SER 321 B Session

Exam Review Session

Sunday, April 27th 2025

6:00 pm - 8:00 pm MST

Agenda

Exam Information

Study Guide PSA

General Review!

SI Session Expectations

Thanks for coming to the **SER 321** SI session. We have a packed agenda and we are going to try to get through as many of our planned example problems as possible. This session will be recorded and shared with others.

- If after this you want to see additional examples, please visit the drop-in tutoring center.
- We will post the link in the chat now and at the end of the session.
  - tutoring.asu.edu
- Please keep in mind we are recording this session and it will be made available for you to review 24-48 hours after this session concludes.
- Finally, please be respectful to each other during the session.

Interact with us:

Zoom Features

Zoom Chat

- Use the chat feature to interact with the presenter and respond to presenter's questions.
- Annotations are encouraged

SER 321
Exam Information

80 minutes

Similar to the quizzes

Make sure to look at the Study Guide!

Exam Info Page

Opens: Wednesday April 30th @ 12:30 AM

Closes: Friday May 2nd @ 11:59:59 PM

SER 321
Review Requests

It's ***not*** too late to make a topic request!

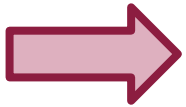
Drop a concept in the chat and we can cover it next!

Check out the recording for the solution and discussion!

SER 321

OSI Model

Unit	Layer	What we are *really* talking about



SER 321

Network Layer - IP

Given the following IP address, identify the…

Port

128.148.32.110:8080

Check out the recording for the solution and discussion!

SER 321

Network Layer - IP

Given the following IP address, identify the…

Subnet

128.148.32.110:8080

Check out the recording for the solution and discussion!

SER 321

Network Layer - IP

Given the following IP address, identify the…

Network

128.148.32.110:8080

Check out the recording for the solution and discussion!

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Network Layer - IP

Given the following IP address, identify the…

Host

128.148.32.110:8080

Check out the recording for the solution and discussion!

SER 321
TCP & UDP

What are the main differences?

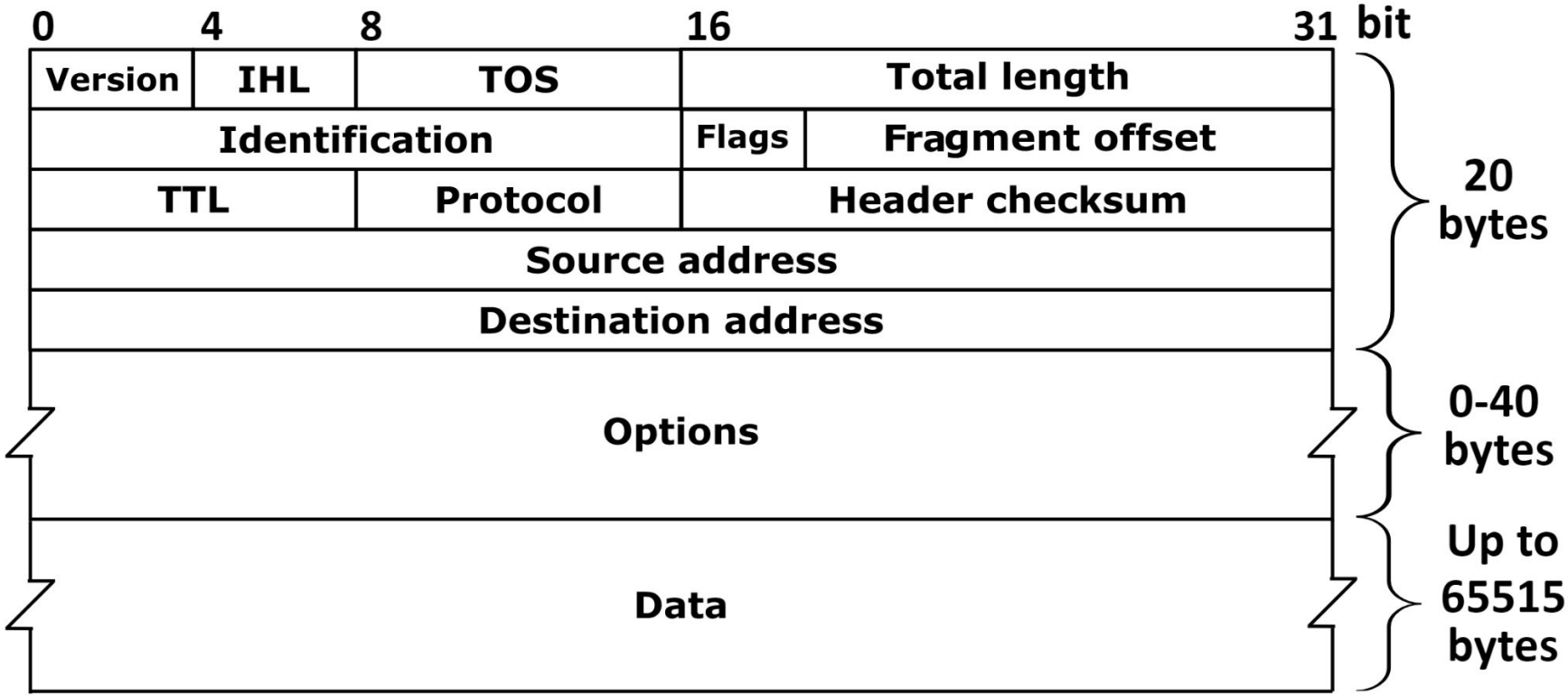
TCP	UDP

Check out the recording for the solution and discussion!

SER 321

Headers

What type of header is this?



Check out the recording for the solution and discussion!

SER 321

Headers

TCP or UDP Header?

Check out the recording for the solution and discussion!

Offsets		0								1								2								3							
Octet	Bit	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7	0	1	2	3	4	5	6	7
0	0	Source port																Destination port															
4	32	Sequence number																															
8	64	Acknowledgment number (if ACK set)																															
12	96	Data offset				Reserved 0 0 0 0				CWR	ECE	URG	ACK	PSH	RST	SYN	FIN	Window Size															
16	128	Checksum																Urgent pointer (if URG set)															
20	160	Options (if *data offset* > 5. Padded at the end with "0" bits if necessary.)																															
⋮	⋮																																
56	448																																

SER 321
Headers

TCP or UDP Header?

Check out the recording for the solution and discussion!

Offset	Octet	0								1								2								3							
Octet	Bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
0	0	Source Port																Destination Port															
4	32	Length																Checksum															
8	64	Data																															
12	96																																
⋮	⋮																																

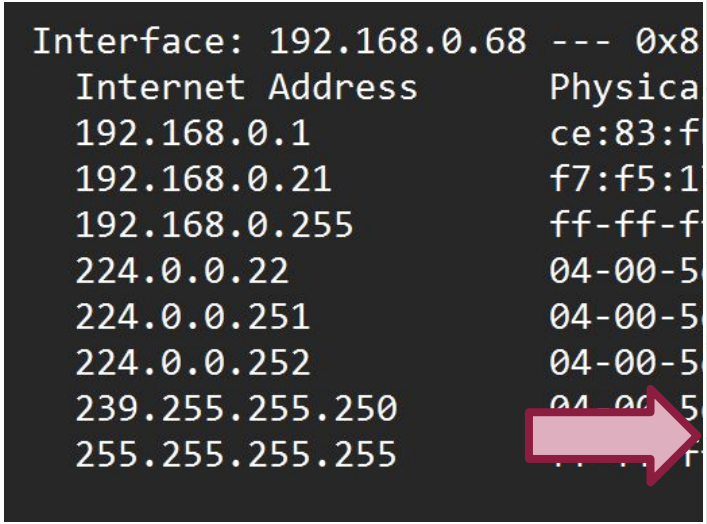
SER 321

Network Concept Checks

Check out the recording for the solution and discussion!

