



Information Technology Engineering

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1393



Teaching Team and Resources

- Instructor:
 - Mohammad Hossein Manshaei
- Teaching Assistant
 - Ms. Ranjbaran
- Course web page available at the IUT web course (<http://ivut.iut.ac.ir/bounce.php?course=754>)

مهندسی فناوری اطلاعات

این درس فناوری های کلیدی شبکه که اینترنت بر پایه آنها بنا شده است، را مورد بحث قرار می دهد. همچنین امکانات و کاربردهای اینترنت شامل تجارت الکترونیکی، چندرسانه ای، جماعت های الکترونیکی و افق های آینده بررسی خواهند شد. دانشجویان در این درس مقدمات طراحی، پیاده سازی و مدیریت وب جهان گستر بر روی شبکه اینترنت را فرا می گیرند. عناوین اصلی مورد بحث شامل مروری بر اینترنت، تألیف وب، برنامه نویسی وب و راه اندازی و نگهداری سرویس دهنده خواهد بود.

سرفصل مطالب

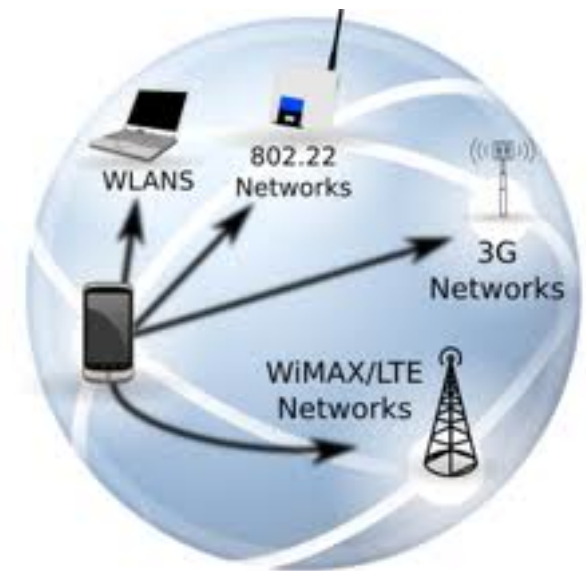
- مفاهیم مورد نیاز در مورد زیرساخت شبکه (دسترسی ، Protocol ، معماری)
- Backbone (ساختار فیزیکی ، سرعت)
- زبان های برنامه نویسی وب
- WWW (تاریخچه ، آمار)
- خدمات (Email, File Transfer , ...)
- مدیریت (SNMP, MIB , ...)
- کاربردها (VOIP, Video Conferencing)
- امنیت (Intrusion Detection, DDOS , ...)
- سیستم های توزیع شده

Course Contents

1. Wireless and Mobile Networks
2. MAC Layer and Backbone Network
3. Multimedia Networking
4. Security and Privacy
5. Network Management
6. Network Simulation
7. Search Engines
8. Network Programming

