

# SER 321 C Session

**SI Session**

**Monday, June 3rd 2024**

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

# Agenda



Sockets!

Basic Needs

Properties

Generic Steps for Use

# 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:

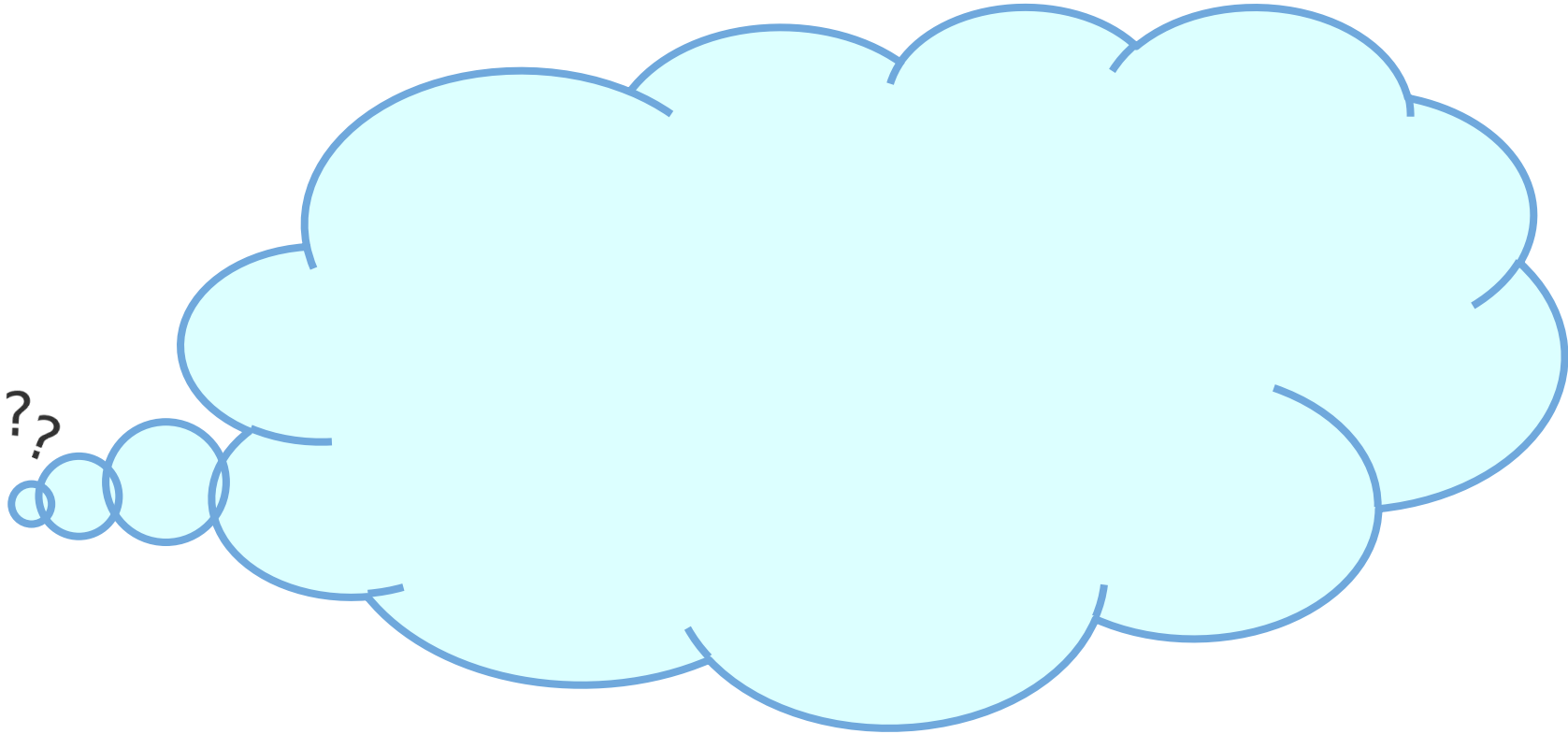
## Zoom Features



### Zoom Chat

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

How do we enable a client/server connection?