What is an ARP table?

Where does it fit in the OSI model?



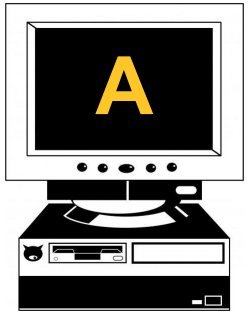
Data	Application	HTTP(s), SMTP, FTP, IMAP, POP, etc.
Data	Presentation	Translation, compression, encryption
Data	Session	AuthN, authZ, session mgmt
Segment	Transport	TCP/UDP
Packet	Network	IP address, routing and delivery
Frame	Data Link	LLC, MAC, data transmission in LAN
Bits	Physical	Signal, Binary transmission

Note - numbers have been modified

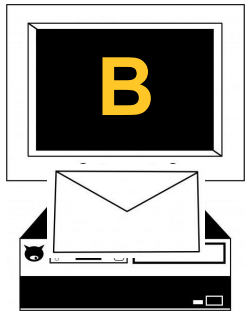
SER 321

Network Concept Checks

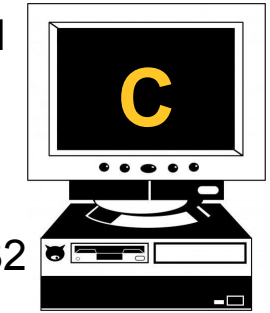
What is NAT?



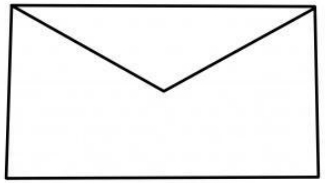
196.122.10.80



196.122.10.81



196.122.10.82

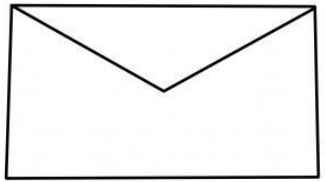


196.122.10.81

128.148.36.179

Thinking…

TO: Device B



128.148.36.179

Check out the recording for the solution and discussion!

SER 321
Lower Layer Matching

Let’s do a quick matching game!

Check out the recording to see our gameplay, or click the link to play yourself!

SER 321
Sockets!

Sockets allow our client and server to communicate!

Need to define **3 properties** before usage

Location	IP or DNS	142.251.46.206	www.google.com
Connection Semantics	TCP or UDP	Connection Oriented	Connectionless
Message Format	Protocol Specs	Synchronous	Asynchronous
		Stateless	Stateful
		Binary	Text
		Headers	No Headers

Check out the recording for the discussion!

SER 321
Sockets!

Sockets allow our client and server to communicate!

Person

Conversation Flow

Conversation Content

l to define **3 properties** before usage

Check out the recording for the discussion!

IP or DNS	142.251.46.206	www.google.com
TCP or UDP	Connection Oriented	Connectionless
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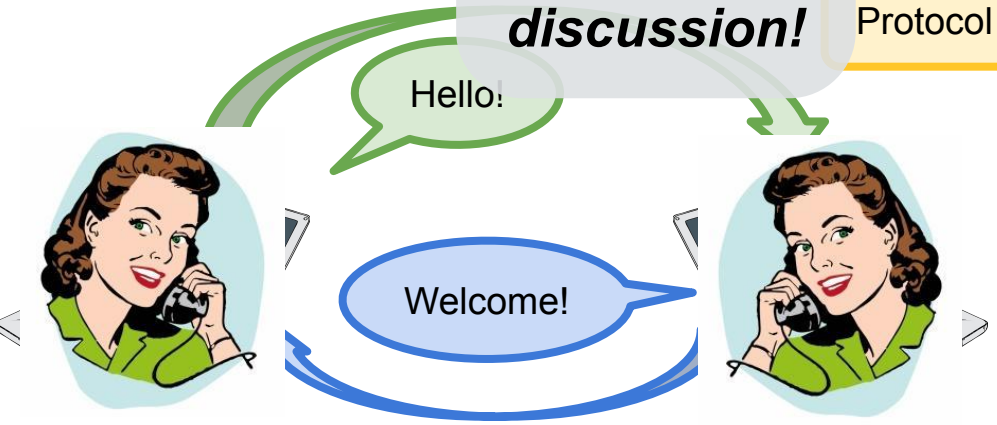


SER 321

Socket Protocol Types

Two Main Conversation Models

1. Client Request

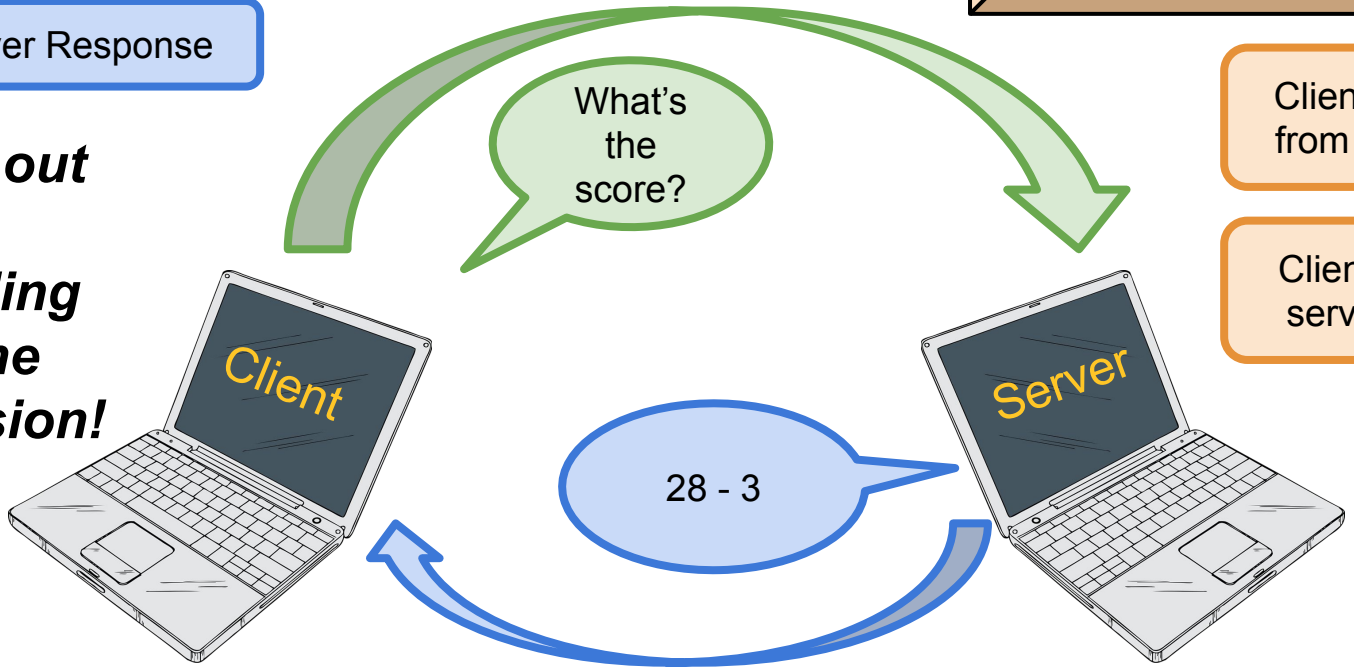
2. Server Response

Check out the recording for the discussion!

Pull/Polling Model

Client *pulls* info from the server

Client *polls* the server for info



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Socket Protocol Types

Two Main Conversation Models

1. Server sends update

2. Client acknowledges

Check out the recording for the discussion!

