

SER 321 B Session

SI Session

Sunday, March 31st 2024

7:00 pm - 8:00 pm MST

Agenda



Protocol Tips!

TCP vs. UDP Review

Server Socket Steps

Handling Client Connection

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

Protocol Tips

Stay Organized!

Try to emulate the structure in 3-1

Format your Markdown!

SER 321

Protocol Tips

Table of Contents

```
<!-- TOC -->
```

```
* \[Protocol:\](#protocol-)
* \[Echo:\](#echo-)
* \[Add:\](#add-)
* \[AddMany:\](#addmany-)
* \[Roller:\](#roller-)
* \[Inventory:\](#inventory-)
* \[General error responses:\]
```

```
<!-- TOC -->
```

```
## Protocol: ##
```

```
### Echo: ###
```

Request:

```
{
  "type" : "echo", -- type of request
  "data" : <String> -- String to be echoed
}
```

General response:

Protocol:

Echo:

Request:

```
{
  "type" : "echo",
  "data" : <String>
}
```

General response:

Table of Contents

```
<!-- TOC -->
* [Protocol:](#protocol-)
* [Echo:](#echo-)
* [Add:](#add-)
* [AddMany:](#addmany-)
* [Roller:](#roller-)
* [Inventory:](#inventory-)
* [General error responses:]
<!-- TOC -->
```

```
## Protocol: ##
```

```
### Echo: ###
```

Request:

```
{
  "type" : "echo", -- type of request
  "data" : <String> -- String to be echoed
}
```

```
####General response:####
```

Protocol:

Echo:

Request:

```
{
  "type" : "echo", -- ty
  "data" : <String> --
}
```

```
####General response:####
```

Spaces are important!

Table of Contents

```
<!-- TOC -->
* [Protocol:](#protocol-)
* [Echo:](#echo-)
  * [Request:](#request-)
  * [General response:](#gen
* [Add:](#add-)
* [AddMany:](#addmany-)
* [Roller:](#roller-)
* [Inventory:](#inventory-)
* [General error responses:]
<!-- TOC -->
```

```
## Protocol: ##

### Echo: ###

#### Request: ####

{
  "type" : "echo", -- type of request
  "data" : <String> -- String to be echoed
}

#### General response: ####
```

Protocol:

Echo:

Request:

```
{
  "type" : "echo",
  "data" : <String>
}
```

General response:

SER 321

TCP vs. UDP Matching

Unreliable

TCP

OR

UDP

SER 321

TCP vs. UDP Matching

Connection-Oriented

TCP

Reliable

OR

UDP

Unreliable

SER 321

TCP vs. UDP Matching

Uses Streams

TCP

Reliable

Connection-Oriented

OR

UDP

Unreliable

Connectionless

SER 321

TCP vs. UDP Matching

Has Less Overhead

TCP

Reliable

Connection-Oriented

Uses Streams

OR

UDP

Unreliable

Connectionless

Uses Datagrams

SER 321

TCP vs. UDP Matching

Has Less Overhead

TCP

Reliable

Connection-Oriented

Uses Streams

Has More Overhead

OR

UDP

Unreliable

Connectionless

Uses Datagrams

Has Less Overhead

SER 321

Server Socket

Steps for the **Server Socket**

1.

2.

3.

4.

5.

6.

7.

8.

9.

SER 321

Server Socket

Java
handles
a few
steps for
us...

1. Define Params

2. Create Socket

3. **C ONLY** Create a struct for the address

3-5. Mark Socket to Listen

5. Mark Socket to Listen for Connections

6. Wait for Connection

7. Handle Client Connection

8. Close Client Connection

9. Continue Listening for Connections

SER 321

Server Socket

1. Define Params

2. Create Socket

3-5. Mark Socket to Listen

6. Wait for Connection

7. Handle Client Connection

8. Close Client Connection

9. Continue Listening

1

2 & 3-5

9

6

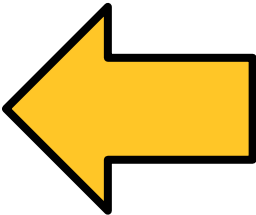
```
public static void main (String args[]) {  
  
    if (args.length != 1) {  
        System.out.println("Expected arguments: <port(int)>");  
        System.exit( status: 1);  
    }  
  
    try {  
        port = Integer.parseInt(args[0]);  
    } catch (NumberFormatException nfe) {  
        System.out.println("[Port|sleepDelay] must be an integer");  
        System.exit( status: 2);  
    }  
  
    try {  
        //open socket  
        ServerSocket serv = new ServerSocket(port);  
        System.out.println("Server ready for connections");  
  
        while (true){  
            System.out.println("Server waiting for a connection");  
            sock = serv.accept(); // blocking wait  
            System.out.println("Client connected");  
            // ...  
        }  
    }  
}
```


SER 321

Server Socket

What needs to be done here?

