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Herbert Wertheim College of Engineering
UNIVERSITY of FLORIDA

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

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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**

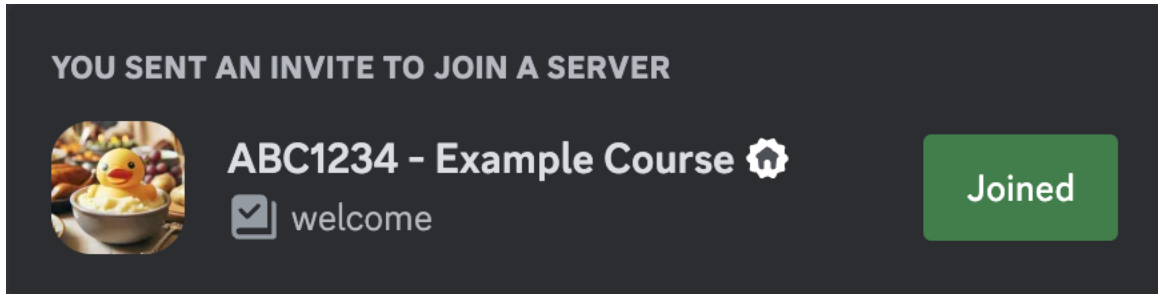
As a result, Coordinate was born.

