

CS 3704: Intermediate Software Design

Group 2

TA Queue *Requirements Analysis*

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Check out our GitHub Project here:

<https://github.com/Intermediate-Software-Design/ISD-Group-Project>

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Please note that UC in this document stands for “Use Case.” As such, each distinct use case will be labeled following this example:

UC1: {Name of Use Case 1}

Contents

1	Office Hours Functionality & Use Cases	4
1.1	Office Hour Use Case Diagram	4
1.2	UC1: Voice Calls	4
1.3	UC2: Screen Sharing	6
1.4	UC3: Pen Functionality for Screen Sharing	7
1.5	UC4: Display Online Status for Faculty and TAs	8
1.6	UC5: Group Conference Calls	9
1.7	UC6: TA Location Tracking	10
1.8	UC7: Office Hour Location Change Notifications	11
2	Priority Queue Functionality & Use Cases	13
2.1	Generic Priority Queue Use Case Diagrams	13
2.2	General In-Person Priority Queue Use Cases	14
2.2.1	General In-Person Priority Queue Special Use Case Diagram	14
2.2.2	UC8: Queue Activation	14
2.2.3	UC9: Student Enqueue	15
2.2.4	UC10: Student Self-Dequeue	16
2.2.5	UC11: Queue Poll	17
2.2.6	UC12: Print Queue	18
2.2.7	UC13: Hogging Alert	19
2.2.8	UC14: Queue Deactivation	20
2.2.9	UC15: Student's Location-Based Enqueue	21
2.3	General Remote Priority Queue Use Cases	22
2.3.1	General Remote Priority Queue Special Use Case Diagram	23
2.3.2	UC16: Automatic Voice Call with Polling TA	23
2.4	TA-Specific Priority Queue Use Cases	24
2.4.1	TA-Specific Priority Queue Special Use Case Diagram	25
2.4.2	UC17: TA Approval for Enqueue	25
3	Asynchronous Interactions Use Cases	27
3.1	Asynchronous Interactions Use Case Diagram	27
3.2	UC18: Public Questions Section	27
3.3	UC19: Private Text Channels	28
3.4	UC20: Integrated Version Control Systems	29
3.5	UC21: Pair Programming Capability	30
3.6	UC22: Live Screen Editing and Sharing	31
4	Course-Based Functionality & Use Cases	32
4.1	Course-Based Use Case Diagram	32
4.2	UC23: Access to Enrolled Courses	32
4.3	UC24: Announcement Creation	33
4.4	UC25: Announcement Viewing	34
4.5	UC26: File Viewing	35
4.6	UC27: Assignment Viewing	36
4.7	UC28: Assignment Submission	36
4.8	UC29: Submission Editing	37
4.9	UC30: Plagiarism Checking	38
4.10	UC31: To-Do List	39

5	Security & Quality of Life Use Cases	40
5.1	Security & Quality of Life Use Case Diagram	40
5.2	UC32: Different Levels of Access per Account Type	40
5.3	UC33: Removing Forum Posts	41
5.4	UC34: Removing Account Permissions	42
5.5	UC35: Banning Accounts	42
5.6	UC36: TimeClock Integration	43
6	TA Queue Class Diagram	45
7	Supplementary Specifications	46