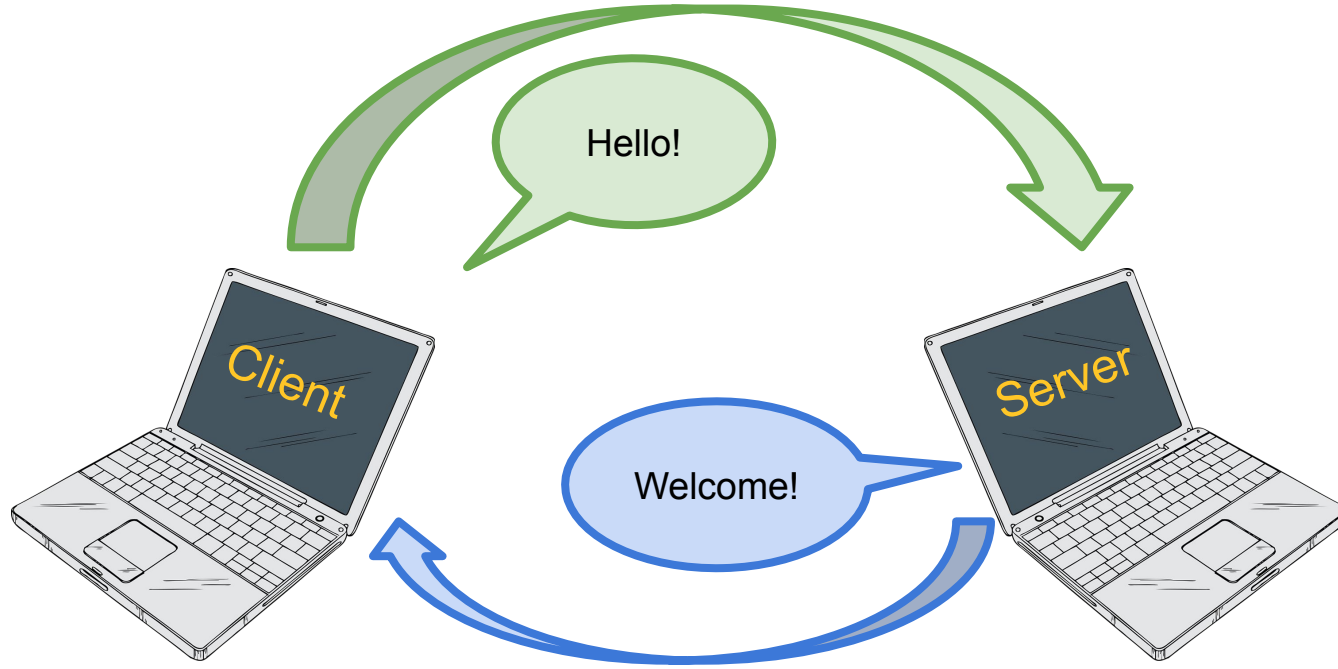


**SER 321**

**Sockets!**

Sockets allow our client and server to communicate!

Enables a client/server **conversation**



# SER 321

## Sockets!

Sockets allow our client and server to communicate!