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

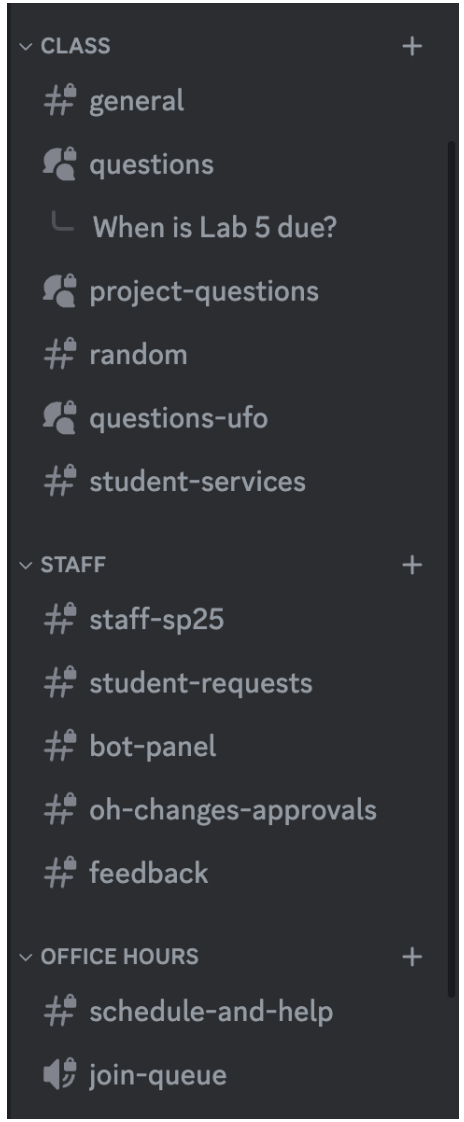
Introducing *Discord*

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

Guild/Server



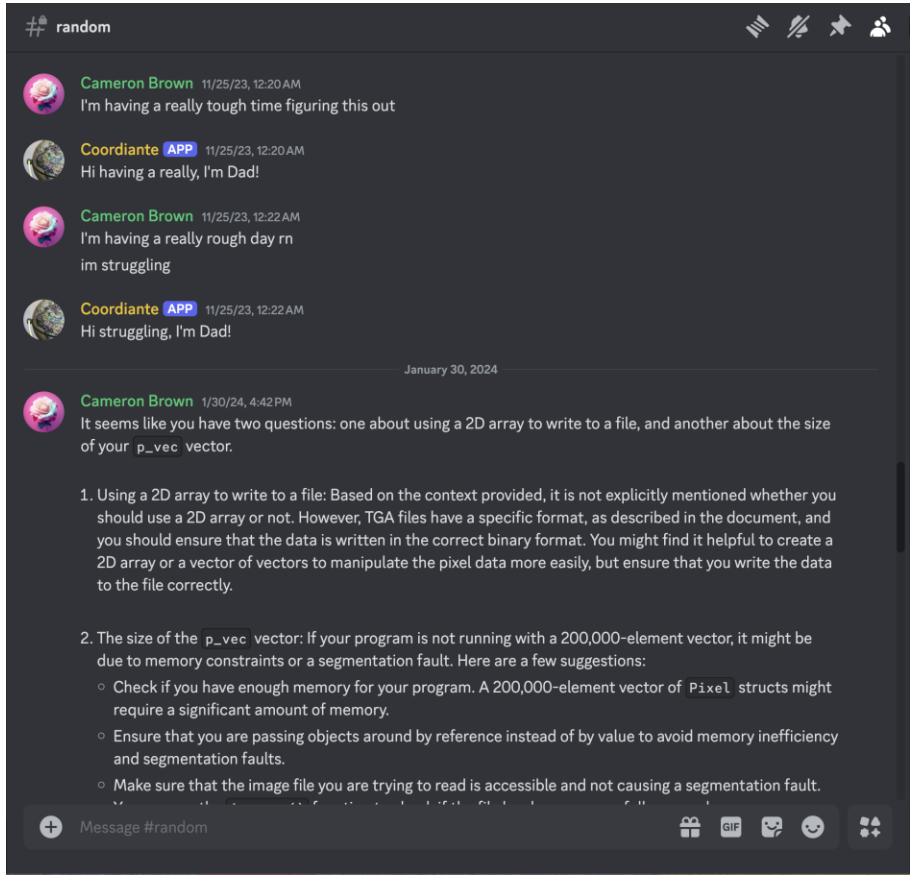
Channels



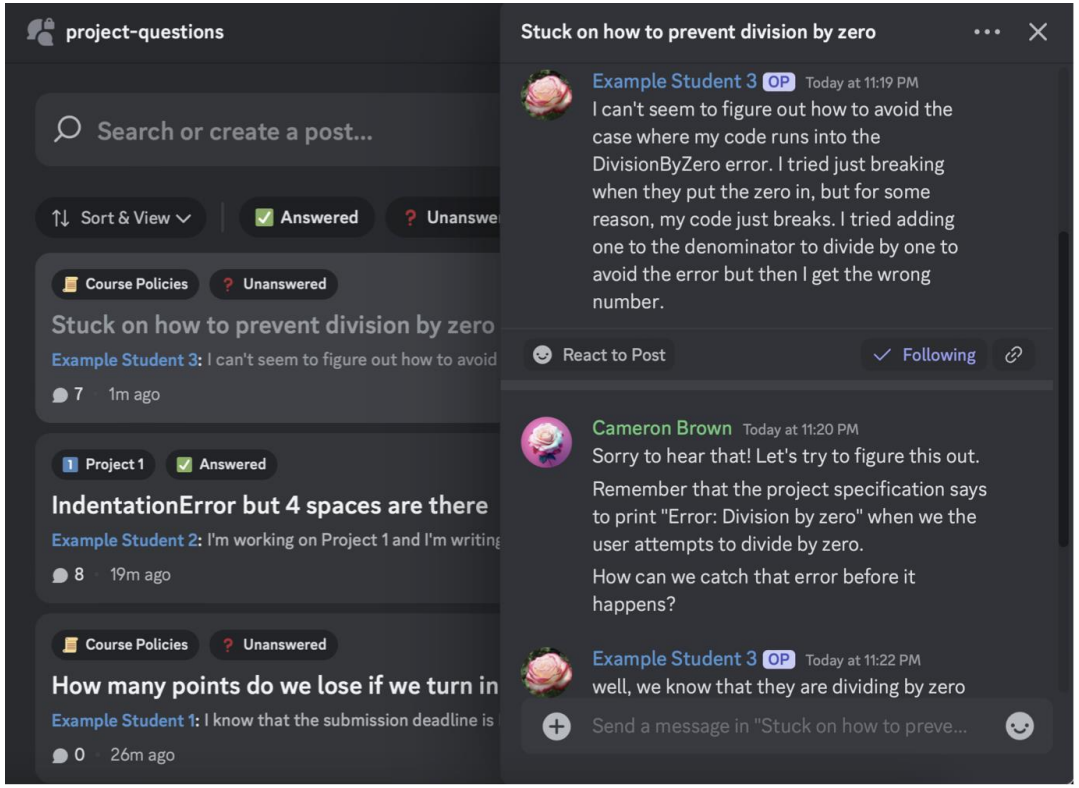
Categories

