

SER 321 C Session

SI Session

Monday, June 10th 2024

6:00 pm - 7:00 pm MST

Agenda



JSON Review

Serialization

Types of Streams

Using Threads

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

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JSON Review

Data is stored in...

Name:Value pairs

AKA

Members

"Katie"

"student" : "Katie"

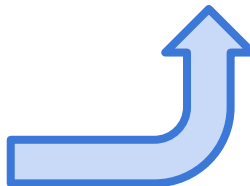
What uses curly braces?

Objects

{ }

What do Objects contain?

Members



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JSON Review

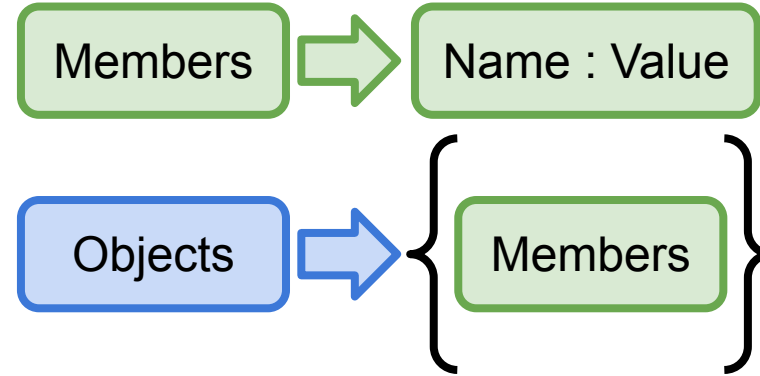
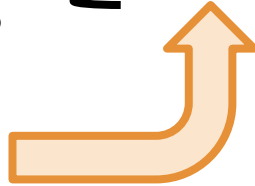
What uses brackets?

Arrays

[]

What do Arrays contain?

Any ***Valid*** Value



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JSON Review

What is a valid value?

Strings

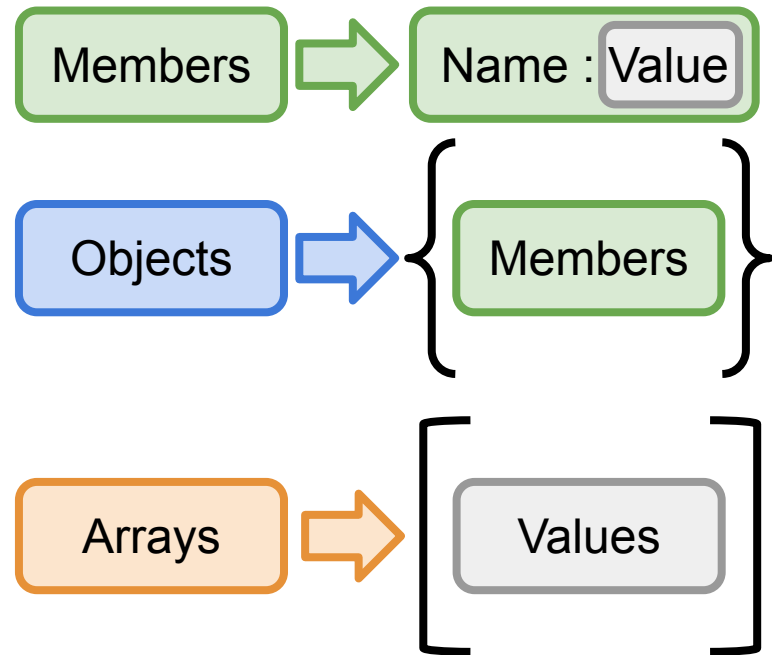
Booleans

Numbers

NULL

Objects

Arrays



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Serialization



What is *serialization*?

“Translating data structures or object states for storage or transmission”

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Serialization

What is *serialization*?

??



Data

“Translating data structures or object states for storage or transmission”

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Serialization



What is *serialization*?

Serialized Data

“Translating data structures or object states for storage or transmission”

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Serialization

Can we recall some of the formats?

JSON

Java Object
Serialization

Protocol Buffers

XML

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Serialization

Binary

Text

Two main
approaches for
storing the
content...

What about the data format?

JSON

Java Object
Serialization

Protocol Buffers

XML

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Serialization

Binary

Text

Who uses *TEXT*?

Text

JSON

Java Object
Serialization

Protocol Buffers

Text

XML

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Serialization

Binary

Text

What does this imply?

Who uses ***BINARY***?

