Computer Networks

CS C461 / IS C461 / CS F303 / IS F303

BITS Pilani

Pilani | Dubai | Goa | Hyderabad

Instructor(s)

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Course Material:

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Text Books:

T1. Larry L. Peterson & Bruce S. Davie: Computer Networks: A Systems Approach, Third Edition, Morgan Kaufmann / Elsevier, New Delhi, 2003.

T2. Alberto Leon-Garcia and Indra Widjaja, Communication Networks: Fundamental Concepts and Key Architectures, Second Edition, Tata McGraw-Hill, 2004.

Reference Books:

R1. A. S. Tanenbaum: Computer Networks, Fourth Edition, Pearson Education, New Delhi, 2003.

R2. D. E. Comer: Internetworking with TCP/IP, Volume 1, Fifth Edition, Pearson Education, 2004.

R3. S. Keshav: Computer Networking: An Engineering Approach, Pearson Education, New Delhi, 1997.

R4. James F. Kurose, and Keith W. Ross: Computer Networking: A Top-Down Approach Featuring the Internet, Third Edition, Pearson Education, 2006.

R5. Research Papers

Evaluation Scheme

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- Test 1 (20%)
- Test 2 (20%)
- Assignment Evaluation (15%)
- Lab Attendance (10%)
- Comprehensive Exam (35%)

Assignments

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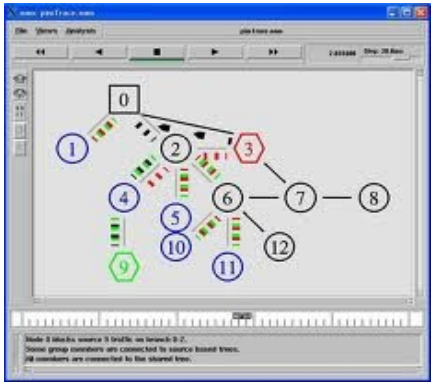
Assignments is to provide practical skills using network simulators and programming language.

Socket programming and related stuffs have to do in Linux-C.

Assignments using NS2 (or) Omnet++ will be used to simulate the working of Network



WIRESHARK

OMNeT++

What is this course about?

- Comprehensive Introduction to computer networks.
- Sound conceptual foundation of computer networking.
- Learn design aspects of computer networking.
- Internet architecture/Protocols as case study.
- Programming assignments to provide practical skills using various network simulators/tools.

