CSE 333 Section 7

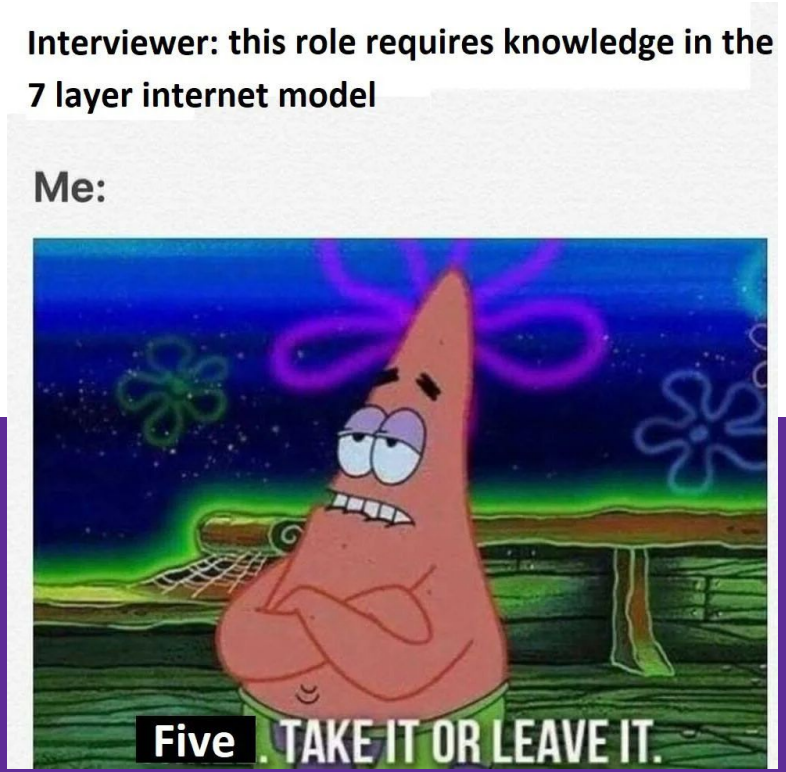
Intro to Networking & Netcat demo

UNIVERSITY of WASHINGTON

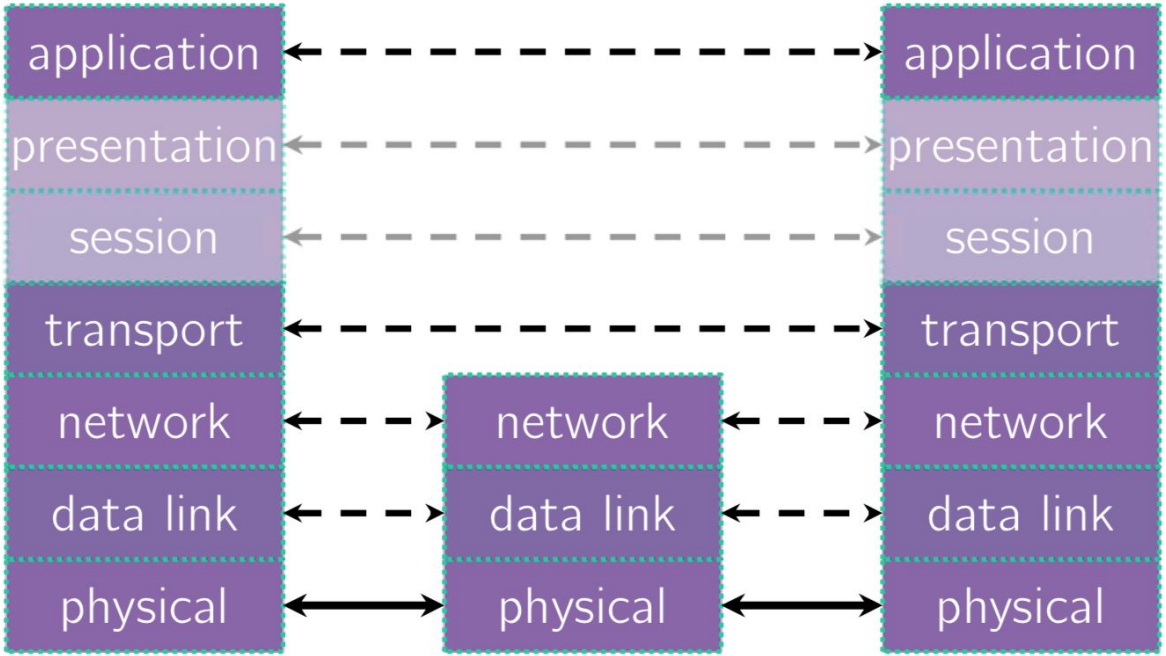
Logistics

- HW3:
  - Due **next Wednesday, 11:59 pm**
- Exercise 14.5:
  - Due **Tomorrow, 11 am**
- Exercise 15:
  - Due **next Monday, 11am**

Computer Networking - At a High Level