Chapter 1

Office Hours Functionality & Use Cases

1.1 Office Hour Use Case Diagram

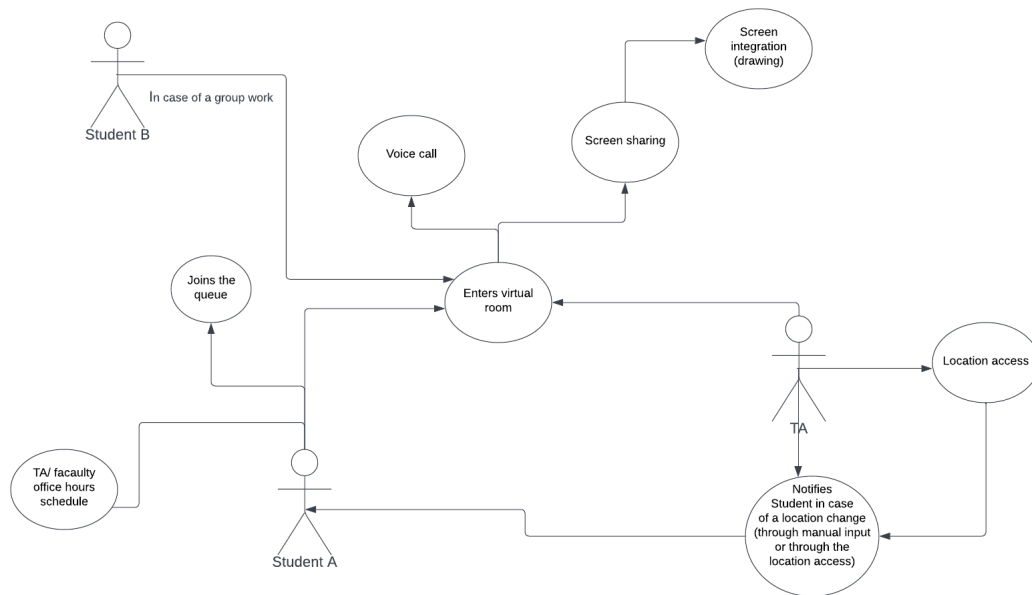


Figure 1.1: Office Hour Use Case Diagram

1.2 UC1: Voice Calls

Primary Actor

TA and Student

Stakeholders and Interests

Student: Get assistance from the TA in a live manner. TA: Be able to aid the student in a live manner.

Preconditions

The student was polled by the TA from the general remote queue. Both parties are assumed to have a valid, working Internet connection as well as working microphones and speakers.

Success Guarantee

Both the TA and the student are connected via a voice call, and are able to actively communicate vocally with each other.

Main Success Scenario

1. TA initiates the voice call manually by pressing the Begin Call Button on the Call Menu connected to the student's account.
2. The call is sent to the student.
3. The Begin Call Button is replaced by the End Call Button on the TA's Call Menu.
4. Both the Mute Button and the Deafen Buttons appear on either side of the End Call Button.
5. The student receives a notification to pick up the call, with the Pickup Button and Reject Call Button appearing on the student's screen with the notification.
6. The student presses the Pickup Button.
7. The student joins the call with the TA.
8. The End Call Button replaces the Pick Up Button on the student's screen.
9. The Mute Button and Deafen Button appear on either side of the End Call Button on the student's screen.
10. The Share Screen Button (see UC2) appears on both parties' screens.

Extensions

- 1a. UC16 is active.
 1. See UC16.
- 6a. The student presses the Reject Call Button.
 1. The student's screen returns to the previous screen,
 2. The TA receives a messaging detailing that the student has dropped the call.
- 8a. Either party presses the End Call Button
 1. The call is dropped for both parties.
 2. The party on the other end receives a notification that the ending party ended the call.
 3. The ending party's screen returns to the previous screen.
- 9a. A party presses the Mute Button.
 1. The party that pressed the button's microphone is turned off.
 2. The Unmute Button replaces the Mute Button on the call Menu.
- 2a. The Unmute Button is pressed.
 1. The party's microphone is turned back on.
 2. The Unmute Button is replaced with the Mute Button.
- 9b. A party presses the Deafen Button.
 1. The party that pressed the button's speaker system is turned off.
 2. The Undeafen Button replaces the Deafen Button on the call Menu.
- 2a. The Undeafen Button is pressed.
 1. The party's speaker system is turned back on.
 2. The Undeafen Button is replaced with the Deafen Button.

Special Requirements

- The call quality must be high, with communication being loud enough to hear and easily decipherable for all parties involved.
- There should be minimal delay in communication

Technology & Data Variation List

- **Call Menu:** Menu visible to all parties for a call when in a call. Students cannot pull up this menu for TAs or higher-privileged accounts, but they can for contacting their peers. This case should only examine the case where a TA calls a student from polling them from the queue.
- **Begin Call Button:** Button to begin the call, visible only on the TA account. This is used to manually begin the call, and not for the cases where UC16 are in play. This button should be in the middle of the screen when the menu is pulled up, and is replaced by the End Call Button when pressed to begin the call.
- **Pickup Button:** Button for the student to use to receive the call, with a green color and an icon of a rudimentary rotary phone being answered. This is visible on the left side of the screen for the student when the TA initiates the call. This button should appear on the student's screen along with the Reject Call Button.
- **Reject Call Button:** Button for the student to reject the incoming call of a TA, with a red color and an icon of a rudimentary rotary phone being hung up. This should appear on the student's screen along with the Pickup Button.
- **End Call Button:** Button to end the call once began. This should be available to both parties once the call has began. For the TA, this should be in the middle of the screen replacing the Begin Call Button once the Begin Call Button was pressed.
- **Mute Button:** Button to turn off the user's microphone system. Should be gray and display a rudimentary studio microphone. This button should be available to both parties once the call has began. This button gets replaced by the Unmute Button if pressed.
- **Unmute Button:** Button to turn back on the user's microphone system. Should be white and display a rudimentary studio microphone with a line through it. This button should be available to a party when they press the Mute Button. This button gets replaced by the Mute Button when pressed.
- **Deafen Button:** Button to turn off the user's speaker system. Should be gray and display a pair of headphones. This button should be available to both parties once the call has began. This button gets replaced by the Undeafen Button if pressed.
- **Undeafen Button:** Button to turn back on the user's microphone system. Should be white and display a pair of headphones with a line through them. This button should be available to a party when they press the Deafen Button. This button gets replaced by the Deafen Button when pressed.