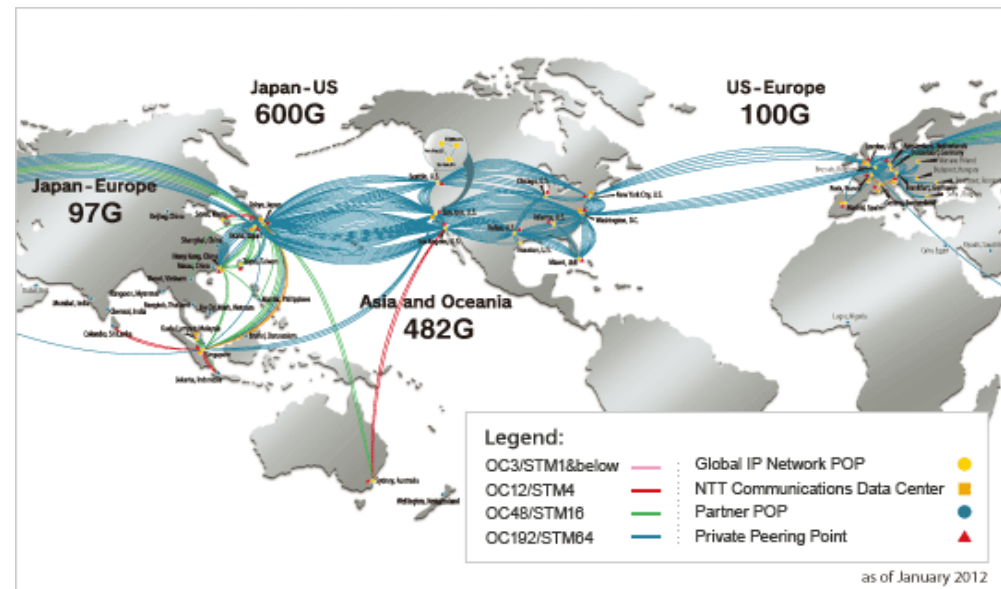
I. Wireless and Mobile Networks

- Wireless Links and Characteristics
- **WiFi: 802.11 Wireless LANs**
 - Architecture
 - CSMA/CA and other MAC protocols
 - Frames
 - Mobility
 - Advanced Features
 - 802.11a/b/g/n/ac
- **Bluetooth and WiMAX**
- **LTE**
- **Cellular Internet Access**
- **Mobile IP**
- **Manage Mobility in Cellular Networks**



2. MAC Layer and Backbone Network

- Backbone Network Components
 - Hub, Switch, Router, Gateway
- Backbone Network Components Architectures
 - Backbone Architecture Layers
 - Switched and Routed Backbones
 - Virtual LANs
- Improving Backbone Performance
 - Improving Circuit Capacity
 - Reducing Network Demand



3. Multimedia Networking

- Multimedia Networking Applications
- Streaming Stored Audio and Video
- Making the best out of Best Effort Service
- Protocols for Real-time Interactive Applications **RTP, RTCP, RTSP, SIP**
- Providing Multiple Classes of Service
- Providing **QoS** Guarantees



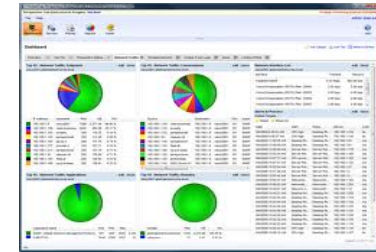
4. Security and Privacy

- What is network security?
- Principles of **cryptography**
- Message integrity
- Securing e-mail
- Securing TCP connections: **SSL**
- Network layer security: **IPSec**
- Securing **wireless LANs**
- Operational security: **firewalls** and **IDS**
- **Privacy** enhancing technology



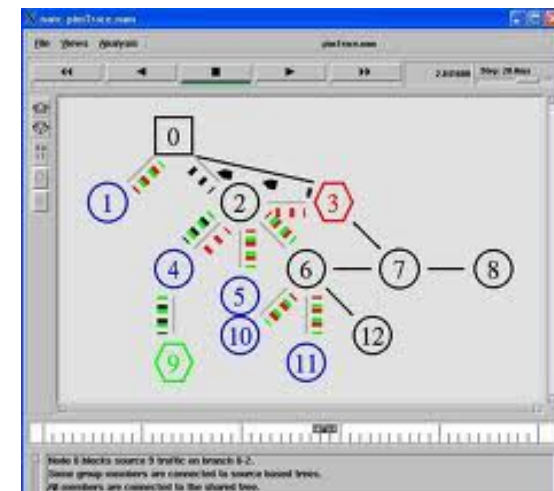
5. Network Management

- Introduction to Network Management
 - Motivation
 - Major Components
- Internet Network Management Framework
 - **MIB**: Management Information Base
 - **SMI**: Data Definition Language
 - **SNMP**: Protocol for Network Management
 - Security and Administration
- Presentation Services: **ASN.1**