Introducing *Discord*

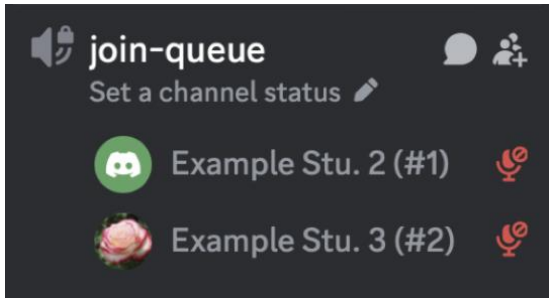
Text Channels



Forum Channels



Voice/VoIP Channels

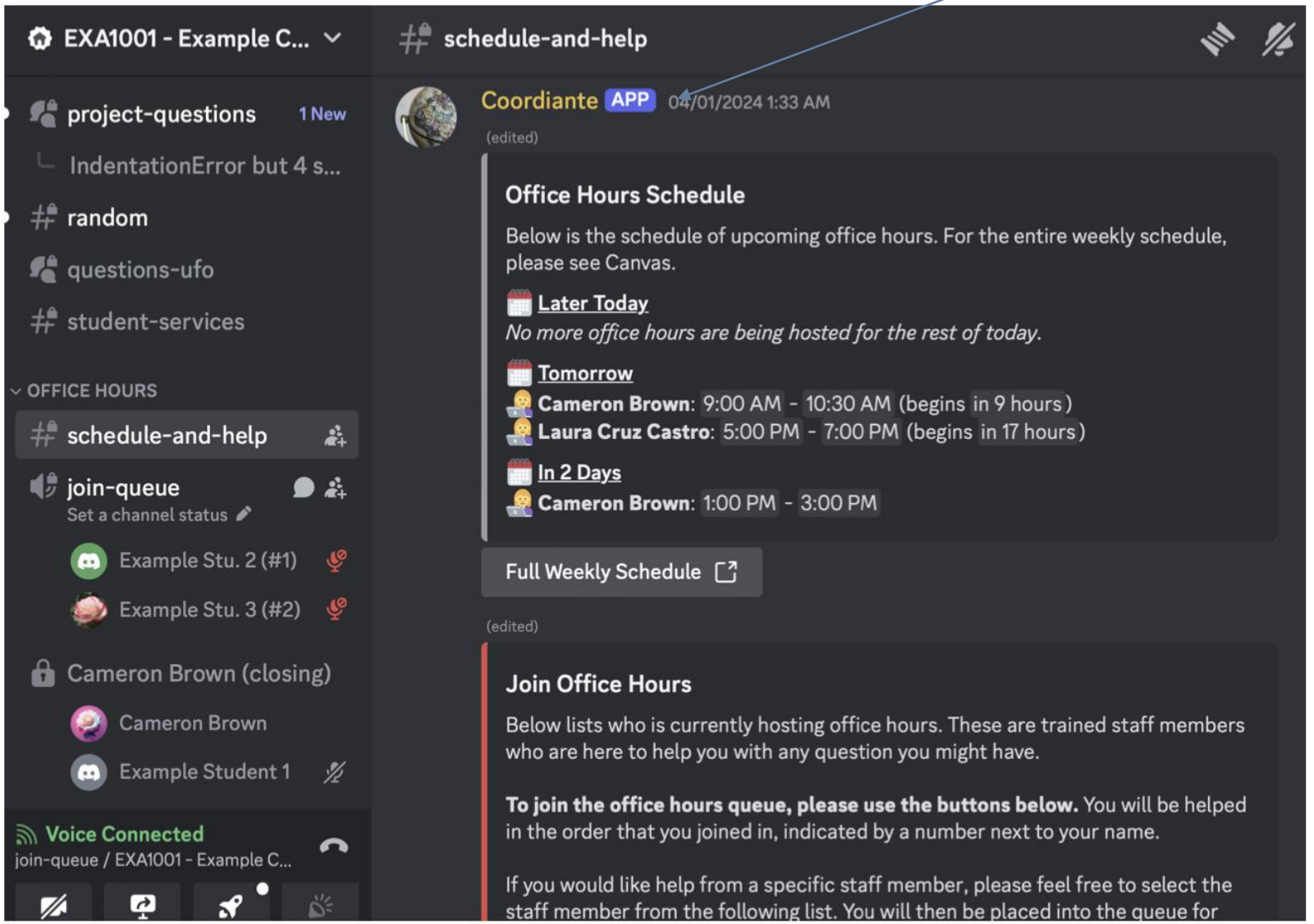


Introducing *Discord*

Bot integration

Several types of channels

Built-in VoIP



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)