Frequency of Occurrence

Medium: Whenever a student gets served/pollled from the general remote priority queue.

1.3 UC2: Screen Sharing

Primary Actor

TA and Student

Stakeholders and Interests

TA: See the student's screen during office hours to provide help.

Student: Receive more direct aid while going to online office hours.

Preconditions

Student just got polled by the TA (see UC11) from the remote general priority queue, and is already in a voice call with the polling TA.

Success Guarantee

Either party has their screen visible to the other party over the audio-now-video call.

Main Success Scenario

1. Either party presses the Share Screen Button.
2. The party who pressed the button's screen is now visible over the voice call to the other party.
3. The Share Screen Button for the pressing party is replaced with the Unshare Screen Button.

Extensions

- 3a. The party presses the Unshare Screen Button.
 1. The screen is taken down from view from the other party.
 2. The Unshare Screen Button is replaced with the Share Screen Button.

Special Requirements

- The screen share quality is great, with no pixelation or blurriness of the screen being transmitted.

Technology & Data Variation List

- **Share Screen Button:** Button to share the screen over the voice call. Should be gray and display a simple, blank monitor. Replaced by the Unshare Screen Button when pressed.
- **Unshare Screen Button:** Button to unshare the screen over the voice call. Should be white and display a simple, blank monitor with a line through it. Replaced by the Share Screen Button when pressed.

Frequency of Occurrence

High: As often as a party wants to share the screen during office hours.

1.4 UC3: Pen Functionality for Screen Sharing

Primary Actor

TA and Student

Stakeholders and Interests

TA: Mark up the screen that is being shared to make a point/keep notes; understand what the student is describing visually. Student: Have a point of reference during office hours/have a visual point of reference for the TA's aid; describe visually their understanding of a topic.

Preconditions

Both parties are already in a voice call, with one sharing the screen already.

Success Guarantee

Either party can mark up the screen for both parties over the call.

Main Success Scenario

1. The party wishing to write on the screen taps the screen.
2. The Pen Menu pops up.
3. The writing party selects the Pen Tool.
4. The writing party can now mark up the screen.

Extensions

- 3a. The writing party chooses the eraser tool.
 1. The writing party erases markings already on the screen.
- 3b. The writing party chooses no tool after five seconds.
 1. The Pen Menu disappears from the screen.

Special Requirements

- Writing should be responsive for both parties.
- Thickness should be just thick enough to be legible without being too wispy, but not too thick as to be illegible due to smudgy appearance.

Technology & Data Variation List

- **Pen Menu:** Menu that appears after a party clicks on the screen. Should contain the Pen Tool and the Eraser Tool. Disappears after 5 seconds of inactivity by that party.
- **Pen Tool:** Tool within the Pen Menu that lets the user write on the screen wherever clicked for both parties. Should be white with the image of a pen displayed.
- **Eraser Tool:** Tool within the Pen Menu that lets the user erase markings on the screen wherever clicked for both parties. Should be white with the image of a rubber eraser displayed.

Frequency of Occurrence

High: Whenever a party marks the screen for use over a screen-shared call.

1.5 UC4: Display Online Status for Faculty and TAs

Primary Actor

TA and Student

Stakeholders and Interests

TA: Know which other colleagues are online at the moment.

Faculty: Know which TAs and colleagues are online for record-keeping purposes.

Students: Know if anyone is available to get help on an assignments.

Preconditions

The user's account has been authenticated for that particular course.

Success Guarantee

All TAs who have logged in (see UC8) are visible to the user.

Main Success Scenario

1. User pulls up the desired priority queue menu.
2. System accesses the TA Auxiliary List (see UC8).
3. System prints the contents of the TA Auxiliary List to the screen under the heading "Active TAs."

Extensions

- 2a. Queue is inactive.
 1. System displays "Queue is active" in the center of the screen.

Frequency of Occurrence

Very High: Whenever a user opens a specific priority queue's menu.

1.6 UC5: Group Conference Calls

Primary Actor

TA and multiple students

Stakeholders and Interests

TA: Be able to address the needs of multiple students at once.

Preconditions

Students have arranged with the TA previously the need for a conference call.

Success Guarantee

The TA has begun a high-fidelity conference call with multiple students at the same time.

Main Success Scenario

1. TA opens a conference call.
2. Conference call screen opens.
3. End Call Button appears in the middle of the screen.
4. Add Caller Button appears below the End Call Button alongside the Drop Caller Button only for the TA.
5. Mute and Deafen Buttons appear on either side of the End Call Button.
6. Shared Screen Button appears on top of the End Call Button.
7. TA presses the Add Caller Button.
8. Query pops up for searching the course for specific students.
9. TA enters the account information for specific students, and adds them to the call.
10. Students are invited to the call in a manner similar to UC1.
11. Students all accept the invitation to the call.
12. Buttons appear on students' screens in a manner similar to UC1. It is important to note that the Add Caller Button and Drop Caller Button are not visible for the students.