Push Model

Server *pushes* info to client

Push notifications

SER 321

Socket Protocol Types

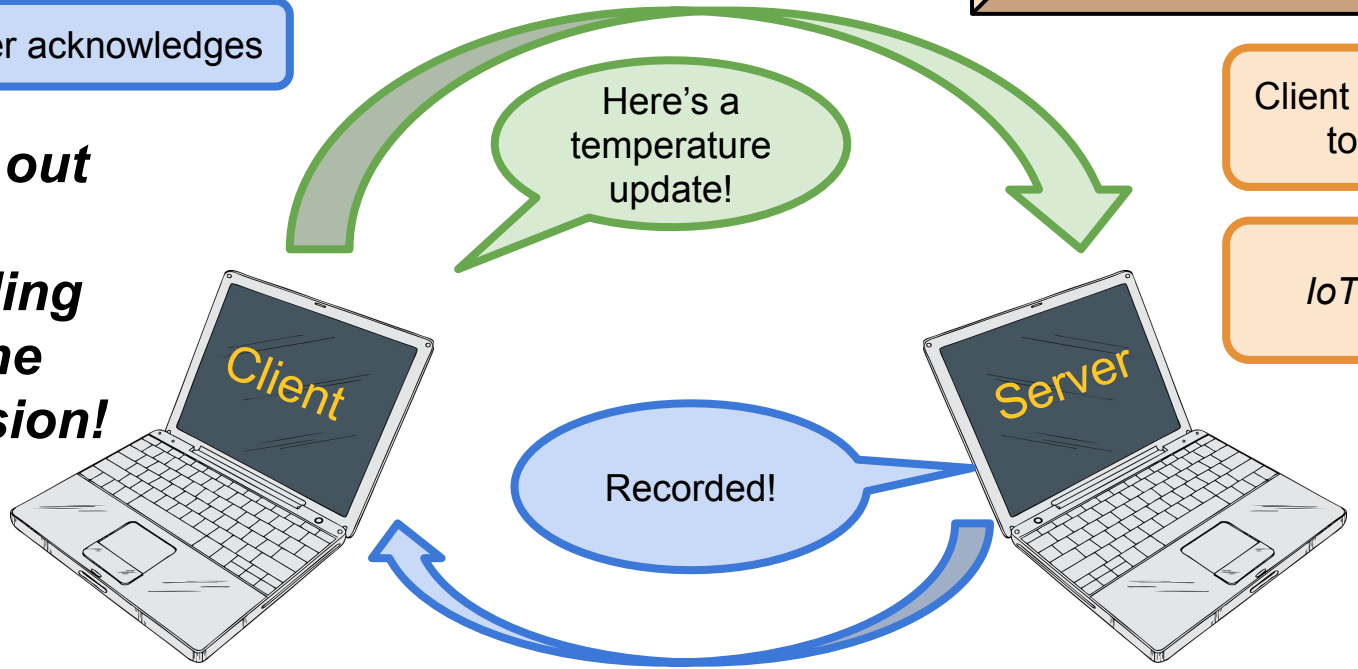
Two Main Conversation Models

Client Push Model

1. Client sends update

2. Server acknowledges

Check out the recording for the discussion!



Client *pushes* info to Server

IoT sensors

SER 321
Client Socket

Steps for the **Client Socket**

1.
2.
3.
4.
5.
6.
7.
8.

Check out the recording for the solution and discussion!

SER 321
Server Socket

Steps for the **Server Socket**

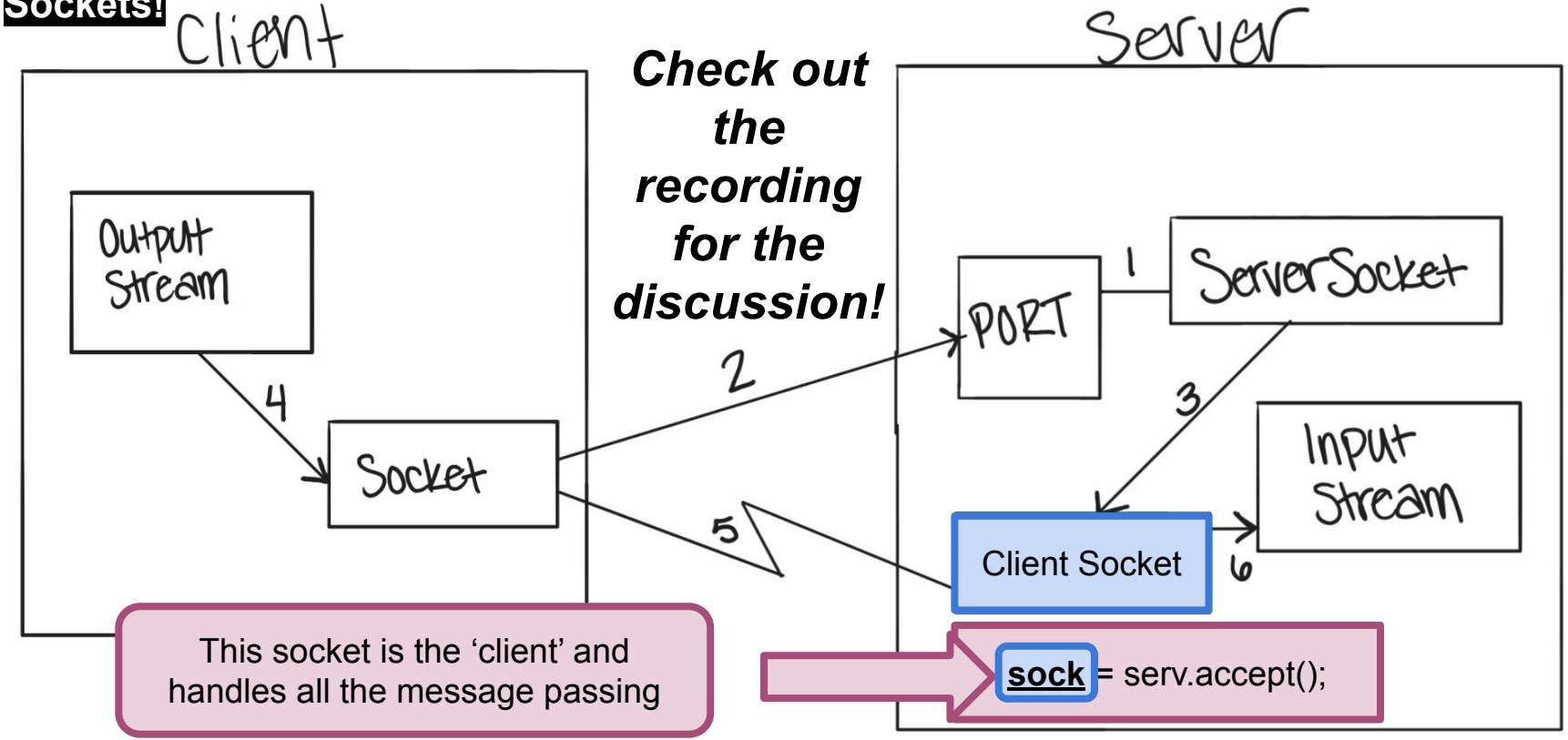
1.
2.
3.
4.
5.
6.
7.
8.
9.

Check out the recording for the solution and discussion!

SER 321

Sockets!

Why do we keep reviewing this?



Check out the recording for the discussion!

