

# SER 321 C Session

**SI Session**

**Thursday, June 27th 2024**

*6:00 pm - 7:00 pm MST*

# Agenda



Peer to Peer Structures

Joining the Cluster

Examine Communication

RAFT

# 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](https://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

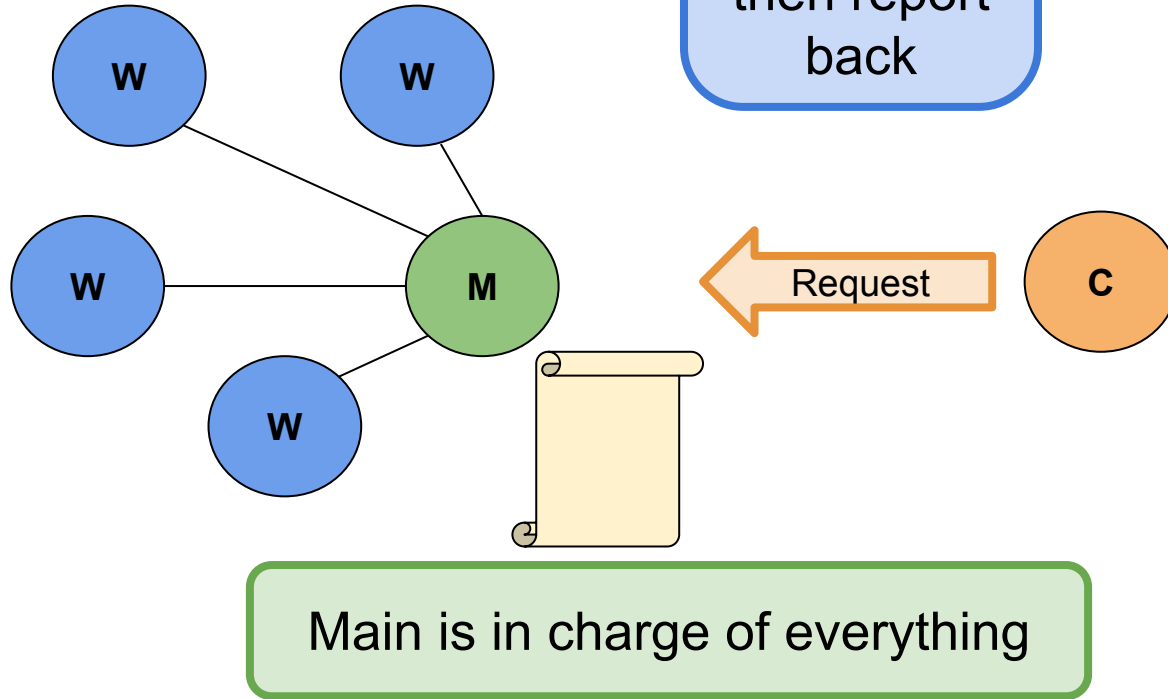


### Zoom Chat

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

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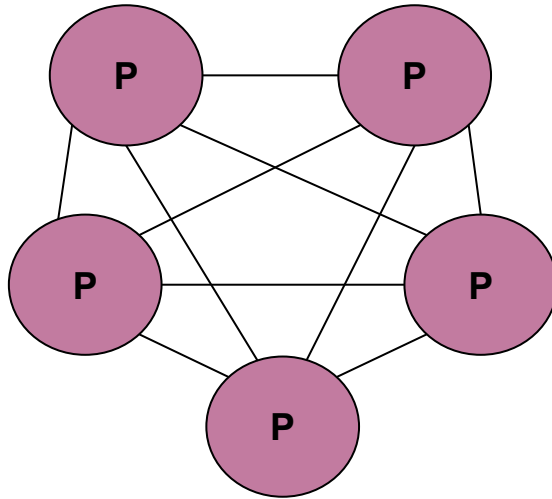
## Communication



# SER 321

## Communication

How do we handle the client in a Peer to Peer system?



