

Computer Networking

Course Introduction

Antonio Carzaniga

Faculty of Informatics
Università della Svizzera italiana

September 20, 2017

- General course information
- Program
- Preliminary schedule
- Intro to computer networking: *the entire course in one hour*

■ On-line course information

- ▶ ***INFO.NTW17*** on iCorsi
- ▶ and on my web page: ***<http://www.inf.usi.ch/carzaniga/edu/ntw/>***
- ▶ previous editions also on-line: ***<http://www.inf.usi.ch/carzaniga/edu/ntw16/>***

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■ Announcements (***you are responsible for reading them!***)

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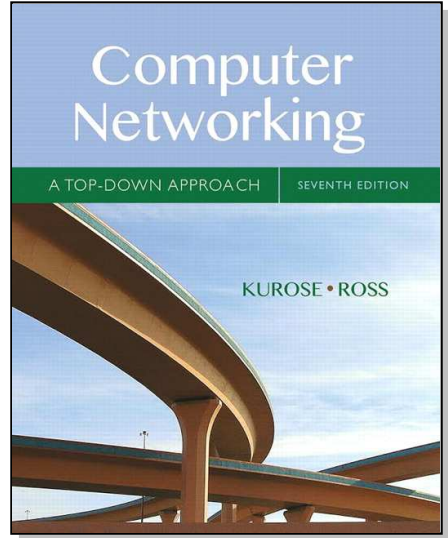
■ Office hours

- ▶ Antonio Carzaniga: *by appointment*
- ▶ Loan Ton: *by appointment*
- ▶ Daniele Rogora: *by appointment*

Computer Networking
A Top-Down Approach

James Kurose
Keith Ross

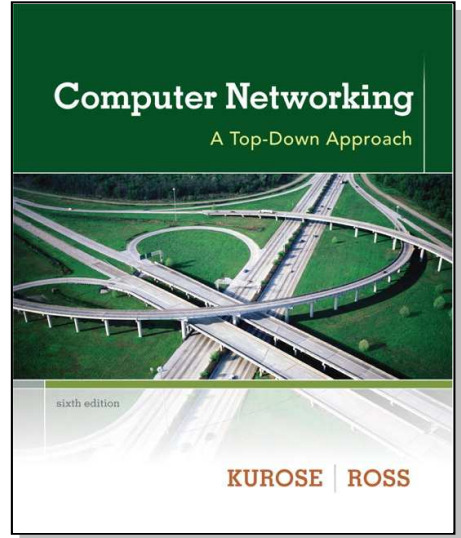
Addison-Wesley



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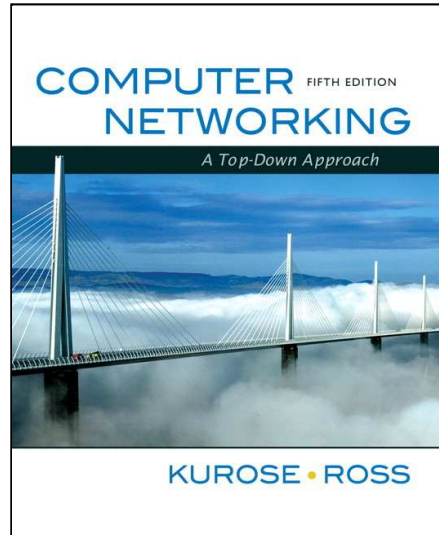
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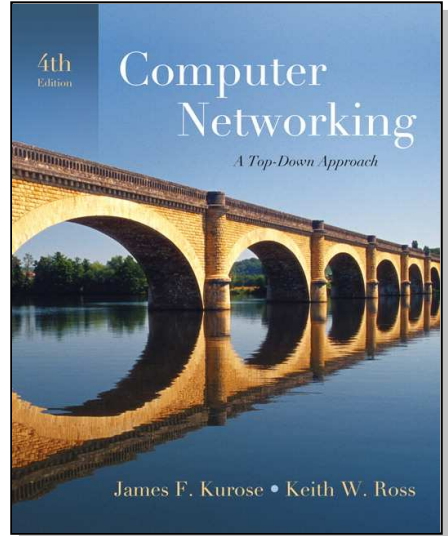
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- +30% homework assignments
 - ▶ at least three *graded* assignments
 - ▶ grades added together, thus resulting in a weighted average
 - ▶ more homework exercises

- +30% midterm exam

- +40% final exam

- $\pm 10\%$ instructor's discretionary evaluation
 - ▶ participation
 - ▶ extra credits
 - ▶ trajectory
 - ▶ ...