1. Define Params
2. Create Socket
- 3-5. Mark Socket to Listen
6. Wait for Connection
7. Handle Client Connection
8. Close Client Connection
9. Continue Listening



- 1
- 2
- 3
- 4
- 5

SER 321

Server Socket

What needs to be done here?

Is input
from the client
or
to the client ?

1. Define Params

```
// setup the object reading channel  
in = new ObjectInputStream(sock.getInputStream());
```

```
// get output channel  
OutputStream out = sock.getOutputStream();
```

```
// create an object output writer (Java only)  
os = new DataOutputStream(out);
```

1

2

3

4

5

```
clientSock = sock.accept(); // blocking wait  
PrintWriter out = new PrintWriter(clientSock.getOutputStream(), autoFlush: true);  
InputStream input = clientSock.getInputStream();  
System.out.println("Server connected to client");
```

SER 321

Server Socket

What needs to be done here?

```
static void overandout() {  
    try {  
        os.close();  
        in.close();  
        sock.close();  
    } catch (Exception e) {e.printStackTrace();}  
}  
  
try {  
    s = (String) in.readObject();  
} catch (Exception e) {  
    System.out.println("Client disconnect");  
    connected = false;  
    continue;  
}
```

1 Create input/output streams

2

3

4

5

SER 321

Server Socket

What needs to be done here?

```
JSONObject res = isValid(s);

if (res.has(key: "ok")) {
    writeOut(res);
    continue;
}

JSONObject req = new JSONObject(s);

res = testField(req, key: "type");
if (!res.getBoolean(key: "ok")) {
    res = noType(req);
    writeOut(res);
    continue;
}
```

```
public static JSONObject isValid(String json) {
    try {
        static JSONObject testField(JSONObject req, String key){
            JSONObject res = new JSONObject();

            // field does not exist
            if (!req.has(key)){
                res.put("ok", false);
                res.put("message", "Field " + key + " does not exist in request");
                return res;
            }

            return res.put("ok", true);
        }

        return res;
    }
}

return new JSONObject();
}
```

SER 321**Server Socket**

What needs to be done here?

```
int numr = input.read(clientInput, off: 0, buflen);
```

```
String received = new String(clientInput, offset: 0, numr);  
System.out.println("read from client: " + received);  
out.println(received);
```

```
if (req.getString(key: "type").equals("echo")) {  
    res = echo(req);  
} else if (req.getString(key: "type").equals("add")) {  
    res = add(req);  
} else if (req.getString(key: "type").equals("addmany")) {  
    res = addmany(req);  
} else {  
    res = wrongType(req);  
}  
writeOut(res);
```

1 Create input/output streams

2 Check for disconnect

3 Check Protocol

4

5

SER 321

Server Socket

What needs to be done here?