This socket is the 'client' and handles all the message passing

sock = serv.accept();

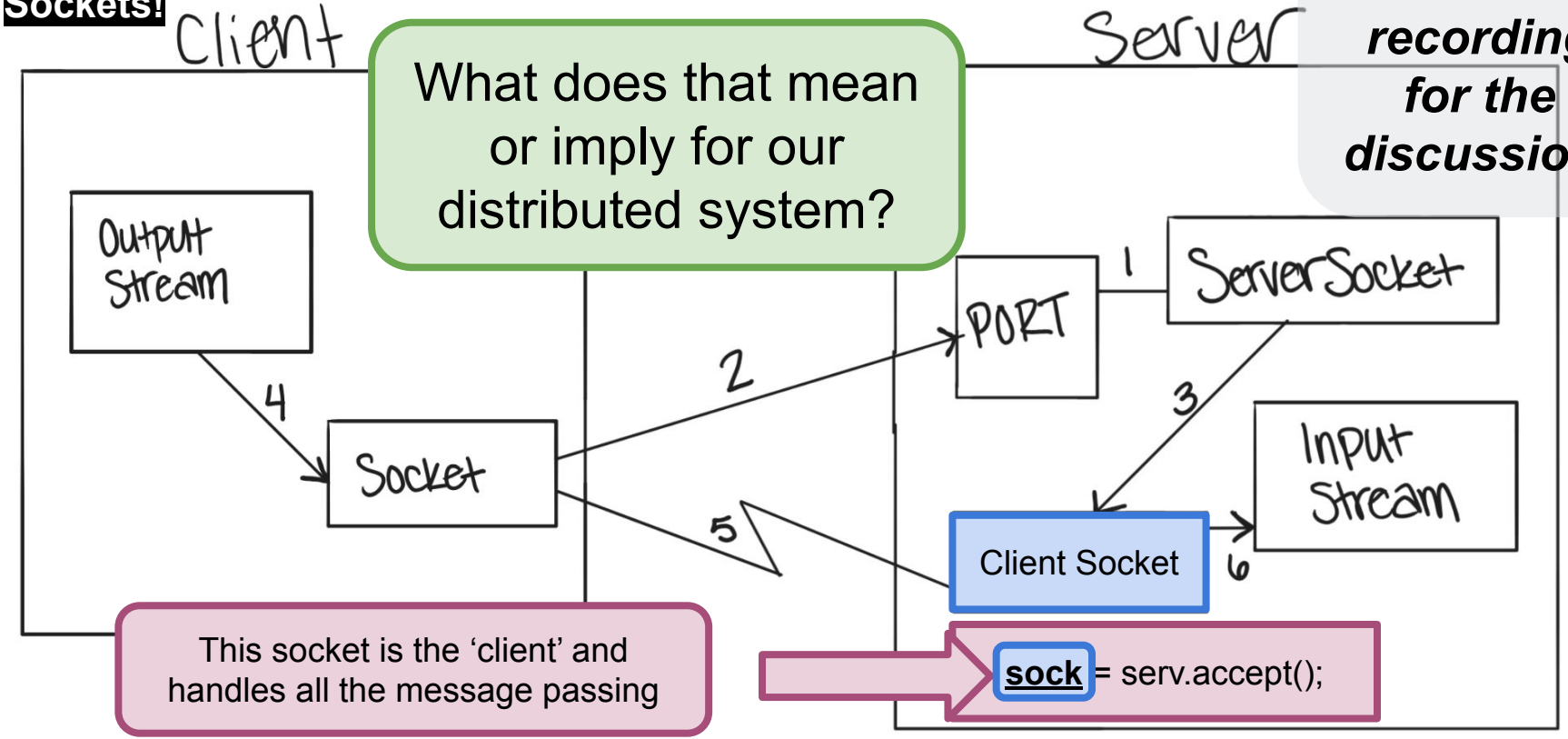
SER 321

Sockets!

Why do we keep reviewing this?

Check out the recording for the discussion!

What does that mean or imply for our distributed system?



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sock = serv.accept();

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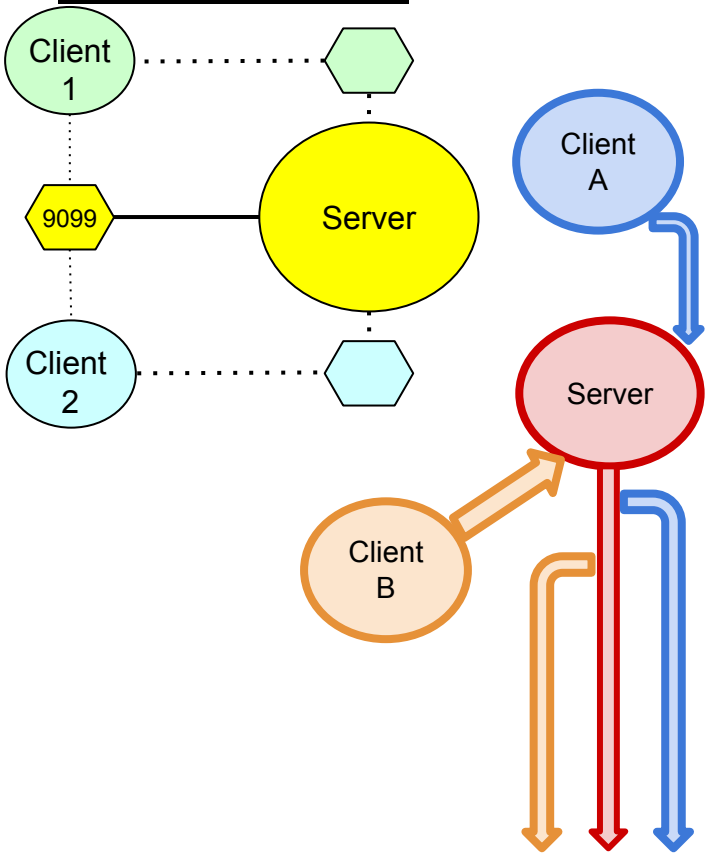
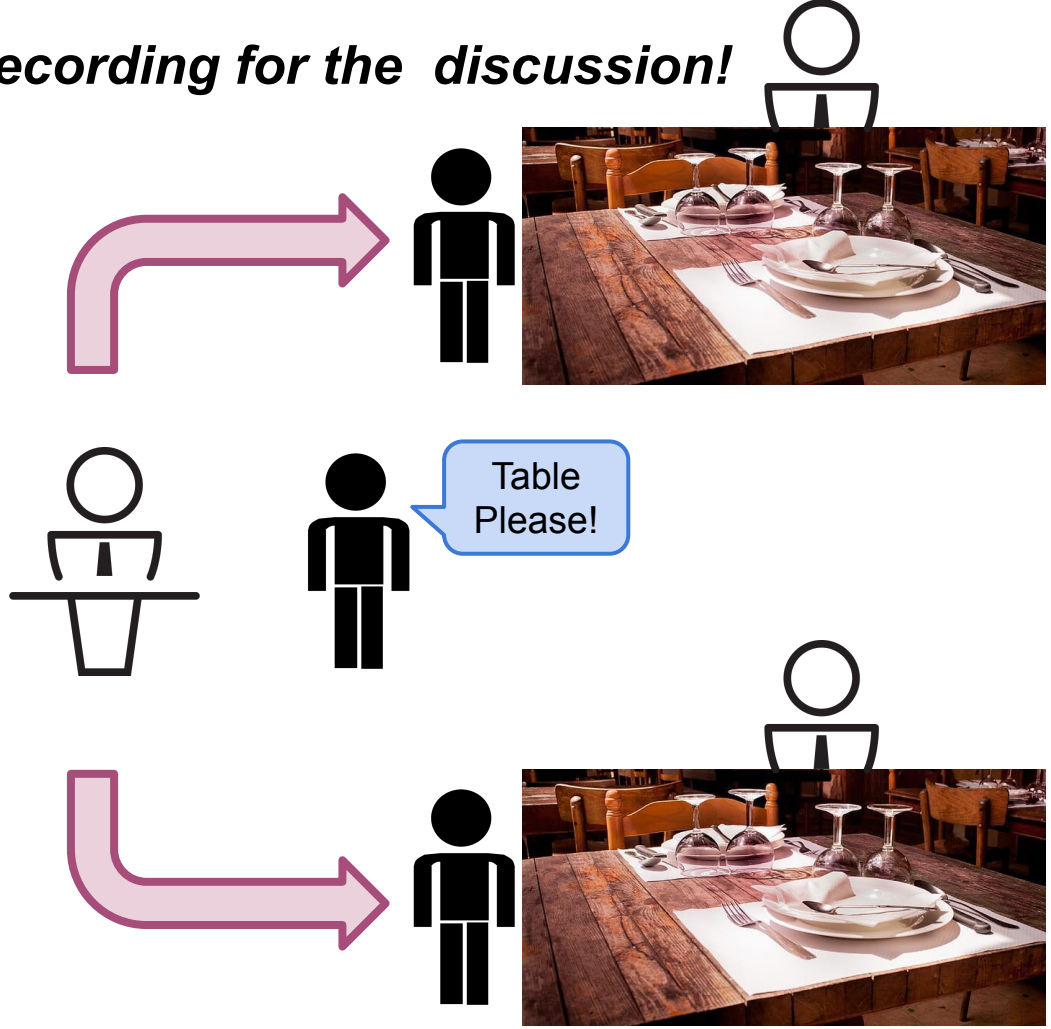
SER 321