Text

JSON

Binary

Java Object
Serialization

Binary

Protocol Buffers

Text

XML

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Serialization

Generic
Superclass

Streams and their types

```
OutputStream out = sock.getOutputStream();
```

Buffered Stream

Bytes

Data Stream

Primitive DATA Types

Object Stream

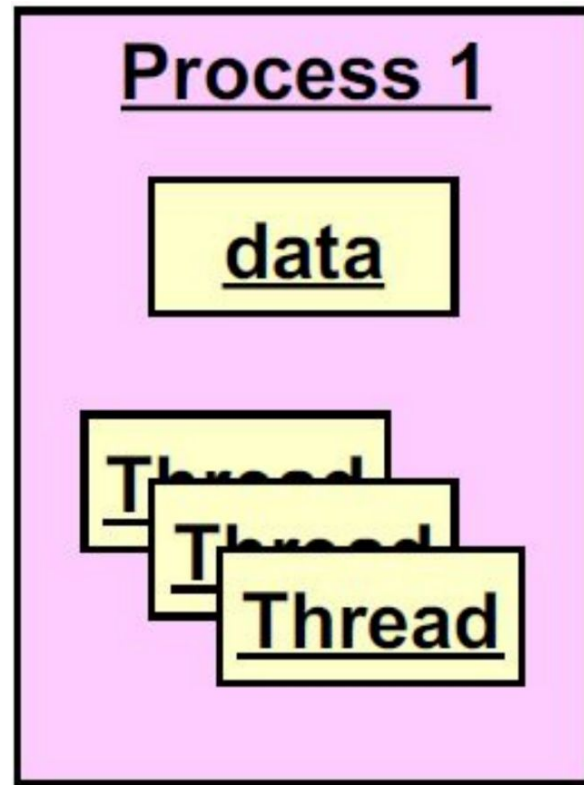
Java Objects

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Threads

Remember that they exist
within the parent process

What does that imply?



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Threading Pitfalls

Race Condition

A thread never gains access to the resource it needs

Starvation

A thread is only able to acquire some of the resources it needs

Deadlock

More than one thread accesses a single resource at the same time

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Threading Pitfalls

Race Condition

A thread never gains access to the resource it needs

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Threading Pitfalls

What does *Spaghetti Consumed* represent?

What does *Thinking* represent?

What does *Hungry* represent?

powered by NetLogo

Dining Philosophers

File: New Revert to Original
Export: NetLogo HTML

Mode: Interactive Commands and Code: Bottom

model speed

ticks: 6712

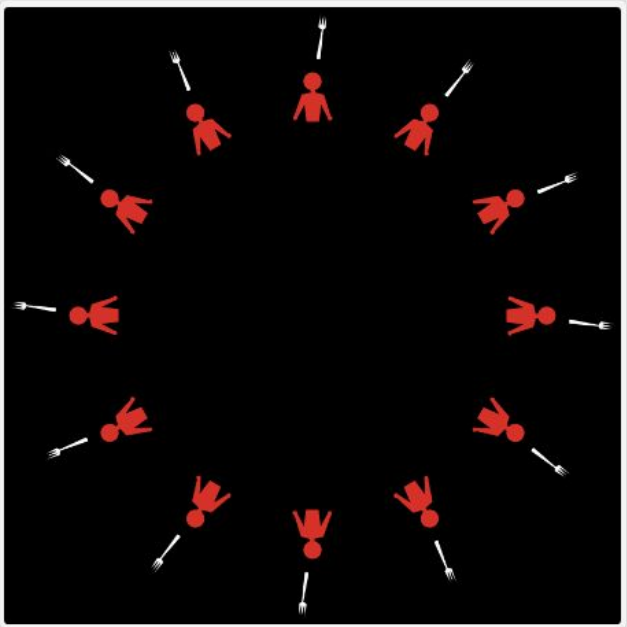
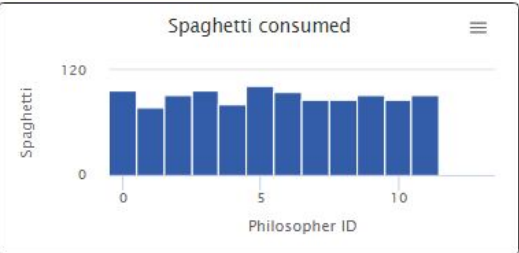
num-philosophers 12