Computer Networks: A 7-ish Layer Cake



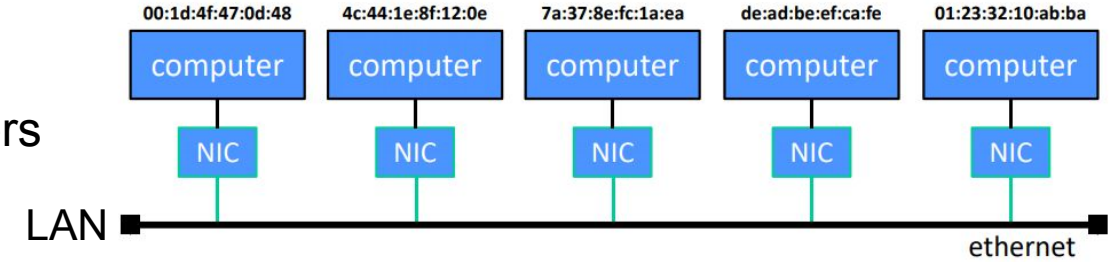
Computer Networks: A 7-ish Layer Cake

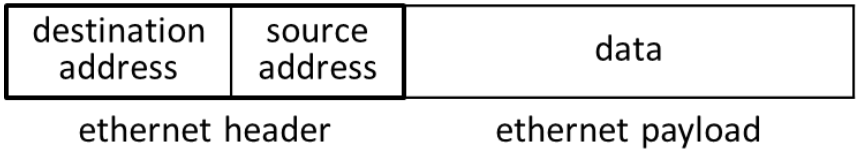
Wires, radio signals, fiber optics

bit encoding at signal level

Computer Networks: A 7-ish Layer Cake

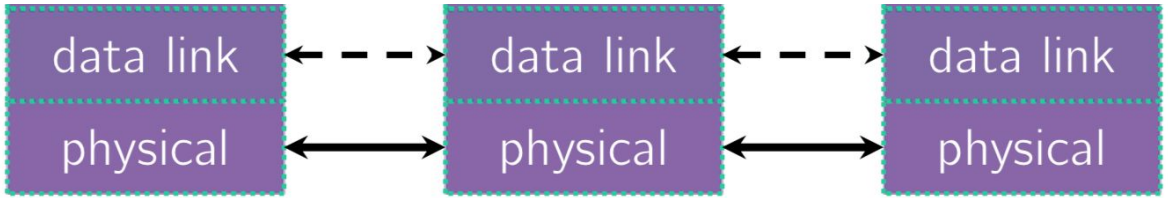
WiFi, ethernet.
Connecting multiple computers