Port Examination

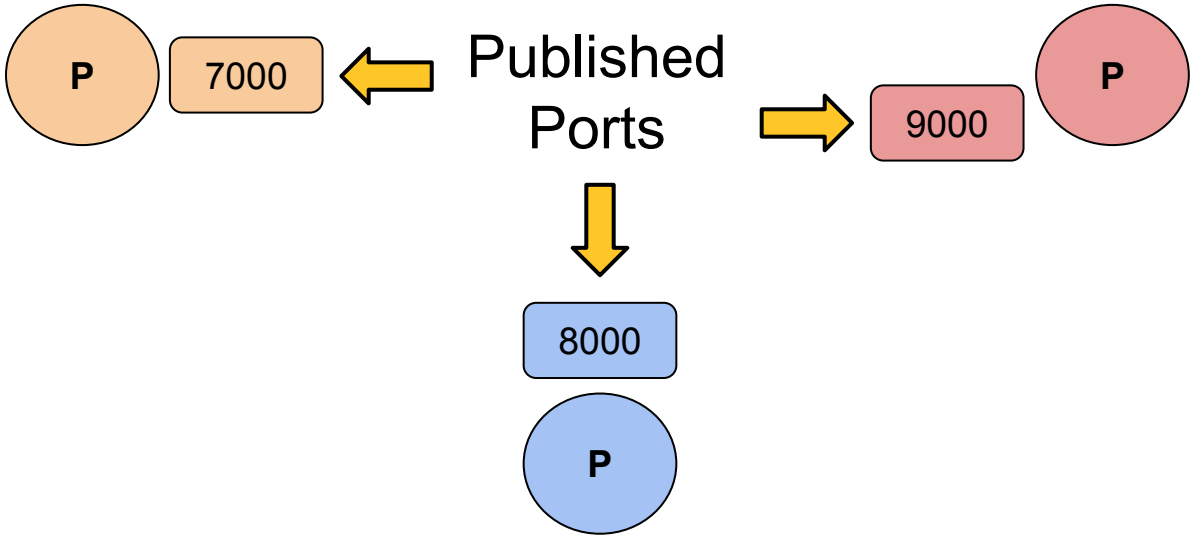




SER 321

P2P Communication

Remember that the OS allocates a new port for the client socket!



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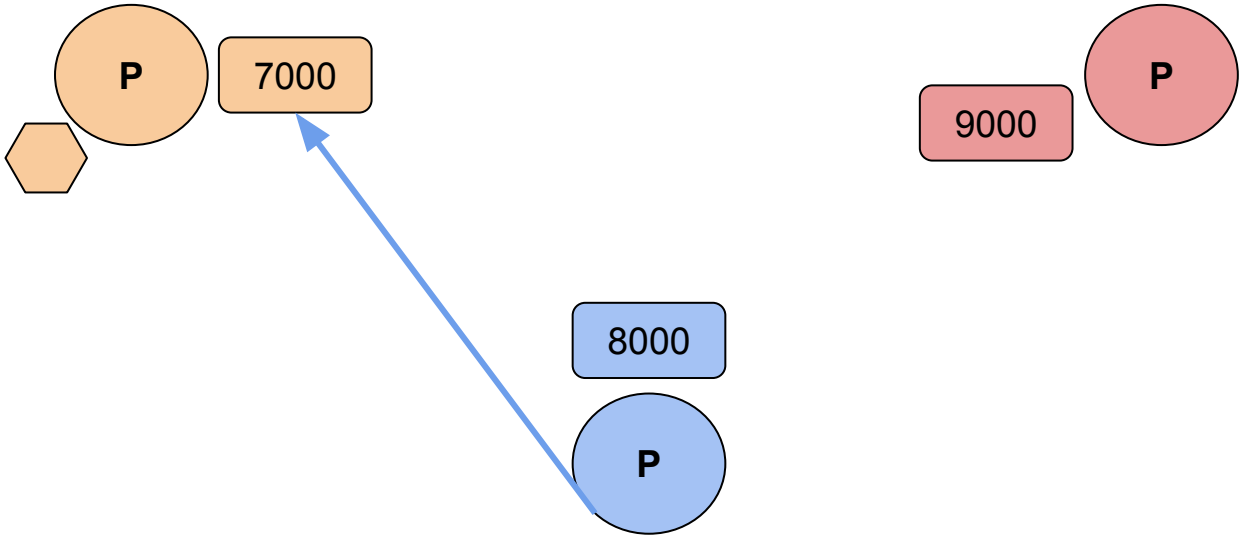
SER 321

P2P Communication

Remember that the OS allocates a new port for the client socket!

sock = server.accept()



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SER 321

P2P Communication

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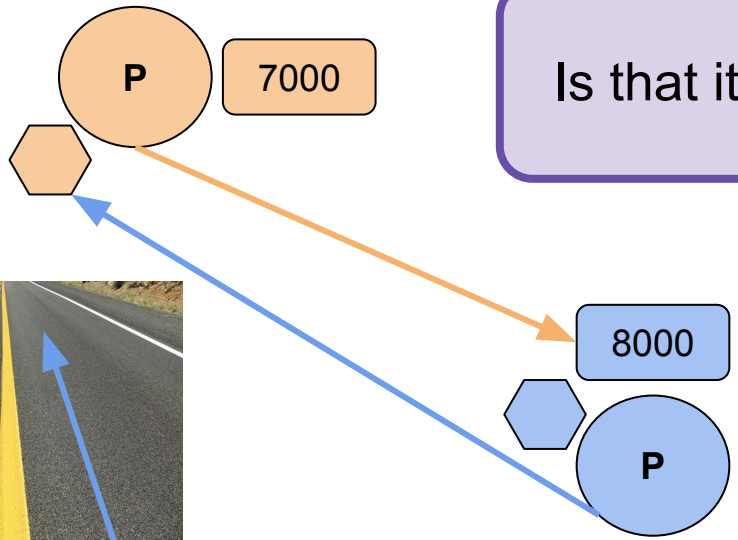