6. Network Simulation

- ns2/ns3 Simulation



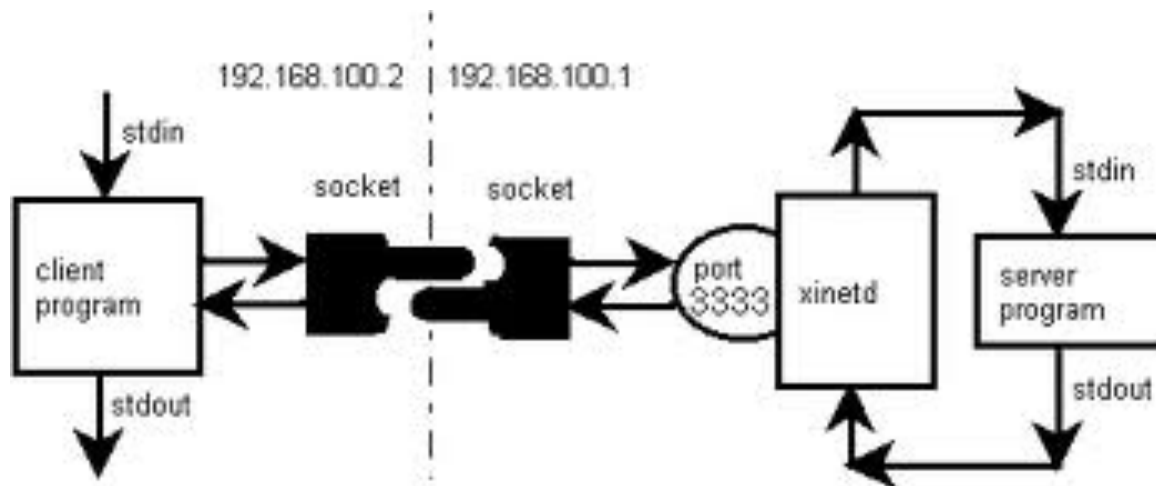
7. Search Engines

- The Google Page Rank Algorithm



8. Network Programming

- Socket Programming
- ASP
- CGI
- Qt



Organization

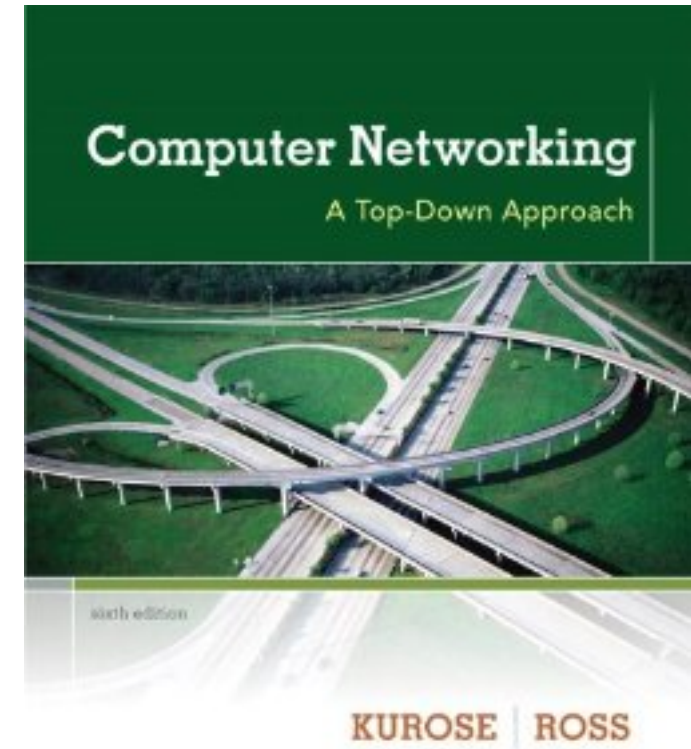
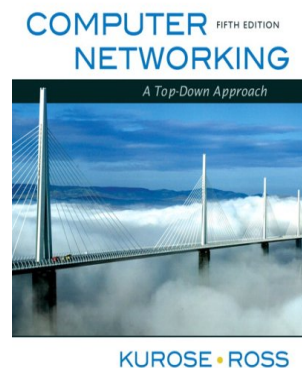
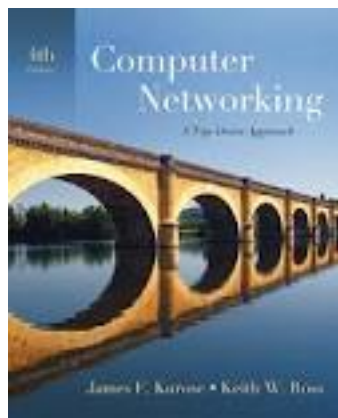
- Lectures
- Homework
 - Several homework with a few correction sessions
- Quiz
 - Several quizzes
 - 10 Multiple Choice Questions
- Mid-term Exam
- Final Exam

Textbook (I)

Computer Networking: A Top Down Approach,
6th edition.