multiple computers on a local network

bit encoding at signal level



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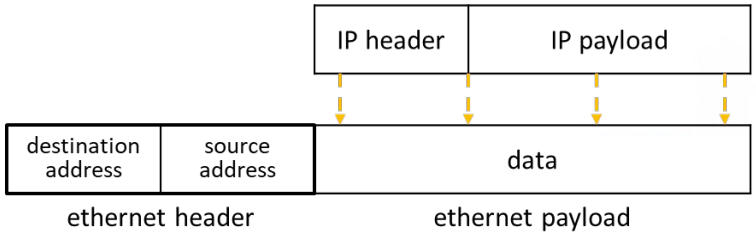
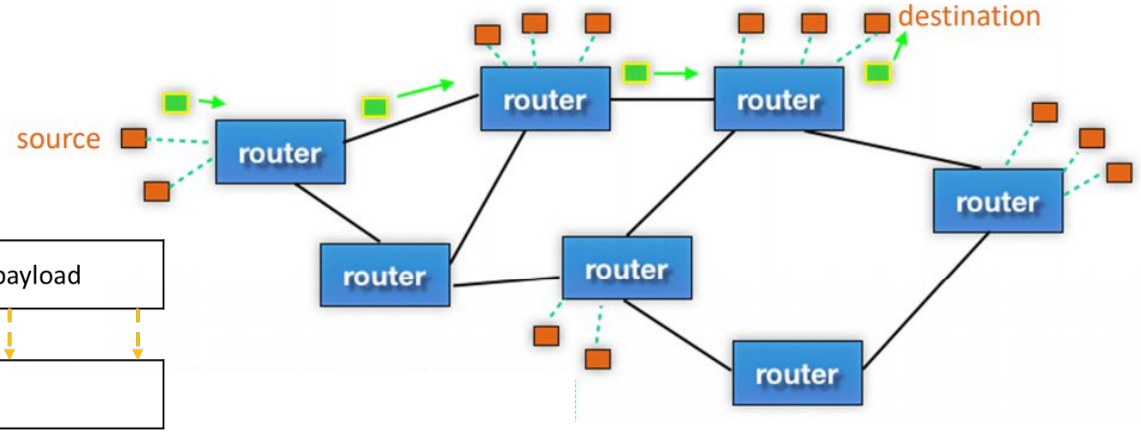
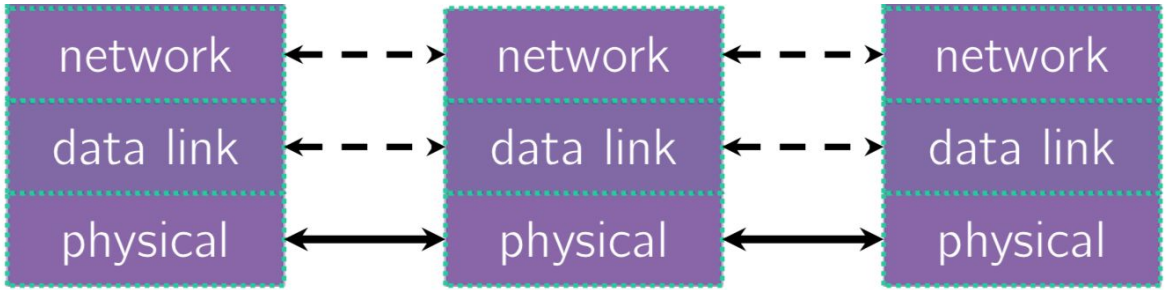




routing of packets across networks

multiple computers on a local network

bit encoding at signal level



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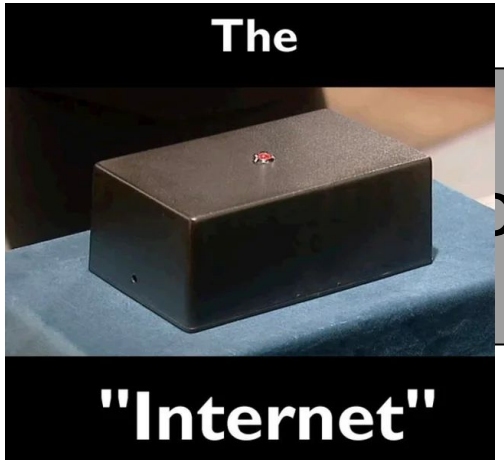
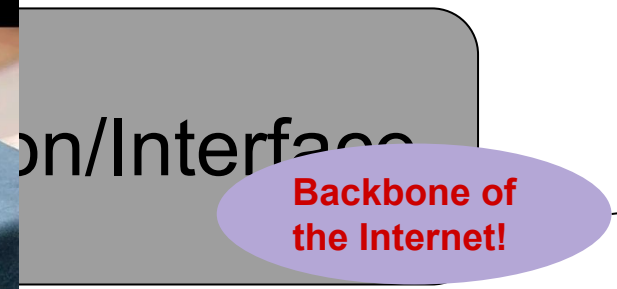
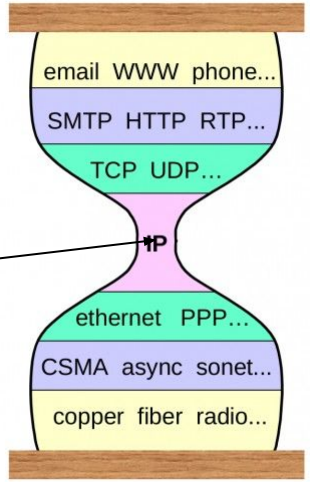