Location

Connection  
Semantics

Message Format

Need to define **3 properties** before usage

IP or DNS

142.251.46.206

www.google.com

TCP or UDP

Connection  
Oriented

Connectionless

Protocol Specs

Synchronous

Asynchronous

Stateless

Stateful

Binary

Text

Headers

No Headers



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**Sockets!**

## Two Main Conversation Models

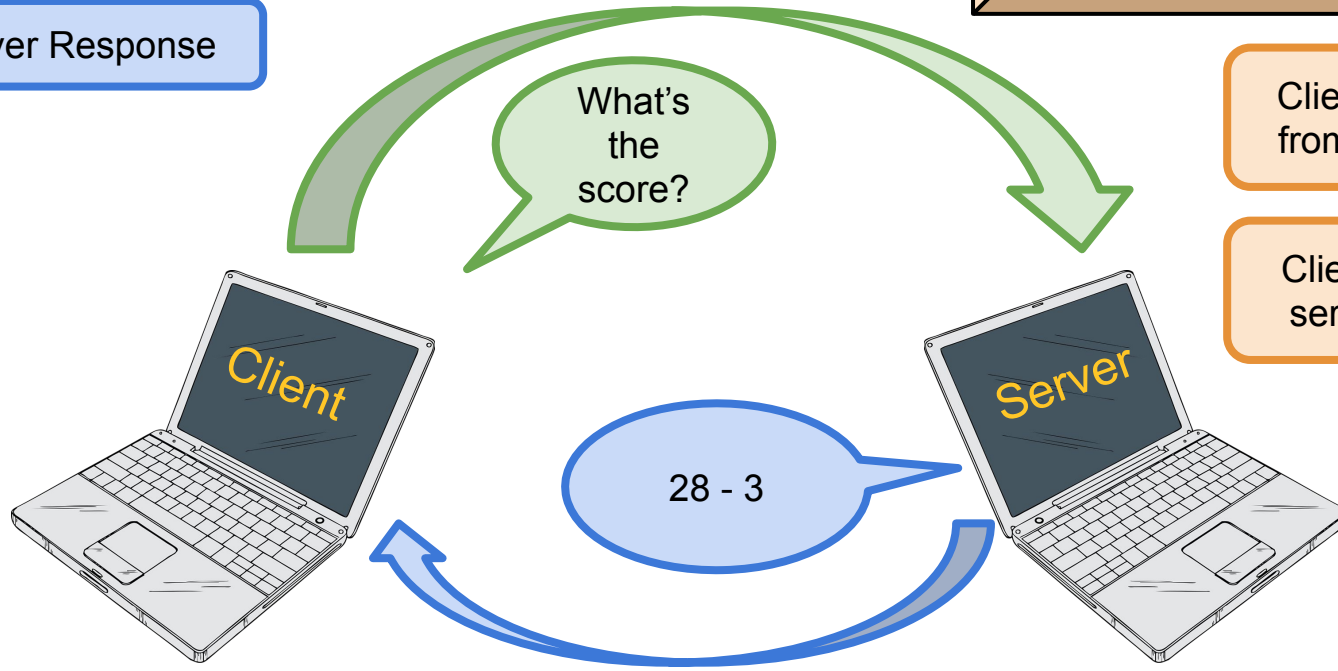
1. Client Request

2. Server Response

### Pull/Polling Model

Client *pulls* info from the server

Client *polls* the server for info





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**Sockets!**

## Two Main Conversation Models

1. Server sends update

2. Client acknowledges

### Push Model

Server *pushes* info to client

*Push notifications*



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**Sockets!**

## Two Main Conversation Models

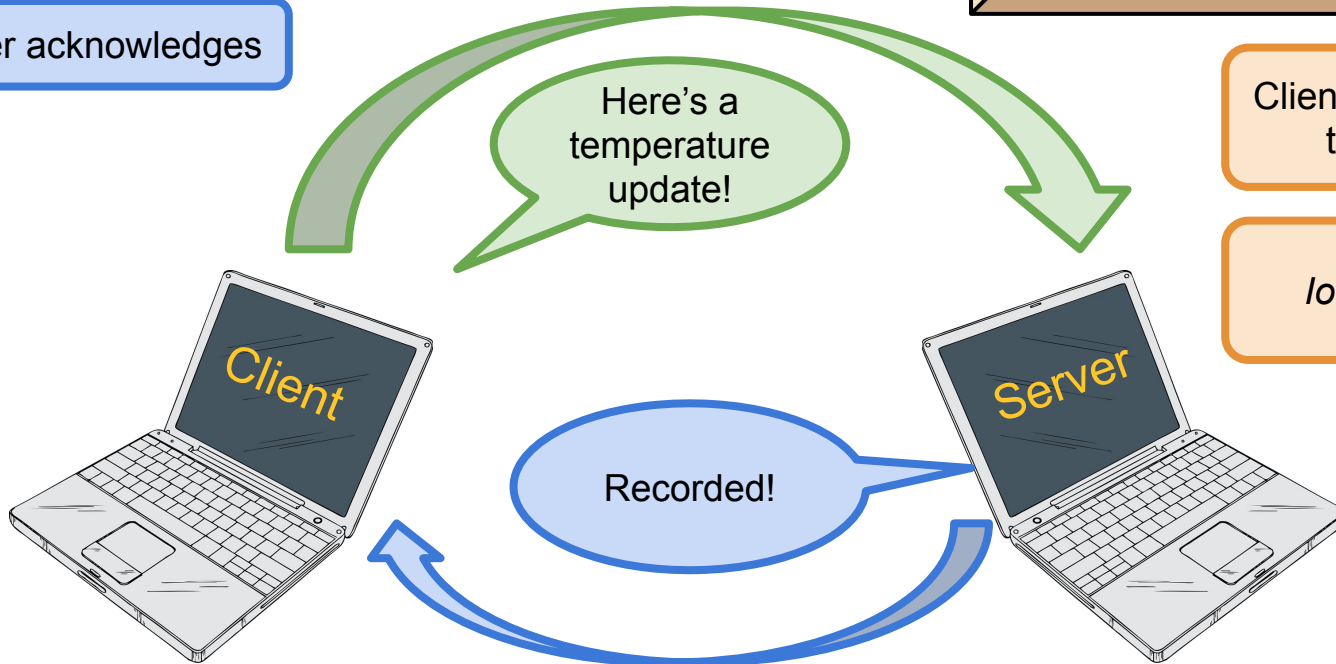
### Client Push Model

1. Client sends update

2. Server acknowledges

Client *pushes* info  
to Server

*IoT sensors*



**SER 321**

**Client Socket**

## Steps for the **Client Socket**

1.

2.

3.

4.

5.

6.

7.

8.

## Assign 3-1 Starter Code

# SER 321

## Client Socket

1. Define Params
2. Create Socket
3. **C ONLY** Create a struct for the address
4. Establish Connection
5. Send Message
6. Receive Message
7. Repeat #5 and #6 as needed
8. Close Socket

```
class SocketClient {
    static Socket sock = null; 4 usages
    static String host = "localhost"; 2 usages
    static int port = 8888; 2 usages
    static OutputStream out; 2 usages
    // Using an Object Stream here and a Data Stream as return. Could both
    // to show the difference. Do not change these types.
    static ObjectOutputStream os; 4 usages
    static DataInputStream in; 3 usages
    public static void main (String args[]) {

        if (args.length != 2) {...}

        try {
            host = args[0];
            port = Integer.parseInt(args[1]);
        } catch (NumberFormatException nfe) {
            System.out.println("[Port|sleepDelay] must be an integer");
            System.exit( status: 2);
        }

        try {
            connect(host, port); // connecting to server
