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# Coordinate: A Virtual Classroom Management Tool For Large Computer Science Courses Using Discord

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ACM SIGCSE TS 2025, Pittsburgh, PA

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# Introduction

Growing computer science courses and the need for classroom management

# Classroom management

- **Classroom management** is critical for student experience (Korpershoek et al.) [1]
- **Virtual classroom management** is an important part of these students' experiences [2] [3]
- **What are some of the things that are consider classroom management?**
  - Communication with students
  - Discussion & Q&A
  - Attendance & Participation Tracking
  - Assignment extensions
  - ... And many more tasks that someone less specialized could do
- Due to a large computer science enrollment, and hybrid and completely online education this is critical to our community
- However, classroom management is time consuming

# Tools for classroom communication

Software tools are increasingly relied upon for classroom management.

- Among them communication tools such as: Slack [4][5], Piazza [7], and Microsoft Teams [6] help streamline the communication with students
- While they improve communication, they require continuous management and oversight
- Adopting these technologies benefits the classroom but adds to the instructor's workload [10]

# The case of a large introductory CS class

- Managing a class 1 instructor, 600 students (approx), and 25+ peer mentors
- Key Classroom Management Tasks:
  - **Approving & Adjusting Deadlines** – Ensuring fairness and flexibility for students.
  - **Providing Accommodations** – Extending time for those in need.
  - **Managing Office Hours** – Coordinating schedules for 25+ peer mentors.
    - **Reducing Wait Times** – Addressing long queues for student support.
  - **Handling Repetitive Questions** – Improving communication efficiency on our platform.

While using a communication tool helped students, it did not have much benefit for the instructional team.

- Many students assume the instructional team is always accessible.
- Some inquiries were asked multiple times... yes, even five times!

**At the end of Fall 2022**, we transitioned to Discord as our communication platform.

- Accessibility and cost
- It has been used before and it has proven to be beneficial to CS students in the classroom, in engaging them and building community [8][9]
- Student prefer efficiency and familiarity
- 30% of Discord users today use the platform for non-gaming purposes [1]
- **Customization**

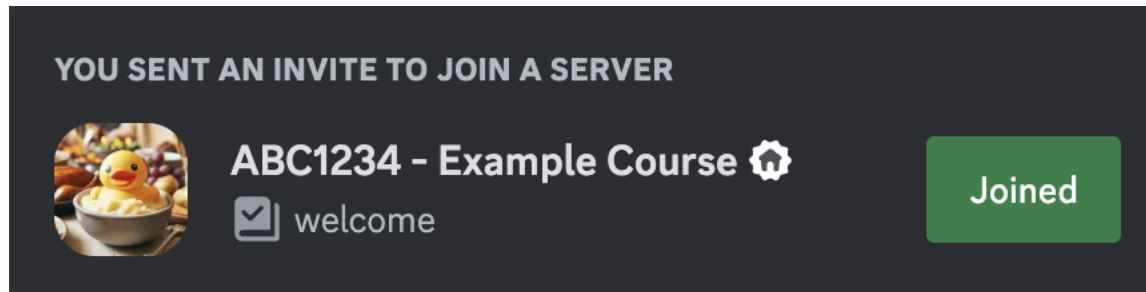
As a result, Coordinate was born.

- A generic educational platform using Discord, not intimately tied into a particular learning management system
- An easily-maintainable tool that everyone could contribute to

