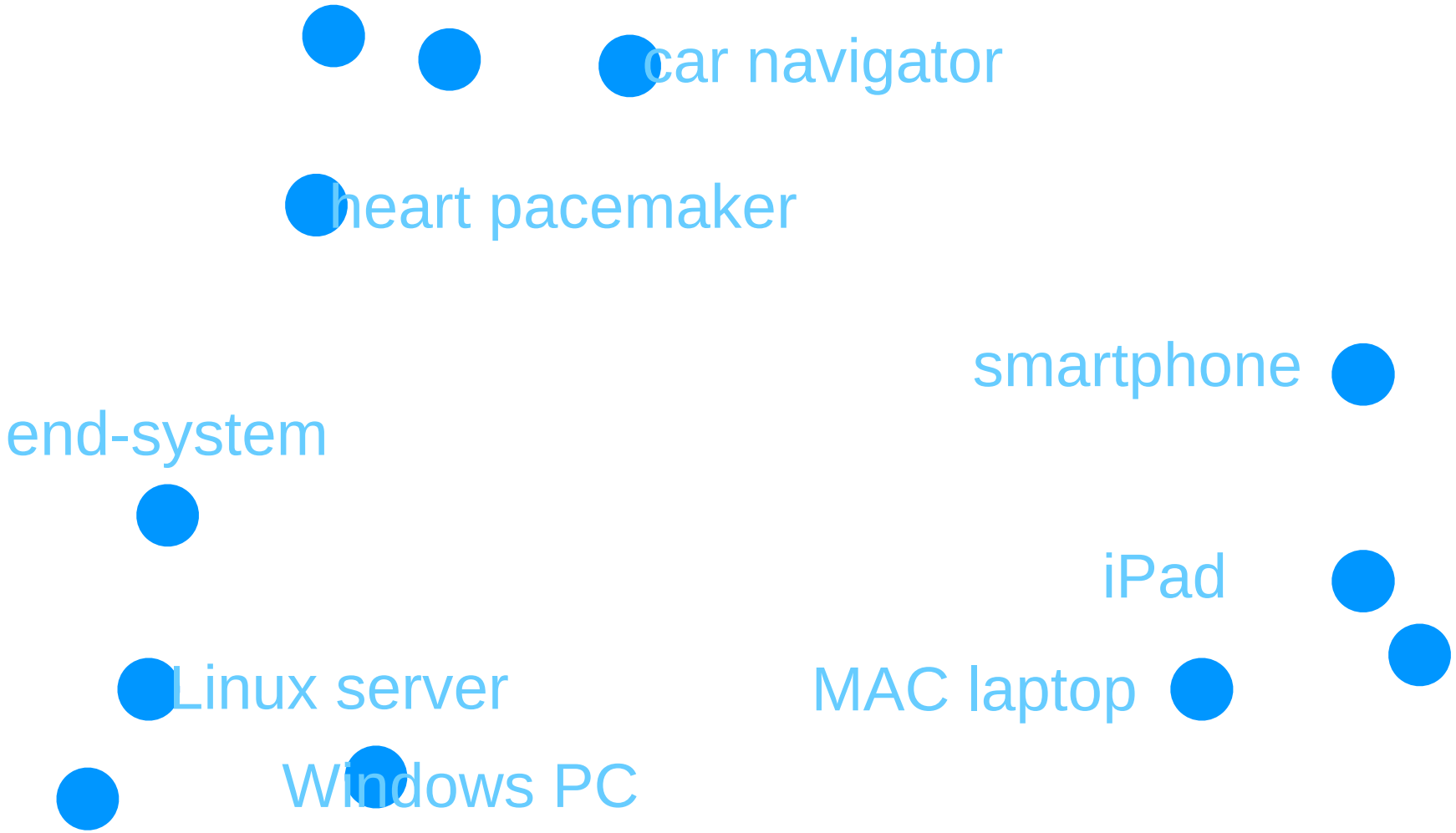
Networking is…

the Internet

Networking is…

Wi-Fi, LTE, SDN, BGP, MIMO,
mesh-networking, full-duplex,
sensor networks, medical devices,
datacenter networks,
undersea, deep space. . .

What is Networking about?


car navigator
heart pacemaker
smartphone
end-system
iPad
Linux server
MAC laptop
Windows PC

What is a "Computer"Network?

- It is a set of nodes such as routers, switches, hosts etc. interconnected via transmission facilities like copper, cable, fibre, satellite, radio, micorwave etc. for the purpose of providing services to the end systems / users

- Why the " "? Non traditional end sytems / fun internet appliances like smart phones, home appliances, gaming consoles, sensors, medical and health equipment etc. are being connectec to the internet

- Point to Point communications is not practical!
  - Devices are too far apart
  - Large set of devices would need impractical number of connections (A simple example on the next slide)

Web-enabled toaster + weather forecaster

IP picture frame

Internet refrigerator