Broad Topics

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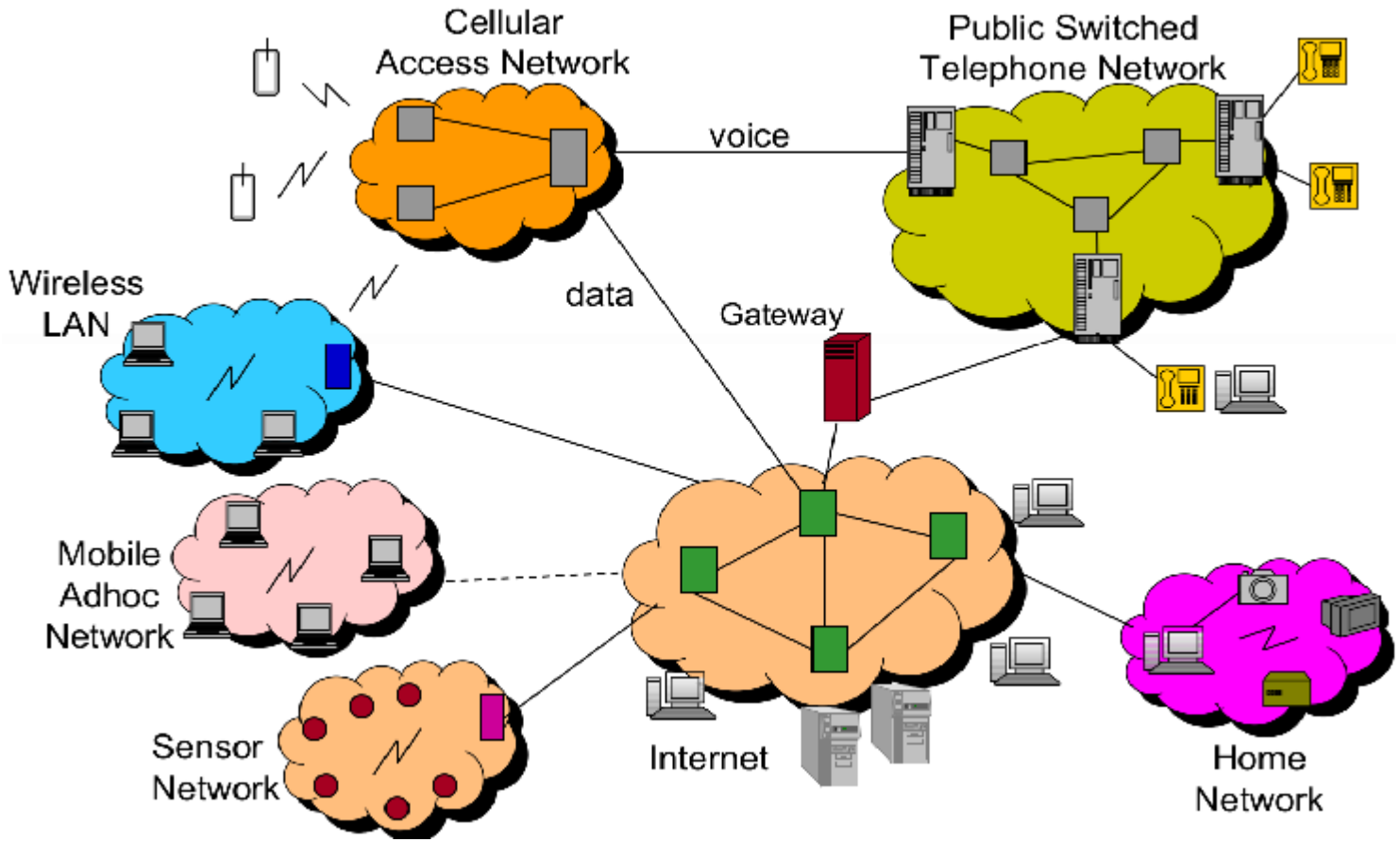
- Fundamental Networking Concepts
- OSI Reference Model
- TCP/IP Protocol Stack
- The Physical Layer
- Basic Internetworking Devices
- Application Layer Protocols
- Transport Layer Services & Principles
- Network Layer Design Issues
- Data Link Layer
- The Ethernet
- Wireless Networks
- Wireless LANs
- Switching technology
- Router Design
- Security aspects
- Network design Issues & Case studies

Networked Systems



Course Overview:

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Introduction

- What is *Internet*, what is a protocol?
- Network edge, network core, network access
- Physical media
- Delay, loss in packet-switched networks
- Protocol layers, service models

Approach

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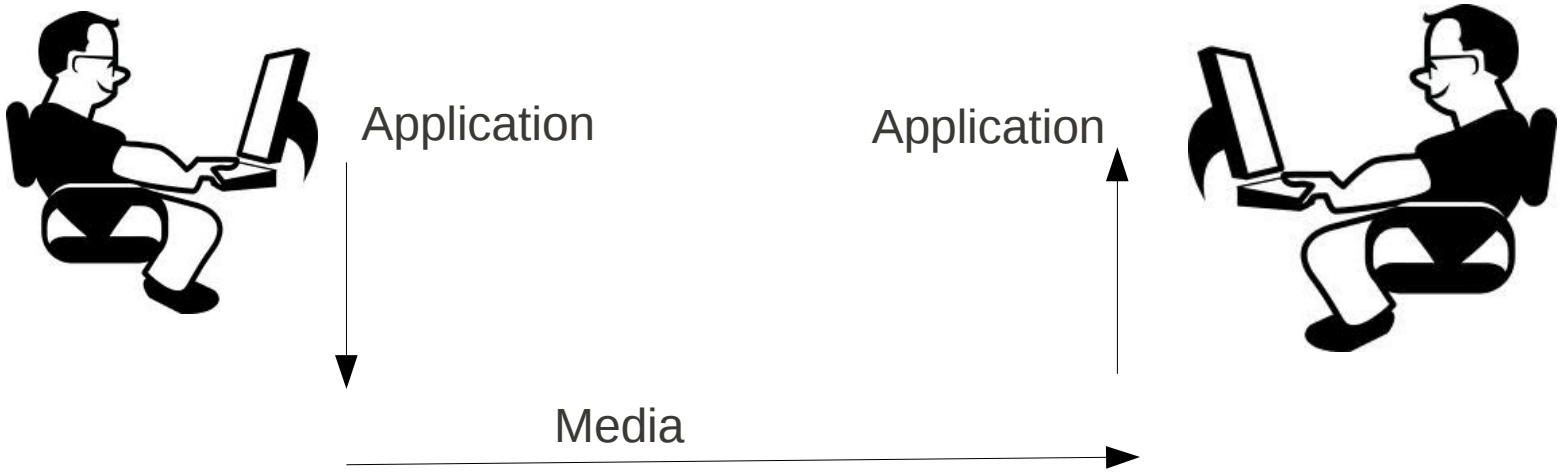
We'll cover networking in top-down model.