            System.out.println("Client connected to server.");
            boolean requesting = true;
            while (requesting) {
                System.out.println("What would you like to do: 1 - echo, 2 - add, 3 - quit");
                Scanner scanner = new Scanner(System.in);
                int choice = Integer.parseInt(scanner.nextLine());
                // You can assume the user put in a correct input, you do not need
                // You can assume the user inputs a String when asked and an int when
                JSONObject json = new JSONObject(); // request object
                switch(choice) {
                    case 0:
                        System.out.println("Choose quit. Thank you for using our service");
                        requesting = false;
                        break;
                    case 1:
                        System.out.println("Choose echo, which String do you want to send");
                        String message = scanner.nextLine();
                        json.put("type", "echo");
                        json.put("data", message);
                        break;
                    case 2:
                        break;
                }
            }
        } catch (Exception e) {
            e.printStackTrace();
        }
    }

    if(!requesting) {
        continue;
    }

    // write the whole message
    os.writeObject(json.toString());
    // make sure it wrote and doesn't get cached in a buffer
    os.flush();

    // TODO: handle the response
    // - not doing anything other than printing payload
    // !! you will most likely need to parse the response for the
    String i = (String) in.readUTF();
    JSONObject res = new JSONObject(i);
    System.out.println("Got response: " + res);
    if (res.getBoolean( key: "ok")){
        if (res.getString( key: "type").equals("echo")) {
            System.out.println(res.getString( key: "echo"));
        } else {
            System.out.println(res.getInt( key: "result"));
        }
    } else {
        System.out.println(res.getString( key: "message"));
    }
}

// want to keep requesting services so don't close connection
//overandout();
}
```

**SER 321**

**Server Socket**

# Steps for the **Server Socket**

1.