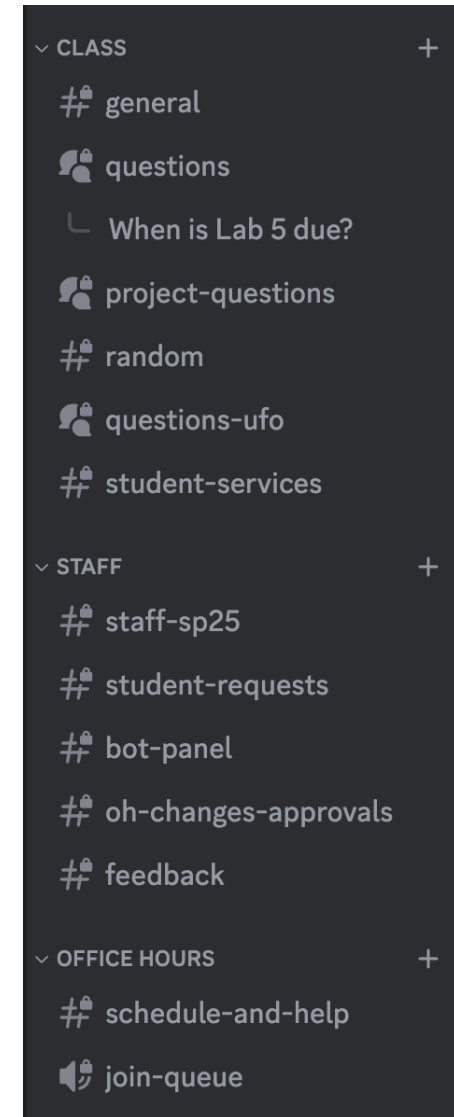
# Introducing *Discord*

- **VoIP-based** chat-app created in 2015, originally focused on gaming content
- Several useful features:

## Guild/Server



## Channels

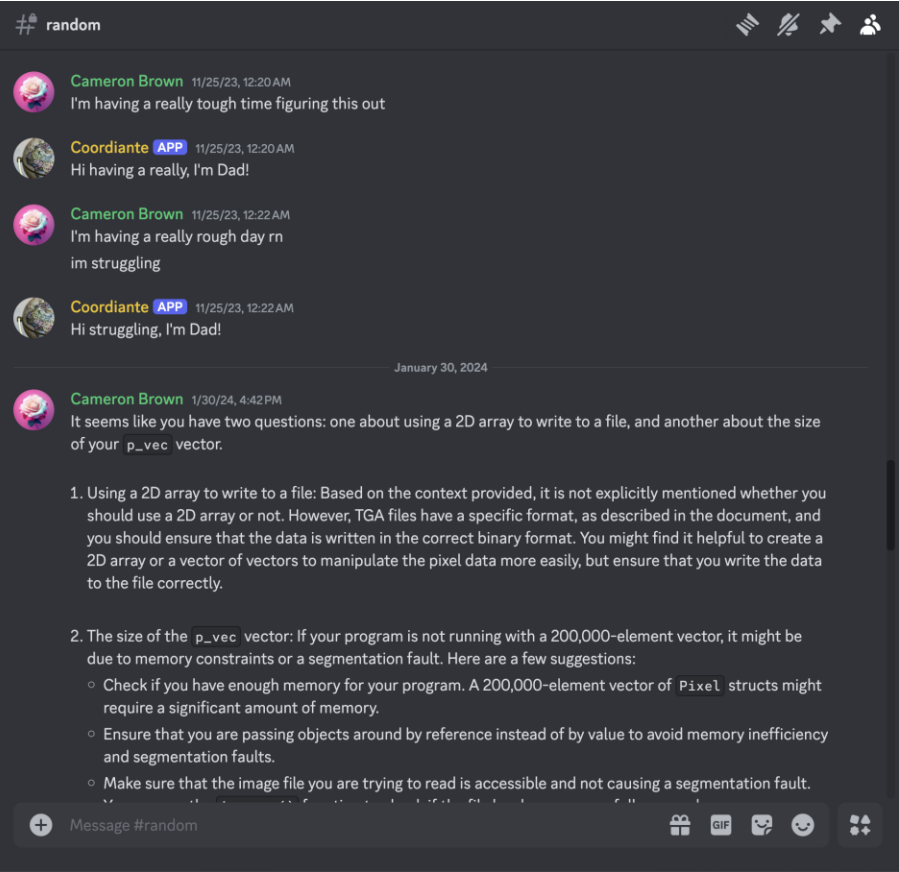


## Categories

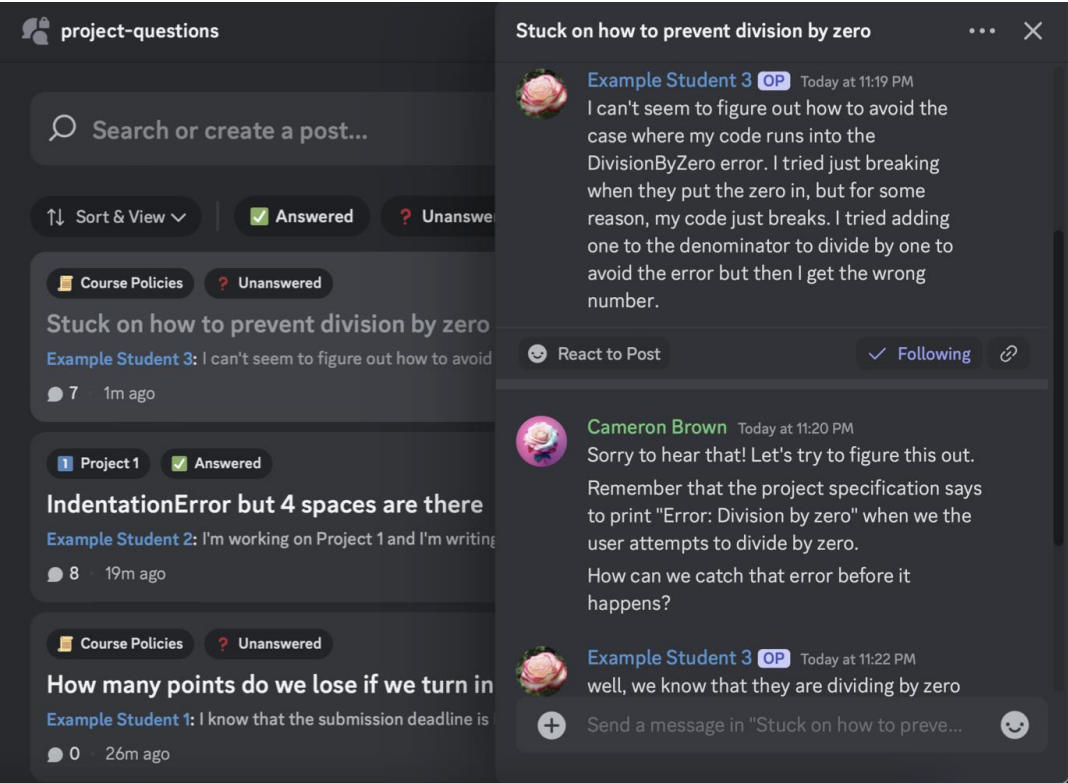


# Introducing *Discord*

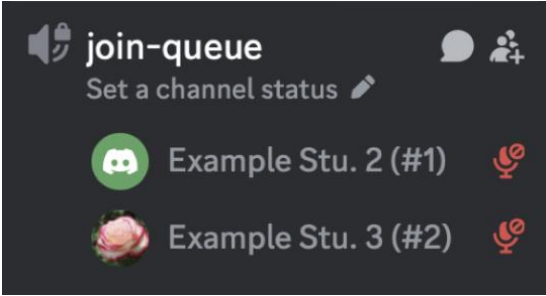
