CS 43: Computer Networks

12: Multiplexing/Demultiplexing

October 10, 2019

SWARTHMORE COLLEGE

Discussion Groups

Please take a seat next to your lab partner!

Transport Layer
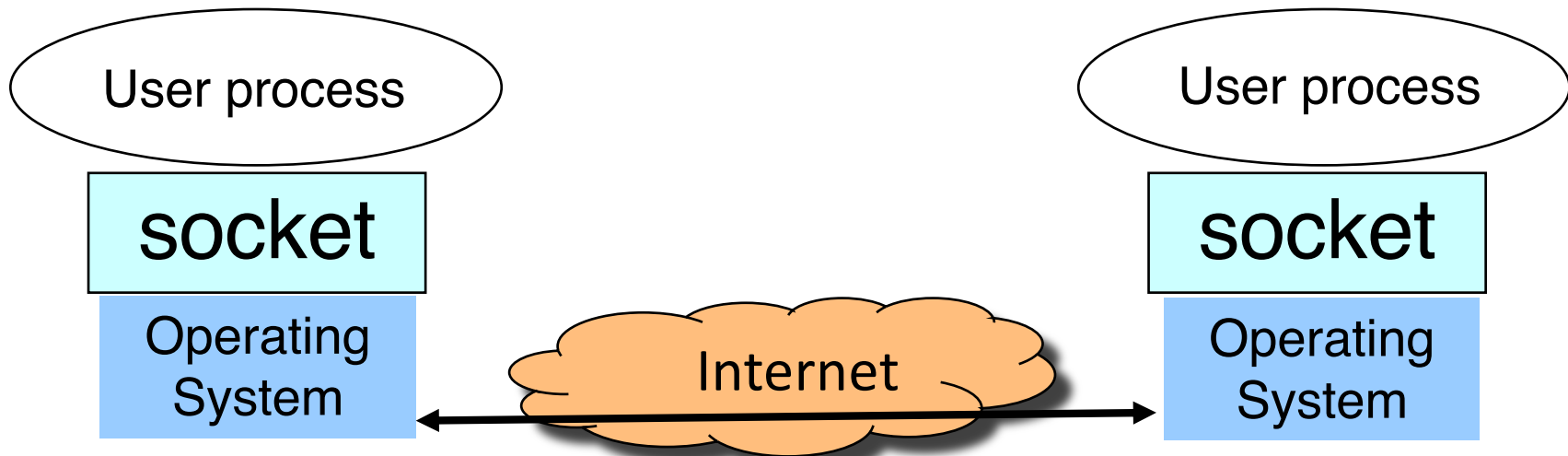
Moving down a layer!

Application Layer

Transport: end-to-end connections, reliability

Network: routing

Link (data-link): framing, error detection

Physical: 1's and 0's/bits across a medium
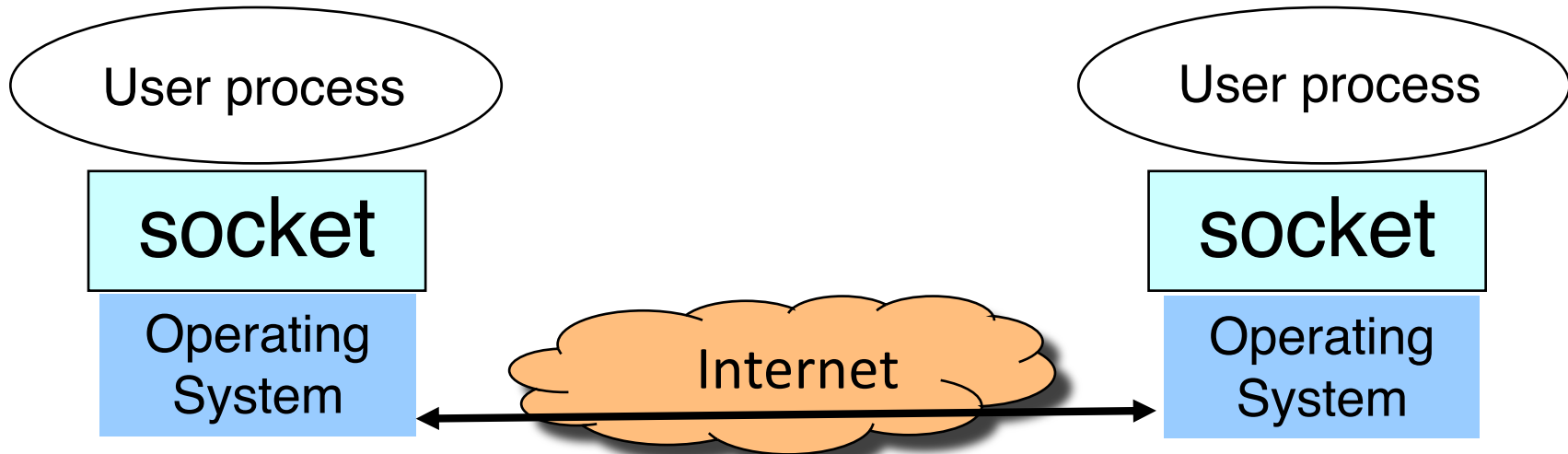(copper, the air, fiber)