Course Overview:

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Application Layer

- Principles of application layer protocols
- Web & HTTP
- File transfer: FTP
- Electronic mail in the Internet
- The Internet's directory service: DNS
- P2P File Sharing

Course Overview:

Transport Layer

- Transport-layer services and principles
- Multiplexing and demultiplexing applications
- Connectionless transport: UDP
- Principles of reliable data transfer
- TCP case study
- Principles of congestion control
- TCP congestion control

Course Overview:

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Network Layer

- Network service model
- Routing principles
- Hierarchical routing
- IP: the Internet Protocol
- IPv4, IPv6
- Lookup Algorithms

Course Overview:

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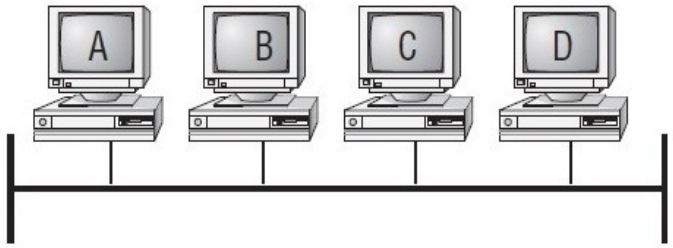
Link Layer, LANs

- Introduction, services
- Error detection, correction
- Multiple Access Protocols
- LAN addresses
- Ethernet
- ARP, DHCP
- Hubs, bridges, switches
- PPP: the Point-to-Point protocol



Course Overview:

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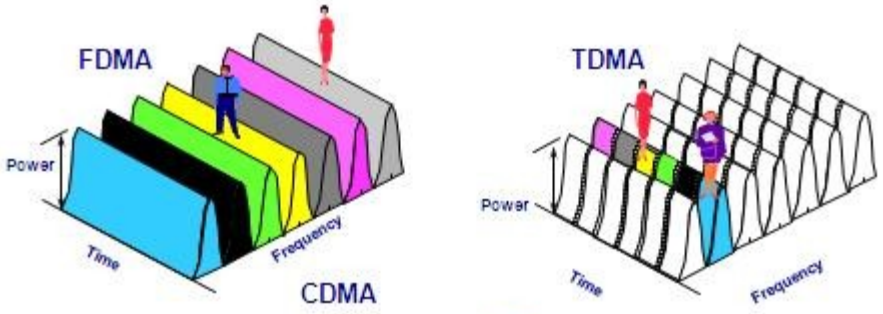
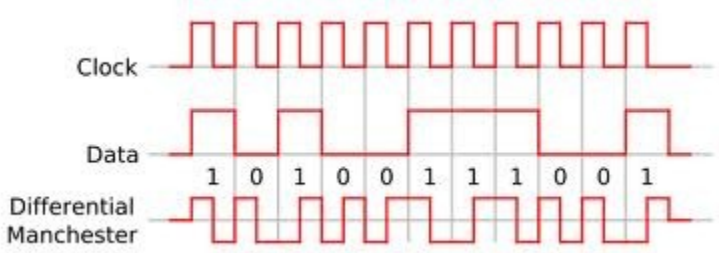
Physical Layer

- Copper, Fiber and Wireless
- Data (Channel) Encoding
- Multiple Access Schemes





Course Overview:

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Wireless & Mobile Networks

- Wireless links, characteristics
- IEEE 802.11 wireless LANs
- Cellular Internet Access
- Mobility: Principles, addressing and routing to mobile users
- Mobile IP

Course Overview:

- Network Management
- Switching technology
- Router Design
- Network Security

Case Study *

- Campus Network
- Short Range Wireless Network
- Planet Lab
- Future Internet
- Smart Grid Networking
- Software Defined Network

** Any two topics from the above will be covered*

Questions?