

SER 321 B Session

SI Session

Sunday, April 7th 2024

7:00 pm - 8:00 pm MST

Agenda



Threads!

Threading your Server

Threading Pitfalls

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

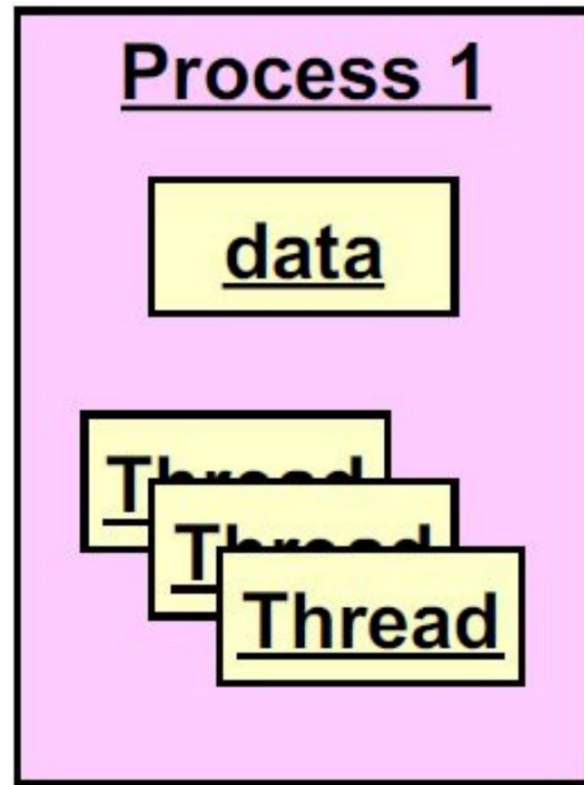
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Threads

Remember that they exist
within the parent process

What does that imply?

Check out the recording for the discussion!



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Threads

*Check out the
recording for the
discussion!*

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

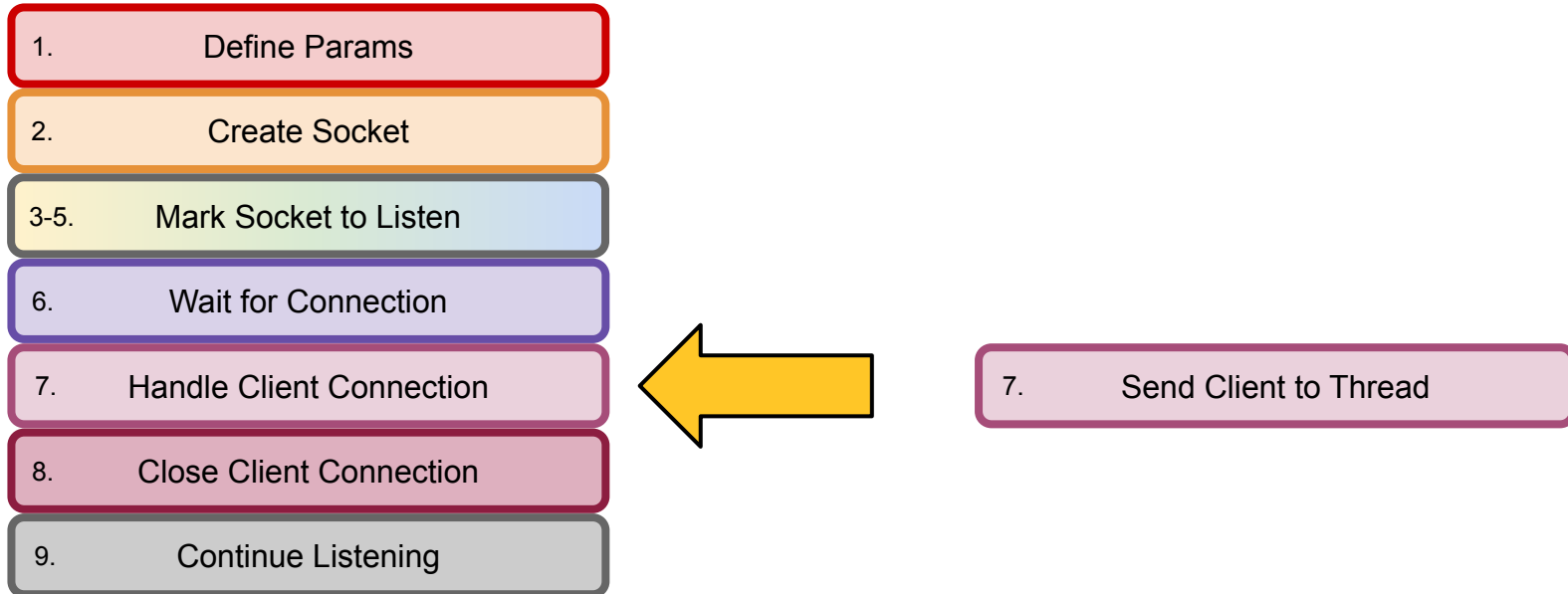
```
public class SockServer {  
    public static void main (String args[]) {  
        Socket sock;  
        try {  
            ServerSocket serv = new ServerSocket(port: 8888);  
            System.out.println("Server ready for 3 connections");  
  
            for (int rep = 0; rep < 3; rep++){  
                System.out.println("Server waiting for a connection");  
                sock = serv.accept(); // blocking wait  
  
                ObjectInputStream in = new ObjectInputStream(sock.getInputStream());  
  
                String s = (String) in.readObject();  
                System.out.println("Received the String "+s);  
  
                Integer i = (Integer) in.readObject();  
                System.out.println("Received the Integer "+ i);  
  
                OutputStream out = sock.getOutputStream();  
  
                ObjectOutputStream os = new ObjectOutputStream(out);  
  
                os.writeObject("Got it!");  
  
                os.flush();  
            }  
        } catch (Exception e) {e.printStackTrace();}  
    }  
}
```