Socket Abstraction

Applications communicate using "sockets"
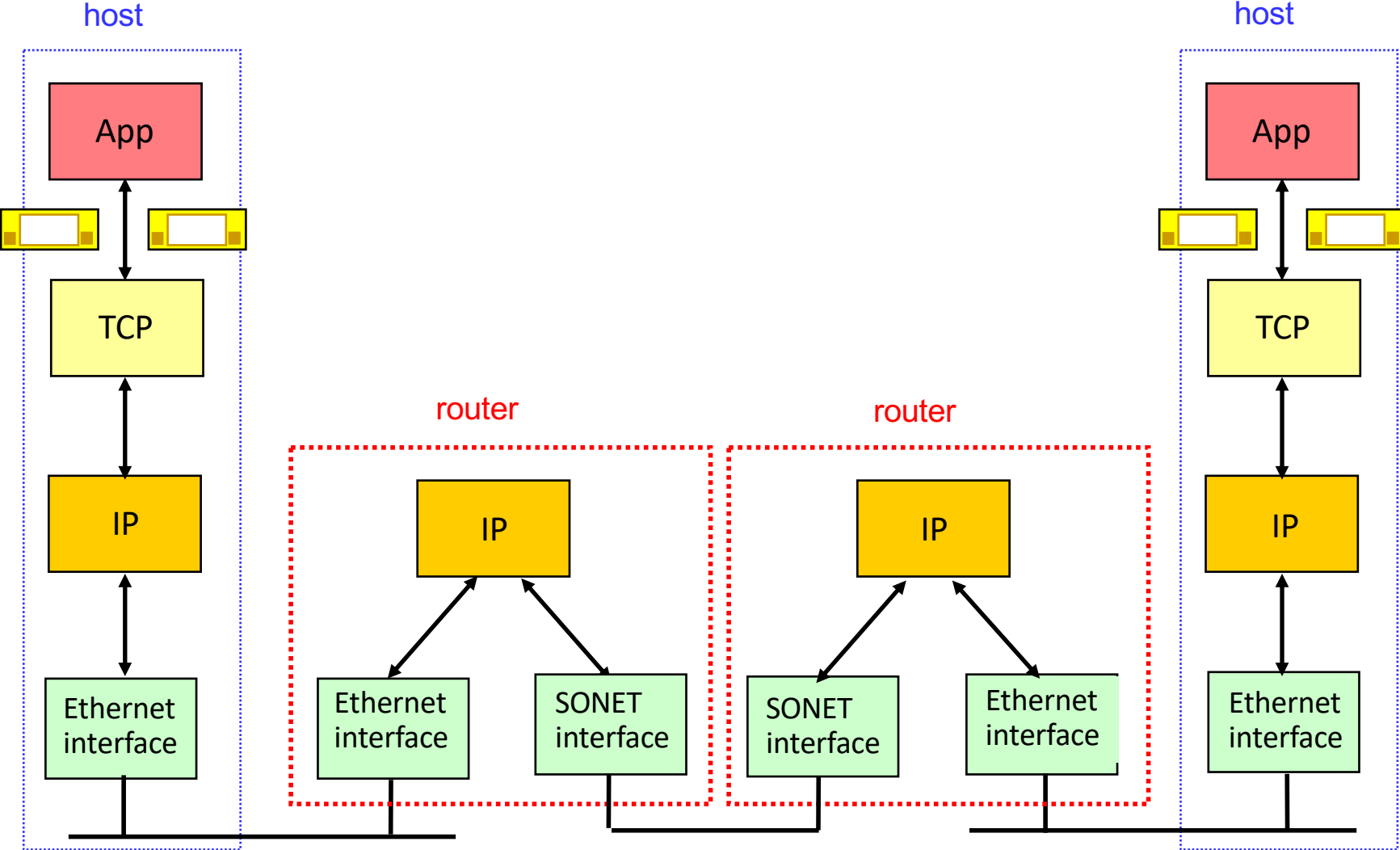Stream socket: reliable stream of bytes
Message socket: unreliable message delivery