## Text Channels



## Forum Channels



## Voice/VoIP Channels

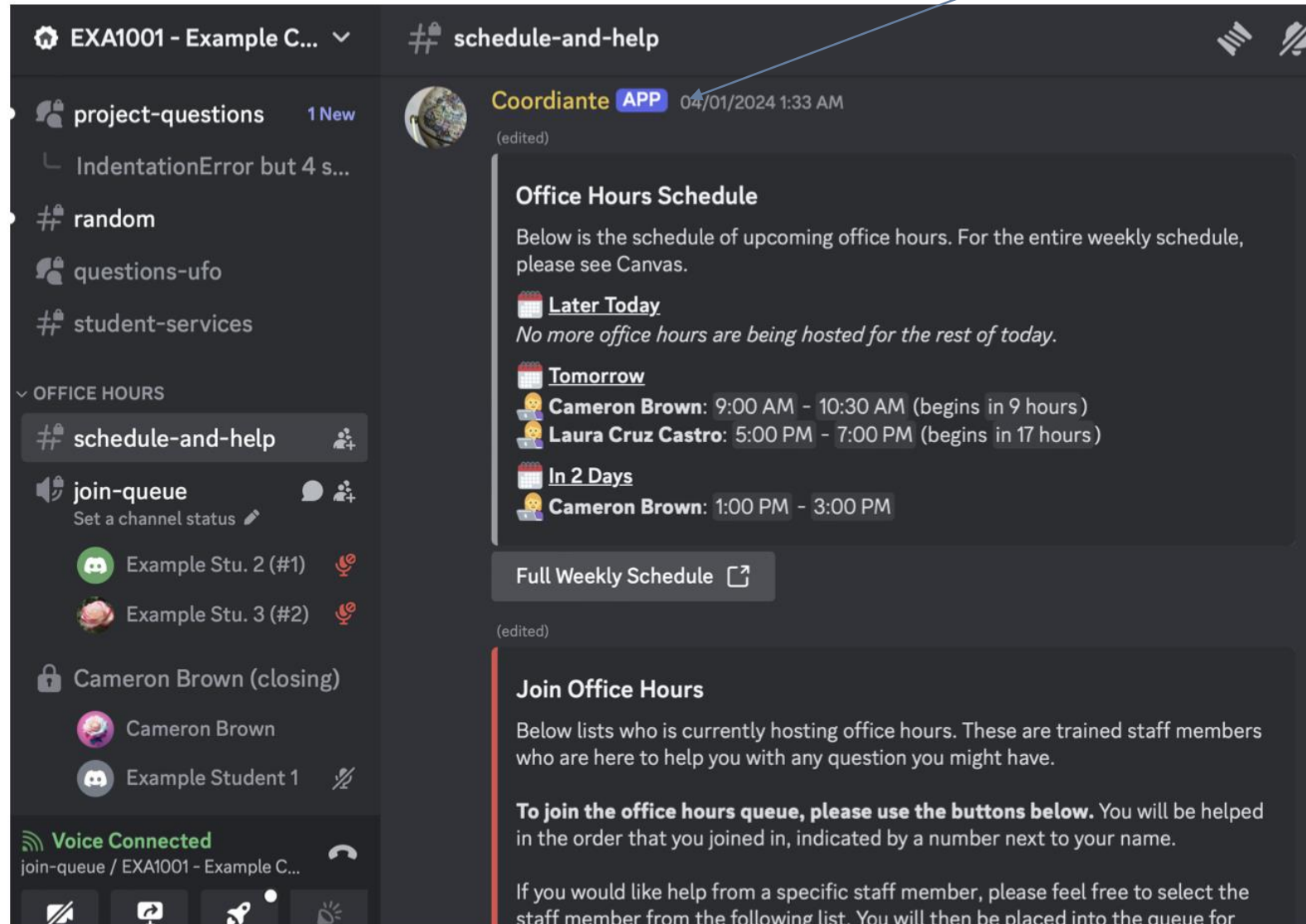


# Introducing *Discord*

Several types  
of channels

Built-in VoIP

Bot  
integration



Free for all  
users!