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Threads

Ideas on how we would go about threading this?

Check out the recording for the discussion!



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Threads

*Check out the
recording for the
discussion!*

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



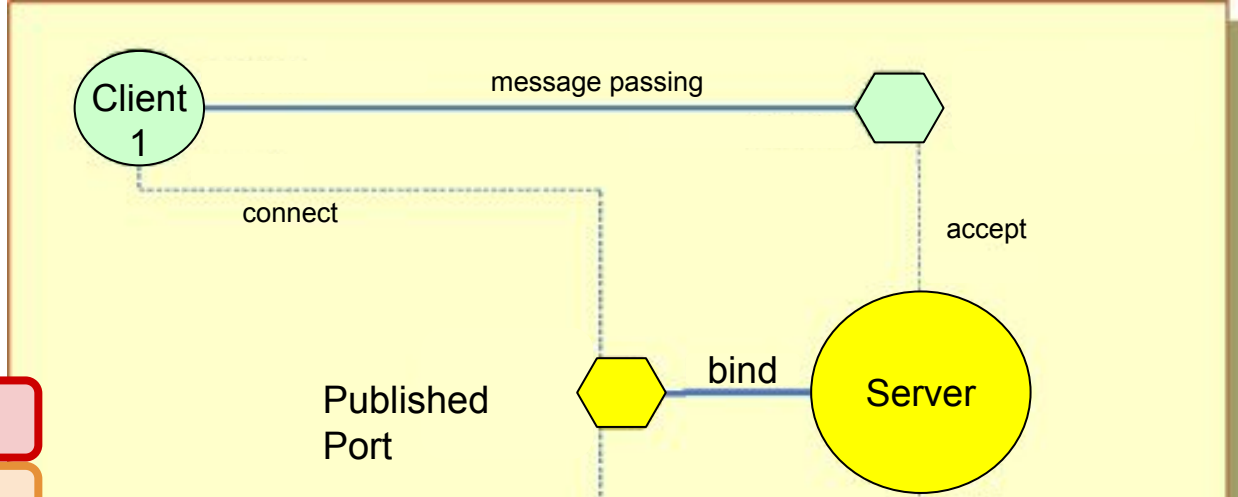
```
public static void main(String args[]) throws IOException {
    Socket sock = null;
    int id = 0;
    try {
        if (args.length != 1) {
            System.out.println
                ("Usage: gradle ThreadedSockServer --args=<port num>");
            System.exit(0);
        }
        int portNo = Integer.parseInt(args[0]);
        if (portNo <= 1024)
            portNo = 8888;
        ServerSocket serv = new ServerSocket(portNo);

        while (true) {
            System.out.println
                ("Threaded server waiting for connects on port " + portNo);
            sock = serv.accept();
            System.out.println
                ("Threaded server connected to client-" + id);
            // create thread
            ThreadedSockServer myServerThread =
                new ThreadedSockServer(sock, id++);
            // run thread and don't care about managing it
            myServerThread.start();
        }
    } catch (Exception e) {
        e.printStackTrace();
    } finally {
        if (sock != null) sock.close();
    }
}
```