Socket Abstraction
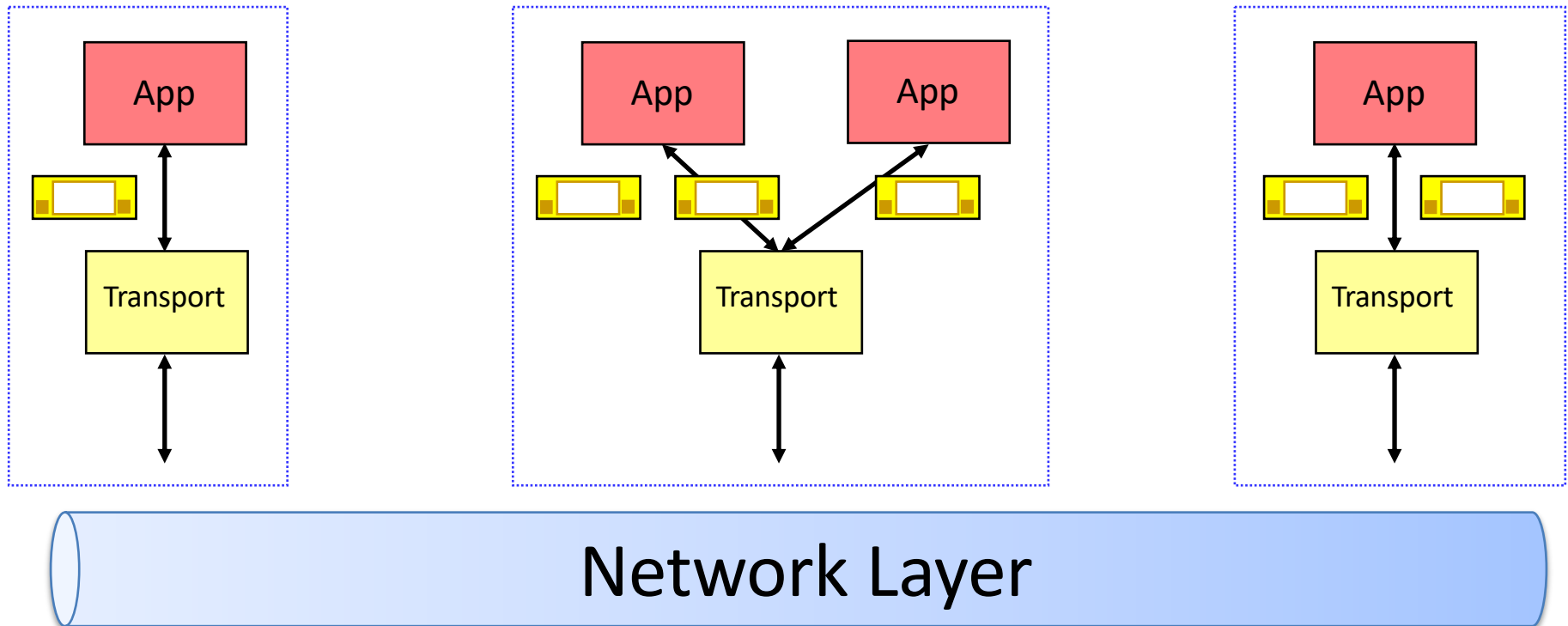

Applications communicate using "sockets"/mailboxes
Different mail-delivery service choices:
TCP, UDP
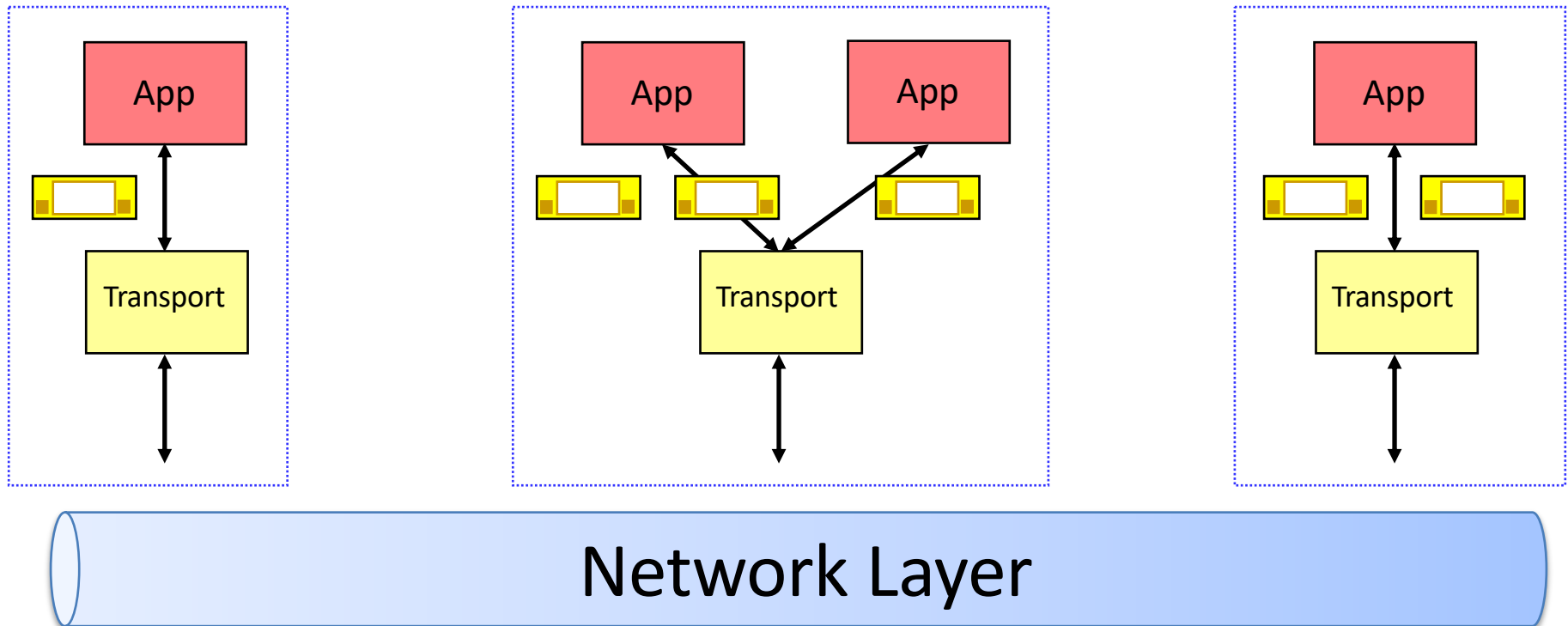
Addressing Applications using Ports