Extensions

- 11a. A student presses the Reject Call Button.
 1. The student's screen returns to the previous screen,
 2. The TA receives a messaging detailing that the student has dropped the call.
- 12a. A student presses the End Call Button
 1. The call is dropped for that party.
 2. The parties on the other end receives a notification that the ending student left the call.
 3. The ending party's screen returns to the previous screen.
- 12b. The TA presses the End Call Button
 1. The call is dropped for all parties.
 2. The parties on all other ends receive a notification that the ending student left the call.
 3. The ending party's screen returns to the previous screen.

12c. A party presses the Mute Button.

1. The party that pressed the button's microphone is turned off.
 2. The Unmute Button replaces the Mute Button on the call Menu.
- 2a. The Unmute Button is pressed.
1. The party's microphone is turned back on.
 2. The Unmute Button is replaced with the Mute Button.

12d. A party presses the Deafen Button.

1. The party that pressed the button's speaker system is turned off.
 2. The Undeafen Button replaces the Deafen Button on the call Menu.
- 2a. The Undeafen Button is pressed.
1. The party's speaker system is turned back on.
 2. The Undeafen Button is replaced with the Deafen Button.

12e. A party presses the Share Screen Button.

1. UC2 proceeds.
- 1a. A party writes on the screen.
1. UC3 proceeds.

Special Requirements

1. Call quality should be high for all users. This includes everything from audio to shared-screen video quality.

Technology & Data Variation List

- Functional buttons like End Call Button, Mute Button, Unmute Button, Deafen Button, and Undeafen Button act and appear the same as in UC1. The Share Screen Button and Unshare Screen Button behave and appear as they do in UC2.
- **Add Caller Button:** Button to add an additional caller to the conference call. Button only appears for the TA in the call, and has a grey color with a plus sign on it. When pressed, opens a query to search for a student account. This query should let the TA add the student account found to the call.
- **Drop Caller Button:** Button to remove a caller from the conference call. Button only appears for the TA in the call, and has a grey color with a minus sign on it. When pressed, opens the Caller List with X symbols by the names of all callers on the list. These symbols, when pressed, lets the TA drop a user from the call.
- **Caller List** An auxiliary list to track the callers presently in the conference call for use in record-keeping and access in the Drop Caller Button. Gets updated by both the Add Caller Button and the Drop Caller Button.

Frequency of Occurrence

Medium: Should only happen when a TA arranges a conference call with multiple students ahead of time.

1.7 UC6: TA Location Tracking

Primary Actor

TA

Stakeholders and Interests

TA: Know where other TAs are at the moment.

Students: Know where TAs are in relation to the office hours room.

Preconditions

The TA in question must have location services allowed, and a valid, working Internet connection. The TA must be having office hours previously prescribed on any given day.

Success Guarantee

The current location of the TA is available for all to view. This would only be available during their prescribed office hours for any given day.

Main Success Scenario

1. TA's office hours begins.
2. TA's position is visible for all to see when checking their profile.

Extensions

- 1a. TA has disabled the Location Services Plug-In.
 1. GPS displays the message "Location disabled" for all parties trying to view the TA's location instead of a mapping.

Special Requirements

- Updates should be quickly processed, and the GPS must have zooming capability.

Technology & Data Variation List

- **Location Services Plug-In:** A feature to allow the location services of the user's device to be used to get the present location of the student. This feature can be deactivated under the account's settings.
- **GPS:** A GPS must be available on the TA's profile page to view a sensible mapping of their location.

Frequency of Occurrence

Medium: Whenever someone wants to view the TA's current location during their office hours.

1.8 UC7: Office Hour Location Change Notifications

Primary Actor

TA

Stakeholders and Interests

TA: Update students so they know their new location.

Preconditions

TA's account has been authenticated.

Success Guarantee

All students for the given course have been updated about the change of a TA's office hour location.

Main Success Scenario

1. TA opens Office Hour Location Change Form using Location Change Button.
2. TA fills out the form.
3. The option to make the change permanent appears.
4. TA presses send at the bottom of the form.
5. System processes the new location change and time frame for the change.
6. System sends notification to students describing the change using the information the TA provided.