Request is sent to the  
*current leader*

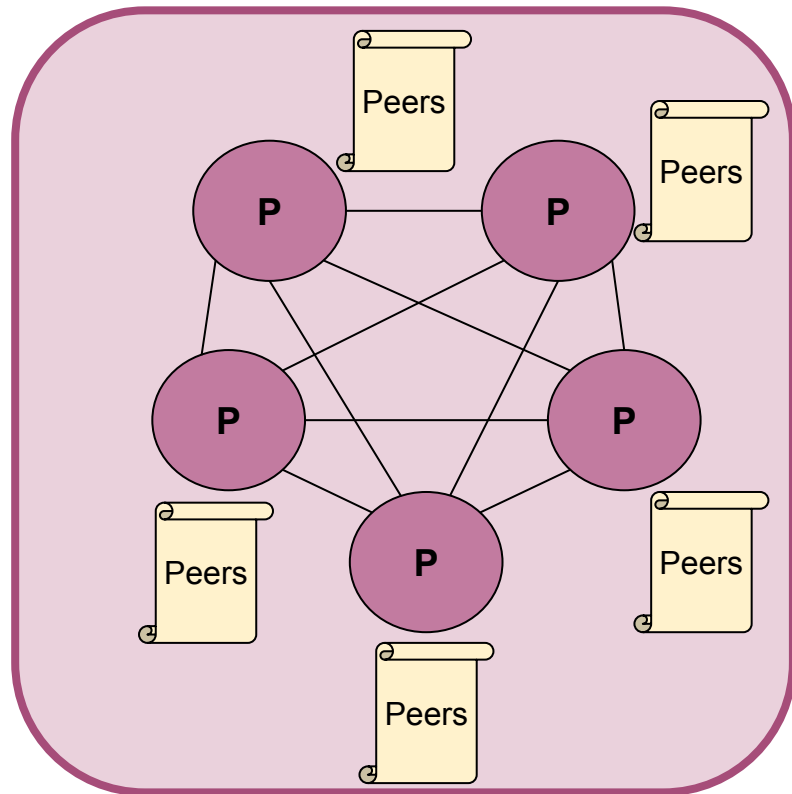
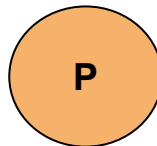
or

Peer that received the  
request *acts as the leader*

**SER 321**

**Communication**

What about *adding* a Peer to the Cluster?



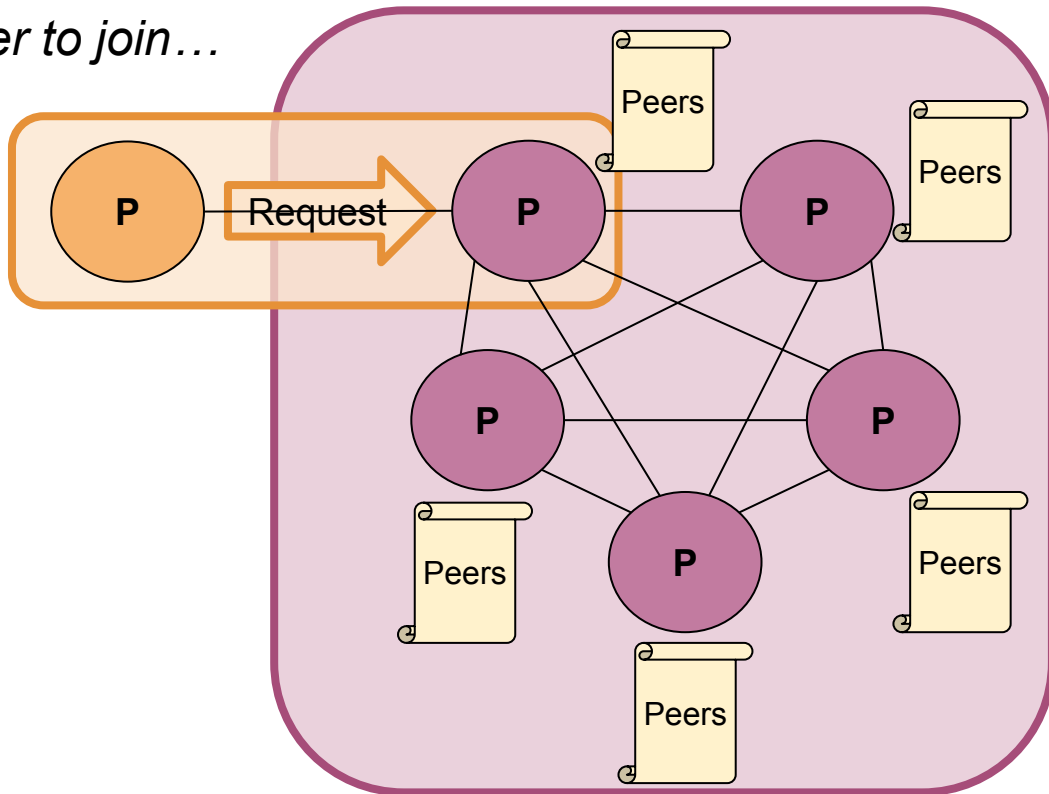
**SER 321**

**Communication**

What about **adding** a Peer to the Cluster?