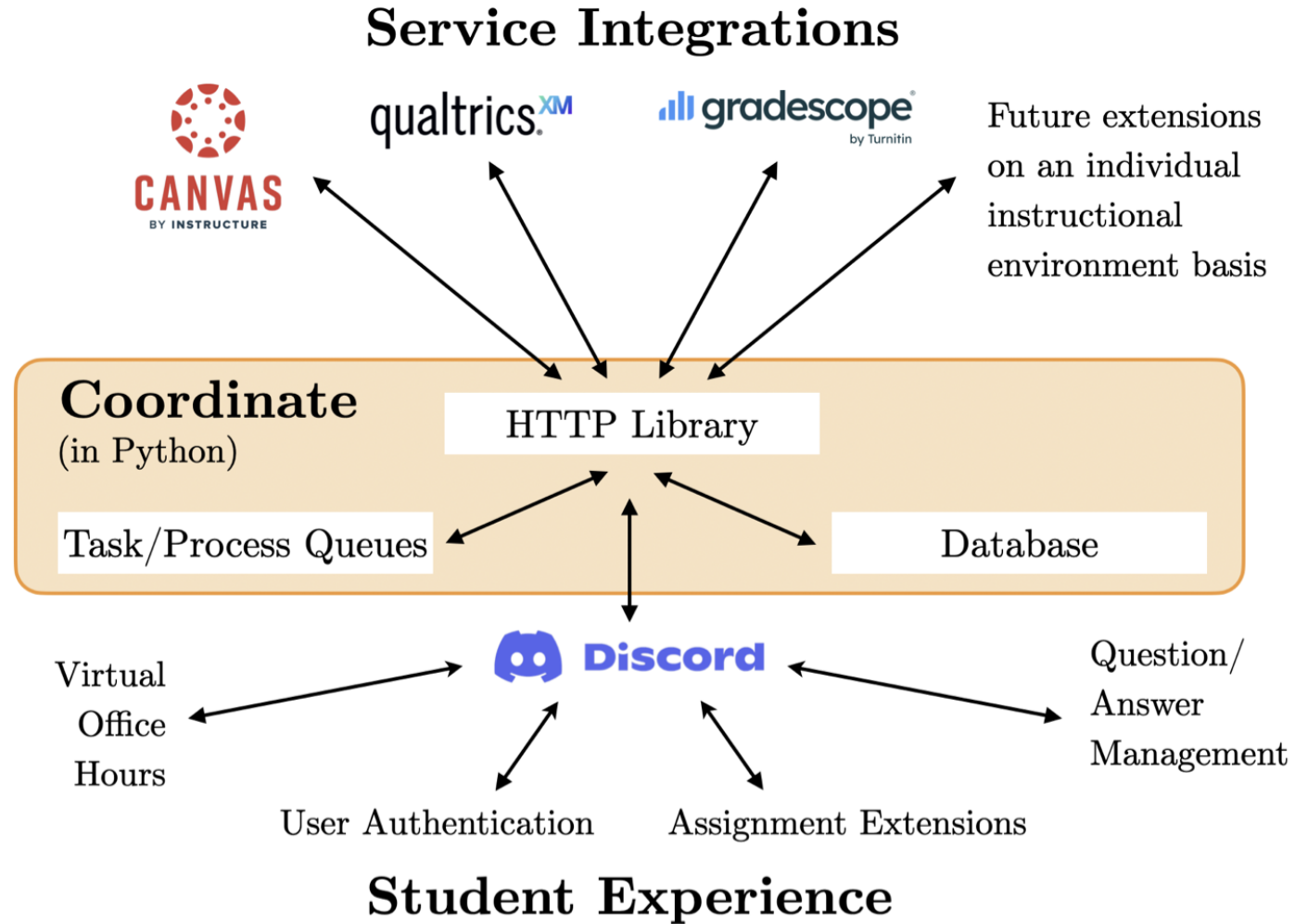
# Coordinate

*Discord with extra goodies!*

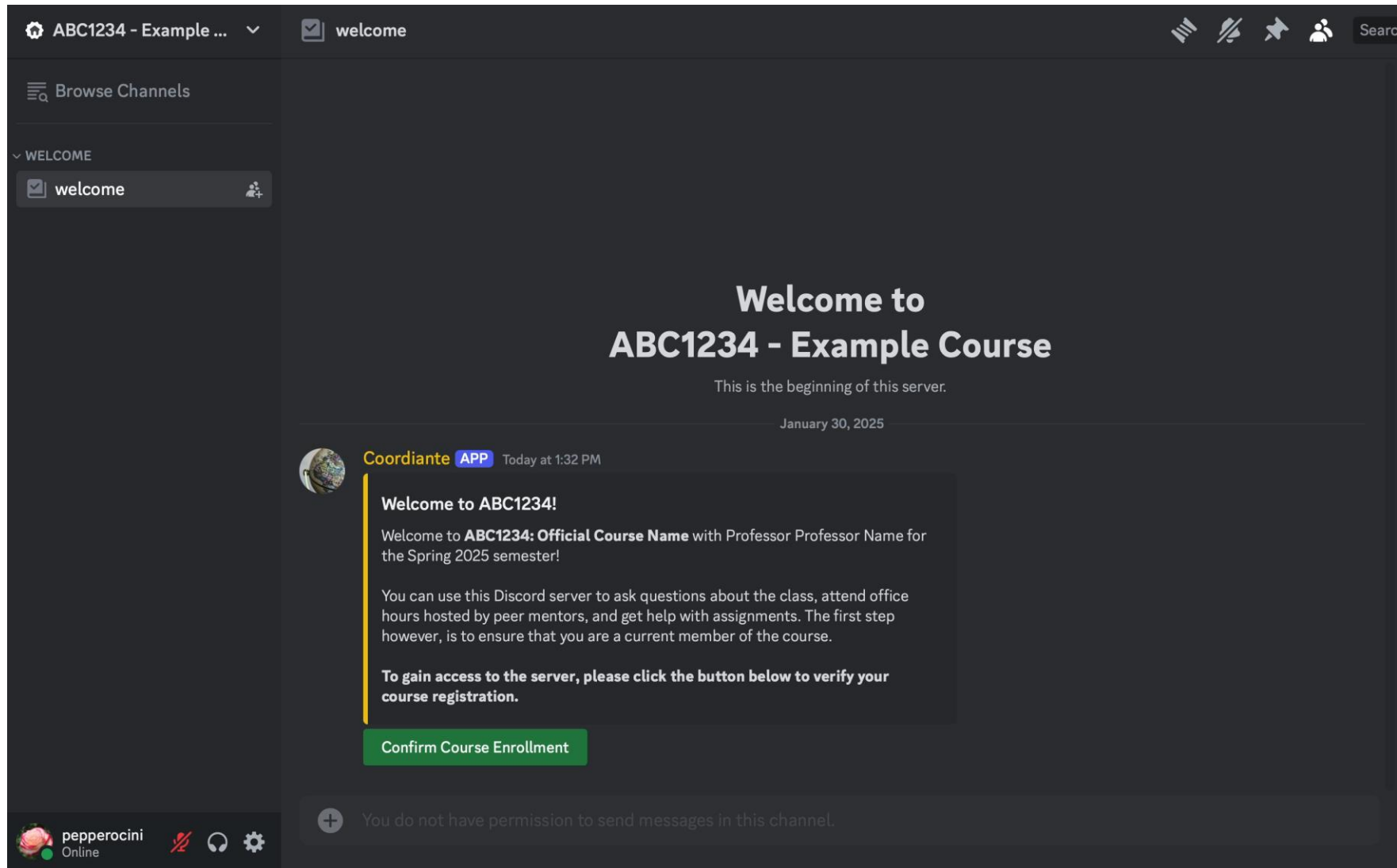
- Authentication
- Office hours (schedule, breaks, feedback)
- Student services (extensions, late pass)
- Question management (thread management, staff participation, LLM integration)