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Doing so means committing plagiarism.*

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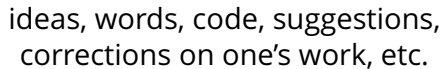
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Just Do The Right Thing!

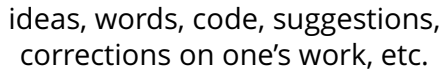
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- Using someone else's material may be appropriate
 - ▶ e.g., software libraries
 - ▶ ***always clearly identify the external material, and acknowledge its source; failing to do so means committing plagiarism.***
 - ▶ the work will be evaluated based on its *added value*

- Committing plagiarism on an assignment or an exam will result in ***failing that assignment or that exam***
- Penalties may be escalated in accordance with the regulations of the Faculty of Informatics

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 - ▶ at the instructor's discretion
 - ▶ only for documented medical conditions or other documented emergencies

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 - ▶ corollary: the grade of an assignment turned in more than two days late is 0

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 - ▶ eavesdrop network traffic (Web, e-mail, etc.)
 - ▶ forge network traffic (e.g., e-mail)
 - ▶ ...

- This knowledge is essential to understanding networked communications
 - ▶ you are encouraged to play with the network, just like you would play with the software on your computer

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- This knowledge is essential to understanding networked communications
 - ▶ you are encouraged to play with the network, just like you would play with the software on your computer
- Nevertheless, abusing this knowledge is unethical—in fact, it may be considered a crime

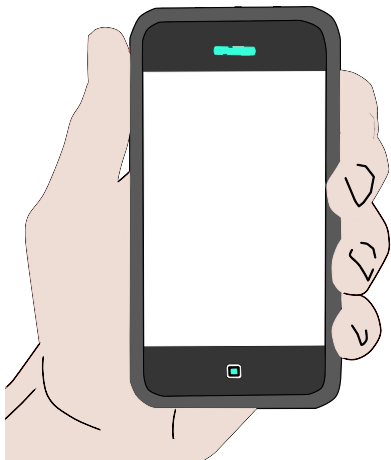
PART 2

What this course is about

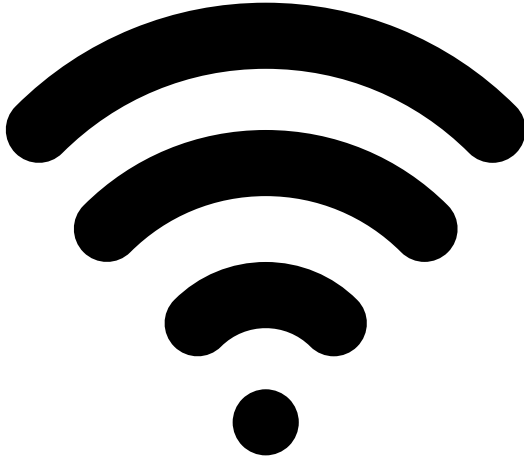
An overview of the entire course in one hour or so

What is the Internet?