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Threads

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



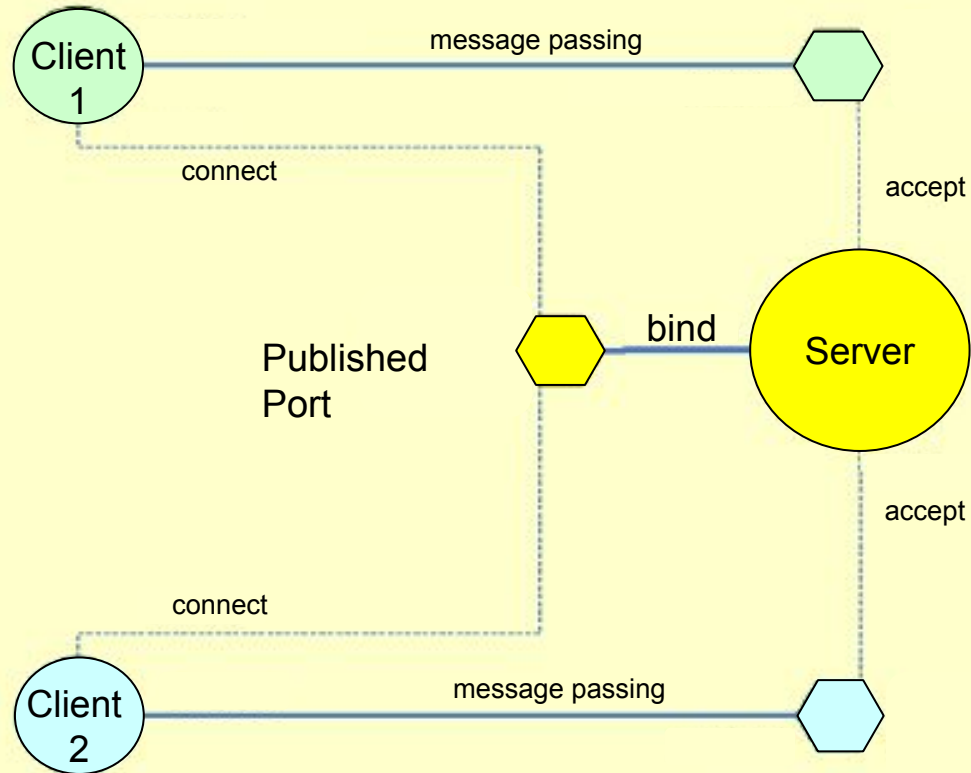
Why do we send the client **socket** to the thread?

Check out the recording for the discussion!

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Threads

1. Define Params
2. Create Socket
- 3-5. Mark Socket to Listen
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Check out the recording for the discussion!

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Threading Pitfalls

Check out the recording for the solution!

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

What does *Spaghetti Consumed* represent?

What does *Thinking* represent?

What does *Hungry* represent?