*Assuming we want to allow the peer to join...*

Is that all?





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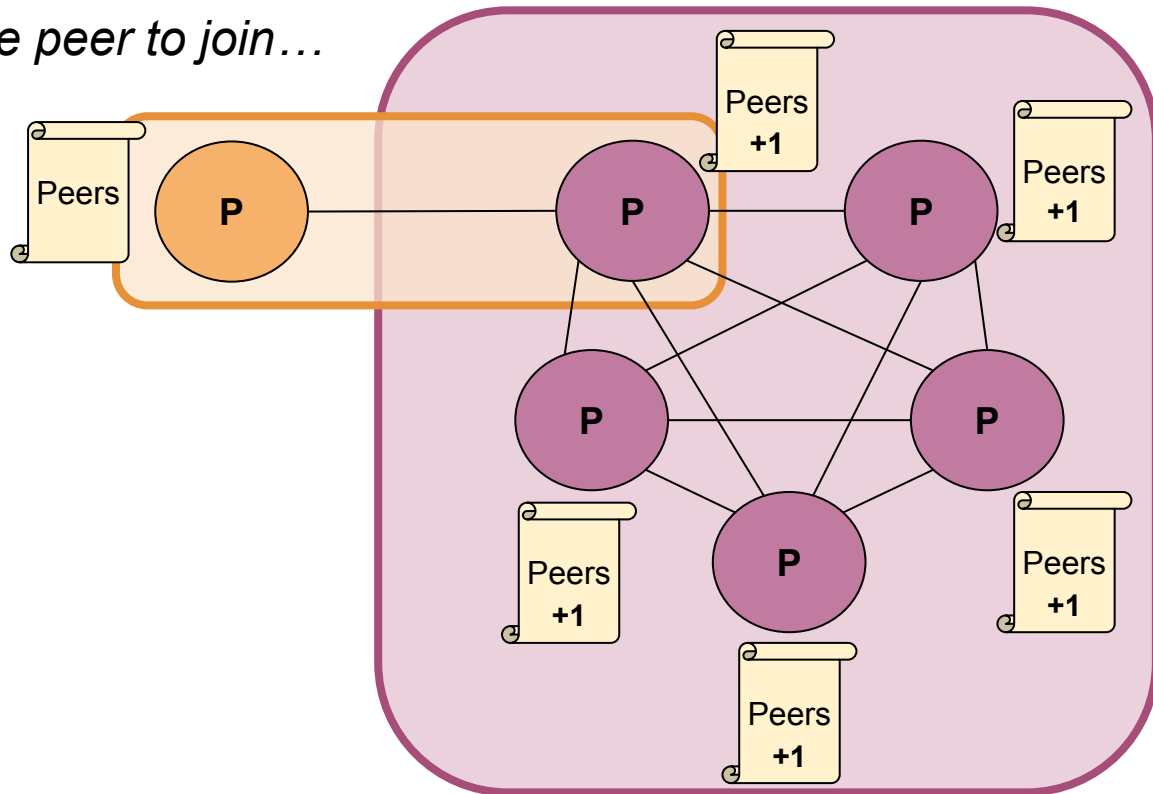
## Communication

What about **adding** a Peer to the Cluster?

*Assuming we want to allow the peer to join...*

Three Additional Steps:

- 1.
- 2.
- 3.





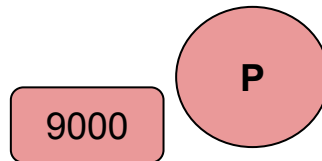
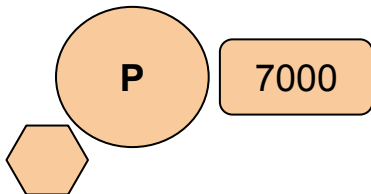
# SER 321

## Communication

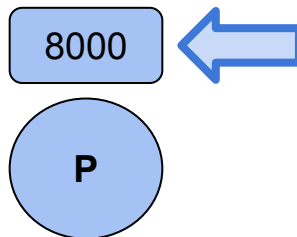
Remember that the OS allocates a new port for the client socket!