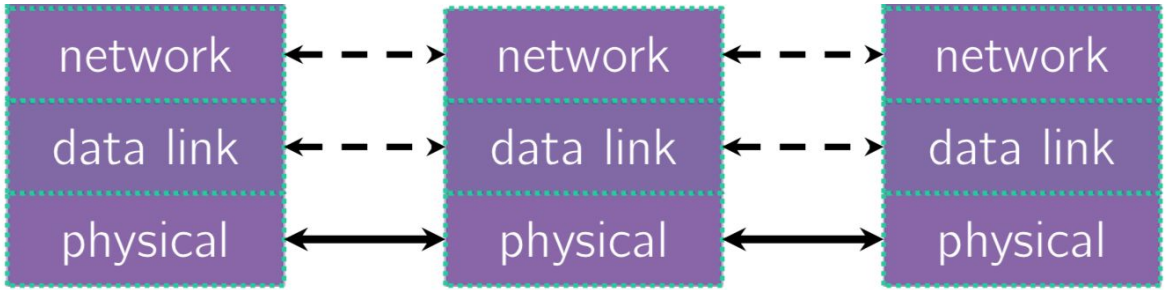




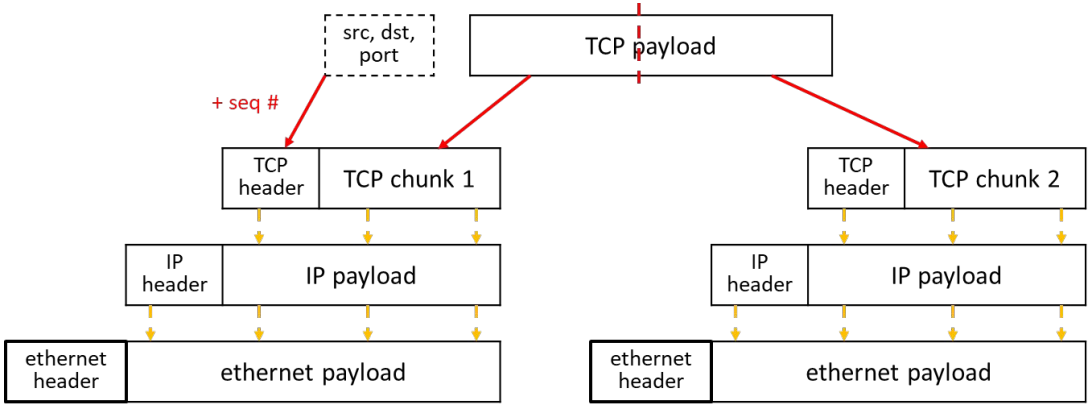
routing of packets across networks

multiple computers on a local network

bit encoding at signal level



Computer Networks: A 7-ish Layer Cake



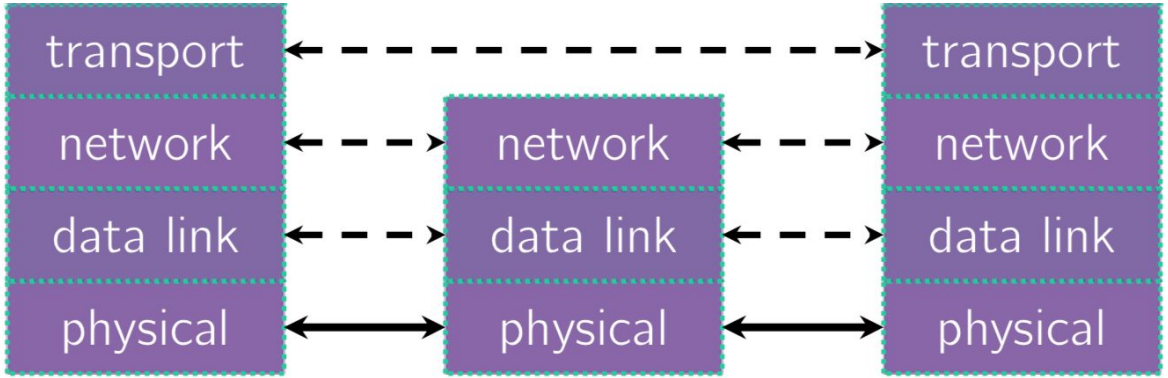
TCP, UDP, etc.