setup go go once

hungry-chance 0.5

full-chance 0.5

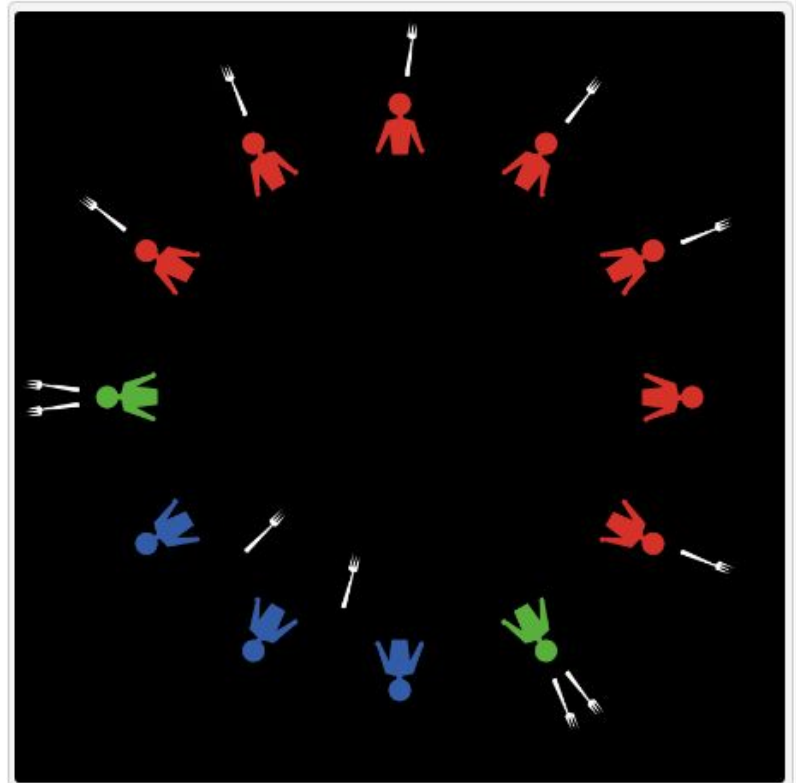
☐ cooperation?



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Threading Pitfalls

Can we take a guess at what happened here?



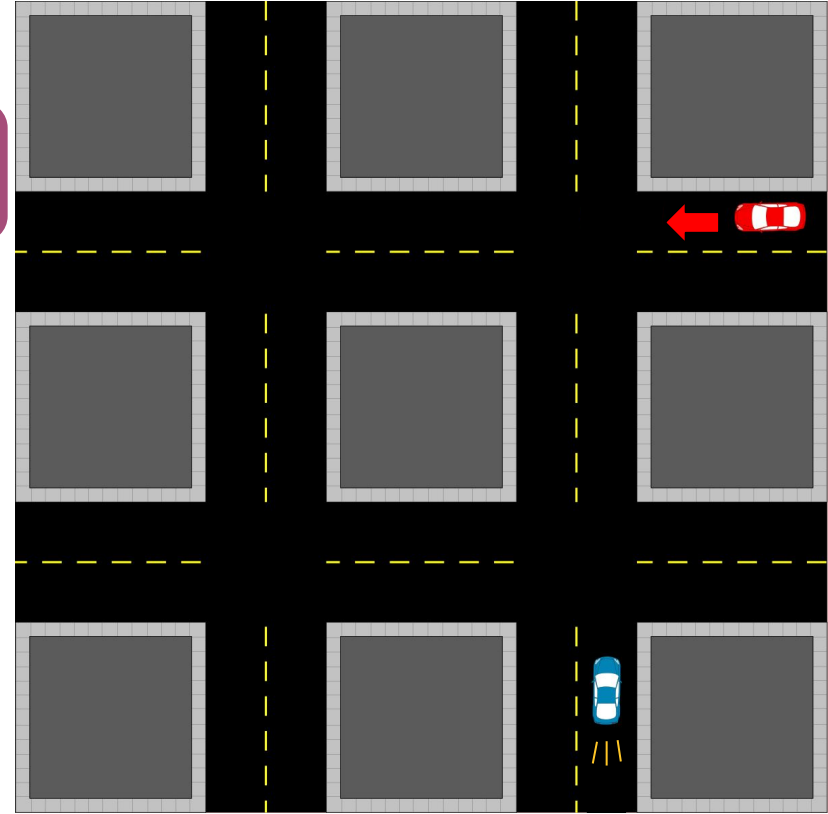
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Threading Pitfalls