Run With:

```
gradle runPeer --args "Name Port"
```



We are going to take a closer look at the code in a moment!

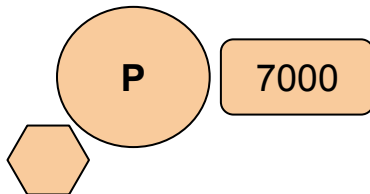


```
gradle runPeer --args "Peer8000 8000"
```

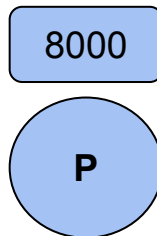
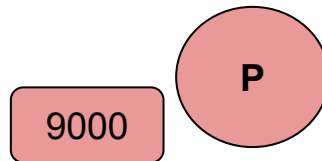
# SER 321

## Communication

```
gradle runPeer --args "Peer7000 7000"
```



```
> Task :runPeer
Hello Peer7000 and welcome! Your port will be 7000
> Who do you want to listen to? Enter host:port
<=====--> 75% EXECUTING [21s]
> :runPeer
█
```



```
> Task :runPeer
Hello Peer8000 and welcome! Your port will be 8000
> Who do you want to listen to? Enter host:port
<=====--> 75% EXECUTING [21s]
> :runPeer
█
```

```
gradle runPeer --args "Peer8000 8000"
```

# SER 321

# Communication

```
gradle runPeer --args "Peer7000 7000"
```

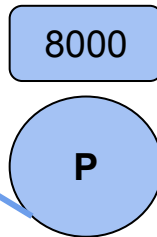
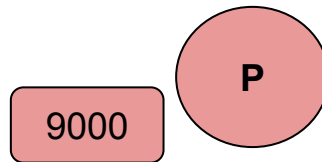
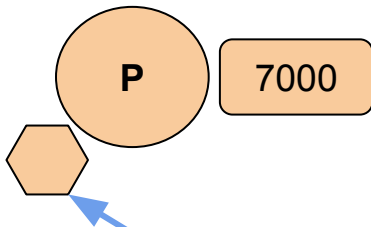
```
> Task :runPeer
```

```
Hello Peer7000 and welcome! Your port will be 7000
```

```
> Who do you want to listen to? Enter host:port
```

```
<=====--> 75% EXECUTING [21s]
```

```
> :runPeer
```



```
> Task :runPeer
```

```
Hello Peer8000 and welcome! Your port will be 8000
```

```
> Who do you want to listen to? Enter host:port
```

```
<<==<==<==<==<==<=====----> 75% EXECUTING [1m 56s]
```

```
> You can now start chatting (exit to exit)
```

```
<=====--> 75% EXECUTING [2m 3s]
```

```
> :runPeer
```

# SER 321 Communication

What will  
happen?

```
> Task :runPeer
Hello Peer7000 and welcome! Your port will be 7000
> Who do you want to listen to? Enter host:port
<===== > 75% EXECUTING [21s]
> :runPeer
█
```

```
> Task :runPeer
Hello Peer8000 and welcome! Your port will be 8000
> Who do you want to listen to? Enter host:port
<===== > 75% EXECUTING [1m 56s]
> You can now start chatting (exit to exit)
<===== > 75% EXECUTING [3m 33s]
<===== > 75% EXECUTING [3m 37s]
hi 7000
```

```
PS C:\ASU\SER321\examples_repo\ser321examples\Sockets\S
Starting a Gradle Daemon, 1 busy and 1 stopped Daemons
```

```
> Task :runPeer
Hello Peer7000 and welcome! Your port will be 7000
> Who do you want to listen to? Enter host:port
<===== > 75% EXECUTING [2m 48s]
> :runPeer
█
```

Why?