sending data end-to-end

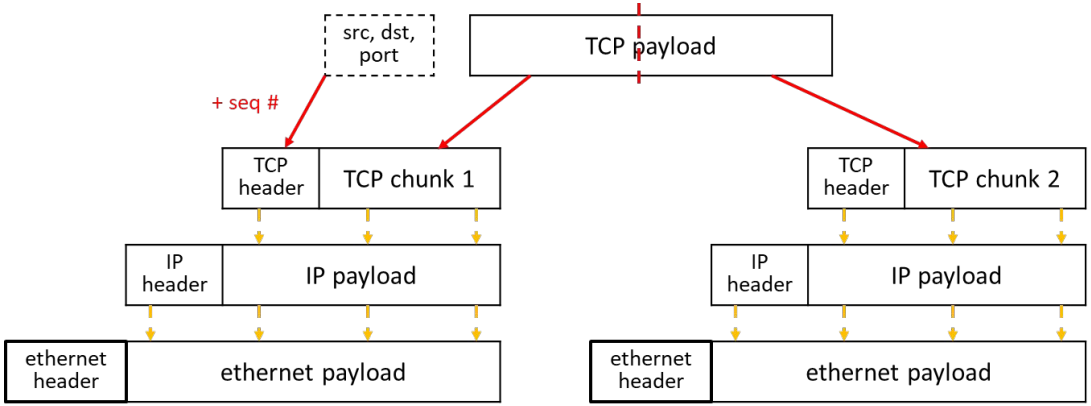
routing of packets across networks

multiple computers on a local network

bit encoding at signal level



Computer Networks: A 7-ish Layer Cake



TCP, UDP, etc.

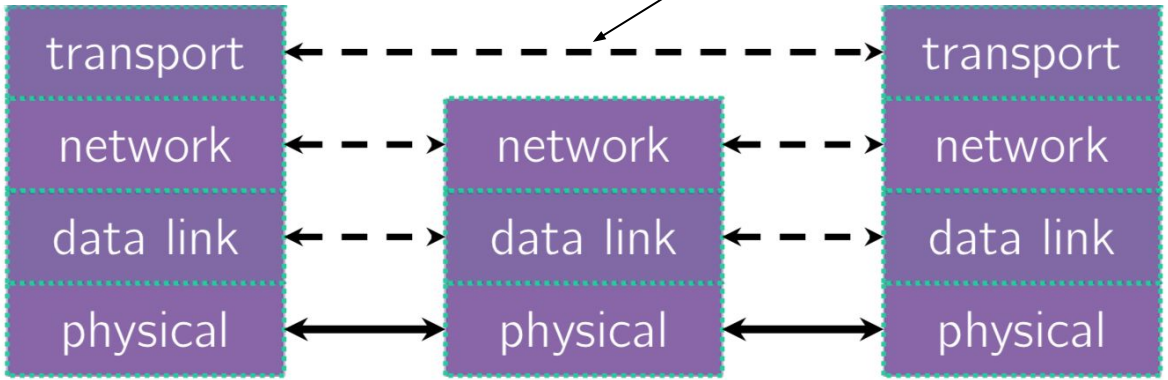
Stream abstraction!