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(Simultaneous transmission of two or more signals/messages over a single channel.)

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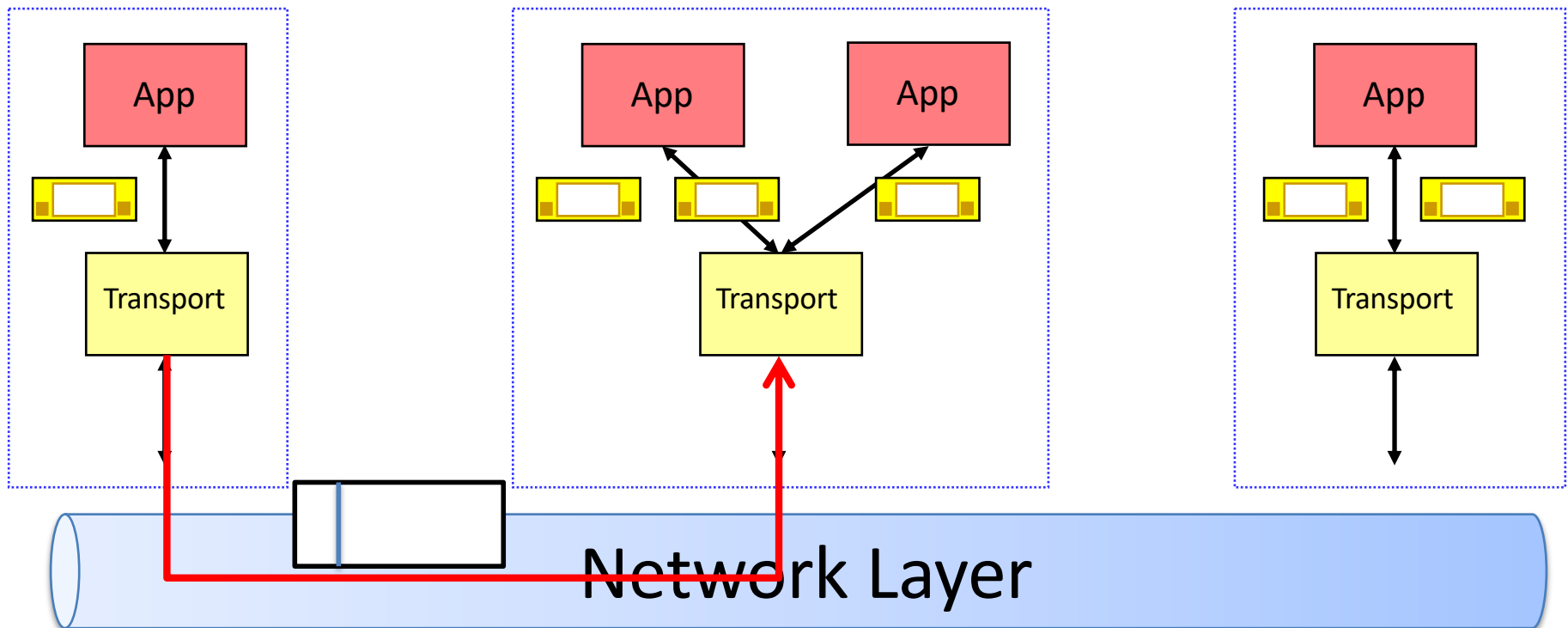
De-multiplexing