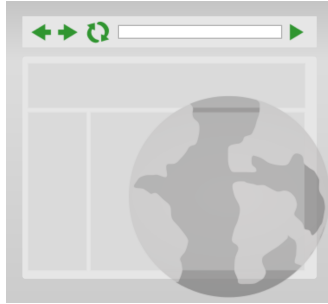
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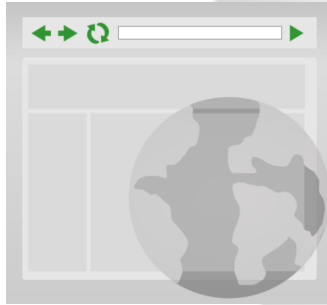
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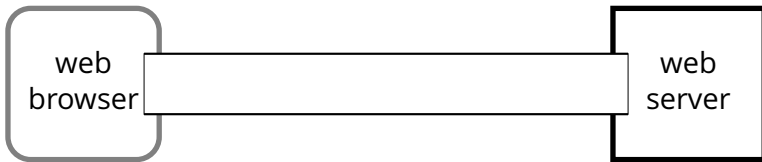


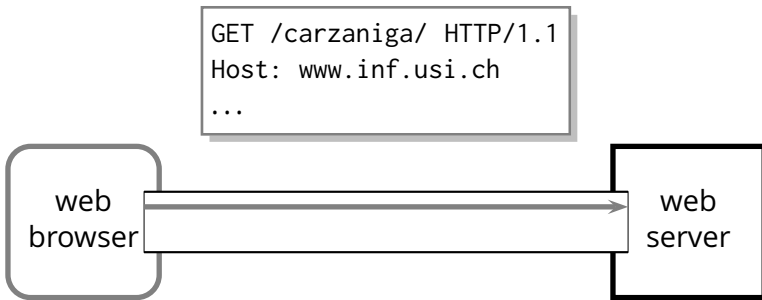
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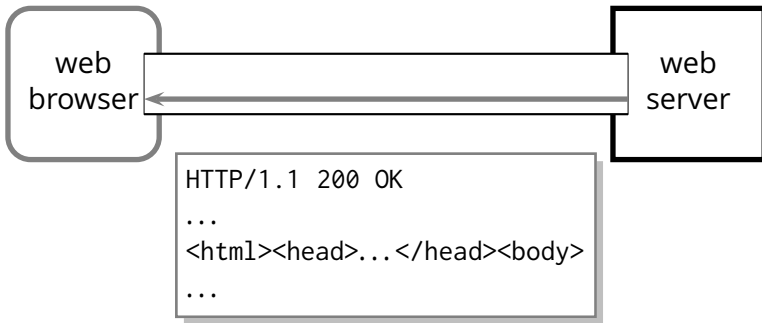


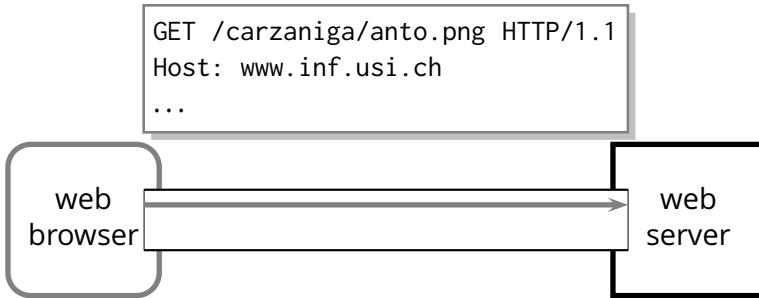
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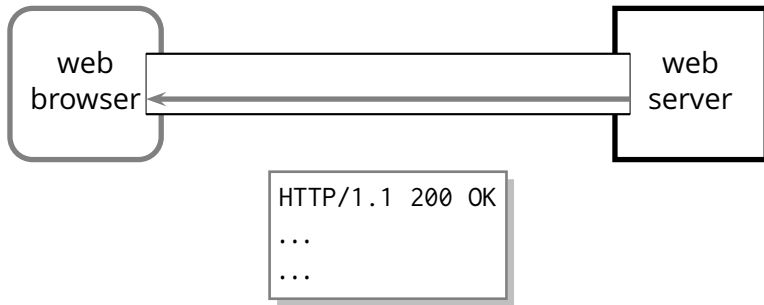