Extensions

- 2b. TA wishes to cancel office hours.
 1. TA marks the box for canceling office hours.
 2. TA fills out the information for the shift to cancel.
 3. The option to make this cancellation permanent appears.
 4. TA hits send at the bottom of the form.
 5. System processes the form, and sends out a message to all students for the course describing that the TA's office hours for the given time and date is canceled.
- 3a. TA makes the cancellation permanent.
 1. Shift is now permanently removed from the course calendar when the form is processed.
 2. Message is sent to the students describing that the office hour is permanently canceled.
- 2c. TA wishes to schedule a new office hour.
 1. TA marks the box for scheduling office hours.
 2. TA fills out the information for the shift to add.
 3. The option to make this new shift regular appears.
 4. TA hits send at the bottom of the form.
 5. System processes the form, and sends out a message to all students for the course describing that the TA's new office hours for the given time and date is scheduled.
- 3a. TA makes the shift regular.
 1. Shift is permanently added to the course calendar when the form is processed.
- 3a. TA wishes to make the location change permanent.
 1. TA marks the box to make the change permanent.
 2. Shift is changed on the course calendar when the form is processed.
- 4a. TA forgot a required field in the form.
 1. System displays a collapsible error message on the TA's screen.
 2. TA's screen then jumps to and highlights the first unfilled required field of the form.

Special Requirements

- Response should immediately be sent out to the students, without any delay.

Technology & Data Variation List

- **Location Change Button** Button on the course home screen for TAs, labeled as "Location Change." When pressed, opens the Office Hour Location Change Form to be filled out.
- **Office Hour Location Change Form** A form to be filled out by a TA to change the office hours for a period of time for a given day for that TA. Should contain fields querying the date, time, and new location and new time for office hours that the TA is holding. Should also have an option to altogether cancel office hours, or to add a new session of office hours.

Frequency of Occurrence

High at first, Low throughout the semester: Changes to schedule should be ironed out before the course even begins, and should not regularly occur throughout the semester.

Chapter 2

Priority Queue Functionality & Use Cases

This chapter is separated into three main sections: Those use cases involving the general in-person priority queue, those use cases involving the remote general priority queue, and those use cases involving TA-specific queues. The three queues share similar use cases UC8 to UC14. These are all listed under the first section, the general in-person queue. The rationale behind this is to group similar structures together so as to not bloat the number of use cases, while still providing distinct groupings for the different needs of the distinct queues. Following those common use cases, each section will have different specific use cases that are numbered as distinct use cases.

For all use cases in this section, all acting parties are assumed to have a valid, working Internet connection.

To prevent the repetition of “TAs or faculty” in this chapter, both groups will be collectively referred to as TAs, and a singular person belonging to either group will be referred to as a TA. In addition, the term “office hour block” is used to refer to the time period where one or more TAs have consecutive office hours, where the only condition is that a TA must be holding office hours in that same medium during the entire time. This is the definition for both general queues. For the TA-specific queue, this is the time that that particular TA is holding office hours.