# Architecture and Features

# Architecture



# Authentication



# Office Hours: Schedule

ABC1234 - Example ...

schedule-and-help

April 1, 2024

welcome

CLASS

general

questions

When is Lab 5 due?

project-questions

random

questions-ufo

student-services

STAFF

staff-sp25

student-requests

bot-panel

oh-changes-approvals

feedback

OFFICE HOURS

schedule-and-help

join-queue

CLASS SECTIONS

12345-example-ta

21712-alex-johnson

26850-cameron-brown

fourLoop Online

Coordiante APP 4/1/24, 1:33 AM

(edited)

Office Hours Schedule

Below is the schedule of upcoming office hours. For the entire weekly schedule, please see Canvas.

Later Today (Wednesday, February 26)

No more office hours are being hosted for the rest of today.

Tomorrow (Thursday, February 27)

Cameron Brown: 8:00 AM - 10:00 AM (begins in 16 hours)

Laura Cruz Castro (room BLD 314): 2:00 PM - 3:30 PM (begins in a day)

In 2 Days (Friday, February 28)

No office hours are being held in two days.

Full Weekly Schedule

(edited)

Join Office Hours

Below lists who is currently hosting office hours. These are trained staff members who are here to help you with any question you might have.

To join the office hours queue, please use the buttons below.

You will be helped in the order that you joined in, indicated by a number next to your name.

If you would like help from a specific staff member, please feel free to select the staff member from the following list. You will then be placed into the queue for that specific staff member. Please note that queueing for a specific staff member will not accelerate your position in the wait list.

Currently Live

No staff members are currently hosting office hours.

Join OH: First Available

Join OH: Specific Staff Member(s)

Message #schedule-and-help

GIF

UNIVERSITY OF FLORIDA HERBERT WERTHEIM COLLEGE OF ENGINEERING

15



# Office Hours: Accepting

ABC1234 - Example ... ▾ # schedule-and-help

Browse Channels

CLASS

- # general
- # questions
- # project-questions
- # random
- # questions-ufo
- # student-services

OFFICE HOURS

- # schedule-and-help
- Cameron Brown
- Cameron Brown

Tomorrow (Friday, February 28)  
Cameron Brown: 11:00 AM - 1:00 PM

In 2 Days (Saturday, March 1)  
No office hours are being held in two days.

Full Weekly Schedule ↗

1:33 AM (edited)

### Join Office Hours

Below lists who is currently hosting office hours. These are trained staff members who are here to help you with any question you might have.

**To join the office hours queue, please use the buttons below.** You will be helped in the order that you joined in, indicated by a number next to your name.

If you would like help from a specific staff member, please feel free to select the staff member from the following list. You will then be placed into the queue for that specific staff member. Please note that queueing for a specific staff member will not accelerate your position in the wait list.

#### Time per Student Limit

In times of high activity, the amount of time given to each student is limited in order to ensure all students can equally access office hours. If you are asked to wrap up your session early, please be respectful and mindful that all other students want to access the same resource. This value will adjust as rooms open and close and the room grows and shrinks.