2.

3.

4.

5.

6.

7.

8.

9.

## Assign 3-1 Starter Code

# SER 321

## Server Socket

1. Define Params
2. Create Socket
3. **C ONLY** Create a struct for the address
4. Bind Socket to Local Address
5. Mark Socket to Listen for Connections
6. Wait for Connection
7. Handle Client Connection
8. Close Client Connection
9. Continue Listening for Connections

```
public class SocketServer {
    static Socket sock; // 4 usages
    static DataOutputStream os; // 4 usages
    static ObjectInputStream in; // 3 usages

    static int port = 8888; // 2 usages

    public static void main (String args[]) {

        if (args.length != 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");

            /** Simple loop accepting one client and calling handling one

            while (true){
                System.out.println("Server waiting for a connection");
                sock = serv.accept(); // blocking wait
                System.out.println("Client connected");

                // 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);

                boolean connected = true;
                while (connected) {
```

```
boolean connected = true;
while (connected) {
    String s = "";
    try {
        s = (String) in.readObject(); // attempt to read string in from client
    } catch (Exception e) { // catch rough disconnect
        System.out.println("Client disconnect");
        connected = false;
        continue;
    }

    JSONObject res = isValid(s);

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

    JSONObject req = new JSONObject(s);

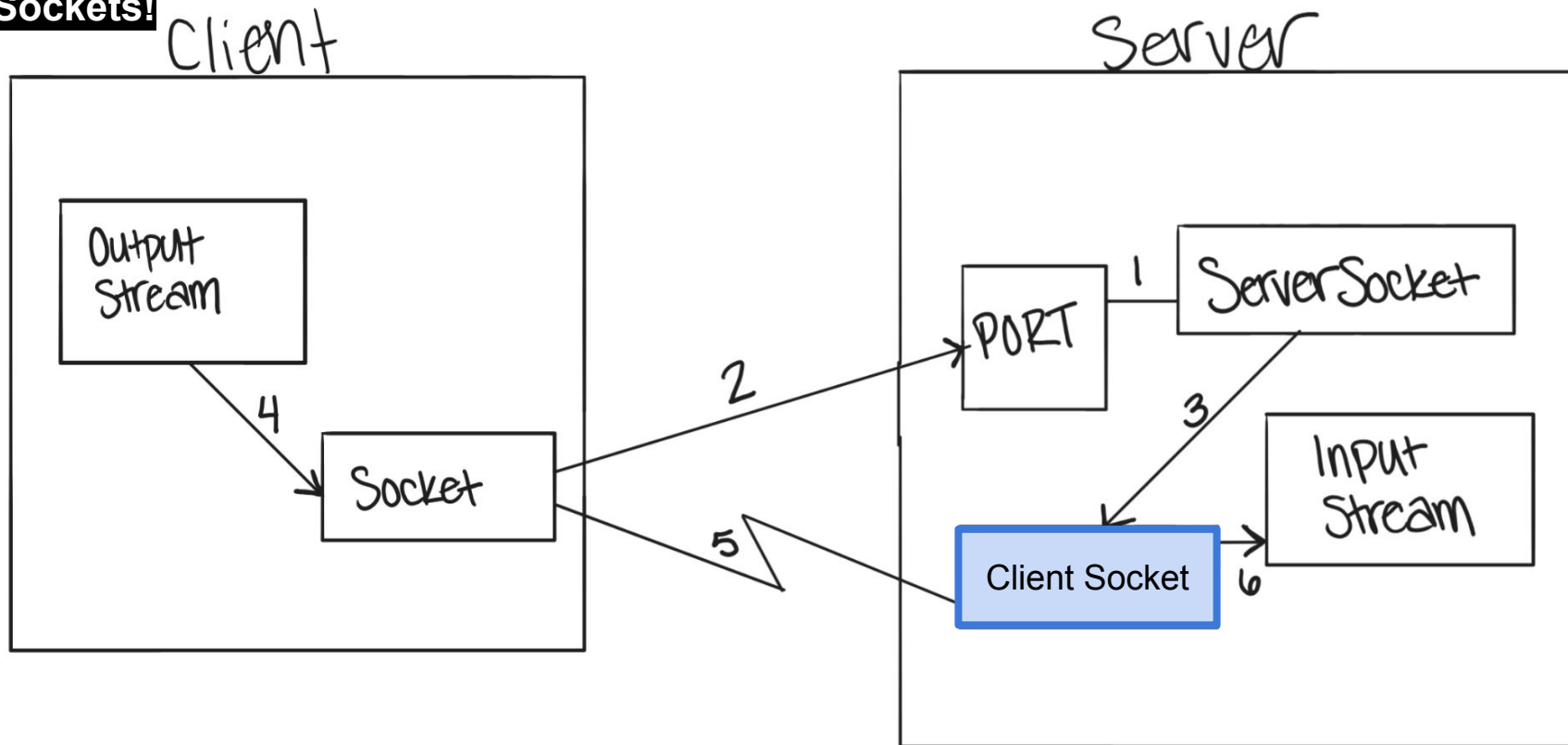
    res = testField(req, key: "type");
    if (!res.getBoolean( key: "ok")) { // no "type" header provided
        res = noType(req);
        writeOut(res);
        continue;
    }

    // check which request it is (could also be a switch statement)
    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);
}

// if we are here - client has disconnected so close connection to socket
overandout();
} catch(Exception e) {...}
}
```