1. Define Params

2. Create Socket

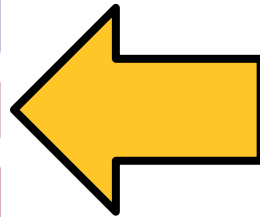
3-5. Mark Socket to Listen

6. Wait for Connection

7. Handle Client Connection

8. Close Client Connection

9. Continue Listening



1 Create input/output streams

2 Check for disconnect

3 Check Protocol

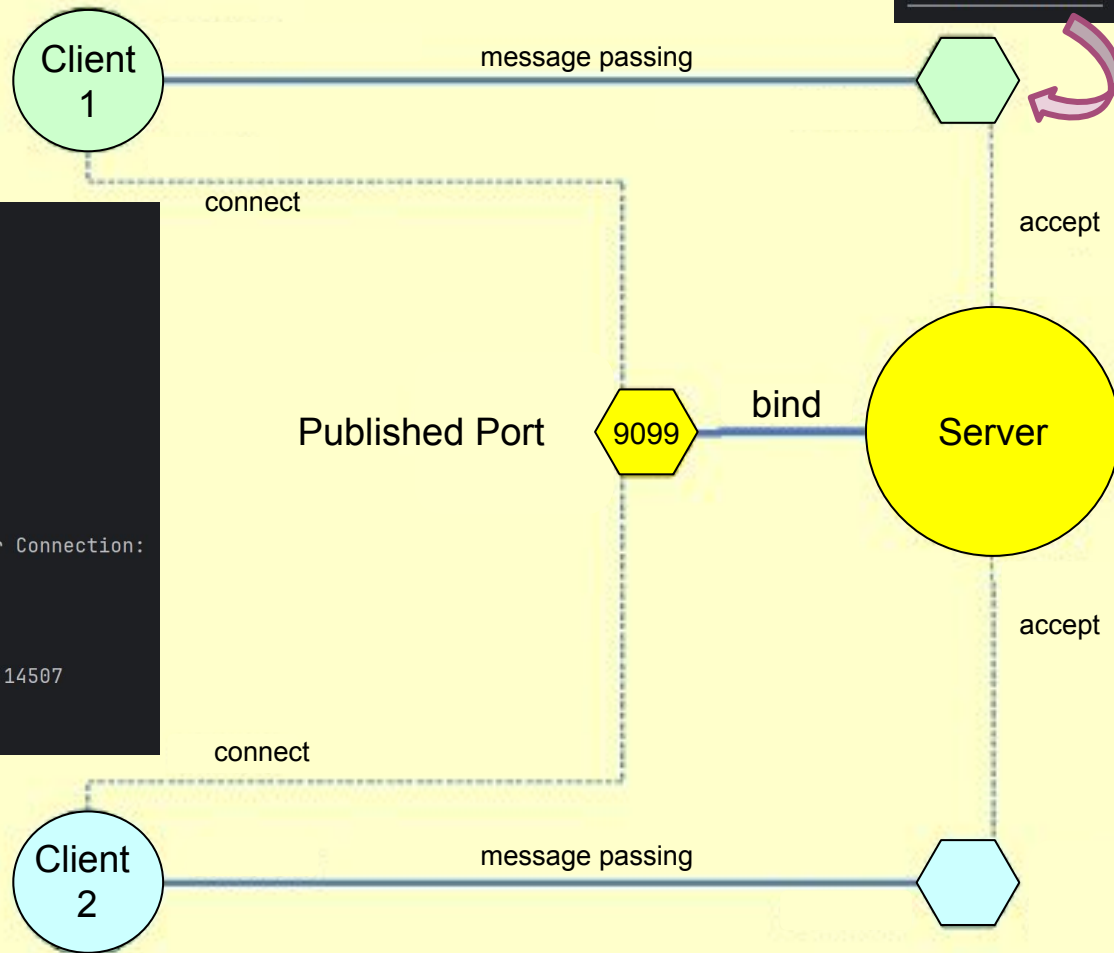
4 Read Headers

5 Handle Accordingly

SER 321

Sockets!

```
> Task :runServer
Server ready for connections
Server is listening on port: 9099
-----
Values of the ServerSocket Object:
Inet Address: 0.0.0.0/0.0.0.0
Local Port: 9099
Server waiting for a connection
Server connected to client
-----
Values of the Client Socket Object after Connection:
Inet Address: /127.0.0.1
Local Address: /127.0.0.1
Local Port: 9099
Allocated Client Socket (Port): 14507
<=====--> 75% EXECUTING [31s]
> :runServer
```



SER 321

Scratch Space

Questions?

Survey:

<http://bit.ly/ASN2324>



Upcoming Events

SI Sessions:

- Monday, April 1st at 7:00 pm MST
- Thursday, April 4th at 7:00 pm MST
- Sunday, April 7th at 7:00 pm MST

Review Sessions:

- Sunday, April 21st at 7:00 pm MST
- **Monday, April 25th Session is *cancelled***

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

 **Academic Support Network**

 [Services](#)  [Faculty and Staff Resources](#) [About Us](#) 

[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.

Select a subject

- Any -

[Apply](#)



Academic Support Network



[Services](#) 

[Faculty and Staff Resources](#)

[About Us](#) 

[University College](#)

Select a subject

- Any -

[Apply](#)

Business

ACC 231

Uses of Accounting Info I

 [Peer Community](#)

ACC 241

Uses of Accounting Info II

 [Peer Community](#)

CIS 105

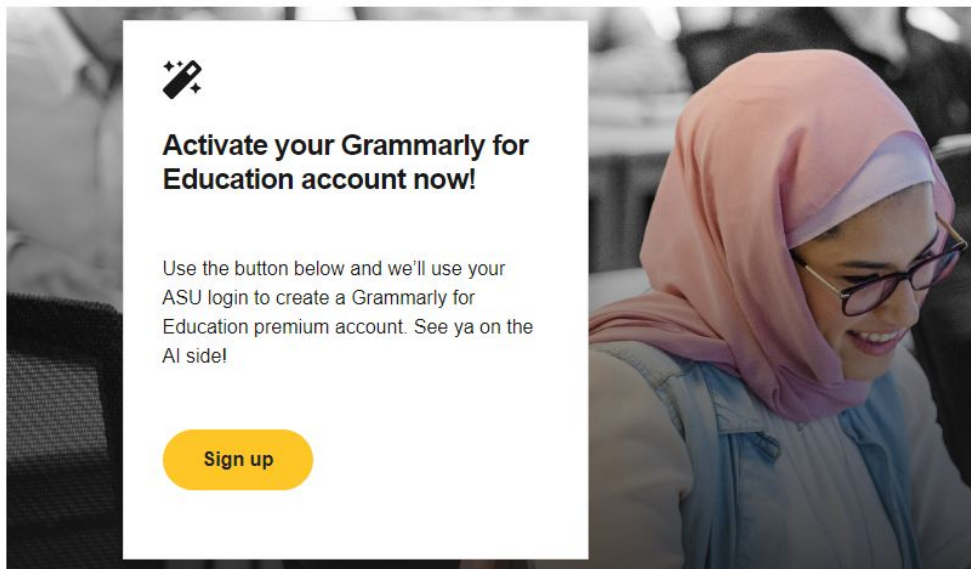
Computer Applications and Information Technology

 [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

*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](#)