9000

P

8000

P

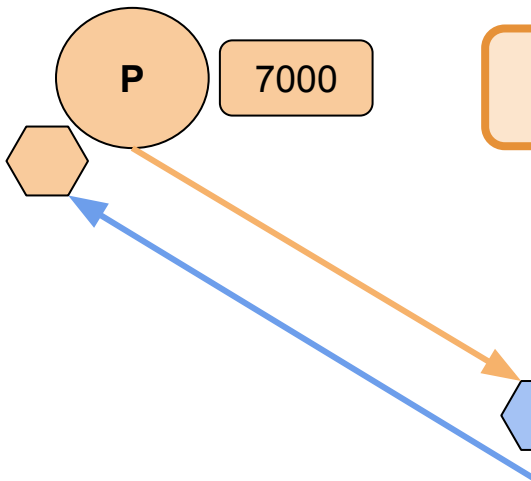
```
> Task :runPeer
Hello Peer8000 and welcome! Your port will be 8000
> Who do you want to listen to? Enter host:port
<===== > 75% EXECUTING [1m 56s]
> You can now start chatting (exit to exit)
<===== > 75% EXECUTING [3m 13s]
> :runPeer
hi 7000
```

# Communication

```
> Task :runPeer  
Hello Peer8000 and welcome! Your port will be 8000  
> Who do you want to listen to? Enter host:port  
<====<<=====<=<=<=====-----> 75% EXECUTING [3m 4s]  
> You can now start chatting (exit to exit)  
[Peer7000]: Hi Peer8000!  
<=====-----> 75% EXECUTING [4m 4s]  
> :runPeer  

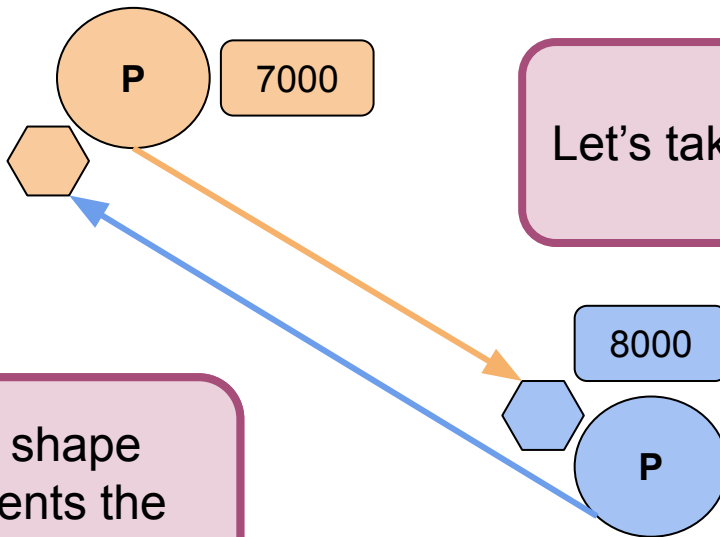
```

```
> Task :runPeer  
Hello Peer7000 and welcome! Your port will be 7000  
> Who do you want to listen to? Enter host:port  
<<====<==<===<=====-----> 75% EXECUTING [3m 43s]  
> You can now start chatting (exit to exit)  
<<<=<==<==<=<=====-----> 75% EXECUTING [3m 58s]  
<=====-----> 75% EXECUTING [4m 1s]  
Hi Peer8000!
```



# Communication

localhost:8000



What shape represents the **ClientThread**?

```
> :runPeer
```



# SimplePeerToPeer

## SER 321

## Communication

### ServerThread

```
public class ServerThread extends Thread {
    2 usages
    private ServerSocket serverSocket;
    2 usages
    private Set<Socket> listeningSockets = new HashSet<>();

    1 usage
    public ServerThread(String portNum) throws IOException {
        serverSocket = new ServerSocket(Integer.valueOf(portNum));
    }

    | Starting the thread, we are waiting for clients wanting to talk to us, then save the socket in a list

    public void run() {
        try {
            while (true) {
                Socket sock = serverSocket.accept();
                listeningSockets.add(sock);
            }
        } catch (Exception e) {...}
    }

    | Sending the message to the OutputStream for each socket that we saved

    1 usage
    void sendMessage(String message) {
        try {
            for (Socket s : listeningSockets) {
                PrintWriter out = new PrintWriter(s.getOutputStream(), true);
                out.println(message);
            }
        } catch (Exception e) {...}
    }
}
```

```
public static void main (String[] args) throws Exception {
```

```
    BufferedReader bufferedReader = new BufferedReader(new InputStreamReader(System.in));
    String username = args[0];
    System.out.println("Hello " + username + " and welcome! Your port will be " + args[1]);

    // starting the Server Thread, which waits for other peers to want to connect
    ServerThread serverThread = new ServerThread(args[1]);
    serverThread.start();
    Peer peer = new Peer(bufferedReader, args[0], serverThread);
    peer.updateListenToPeers();
}
```