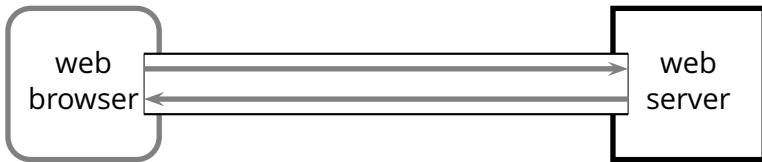








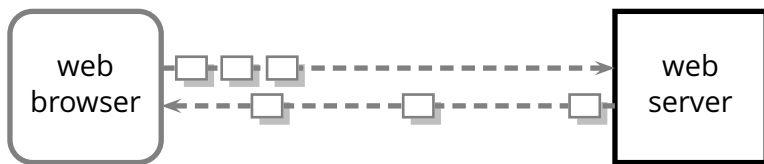
Streams or Packets?



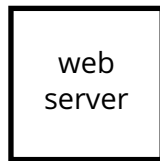
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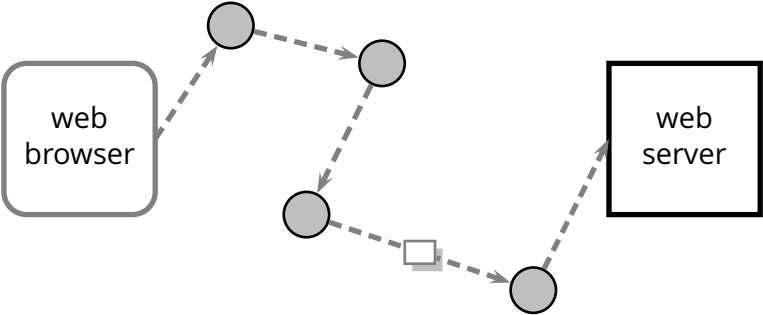
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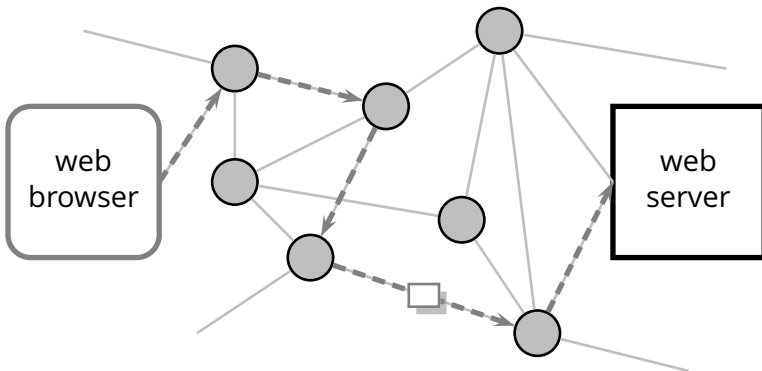
Interconnections and Paths



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■ Introduction to networking and the Internet

- ▶ the course in one lecture: a tour of all the topics of the course through an end-to-end scenario
- ▶ the layered architecture
- ▶ what is a protocol
- ▶ basic network services: connection-oriented and connectionless service; packet switching vs. circuit switching
- ▶ a bit of an historical perspective

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■ Application layer

- ▶ the application interface: OS primitives
- ▶ a simple client/server program
- ▶ the Web: HTTP; web caching
- ▶ e-mail: transfer protocol (SMTP); access protocols (POP and IMAP); message format (MIME)
- ▶ DNS
- ▶ peer-to-peer networks (BitTorrent)

■ Transport layer

- ▶ multiplexing/demultiplexing
- ▶ UDP: connectionless transport protocols
- ▶ principles of reliable data transfer
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- ▶ TCP: header format, reliability, congestion control

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■ Network layer

- ▶ forwarding and routing for datagram and virtual-circuit services
- ▶ router architecture: interfaces, switching fabric, queues
- ▶ IP: header formats (IPv4 and IPv6), addressing, extensions, fragmentation, IP forwarding
- ▶ Routing algorithms and principles: link-state and distance vector routing, hierarchical routing
- ▶ IP Routing: OSPF, RIP, BGP

■ Cross-layer Topics

- ▶ basic elements of communication security: block ciphers, modes of operation, public-key cryptography, RSA, basics of TLS/SSL