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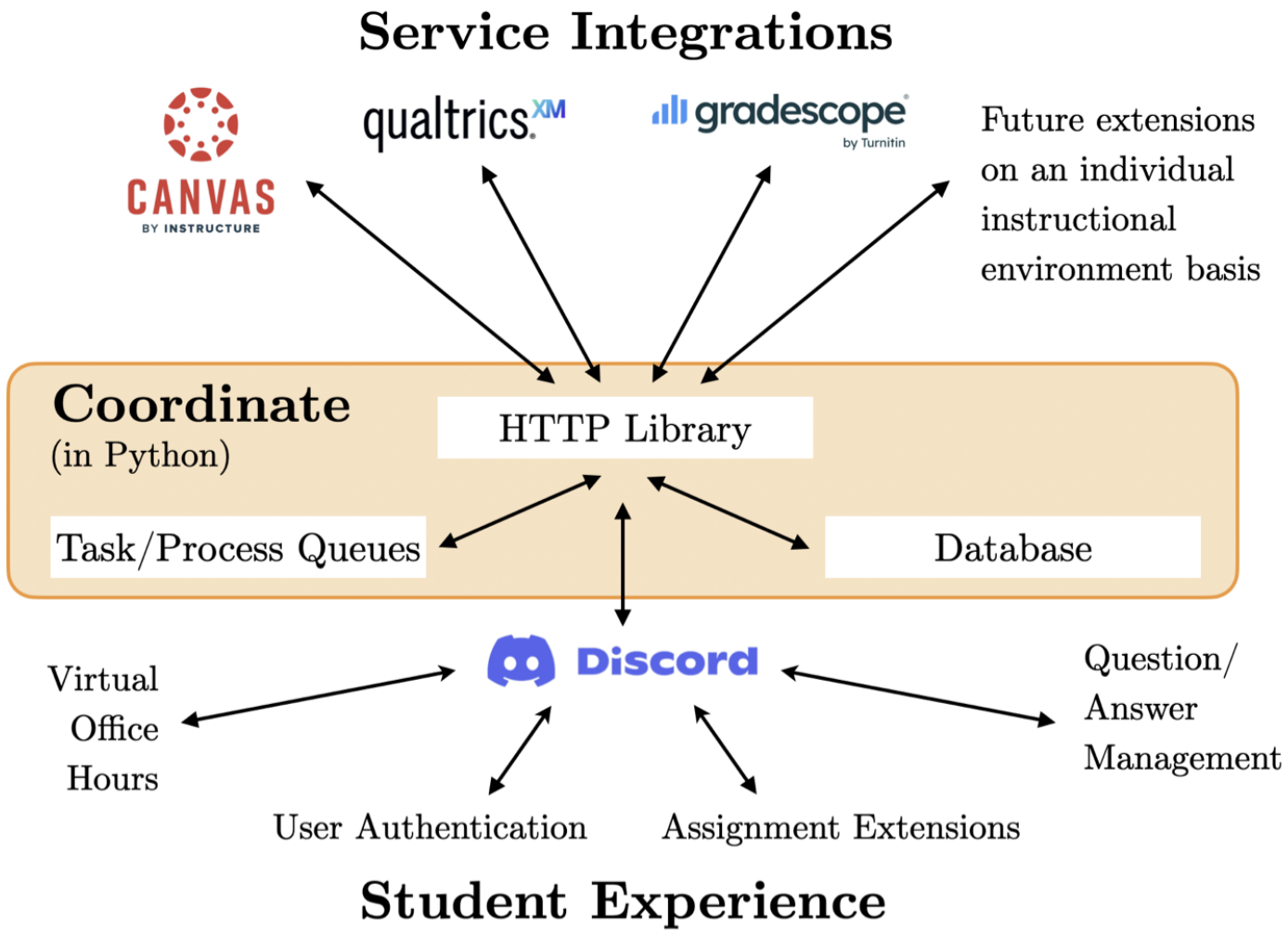
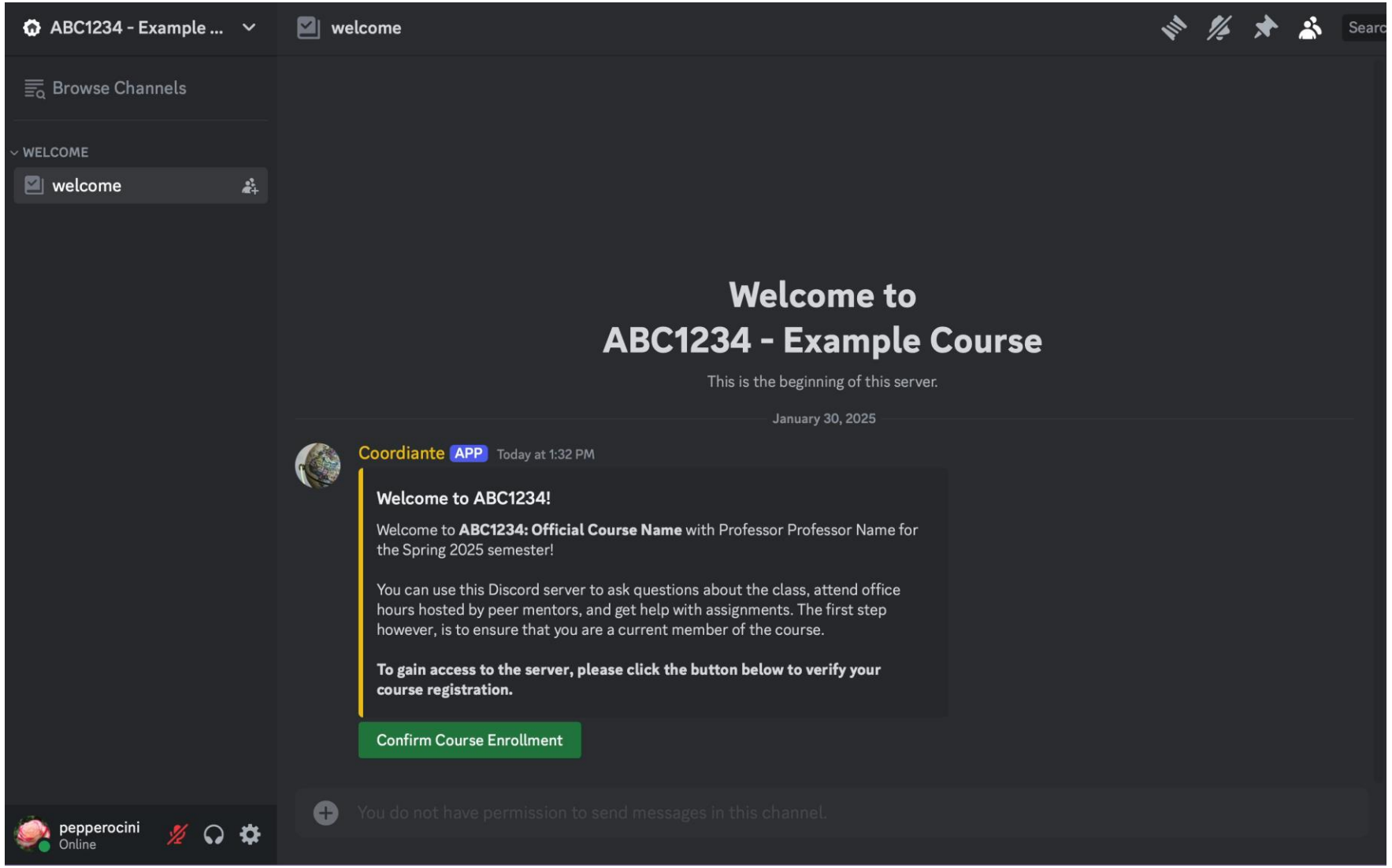
Architecture and Features