### Peer

### ClientThread

```
public class ClientThread extends Thread {
    2 usages
    private BufferedReader bufferedReader;

    1 usage
    public ClientThread(Socket socket) throws IOException {
        bufferedReader = new BufferedReader(new InputStreamReader(socket.getInputStream()));
    }

    public void run() {
        while (true) {
            try {
                JSONObject json = new JSONObject(bufferedReader.readLine());
                System.out.println("[\" + json.getString(\"username\")+\"]: \" + json.getString(\"message\");
            } catch (Exception e) {...}
        }
    }
}
```



```
public class ClientThread extends Thread {  
    2 usages  
    private BufferedReader bufferedReader;  
  
    1 usage  
    public ClientThread(Socket socket) throws IOException {  
        bufferedReader = new BufferedReader  
            (new InputStreamReader(socket.getInputStream()));  
    }  
    public void run() {  
        while (true) {  
            try {  
                JSONObject json =  
                    new JSONObject(bufferedReader.readLine());  
                System.out.println  
                    ("[" + json.getString("username")+"]: "  
                     + json.getString("message"));  
            } catch (Exception e) {...}  
        }  
    }  
}
```

ClientThread

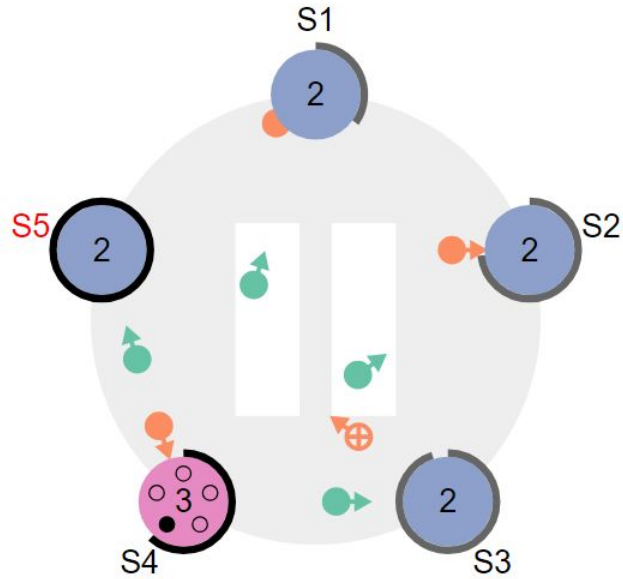
```
public static void main (String[] args) throws Exception {  
  
    BufferedReader bufferedReader = new BufferedReader(new InputStreamReader(System.in));  
    String username = args[0];  
    System.out.println("> Who do you want to listen to? Enter host:port");  
    // st  
    public void updateListenToPeers() throws Exception {  
        System.out.println("> Who do you want to listen to? Enter host:port");  
        String input = bufferedReader.readLine();  
        String[] setupValue = input.split(" ");  
        for (int i = 0; i < setupValue.length; i++) {  
            String[] address = setupValue[i].split(":");  
            Socket socket = null;  
            try {  
                socket = new Socket(address[0], Integer.valueOf(address[1]));  
                new ClientThread(socket).start();  
            } catch (Exception c) {  
                if (socket != null) {  
                    socket.close();  
                } else {  
                    System.out.println("Cannot connect, wrong input");  
                    System.out.println("Exiting: I know really user friendly");  
                    System.exit(0);  
                }  
            }  
        }  
    }  
    askForInput();  
}
```

Peer.updateListenToPeers

# SER 321

## RAFT

RAFT



	1	2	3	4	5	6	7	8	9	10
S1	2									
S2	2									
S3	2									
S4	2									
S5	2									



1/100x

0.415s

# SER 321

Scratch Space

# Questions?



## Survey:

<http://bit.ly/ASN2324>



## Upcoming Events

### SI Sessions:

- Sunday, June 30th at 6:00 pm MST
- Monday, July 1st at 6:00 pm MST
- **Wednesday, July 3rd at 6:00 pm MST - \*\*REVIEW SESSION\*\***
- Sunday, July 7th at 6:00 pm MST - Q&A (Last Session)

### Review Sessions:

- Review Session - **Wednesday**, July 3rd at 6:00 pm MST (2 hr Session)
- Q&A Session - Sunday, July 7th at 6:00 pm MST (Final Session)

# More Questions?

Check out our other resources!

tutoring.asu.edu



## Academic Support

Academic Support Network (ASN) provides a variety of free services in-person and online to help currently enrolled ASU students succeed academically.