Race Condition

Crash

More than one thread accesses a single resource at once



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Threading Pitfalls

Race Condition

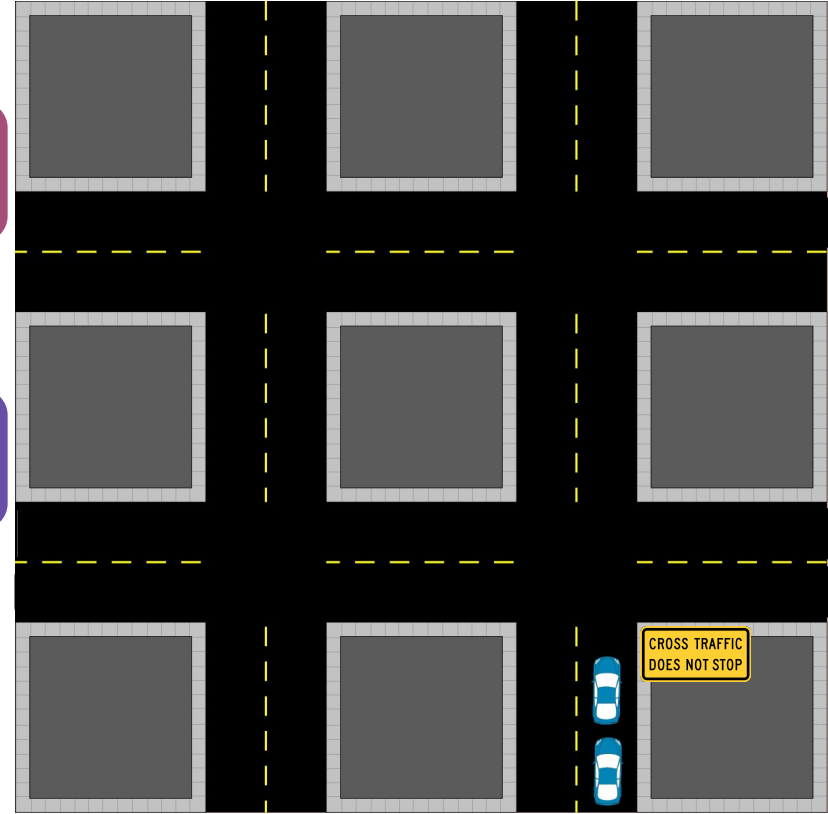
Crash

More than one thread accesses a single resource at once

Starvation

Cross Traffic

A thread never gains access to the resource it needs



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Threading Pitfalls

Race Condition

Crash

More than one thread accesses a single resource at once

Starvation

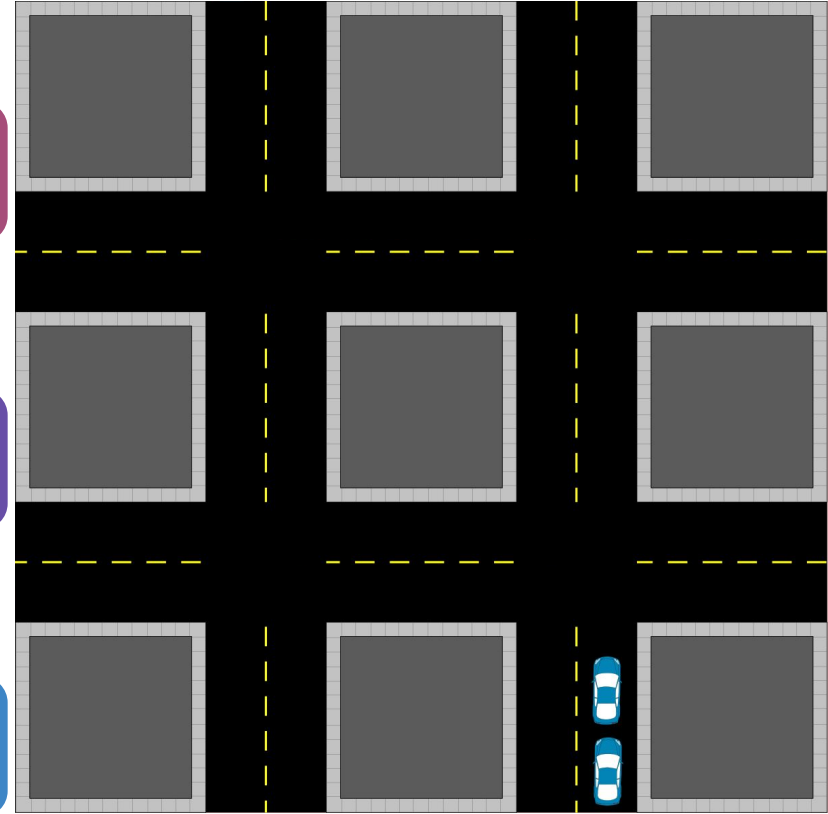
Cross Traffic

A thread never gains access to the resource it needs

Deadlock

Gridlock

A thread is only able to acquire some of the needed resources



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Threading Pitfalls

As the project name implies, we encounter a **deadlock**.