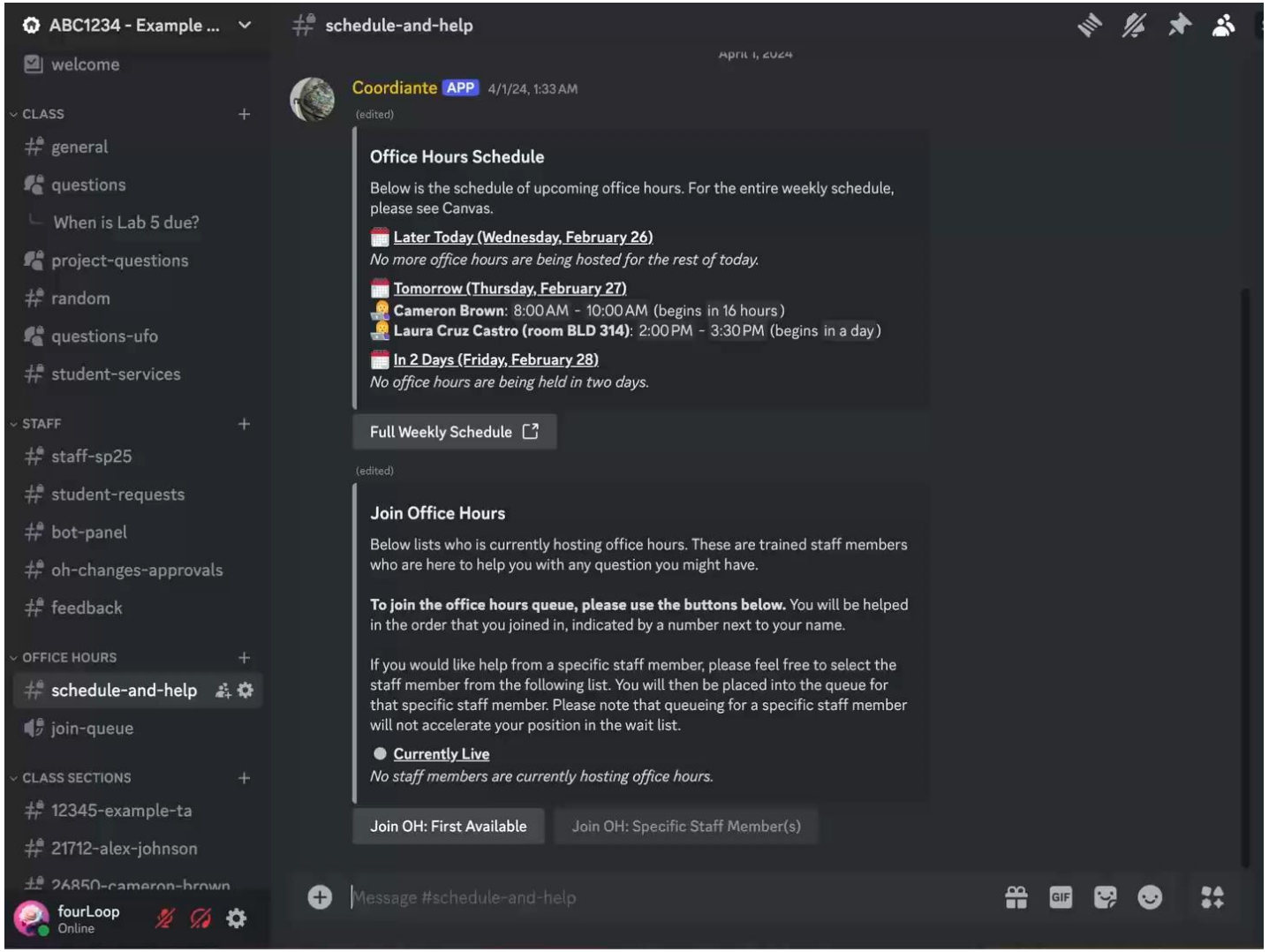
Architecture



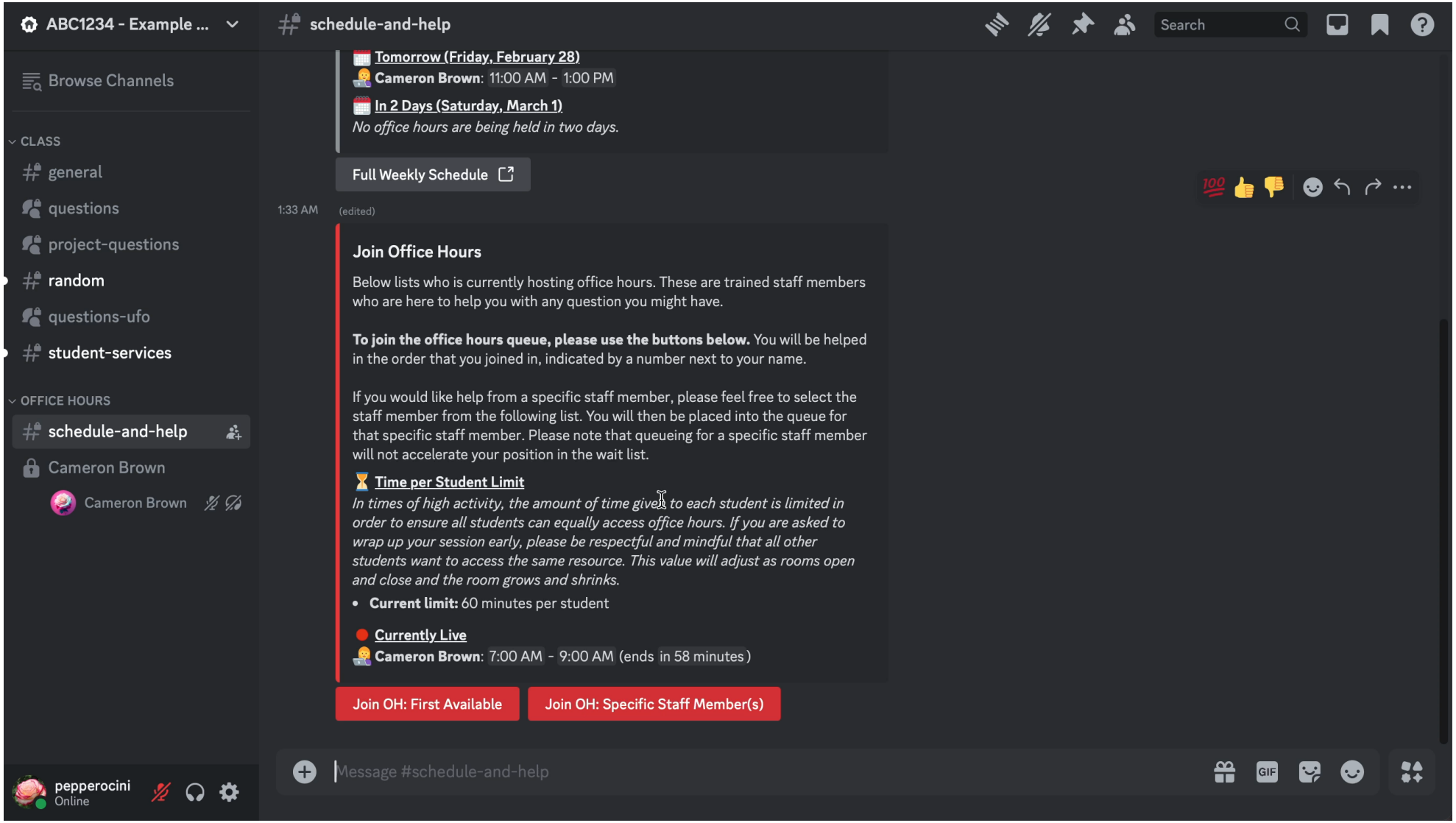
Authentication



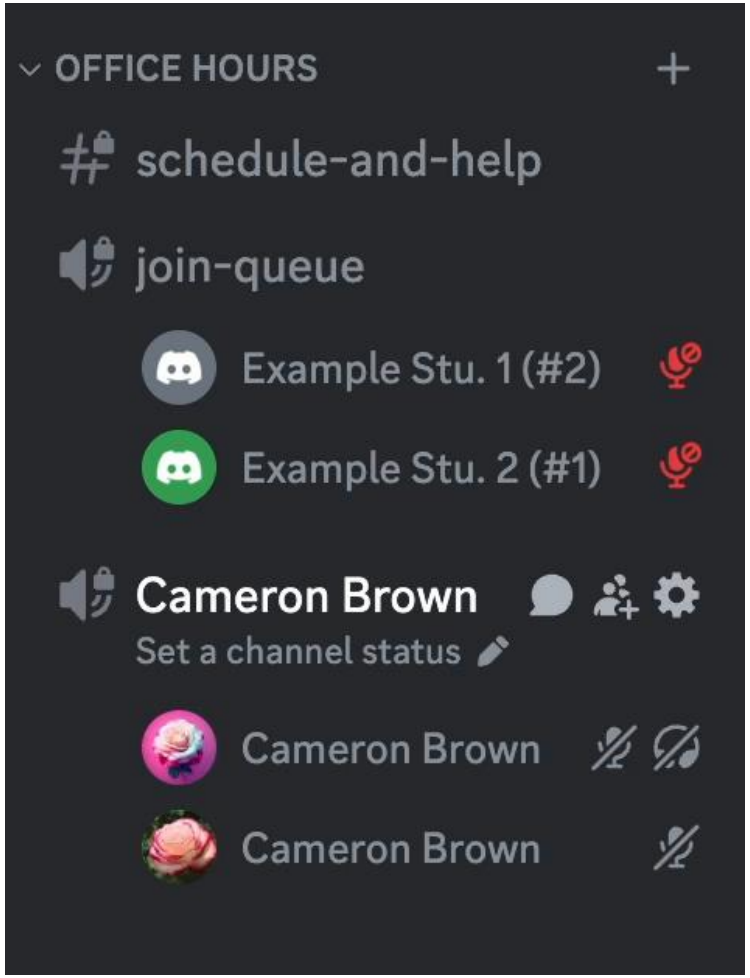