Check out the recording for the solutions!

powered by NetLogo

Dining Philosophers

File: [New](#) [Revert to Original](#)

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Mode: Interactive

Commands and Code: Bottom

model speed

ticks: 6712

num-philosophers 12

setup

go

go once

hungry-chance 0.5

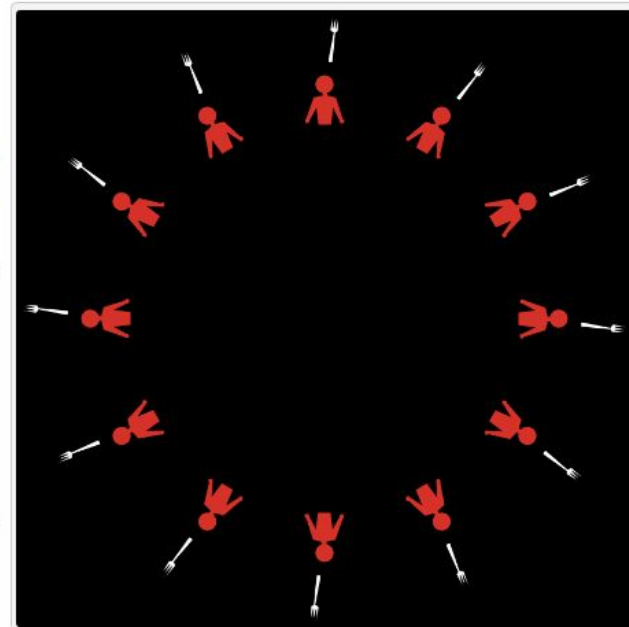
full-chance 0.5

☐ cooperation?

Spaghetti consumed



Resource allocation

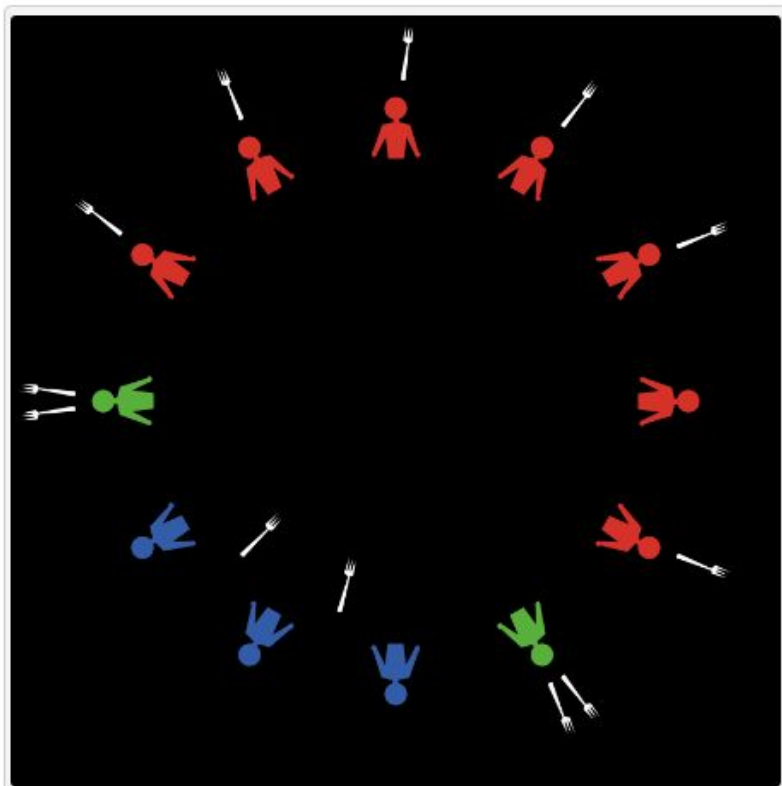


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Threading Pitfalls

Can we identify any concurrency issues here?

Check out the recording for the discussion!