2.1 Generic Priority Queue Use Case Diagrams

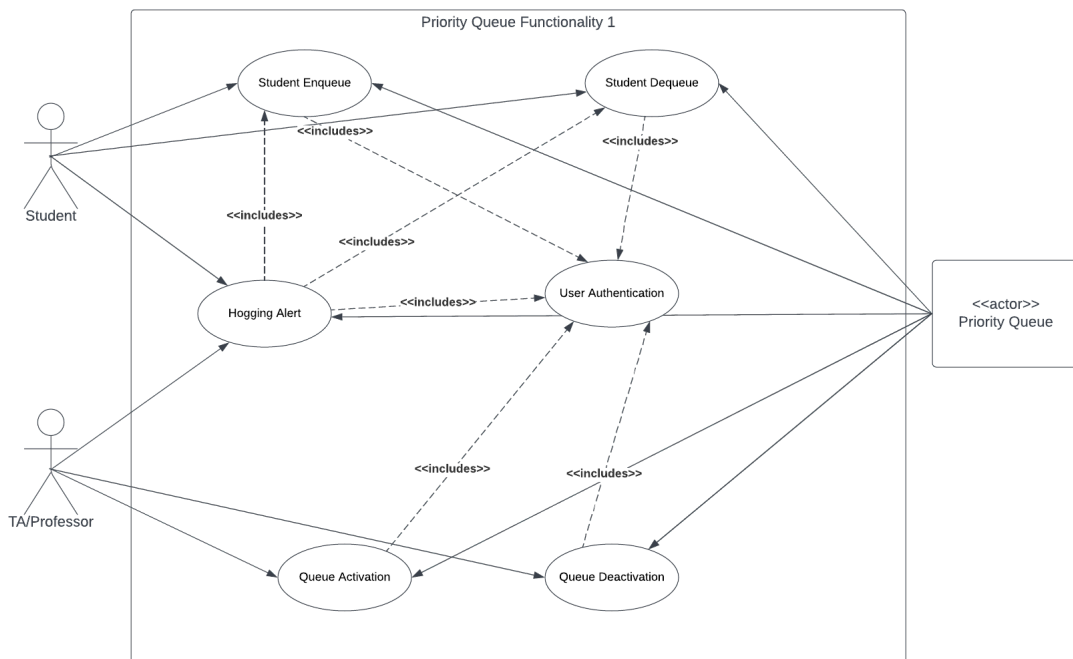


Figure 2.1: Generic Priority Queue Use Case Diagram 1

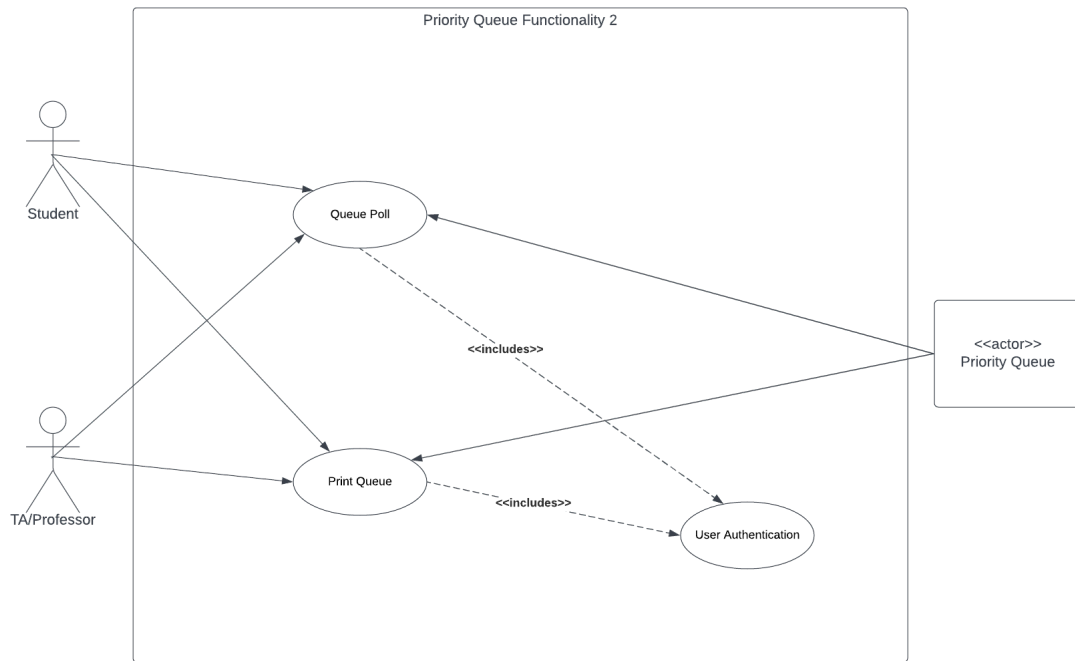


Figure 2.2: Generic Priority Queue Use Case Diagram 2

2.2 General In-Person Priority Queue Use Cases

2.2.1 General In-Person Priority Queue Special Use Case Diagram

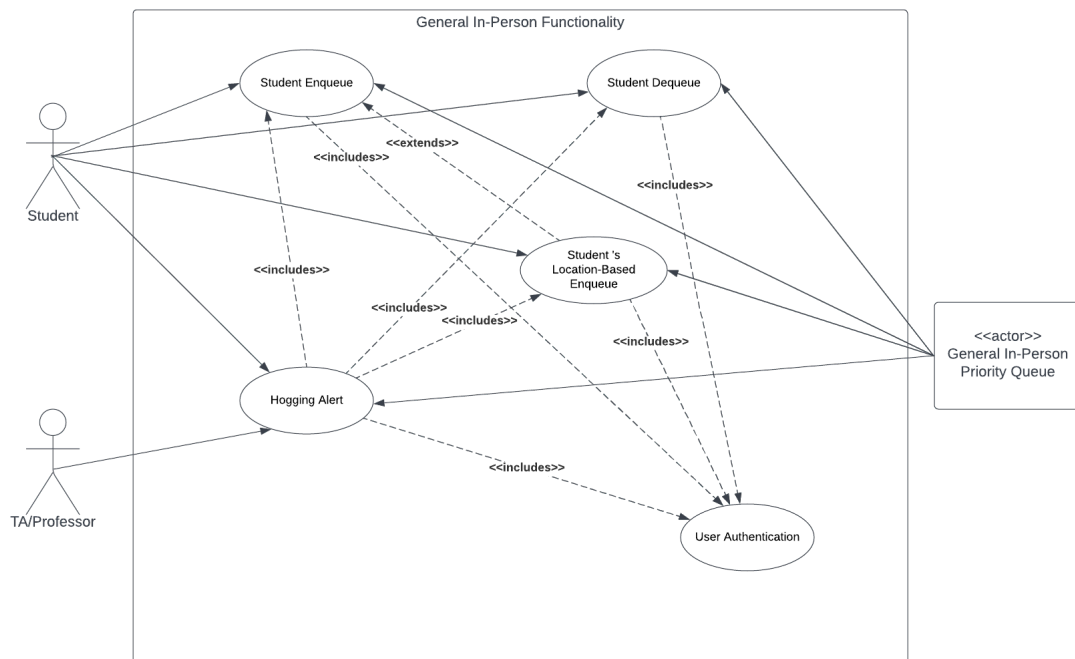


Figure 2.3: General In-Person Priority Queue Special Use Cases

2.2.2 UC8: Queue Activation

Primary Actor

TA

Stakeholders and Interests

TAs: Have a way to manage the order in which students are served during in-person office hours.