But what happened?

```
class SockClient {  
    public static void main (String args[]) throws Exception {  
        Socket      sock = new Socket( host: "localhost", port: 8888);    //Any IP name  
  
        ObjectInputStream in = new ObjectInputStream(sock.getInputStream());  
        ObjectOutputStream out = new ObjectOutputStream(sock.getOutputStream());  
  
        String s = (String) in.readObject();  
        out.writeObject("Back at you");  
  
        in.close();  
        out.close();  
        sock.close();  
    }  
}
```

Client

```
class SockServer {  
    public static void main (String args[]) throws Exception {  
  
        int count = 0;  
        ServerSocket      serv = new ServerSocket( port: 8888);  
  
        Socket sock = serv.accept();  
  
        ObjectInputStream in = new ObjectInputStream(sock.getInputStream());  
        ObjectOutputStream out = new ObjectOutputStream(sock.getOutputStream());  
  
        String s = (String) in.readObject();  
        System.out.println("Received " + s);  
        out.writeObject("Back at you");  
        System.out.println("Received " + s);  
  
        in.close();  
        out.close();  
        sock.close();  
    }  
}
```

Server

```
PS C:\ASU\SER321\examples_repo\ser321examples\Threads\NetworkDeadlock> gradle  
server  
<=====--> 75% EXECUTING [1m 33s]  
> :server  
█
```

```
PS C:\ASU\SER321\examples_repo\ser321examples\Threads\NetworkDeadlock> gradle  
client  
Starting a Gradle Daemon, 1 busy and 1 stopped Daemons could not be reused, use  
--status for details  
<=====--> 75% EXECUTING [53s]  
> :client  
█
```


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Threaded Server

Given the standard server socket steps...

Ideas on how we could introduce threads?

1. Define Params

2. Create Socket

3-5. Mark Socket to Listen

6. Wait for Connection

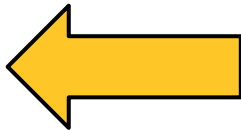
7. Handle Client Connection

8. Close Client Connection

9. Continue Listening

Why do we send the *client socket* to the thread?

7. Send Client Socket to thread



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Scratch Space

Questions?



Survey:

<http://bit.ly/ASN2324>



Upcoming Events

SI Sessions:

- Thursday, June 13th at 6:00 pm MST
- Sunday, June 16th at 6:00 pm MST
- Monday, June 17th 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!

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2. Click on 'View the tutoring schedule' to see when tutors are available for specific courses.

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Check out our other resources!

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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

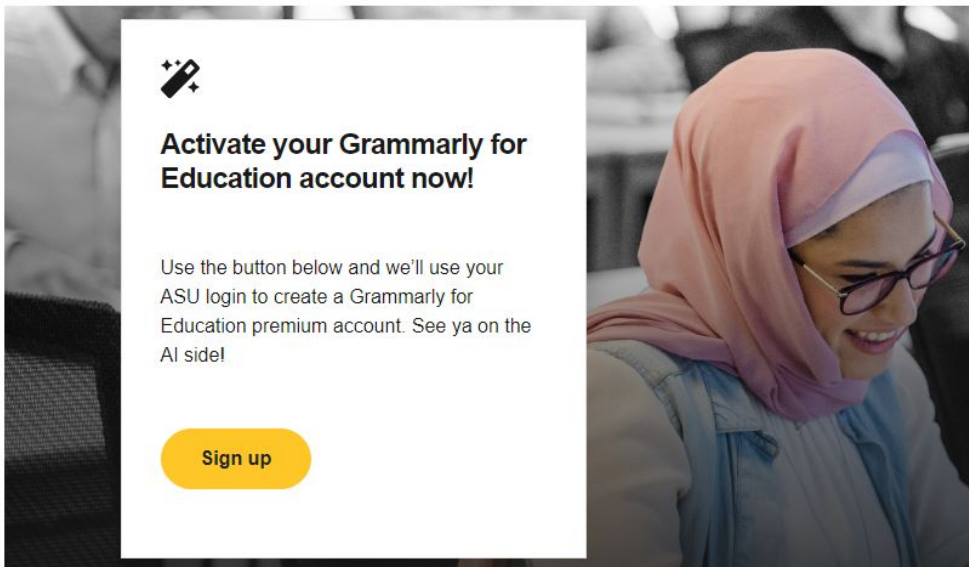
Computer Applications and Information Technology


 [Peer Community](#)

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*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](#)
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