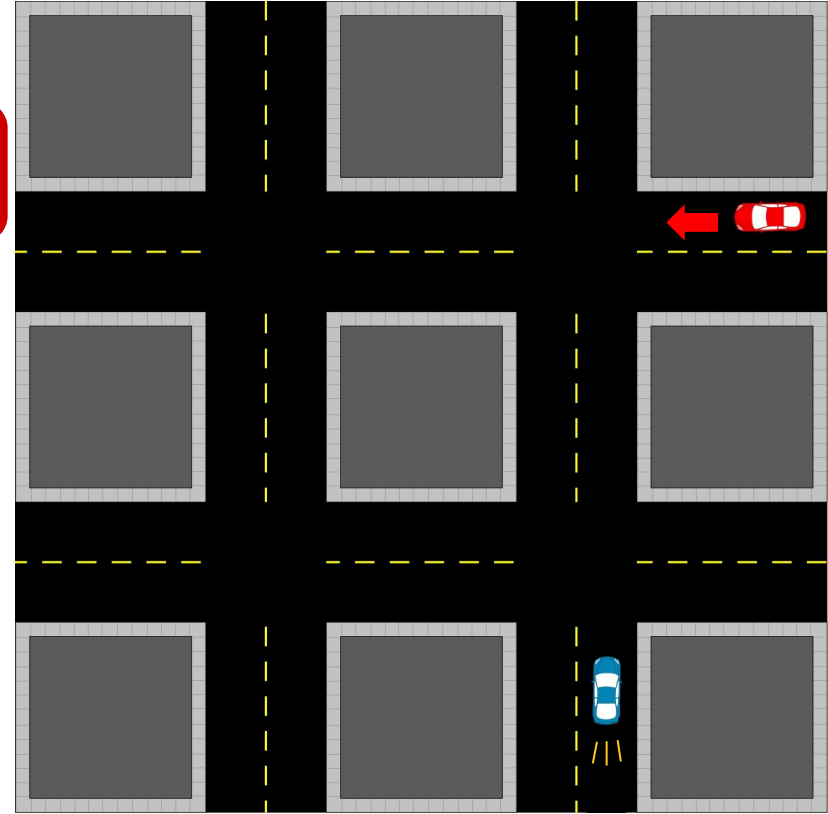
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Threading Pitfalls