- Current limit: 60 minutes per student

Currently Live

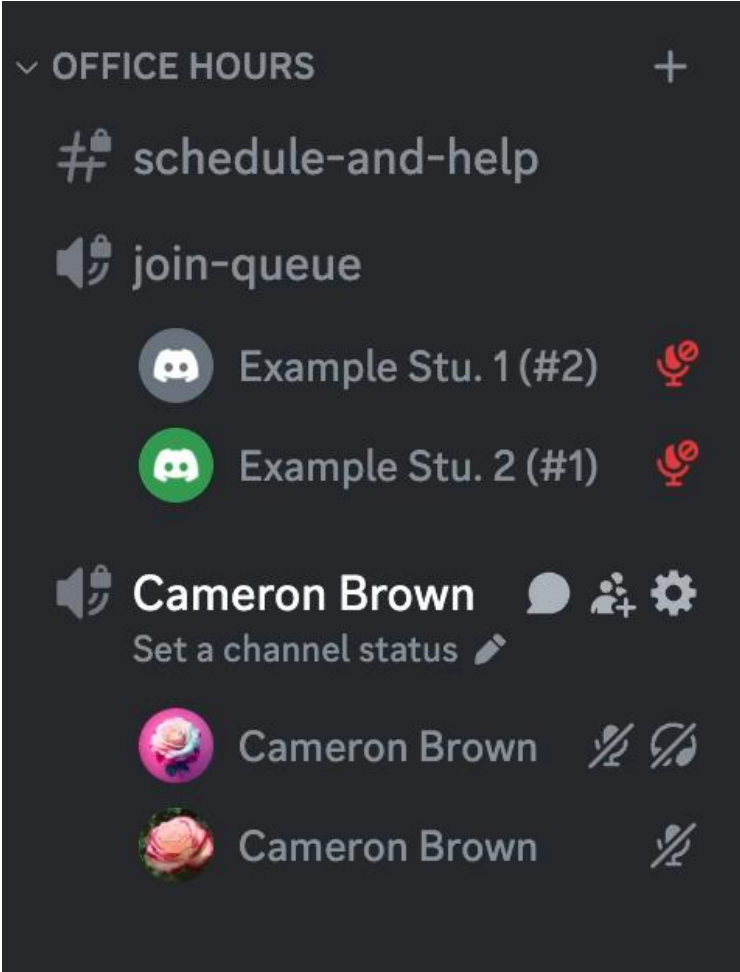
Cameron Brown: 7:00 AM - 9:00 AM (ends in 58 minutes)

Join OH: First Available Join OH: Specific Staff Member(s)