sending data end-to-end

routing of packets across networks

multiple computers on a local network

bit encoding at signal level



TCP:


alamy stock photo
BM2CW1
www.alamy.com

UDP:


Adobe Stock | #243627987

Computer Networks: A 7-ish Layer Cake

HTTP, DNS, much more

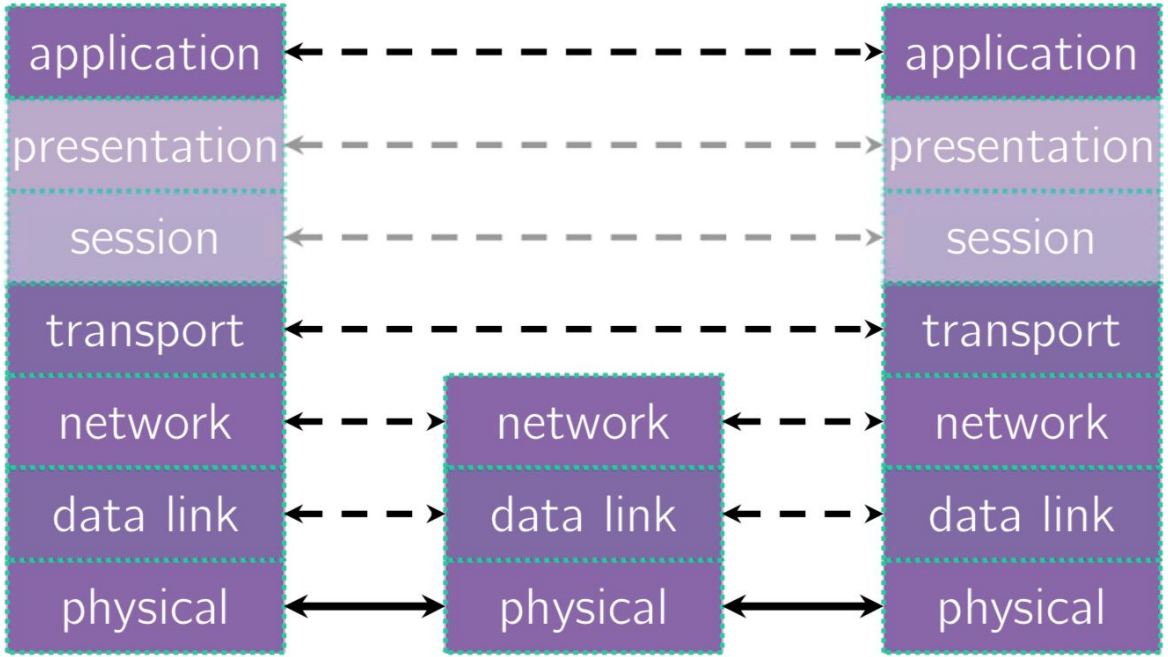
format/meaning of messages

sending data end-to-end

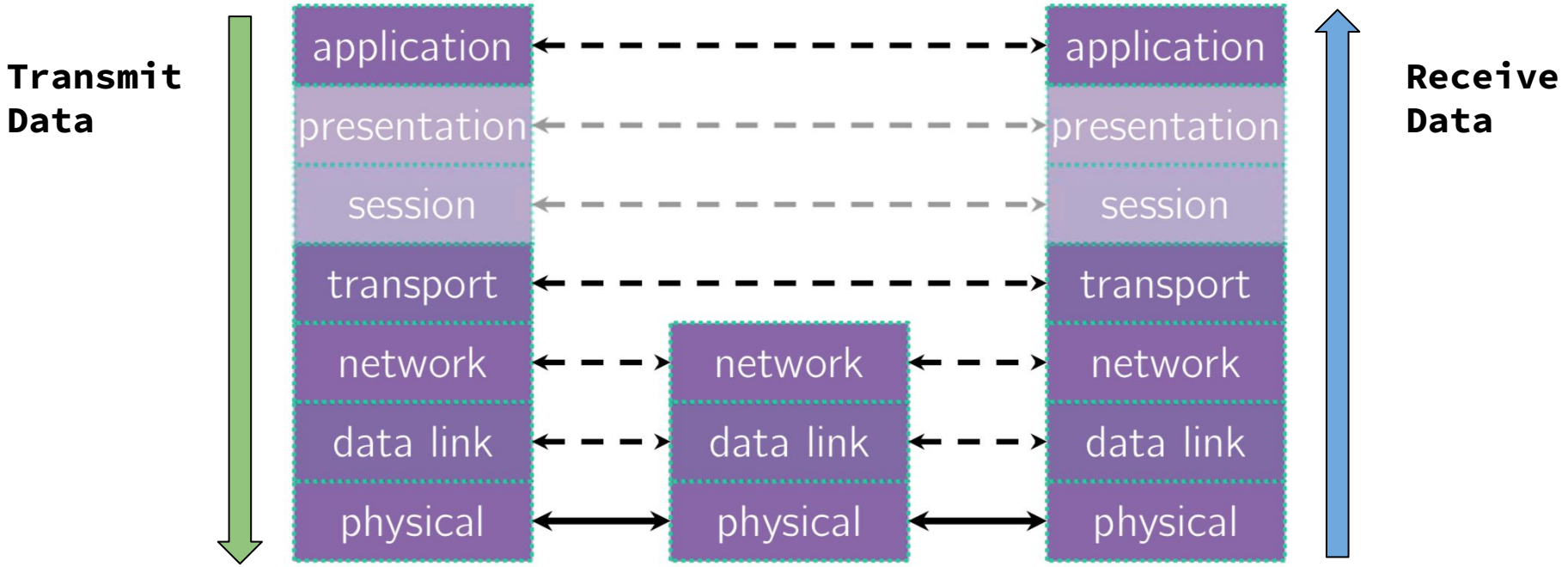
routing of packets across networks

multiple computers on a local network

bit encoding at signal level



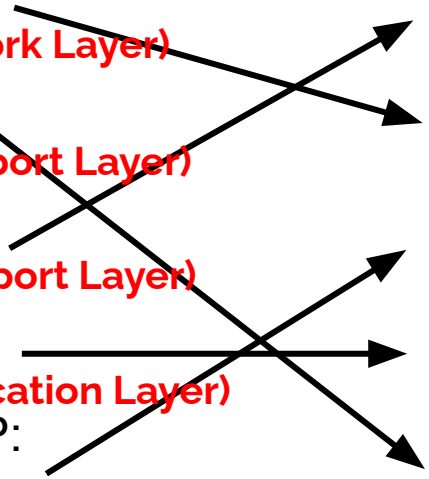
Data Flow


Transmit Data
application
presentation
session
transport
network
data link
physical
network
data link
physical
application
presentation
session
transport
network
data link
physical
Receive Data

Exercise 1

Exercise 1

- DNS: (Application Layer)
- IP: (Network Layer)
- TCP: (Transport Layer)
- UDP: (Transport Layer)
- HTTP: (Application Layer)



Reliable transport protocol on top of IP.

Translating between IP addresses and host names.

Sending websites and data over the Internet.

Unreliable transport protocol on top of IP.

Routing packets across the Internet.

TCP versus UDP

Transmission Control Protocol (TCP):

- Connection-oriented service
- Reliable and Ordered
- Flow control

User Datagram Protocol (UDP):

- “Connectionless” service
- Unreliable packet delivery
- High speed, no feedback

TCP guarantees reliability for things like messaging or data transfers. UDP has less overhead since it doesn’t make those guarantees, but is often fine for streaming applications (e.g., YouTube or Netflix) or other applications that manage packets on their own or do not want occasional pauses for packet retransmission or recovery.

Netcat demo

netcat

- Command-line utility to setup a TCP/UDP connection to read/write data
  - Man page: https://www.commandlinux.com/man-page/man1/nc.1.html
- To start a server:
  - `nc -l <hostname> <port>`
- To connect to that server (as a client):
  - `nc <hostname> <port>`
- `<hostname>` can be:
  - `localhost`
  - `attu#.cs.washington.edu`

Extra Office Hour