Race Condition

Crash

More than one thread accesses a single resource at once



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Threading Pitfalls

Race Condition

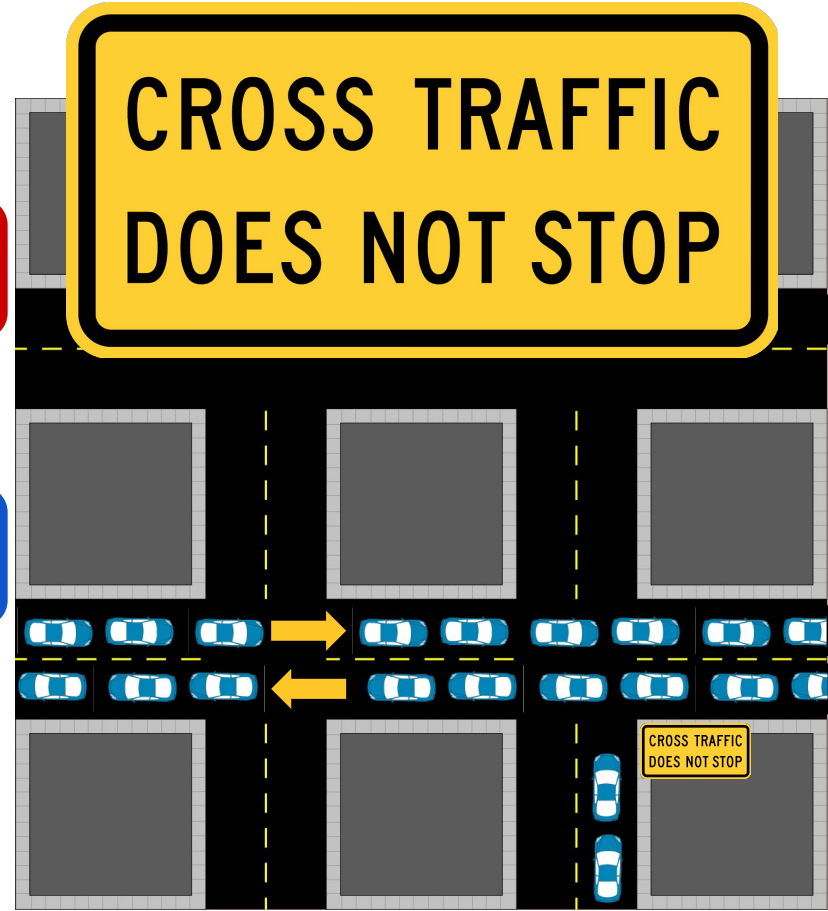
Crash

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

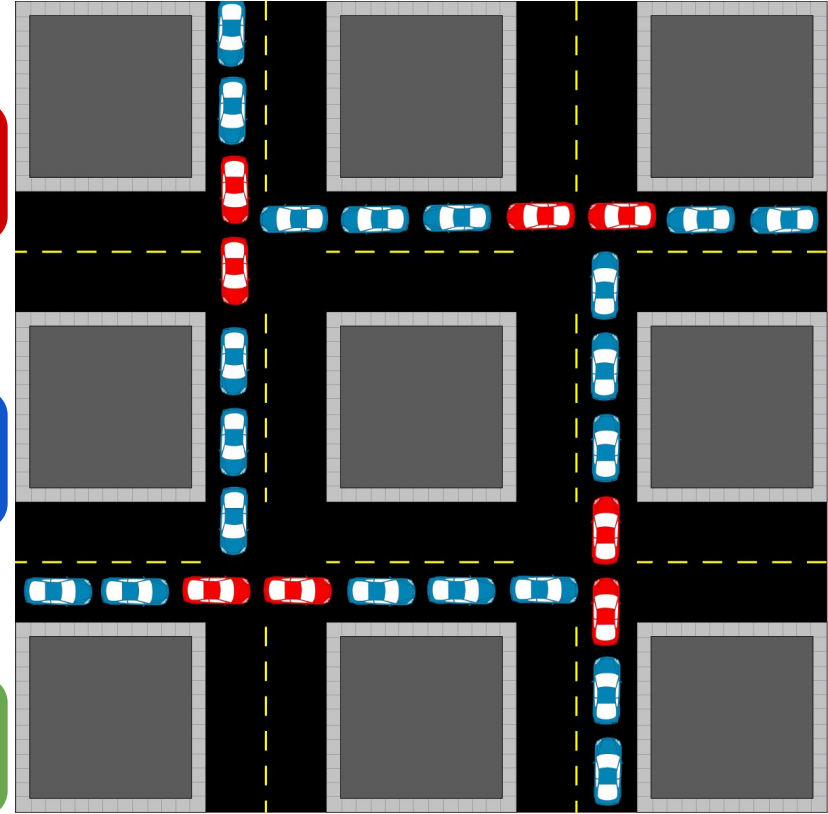
Cross Traffic

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

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Dining Philosophers

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Mode: Interactive Commands and Code: Bottom