# SER 321

## Sockets!



**SER 321**

**Scratch Space**



# Questions?



## Survey:

<http://bit.ly/ASN2324>



## Upcoming Events

### SI Sessions:

- Thursday, June 6th at 6:00 pm MST
- Sunday, June 9th at 6:00 pm MST
- Monday, June 10th at 6:00 pm MST

### 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.

Select a subject

- Any -

Apply



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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

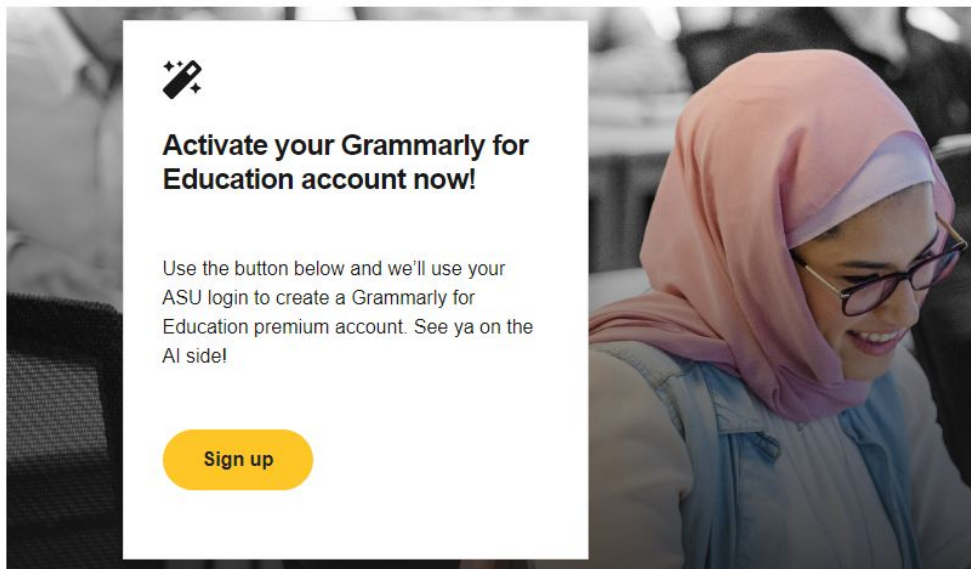
Computer Applications and Information Technology

 [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](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](#)