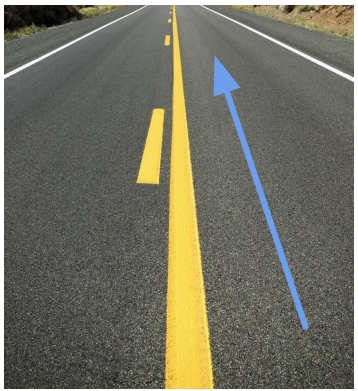

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SER 321

P2P Communication

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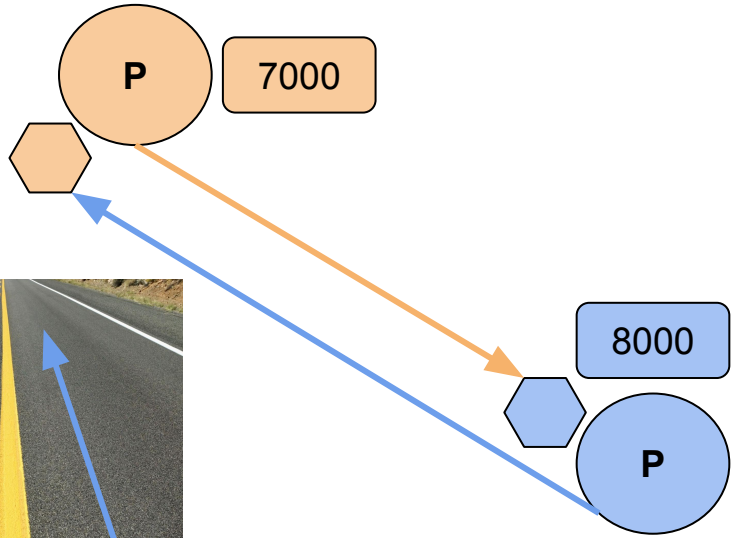
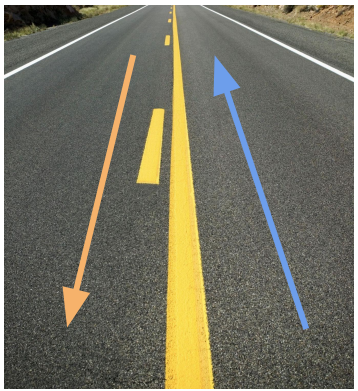
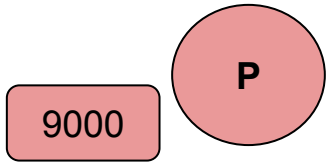


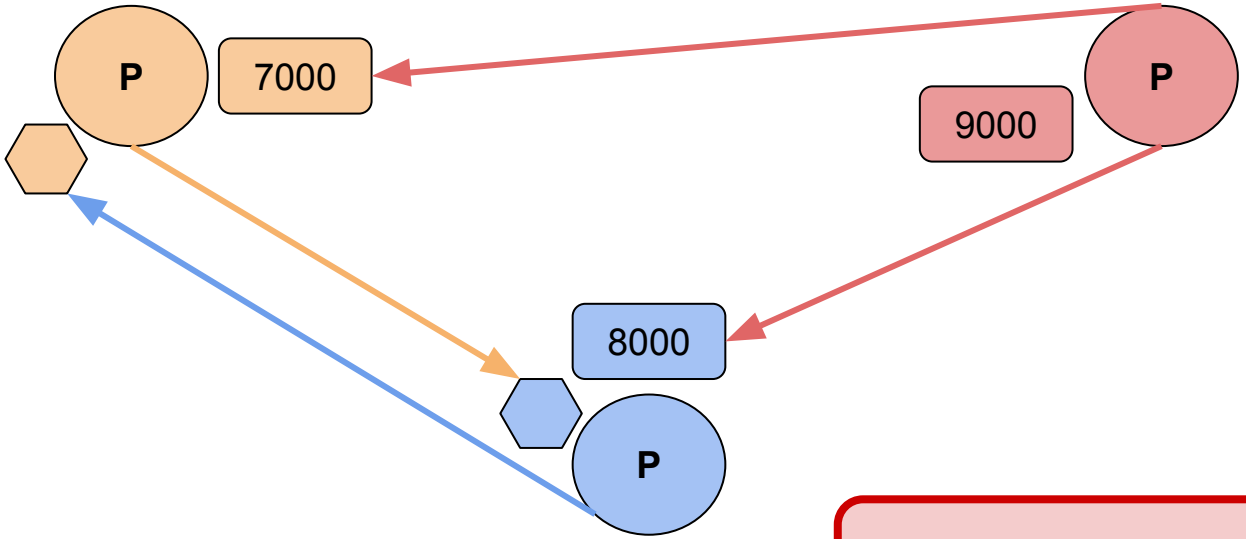




Check out the recording for the discussion!

What about Peer 9000?

Remember that the OS allocates a new port for the client socket!



Check out the recording for the discussion!

What about Peer 9000?

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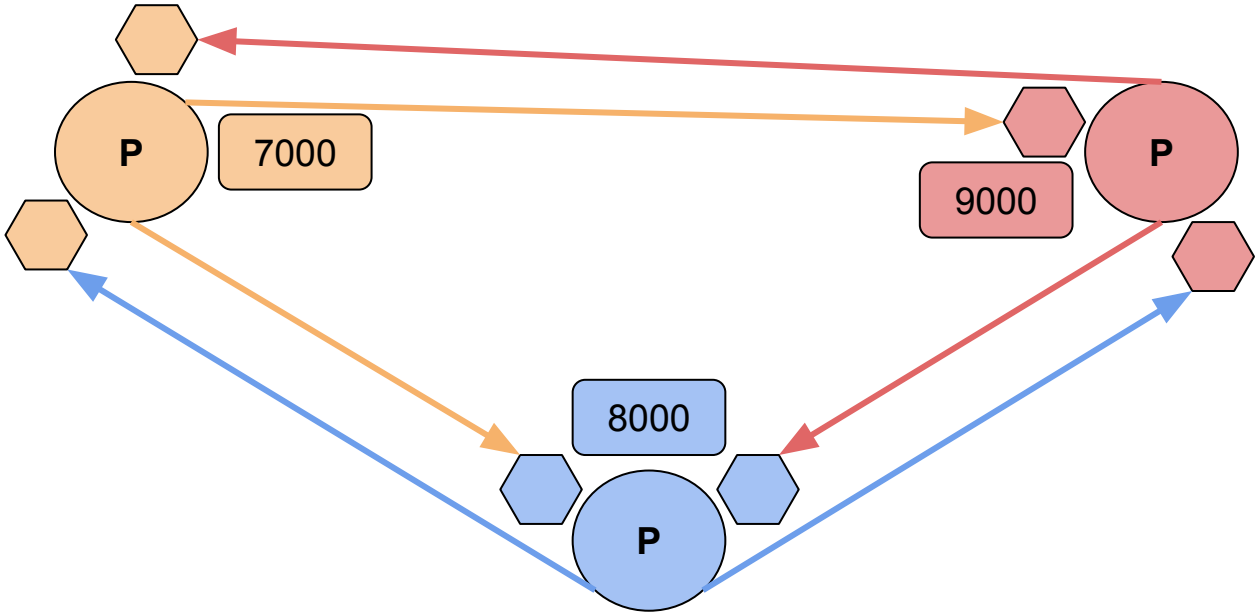
P2P Communication

Remember that the OS allocates a new port for the client socket!



Check out the recording for the discussion!

Check out the recording for the solution!

SER 321
Threaded Pitfalls

Starvation	More than one thread accesses a single resource at the same time
Deadlock	A thread never gains access to the resource it needs
Race Condition	A thread is only able to acquire some of the resources it needs

SER 321
Threaded Pitfalls

What's the difference?