Office Hours: Schedule



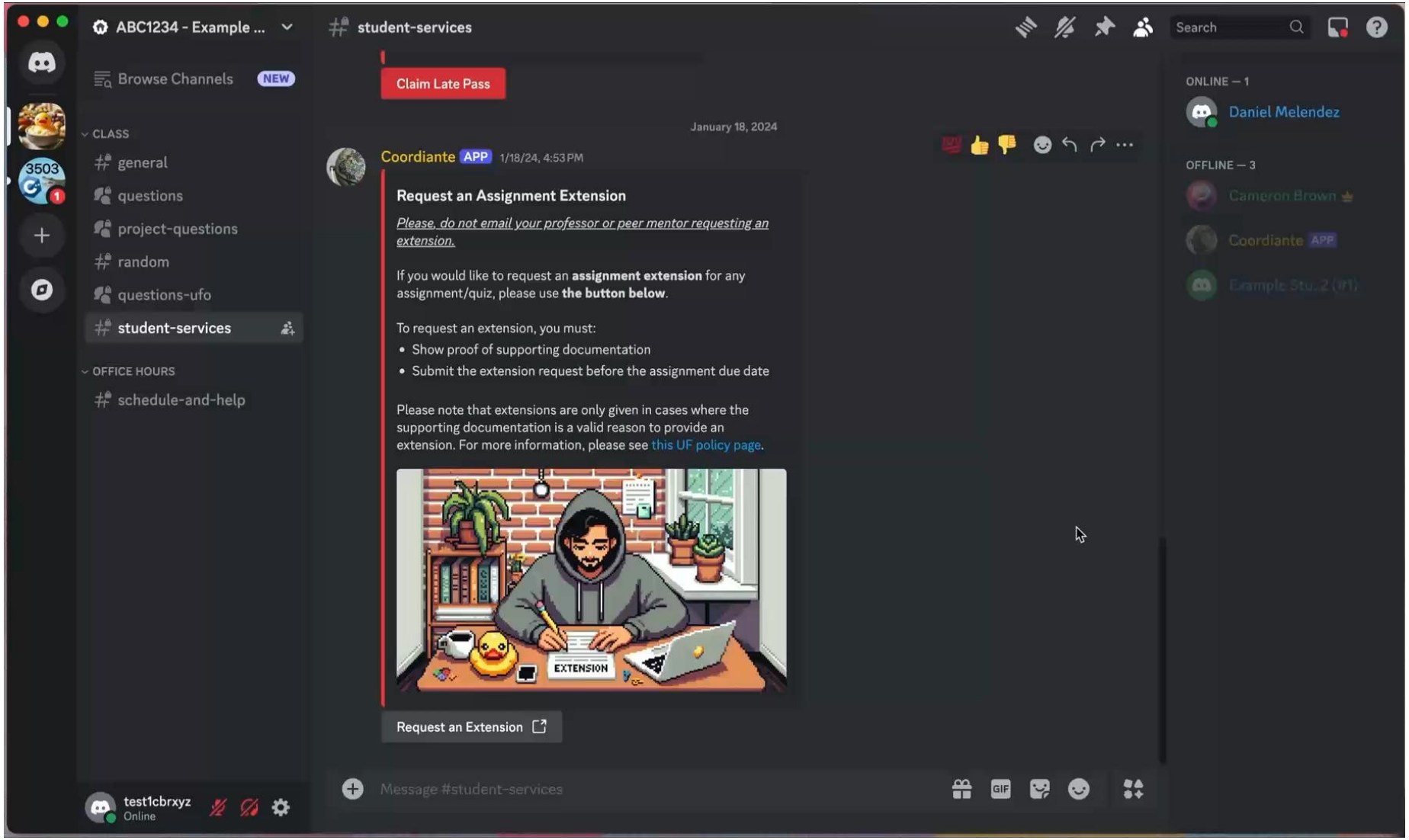
Office Hours: Accepting



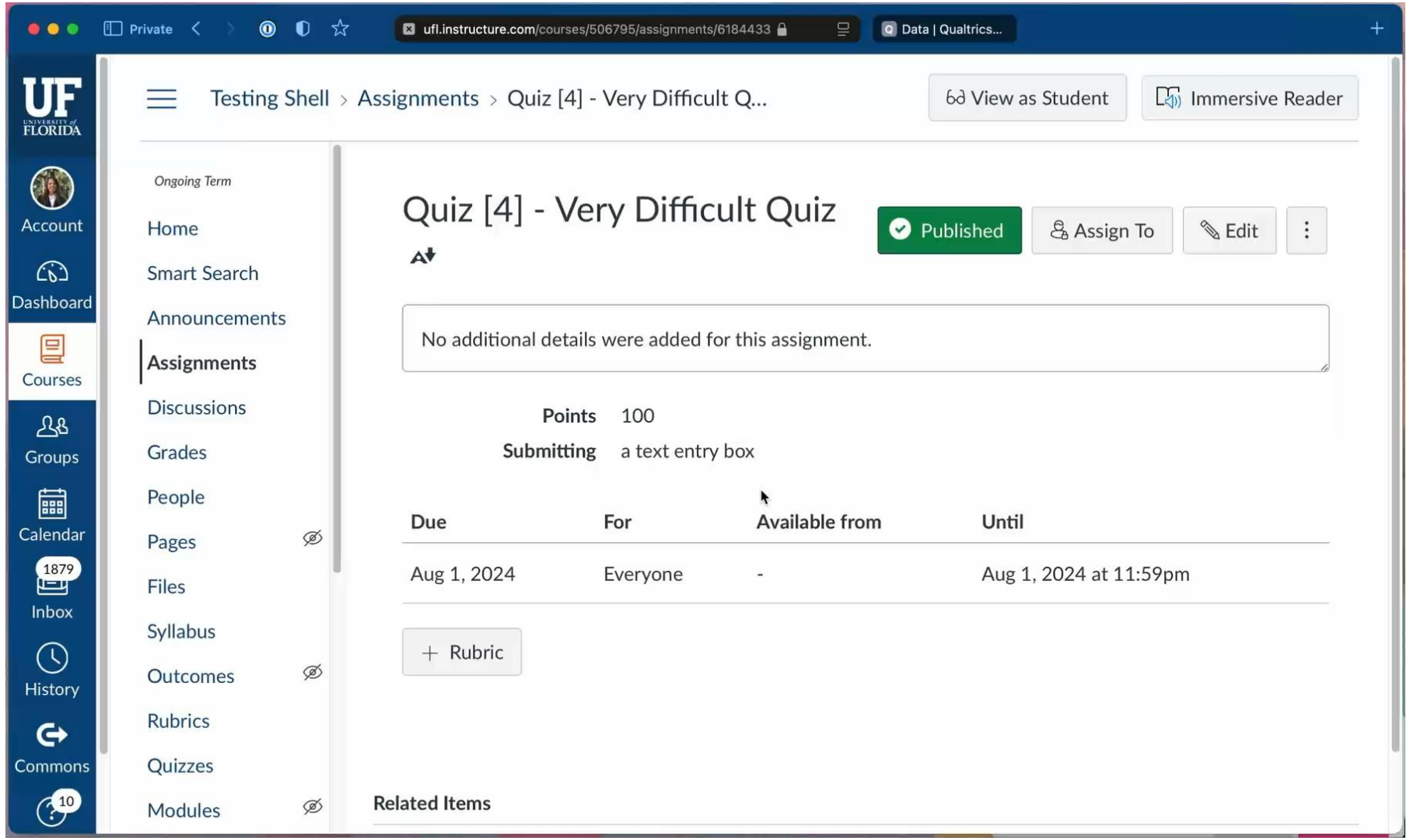
Office Hours: Room Movements



Assignment Extension: Student



Assignment Extension: Faculty



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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

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- CISE at University of Florida and ACM-W (funding)

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