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- Receivers check header, deliver data to correct socket.
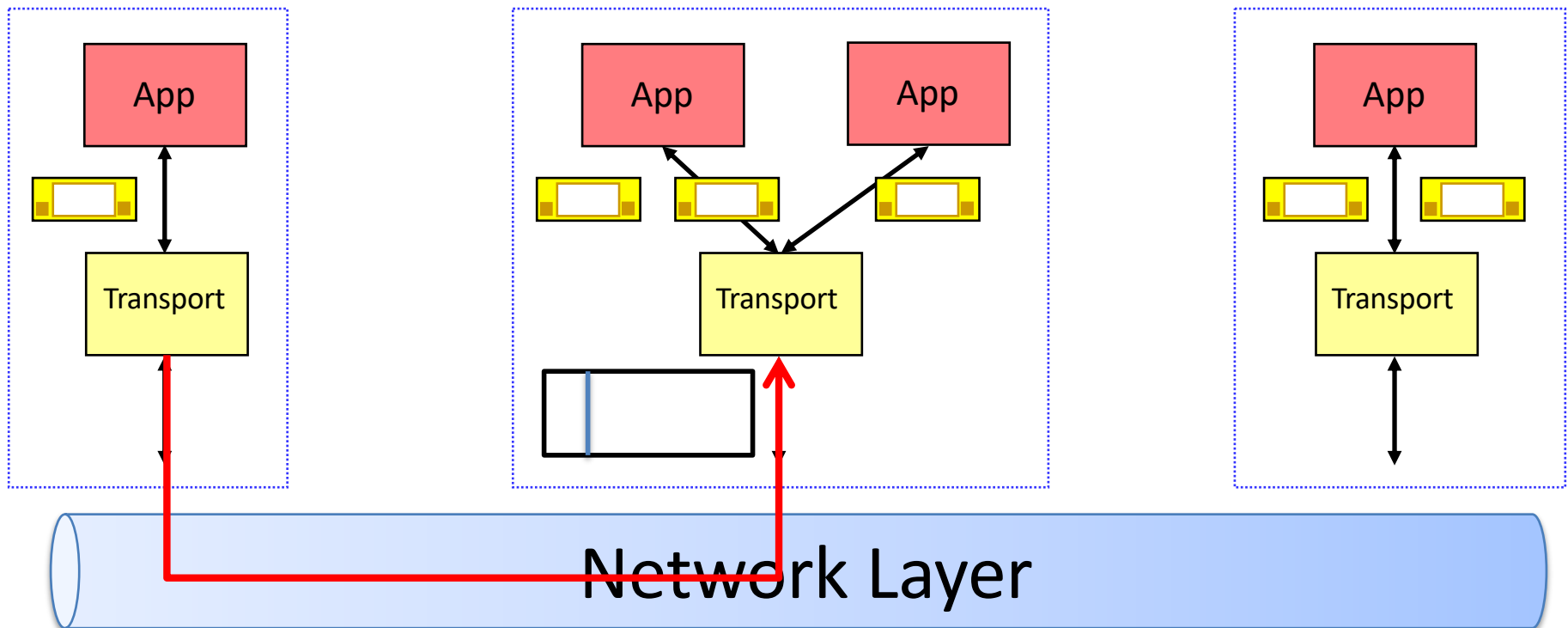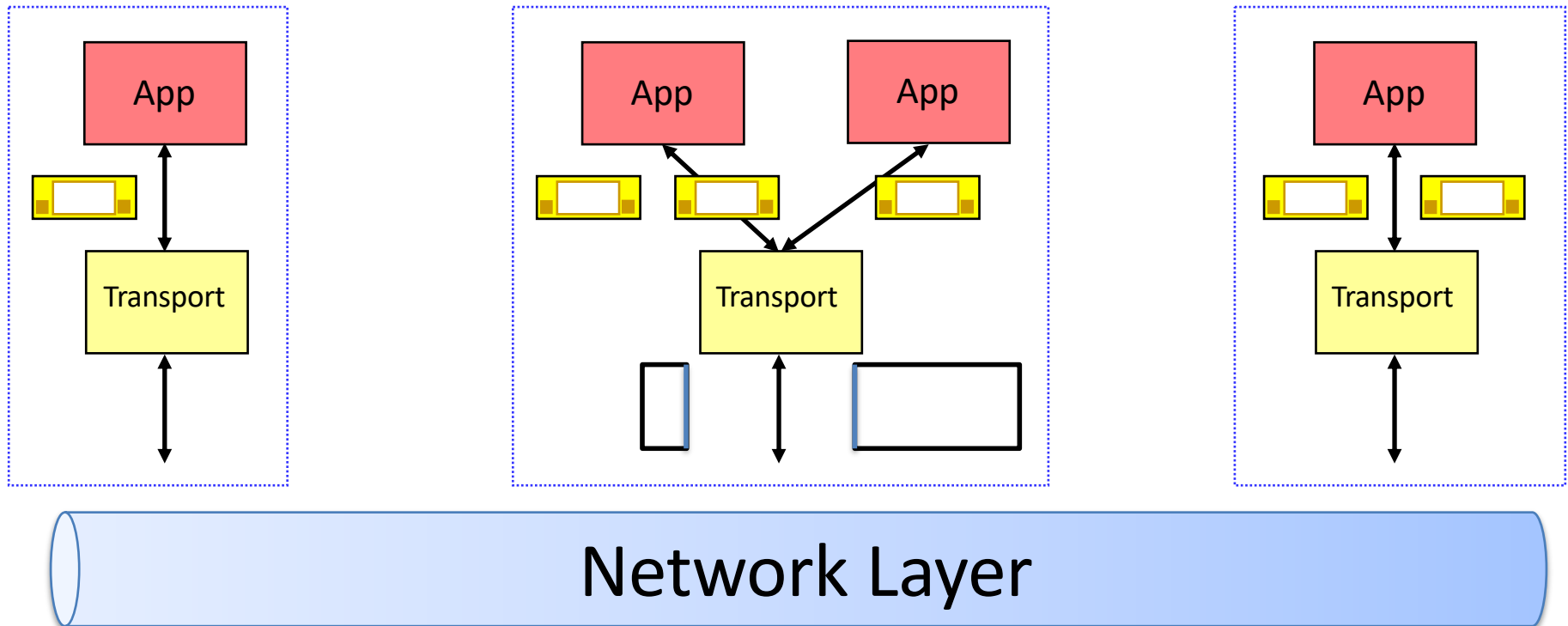
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Midterm