Starvation	vs.	Deadlock
A thread never gains access to the resource it needs	***Check out the recording for the discussion!***	A thread is only able to acquire some of the resources it needs
Waiting to access the ***CPU***		Waiting to access another ***resource***
Ready to go; never gets a chance		***Not*** ready to go

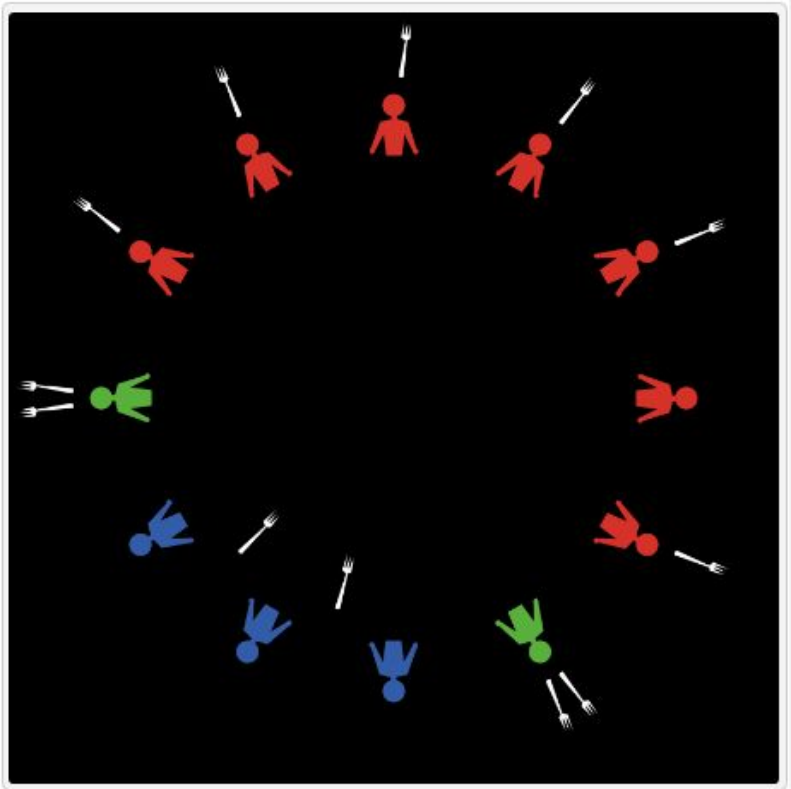
Check out the recording for the solution!

Dining Philosophers

SER 321

Dining Philosophers

Can we take a guess at what is happening here?



What are the **BLUE** people doing?

What are the **GREEN** people doing?

What are the **RED** people doing?

org.json Docs

JSON Guide

SER 321
JSON Structure

Check out the recording for the discussion!

Data is stored in…

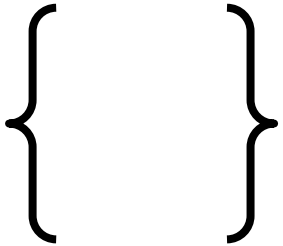
Name:Value pairs → AKA → Members

"Katie"

"student" : "Katie"

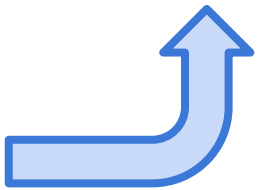
What uses curly braces?

Objects



What do Objects contain?

Members



org.json Docs

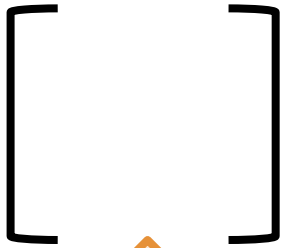
JSON Guide

SER 321

JSON Structure

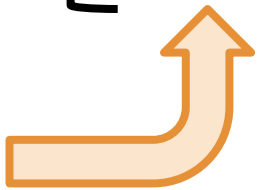
What uses brackets?

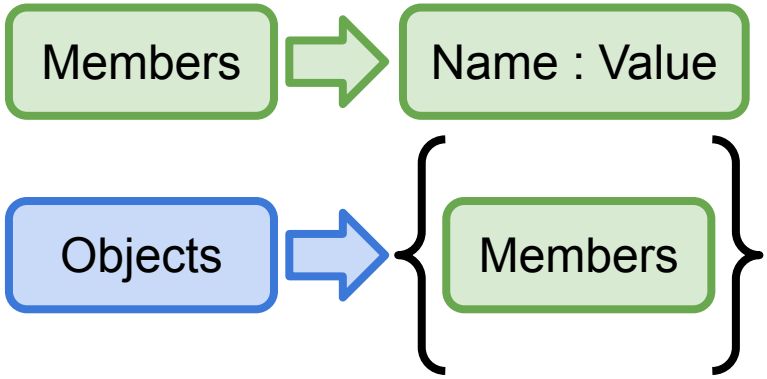
Arrays



What do Arrays contain?

Any ***Valid*** Value





Check out the recording for the discussion!

org.json Docs

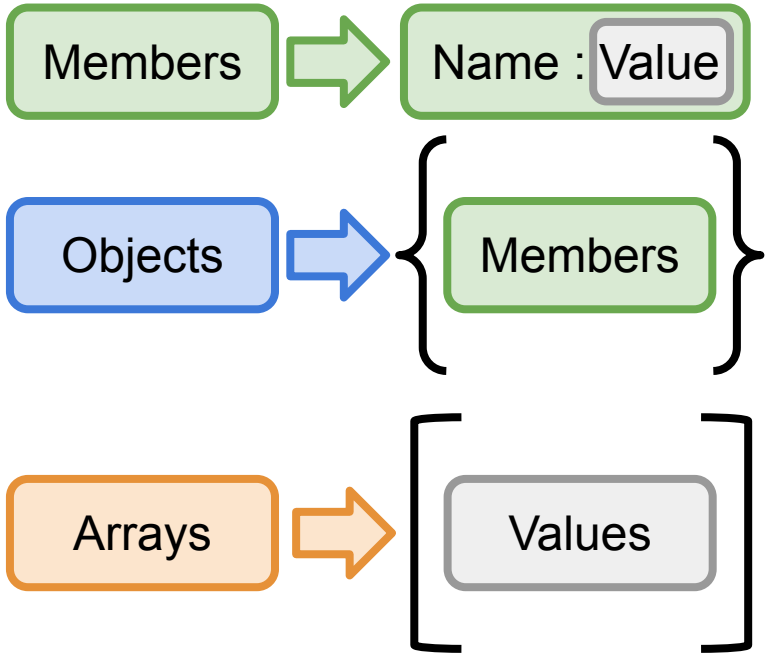
JSON Guide

SER 321

JSON Structure

What is a valid value?

- Strings
- Booleans
- Numbers
- NULL
- Objects
- Arrays



Check out the recording for the discussion!

SER 321

Scratch Space

Upcoming Events

SI Sessions:

- Tuesday, April 29th, at 10:00 am MST - **Q&A Session**

Review Sessions:

- ~~Sunday, April 27th at **6:00 pm** MST - **2 hour Exam Review Session**~~
- Tuesday, April 29th, at 10:00 am MST - **Q&A Session**

Questions?