Jim Kurose, Keith Ross
Addison-Wesley PEARSON, 2009.

Chapters: 5, 6, 7, 8, and 9

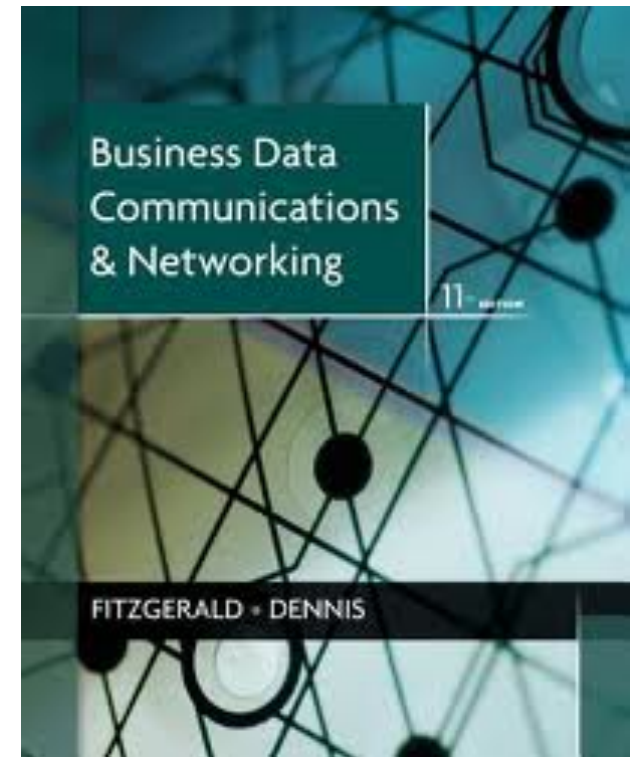


Textbook (2)

Business Data Communications & Networking,
11th edition.

Jerry Fitzgerald and Alan Dennis
JOHN WILEY & SONS, INC. 2012

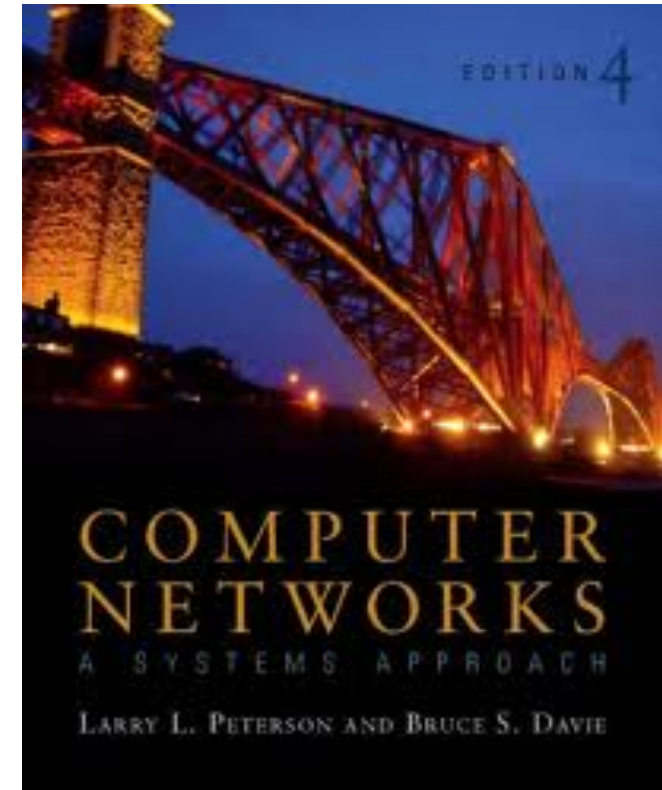
Chapter 7 (6, 8, and 9)



Textbook (3)

Computer Networks: A System Approach,
4th edition.

Larry L. Peterson & Bruce S. Davie
Elsevier 2007



More References

1. M. H. Manshaei, “*ns-2: A Quick Tutorial*”
2. Ian Rogers, “*The Google Pagerank Algorithm and How It Works*”
3. And ...

Exams and Grading

- Mid-term: 30~35%
- Final exam: 45~50%
- Quizzes: 10%
- Homework and Network Programming: 15%

→ Hence, 5% bonus 😊