Computer Networks

Self-introduction

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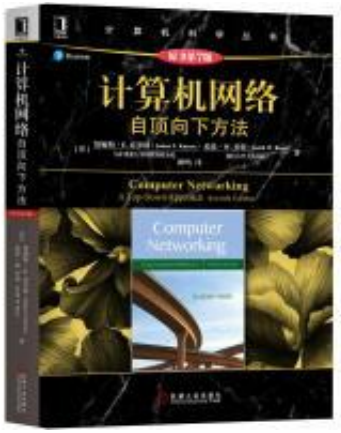
Reference

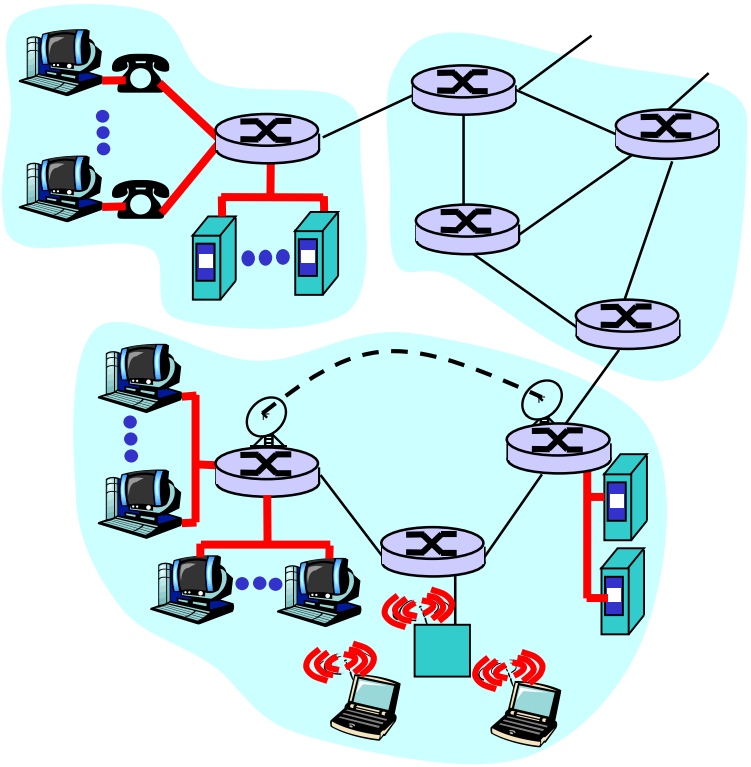
- James F. Kurose， Keith W. Ross. 计算机网络-自顶向下方法（原书第7版）. 机械工业出版社. 2018..(Text Book)
- Andrew S. Tanenbaum and David J. Wetherall著,严伟、潘爱民译，计算机网络（第5版），清华大学出版社，2012
- William Stallings, Data & Computer Communications (Sixth Edition), Higher Education Press (China) & Pearson Education, 2001.
- Douglas E. Comer & David L. Stevens, INTERNETWORKING WITH TCP/IP-Vol. 1,Vol.2, Vol. 3, Tsinghua University Press, 1999,10.



A top-down approach:

We'll cover networking top-down

- end-system applications, end-end transport
- network core: routing, hooking nets together
- link-level protocols, e.g., Ethernet
- other stuff: security, mobility, management,



Course Overview:

Part 1: Introduction *(4 classes, text: Chp 1)*

- what is a Computer Networks?
- What is a protocol?
- Network structure:network edge, network core, network access
- delay, loss in packet-switched networks
- protocol layers, service models
- Internet backbones, NAPs and ISPs
- brief history of networking, Internet

Course Overview:

Part 2: Application Layer *(6 classes, text: Ch. 2)*

- principles of application-layer protocols
- World Wide Web: HTTP
- file transfer: FTP
- electronic mail in the Internet
- the Internet's directory service: DNS
- P2P applications
- socket programming

Course Overview:

Part 3:Transport Layer *(6 classes, text Ch. 3)*

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

Course Overview:

Part 4: Network Layer *(10 classes, text: Ch. 4)*

- introduction and network service model
- what's inside a router?
- routing principles (algorithms)
- hierarchical routing
- IP: the Internet Protocol
- IP addressing, subnet, route table
- Internet routing: RIP, OSPF, BGP

Course Overview:

Part 5:Link Layer, LANs *(6 classes, text:Ch. 5)*

- introduction, services
- error detection, correction
- multiple access protocols, LANs
- LAN addresses, ARP
- Ethernet
- HDLC, PPP

Course Overview:

Part 6: The Physical Layer (2 Hrs)

- Data Transmission
  - Terminology
- Data Encoding
  - Encoding Techniques
  - Digital Data, Digital Signal
  - Encoding Schemes
- Transmission Media
- The Data Communications Interface
  - Asynchronous and Synchronous Transmission
  - Interfacing

Course Overview:

Part 7: Wireless and Mobile Networks (4 *Hrs*, Ch 6)

- wireless link characteristics
- the wireless link:
  - 802.11
  - cellular Internet access
  - mobility principles
- mobility in practice:
  - mobile IP
  - mobility in cellular networks

Course Overview:

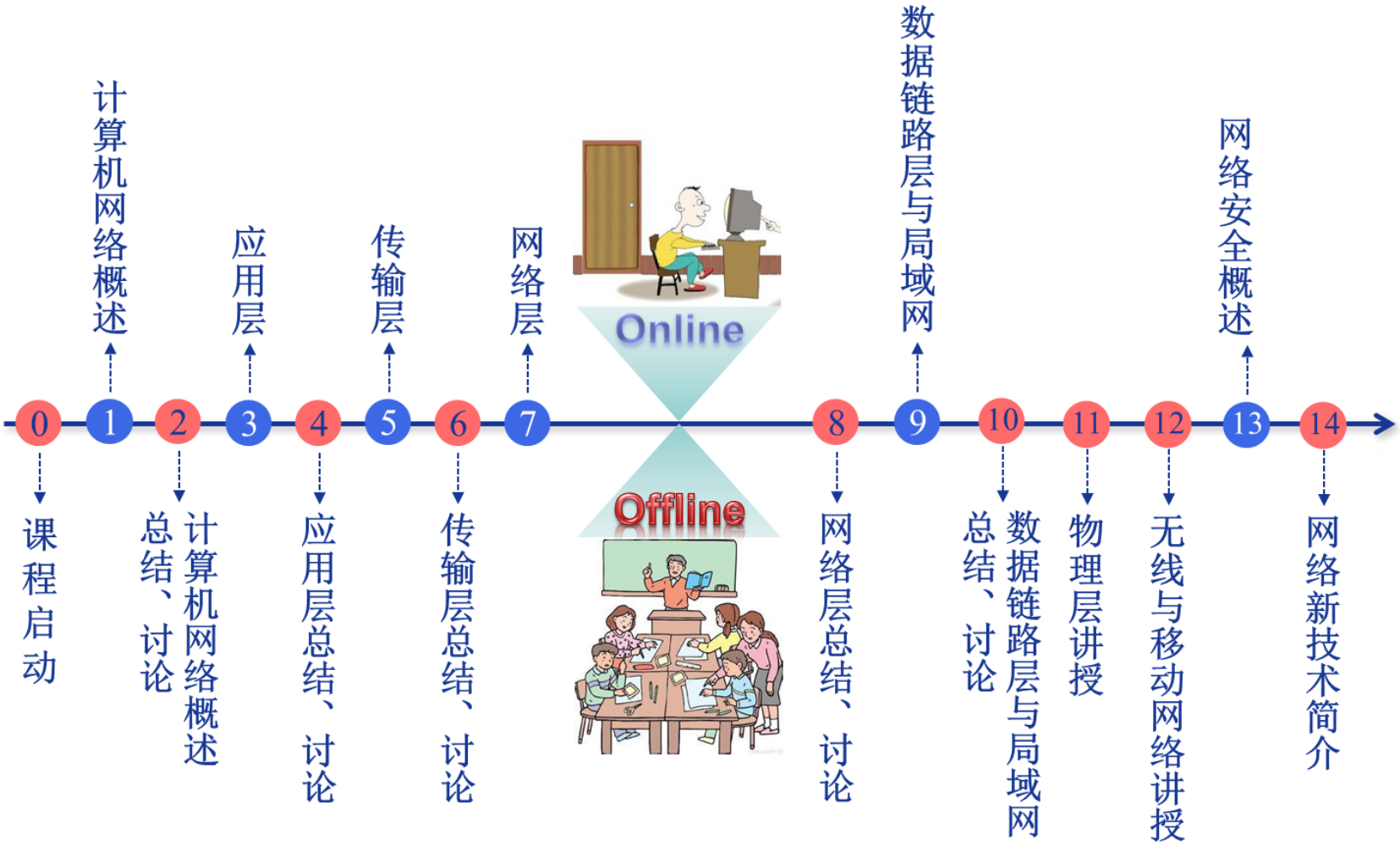
Part 8: New Trends in Computer Networks *(2 Hrs)*

- Internet 2
- New architecture
- Internet of Things (IoT)
- SDN
- Hot topics in computer networks
- ……

Assessment

- SPOC/MOOC: -~15%
  - http://www.icourse163.org/spoc/course/HIT-1001720004
  - https://www.icourse163.org/course/HIT-154005
- Class-~10%
- Lab-~15%
- Final examination-~60%

混合式教学模式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课程启动
1
计算机网络概述
2
总结、讨论
计算机网络概述
3
应用层
4
应用层总结、讨论
5
传输层
6
传输层总结、讨论
7
网络层
Online
Offline
8
网络层总结、讨论
9
数据链路层与局域网
10
总结、讨论
数据链路层与局域网
11
物理层讲授
12
无线与移动网络讲授
13
网络安全概述
14
网络新技术简介

线下课堂教学

- 大班讲授
- 小班翻转
  - 分班、分组
  - 束广就狭，你学你秀
  - 开疆拓土，知识扩展
  - 质疑辨惑，我问你答
  - 解疑释惑，你问我答
  - 演武修文，现场操练

课程QQ群

软件工程

群名称：《计算机网络》（2021秋）

群　号：429788979

课程QQ群

人工智能

群名称：《计算机网络》（2021秋）

群　号：767245325

Now let's go!