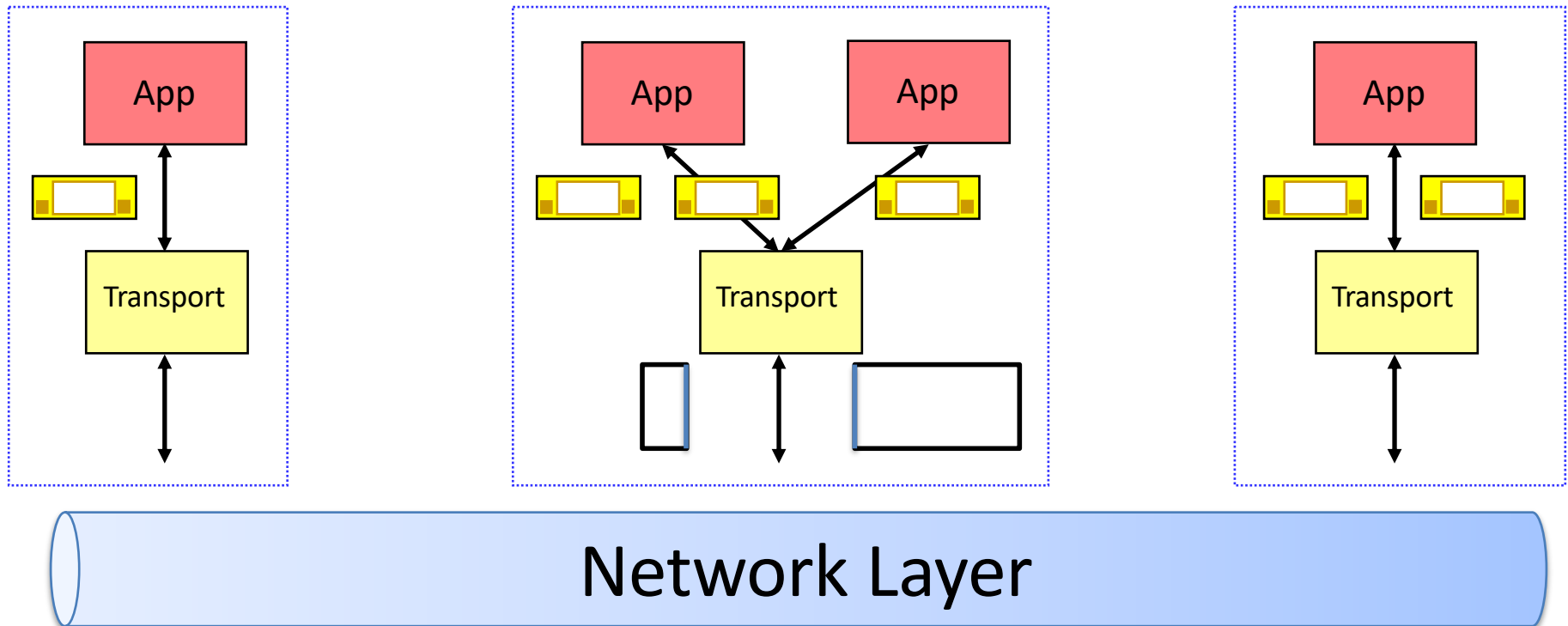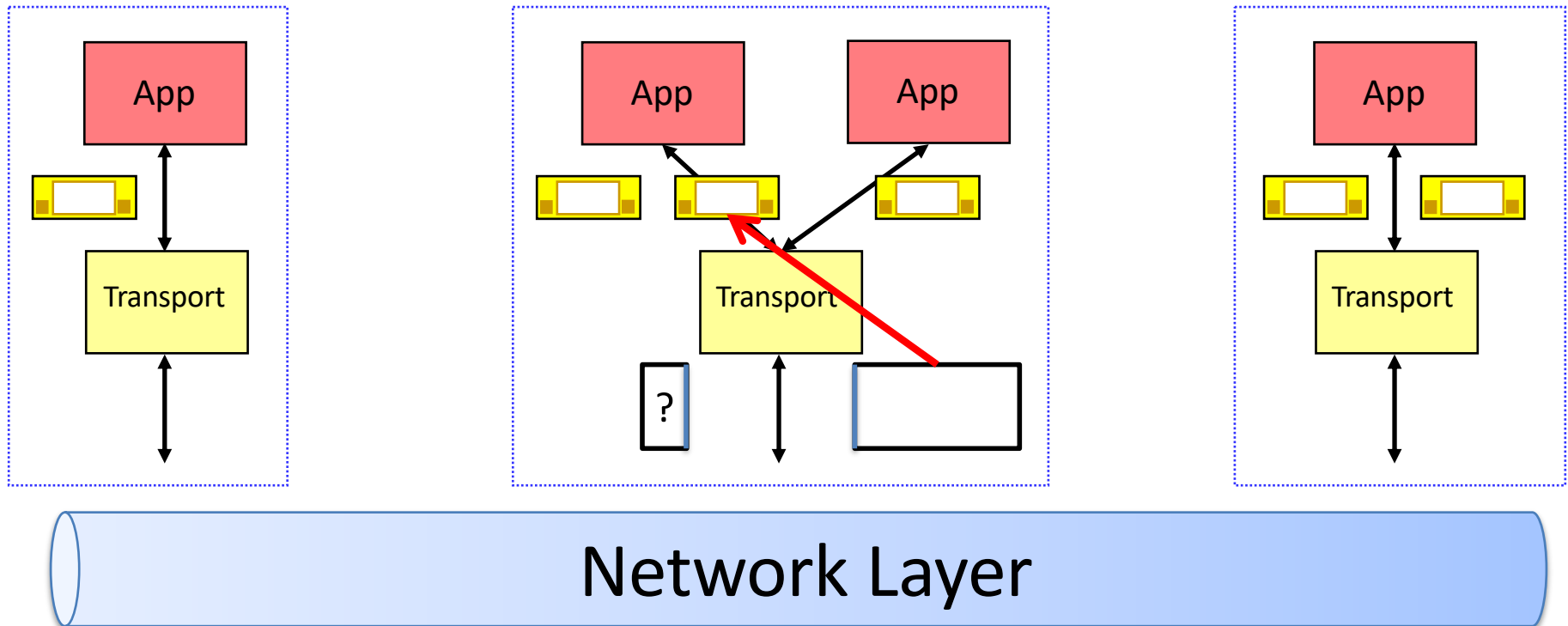- **When:** Tuesday, Oct. 22