Survey:

https://asuasn.info/ASNSurvey

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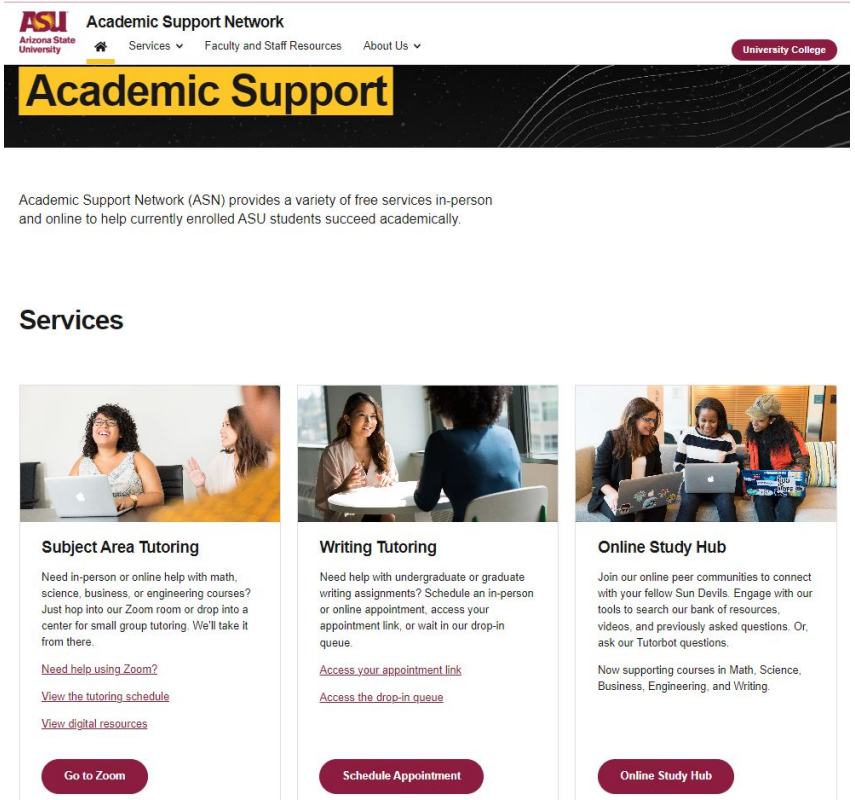
More Questions?

Check out our other resources!

tutoring.asu.edu

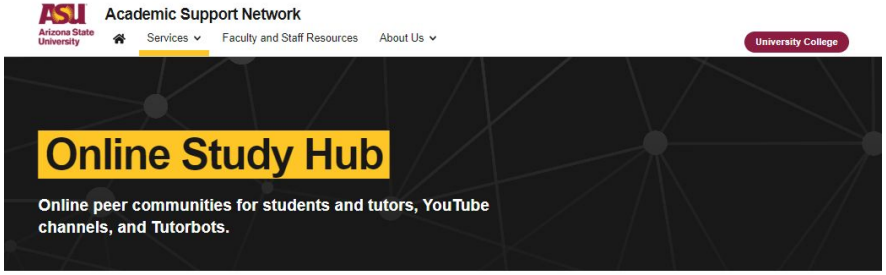


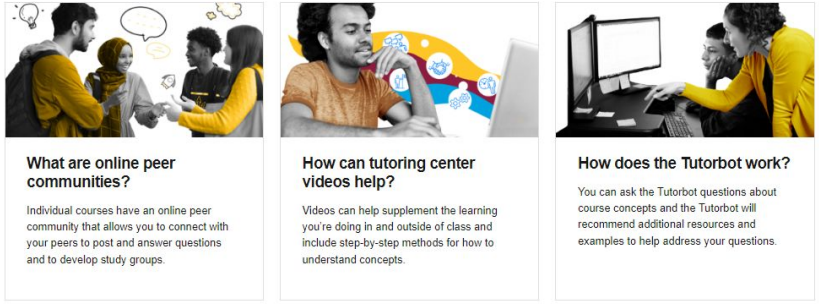
1. **Click on ‘Go to Zoom’ to log onto our Online Tutoring Center.**
2. **Click on ‘View the tutoring schedule’ to see when tutors are available for specific courses.**

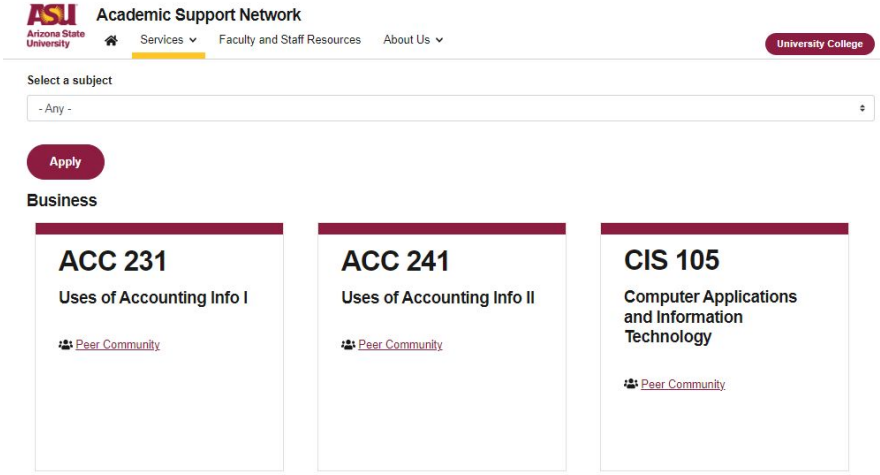
More Questions?

Check out our other resources!

tutoring.asu.edu/online-study-hub



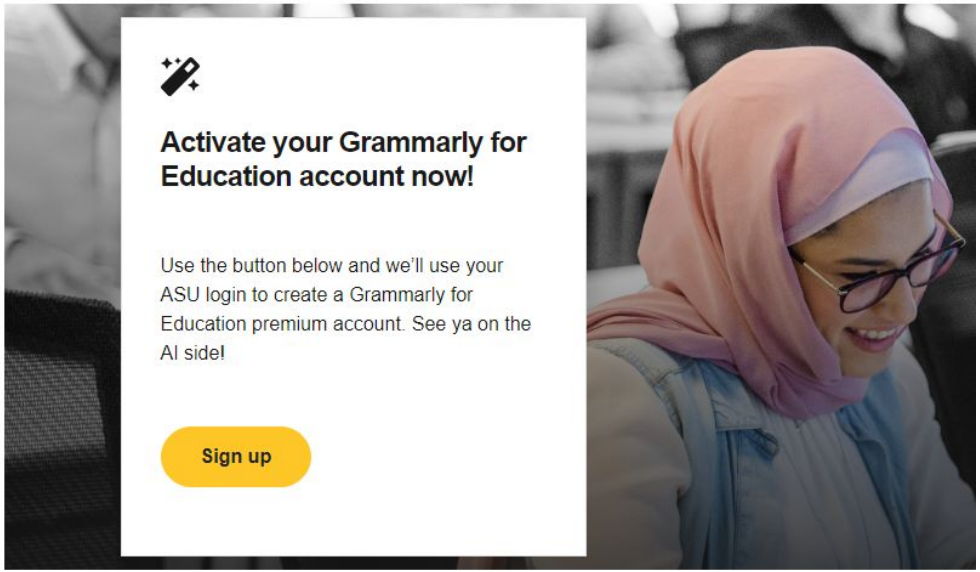




Don't forget to check out the Online Study Hub for additional resources!

Expanded Writing Support Available

Including Grammarly for Education, at no cost!



tutoring.asu.edu/expanded-writing-support

*Available slots for this pilot are limited

Additional Resources

- Course Repo
- Gradle Documentation
- GitHub SSH Help
- Linux Man Pages
- OSI Interactive
- MDN HTTP Docs
  - Requests
  - Responses
- JSON Guide
- org.json Docs
- javax.swing package API
- Swing Tutorials
- Dining Philosophers Interactive
- Austin G Walters Traffic Comparison
- RAFT