Students: Have a way to be registered and in line for in-person office hours.

Preconditions

The TA's account must be authenticated as a TA for that class, and the TA must also be having in-person office hours before activating the general in-person queue. The TA in the main flow is assumed to be the first TA in that office hour block.

Success Guarantee

The general in-person queue is activated and able to take students and organize them in order of least-served first. Students can properly enqueue themselves, dequeue themselves, and print the contents of this queue after activation. Additional TAs activating the queue will then be added to the TA Auxiliary List.

Main Success Scenario

1. TA pulls up the general in-person priority queue menu.
2. TA hits the "Log In" button.
3. The priority queue restarts, instantiating a new, empty priority queue.
4. The Enqueue Auxiliary List (see UC13) restarts in a manner similar to the priority queue.
5. The Dequeue Auxiliary List (see UC13) restarts in a manner similar to the priority queue.
6. The Poll Auxiliary List (see UC11) restarts in a manner similar to the priority queue.
7. The TA Auxiliary List restarts in a manner similar to the priority queue.
8. The activating TA is added to the TA Auxiliary List.
9. "Log In" button transforms into the "Log Out" Button (see UC14) for the activating TA.

Extensions

- 2a. General in-person queue is already activated.
 1. The TA is added to the TA Auxiliary List.
 2. The "Log In" Button transforms into the "Log Out" Button (see UC14) for the newly-logged-in TA.
 3. The cached print response is cleared (see UC12).

Technology & Data Variation List

- **"Log In" Button:** Button on the general in-person priority queue menu given only to TA accounts to start up the queue. This would be labeled as "Log In" if the queue is not yet logged in, or if the TA has not logged into the already active queue. This button transforms into the "Log Out" Button (see UC14) if the TA has pressed the "Log In" Button.
- **TA Auxiliary List:** List to keep track of which and how many TAs are holding office hours at the moment. A TA is added to this list by pressing the "Log In" Button, effectively logging in, and removed from the list by pressing the "Log Out" Button (see UC14).

Frequency of Occurrence

Should occur only at the beginning of a TA's office hours.

2.2.3 UC9: Student Enqueue

Primary Actor

Student

Stakeholders and Interests

TAs: Have an organized list of students to help during in-person office hours, with order dictated by triage of occurrence.

Students: Add themselves to the office hour queue to be helped by a TA during in-person office hours.

Preconditions

The Student's account has been authenticated for that course.

Success Guarantee

The Student has been added to the general in-person priority queue. The student's value in the Enqueue Auxiliary List is incremented after this operation (see UC13). In addition, the "Enqueue" Button transformed into the "Dequeue" Button.

Main Success Scenario

1. Student pulls up the general in-person queue menu.
2. Student hits the "Enqueue" Button.
3. "Enqueue" Button deactivates temporarily so the student can be enqueued without repeated input from the same student.
4. Enqueue Auxiliary List increments the counter and sets the new latest time of enqueue for the specific student (See UC13).
5. Priority queue references the number of times the student has been helped by a TA from the Poll Auxiliary List (see UC11). This value is what the priority queue sees and uses to heapify its contents upon every enqueue or dequeue operation.
6. Priority queue enqueues the student with the weighted value being the value retrieved in Step 5.
7. The cached print response is cleared, if applicable.
8. The "Enqueue" Button transforms into the "Dequeue" Button.
9. The "Dequeue" Button is reactivated for the student to remove themselves from the priority queue (see UC10).

Extensions

- 2a. General in-person queue is not active.
 1. System displays an error message detailing that the queue is not open since a TA is not available at the moment.
 2. "Enqueue" Button does not change to the "Dequeue" Button.

Technology & Data Variation List

- **"Enqueue" Button:** This should be accessible only through a button on the general in-person priority queue menu given only to Student accounts. This would be labeled as "Enqueue" if the queue is presently active or if the student is not already in the queue. This button would change modes to the "Dequeue" Button (see UC10) if the student is presently in the queue. This button is deactivated if the student triggers the Hogging Alert (see UC13), and reactivates after an hour.

Frequency of Occurrence

As often as a student needs help during office hours.

2.2.4 UC10: Student Self-Dequeue

Primary Actor

Student

Stakeholders and Interests

TAs: Have a way to manage the order in which students are served during in-person office hours.

Students: Remove themselves from the priority queue for in-person office hours.

Preconditions

The Student's account has been authenticated for that course.