- **Time:** 2.40 – 3.55 PM

- **Location: SCI 181**

CS Exam Policy

Exam takers must place all non-essential items at the front of the room (or other designated area).

Unless otherwise permitted, students may not have any electronic devices or course materials in their possession during the entirety of the exam. This includes cell phones, tablets, laptops, smart watches, course notes, articles and books, among others. These items should be placed at the front of the room near the proctor.

If you need to leave the room during the exam, you must obtain permission from an instructor first. **Any non-permitted discussion or aide in regards to exam material will result in immediate forfeiture of the exam and a report to the College Judiciary Committee**. Please discuss any concerns or accommodations with your instructor prior to starting the exam.

Format

- A few important definitions.

- A few short answer questions.

- A few multi-part depth questions.

Hints

- You don't need to shotgun me with info.
  - If it says to be brief, don't write a ton.
  - I will grade all of what you write.

- I try to specify approximately how much text I'm looking for.
  - When it's not explicit, you can tell by the point value of the question and blank space.

Hints

- For many questions, the point value roughly corresponds to how many things I'm looking for in your response.
  - 3 points: describe 3 things...

- Numerical questions: showing work can help you get partial credit

- Explanation/Why questions: I'm generally looking for a text answer. You can use examples/numbers as supporting evidence though.

Hints

- If I ask a question like, "Given [scenario], why might we prefer to do X rather than Y?"

- DO NOT just answer:
  - "it's faster" / "it's better" / "it's more efficient"

- Much better:
  - "it's faster because…" (e.g., it requires fewer instructions)

# Fair game
(As covered in class/labs)

- Abstraction, Layering, End-to-end design

- HTTP, DNS, Email, BT, etc. (app protocols)

- Basics of distributed systems

- Concurrency, application structure, and blocking

- **Everything up to the transport layer**

- The functions we highlighted in labs

- Anything else we talked about in class

Regarding Labs

- I do **not** expect that you memorized lab solutions.

- I **do** expect that you participated in the labs and are familiar with what they asked you to do.

Examples:

Examples: Cacti
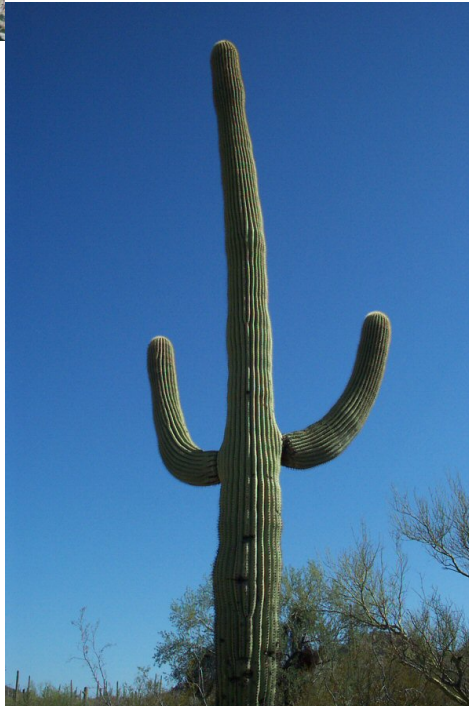
Definitions

- Response: ~1-2 sentences

- Cactus example:

  spine

  Cactus spines are modified leaf structures that provide protection against herbivores and aid in the reduction of water loss.

Short Answer

- Response: a few words to one sentence

- Cactus example:

  In class, we talked about several common cactus body types. Choose three, and briefly describe their characteristics.

  Columnar – Tall, large, sparse columns, like the Saguaro

  Globular – Singular barrel-like shape

  Clumping – Group of small, usually round stems closely clustered together

Multi-Part

- Response: depends on part and point value
  - *Usually* earlier Q's are fewer points and shorter

Cactus Classification

A. (1 pt) What is the relationship between cacti and succulents?

B. (2 pt) Why is it difficult to classify cacti?

C. (4 pt) How have genetic markers been used to classify cacti?

Multi-Part

A. (1 pt) What is the relationship between cacti and succulents?

All cacti are succulents, not all succulents are cacti.

B. (2 pt) Why is it difficult to classify cacti?

Cacti pollination is not selective, leading to many hybrid species for which there is no classification. Furthermore, different groups using different naming systems, adding more confusion to cactus classification. (ex optional)

C. (4 pt) How have genetic markers been used to classify cacti?

(I have no idea.)

Exam logistics questions?