model speed

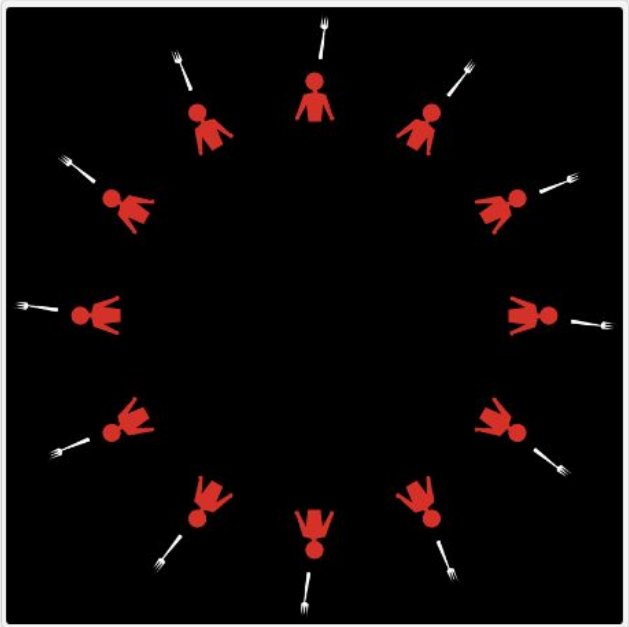
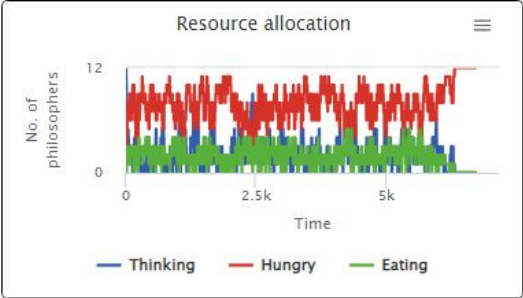
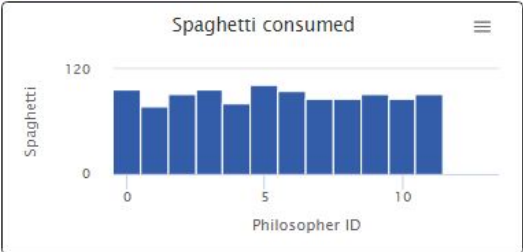
ticks: 6712

num-philosophers 12

[setup](#) [go](#) [go once](#)

hungry-chance 0.5 ☐ cooperation?

full-chance 0.5



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Scratch Space

Questions?

Survey:

<http://bit.ly/ASN2324>



Upcoming Events

SI Sessions:

- Monday, April 8th at 7:00 pm MST
- Thursday, April 11th at 7:00 pm MST
- Sunday, April 14th at 7:00 pm MST

Review Sessions:

- Sunday, April 21st at 7:00 pm MST
- **Thursday, 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



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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.

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[Access the drop-in queue](#)

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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-

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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

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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 -

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- Any -

Apply

Business

ACC 231

Uses of Accounting Info I

 [Peer Community](#)

ACC 241

Uses of Accounting Info II

 [Peer Community](#)

CIS 105

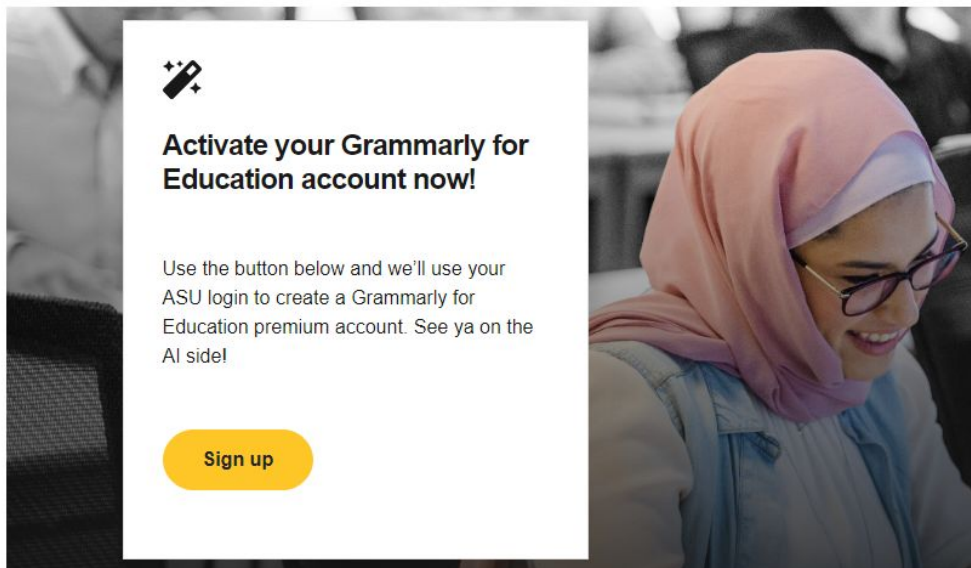
Computer Applications and Information Technology

 [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](#)
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- [org.json Docs](#)
- [javax.swing package API](#)
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- [Austin G Walters Traffic Comparison](#)