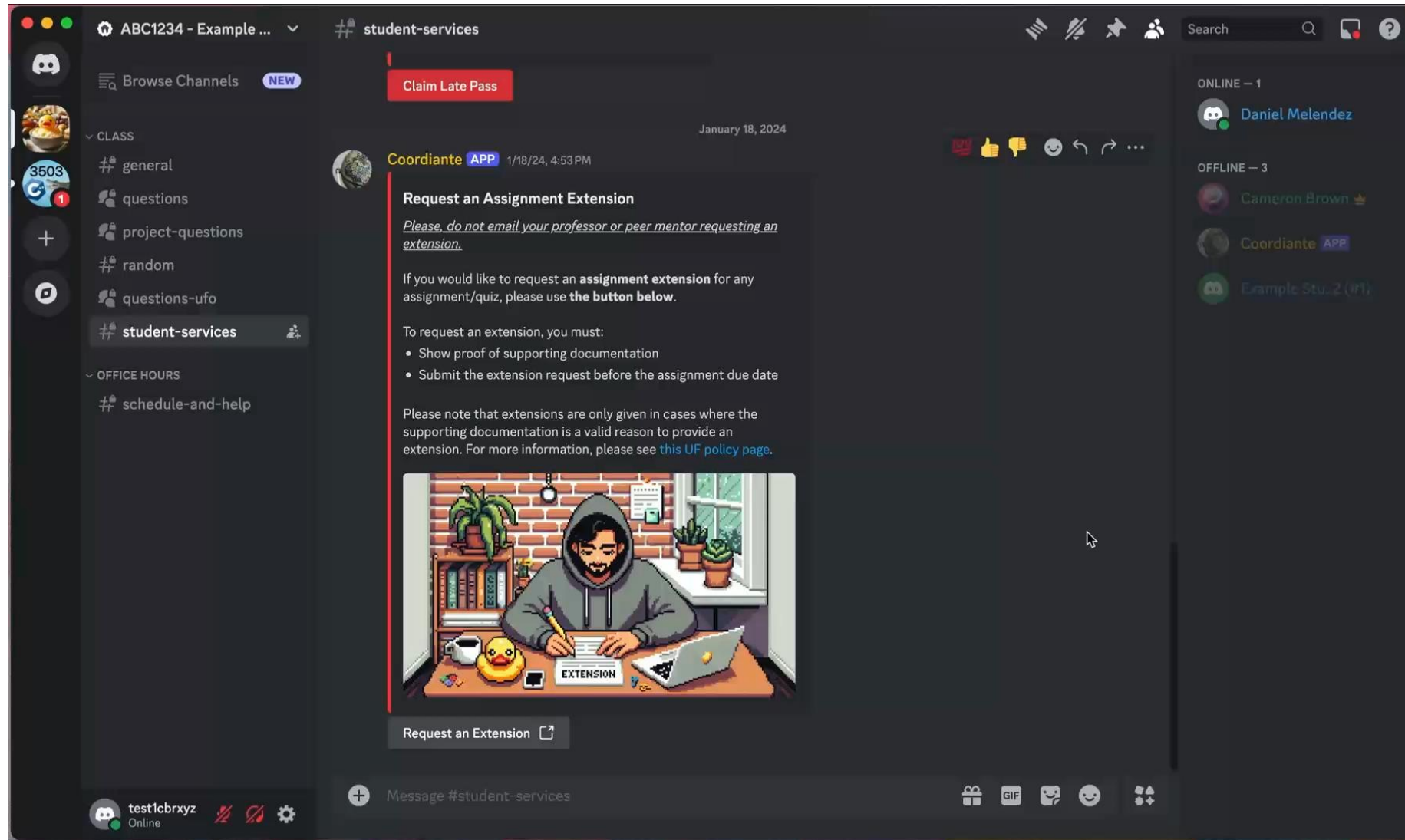
pepperocini Online




# Office Hours: Room Movements




# Assignment Extension: Student




# Assignment Extension: Faculty




Account




Dashboard



Courses




Groups




Calendar


1879



Inbox




History



Commons

10



Testing Shell > Assignments > Quiz [4] - Very Difficult Q...

View as Student

Immersive Reader

Ongoing Term

Home

Smart Search

Announcements

Assignments

Discussions

Grades

People

Pages

Files

Syllabus

Outcomes

Rubrics

Quizzes

Modules

Quiz [4] - Very Difficult Quiz

Published

Assign To

Edit

No additional details were added for this assignment.

Points100

Submittinga text entry box

Due	For	Available from	Until
Aug 1, 2024	Everyone	-	Aug 1, 2024 at 11:59pm

+ Rubric

Related Items

# Tool Deployment

# Deployment I (Spring 2023, 2024)

- Deployed to one large CS2 class at a public state university
  - Spring 2023:  $n = 556$
  - Spring 2024:  $n = 669$
- Students were primarily **freshmen** and **sophomores**
- Prior to this, Slack (chat) and Zoom (office hours) were being used

# Spring 2023

78.9% preferred Coordinate to Slack

- 85% believed it was “easy to use and friendly”
- 79% preferred Coordinate automated office hours to Zoom office hours

## Students' perception:

- One student noted, “It boots up quickly, is organized, looks clean,”
- Another adds that one benefit is “the questions tab where any TA could help”
- One says, “I liked how the queue for all office hours was automatic.”
- “I like that other students can answer questions posed in chat. It makes the class feel more collaborative.”

However, they also mention that there were areas for improvement:

- “improved management of office hours” and a “more user-friendly interface”

## Spring 2024

- 95.7% of the students preferred using the Coordinate
- 97.8% believed the platform was user-friendly. In
- 96.7% of students liked Coordinate over Zoom for office hours.

### Students' perception:

- “It’s convenient. Most people, myself included, already have Discord open throughout the day, so seeing notifications near instantaneously really helps.”
- They like that “It allowed for fast response time”
- They find the “office hours system” useful

## Deployment 2 (Summer 2024)

- Deployed to five smaller summer computer science classes at a public state university
- Focusing on primarily instructor feedback
- Prior to Coordinate, Slack and Microsoft Teams were being used
- All faculty were “highly” or “somewhat satisfied” with Coordinate
- 3/4 said they would not consider moving to another platform



# Conclusion

# Conclusion

- Students and professors overwhelmingly enjoyed using Coordinate
  - Students enjoyed the **familiarity** of the platform
  - Instructors enjoyed features **that reduced their workload**
- Tools like Coordinate have the potential of off-set the tradeoffs between adopting technology that improves students' engagement and instructional teams benefiting from it
- Future work
  - Adding additional easy course to course customization
  - LLM-related features
  - Collaborating with other institutions
- Feel free to try out the tool for yourself at your own institution!

# Use in your own institution

- All our code is open-source, and can be deployed in your own institution:  
<https://github.com/cbrxyz/coordinate>
- Documentation (including setup guides) is available as well:  
<https://coordinate.cbrxyz.com>
- Build it yourself, or use Docker

GitHub



# Acknowledgements

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