### Services



#### Subject Area Tutoring

Need in-person or online help with math, science, business, or engineering courses? Just hop into our Zoom room or drop into a center for small group tutoring. We'll take it from there.

[Need help using Zoom?](#)

[View the tutoring schedule](#)

[View digital resources](#)

Go to Zoom



#### Writing Tutoring

Need help with undergraduate or graduate writing assignments? Schedule an in-person or online appointment, access your appointment link, or wait in our drop-in queue.

[Access your appointment link](#)

[Access the drop-in queue](#)

Schedule Appointment



#### Online Study Hub

Join our online peer communities to connect with your fellow Sun Devils. Engage with our tools to search our bank of resources, videos, and previously asked questions. Or, ask our Tutorbot questions.

Now supporting courses in Math, Science, Business, Engineering, and Writing.

Online Study Hub

1-

Go to Zoom

2-

[Need help using Zoom?](#)

[View the tutoring schedule](#)

[View digital resources](#)



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](https://tutoring.asu.edu/online-study-hub)

 **Academic Support Network**

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[University College](#)

## Online Study Hub

Online peer communities for students and tutors, YouTube channels, and Tutorbots.



### What are online peer communities?

Individual courses have an online peer community that allows you to connect with your peers to post and answer questions and to develop study groups.



### How can tutoring center videos help?

Videos can help supplement the learning you're doing in and outside of class and include step-by-step methods for how to understand concepts.



### How does the Tutorbot work?

You can ask the Tutorbot questions about course concepts and the Tutorbot will recommend additional resources and examples to help address your questions.

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Business


### ACC 231

Uses of Accounting Info I

 [Peer Community](#)

### ACC 241

Uses of Accounting Info II

 [Peer Community](#)

### CIS 105

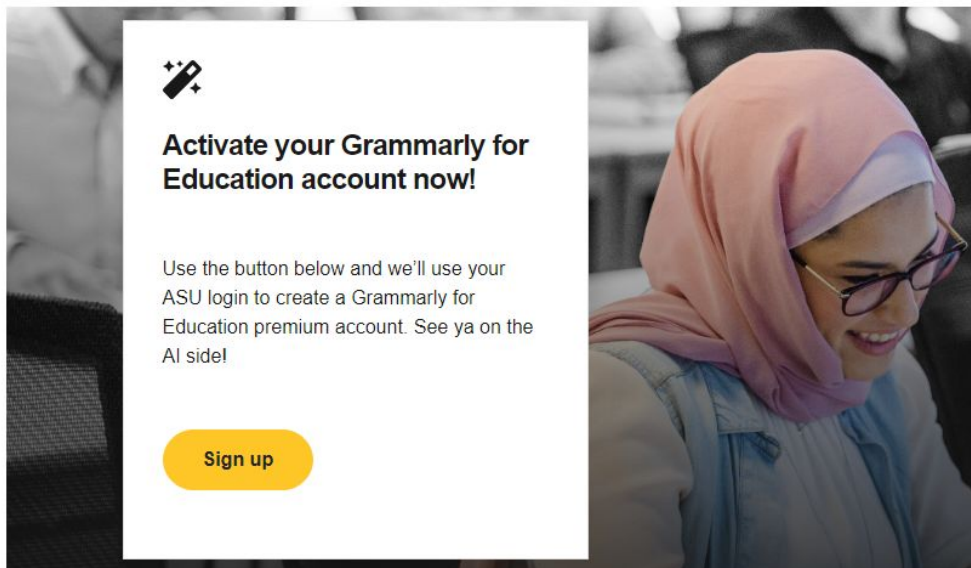
Computer Applications and Information Technology

 [Peer Community](#)

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](https://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](#)
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