Success Guarantee

The Student has been removed from the general in-person priority queue. The student's value in the Dequeue Auxiliary List is incremented after this operation (see UC13). In addition, the "Dequeue" Button transformed into the "Enqueue" Button.

Main Success Scenario

1. Student pulls up the general in-person queue menu.
2. Student dequeues themselves from the queue using the "Dequeue" Button.
3. "Dequeue" Button deactivates temporarily so the student can be dequeued without repeated input from the same student.
4. Dequeue Auxiliary List increments the counter and sets the new latest time of dequeue for the specific student (see UC13).
5. Priority queue removes the student from the queue.
6. Priority queue reheapifies the remaining students in the queue.
7. The cached print response is cleared, if applicable.
8. The "Dequeue" Button transforms into the "Enqueue" Button.
9. The "Enqueue" Button is reactivated for the student to enqueue themselves in the priority queue (see UC9).

Extensions

Note: No extensions should occur for this use case as the conditions for the "Log Out" Button to appear on a student's general in-person priority queue menu are not the default and require the queue to be both active AND contain the student already.

Technology & Data Variation List

- **"Dequeue" Button:** This should be accessible only through a button on the general in-person priority queue menu given only to Student accounts. This would be labeled as "Dequeue" if the queue is presently active AND the student is already in the queue. This button would change modes to the "Enqueue" Button (see UC9) if the student is not presently in the queue. This button turns into the "Enqueue" Button and is deactivated if the student triggers the Hogging Alert (see UC13), and reactivates after an hour.

Frequency of Occurrence

As often as a student would like to self-dequeue during office hours.

2.2.5 UC11: Queue Poll

Primary Actor

TA

Stakeholders and Interests

TAs: Serve the next student in the queue.

Polled Student: Get served by the TA.

Other Students: Move closer to the front of the priority queue.

Preconditions

The TA's account has been authenticated for that course.

Success Guarantee

The Student has been removed from the general in-person priority queue, and is able to be helped by the TA who polled them from the priority queue. The student's value in the Poll Auxiliary List is incremented after this operation.

Main Success Scenario

1. The TA pulls up the general priority queue.
2. The TA hits the "Poll" button.
3. The queue polls the first student in the queue, removing them from the queue.
4. The TA receives a message that gives the name of the student to be helped.
5. The student who was polled from the queue receives a notification on their device that gives the name of the TA.
6. The Poll Auxiliary List increments the value corresponding to the polled student.
7. The priority queue shifts its contents up, reheapifying the data structure with the remaining students in the queue.
8. The cached print response is cleared, if applicable.

Extensions

- 2a. TA did not log into the queue.
 1. System displays an error message detailing that the TA did not log into the general in-person queue.
Note: This should occur with or without an active queue.
- 2b. The queue is empty.
 1. System displays an error message detailing that the queue is empty, and no students are in office hours to be helped.

Technology & Data Variation List

- **"Poll" Button:** This should be accessible only through a button on the general in-person priority queue menu given only to TA accounts, which has the label "Poll." This button should be present at all times for every TA.
- **Poll Auxiliary List:** A list to keep track of the number of times students have been helped. The data from this list is used as the weight for students for heapification of the queue to arrange a new order.

Frequency of Occurrence

As often as the TAs on duty can serve students.

2.2.6 UC12: Print Queue

Primary Actor

Either TA or Student, anyone with interest in the queue.

Stakeholders and Interests

TAs: Know the present order of the queue.

Students: Know their present placement in the queue, as well as available TAs.

Preconditions

The primary actor's account has been authenticated for that course.

Success Guarantee

The contents of the priority queue are printed to the screen in a scrollable format in the order that the students will be served. In addition, the presently logged-in TAs are listed at the top of this scrollable window.

Main Success Scenario

1. Primary actor pulls up the general in-person priority queue menu.
2. Primary actor hits the "Show Queue" Button.
3. System prints the presently logged-in TAs from the TA Auxiliary List (see UC8), followed by the contents of the queue in weighted order in a scrollable pop-up window.

Extensions

- 2a. TA is the primary actor and has not logged into the general in-person queue.
 1. System displays only the message "The queue is inactive."Note: This should occur with or without an active queue for a TA.
- 2b. A student is the primary actor and no TA has logged into the general in-person queue.
 1. System displays only the message "The queue is inactive."
- 2c. General in-person queue is empty.
 1. System displays only the message "The queue is empty."

Technology & Data Variation List

- **"Show Queue" Button:** This button should be labeled "Show Queue" and should always be available in the queue's menu for all users of the priority queue.
- **Cached Response:** The TAs on duty and the contents of the queue should be saved server-side once a user requests to view the contents of the priority queue to avoid repeated traversals of the heap. This cached response should be deleted when the queue is changed at all, or if a TA joins or leaves office hours, and refreshed once another request is put in to print the contents of the queue.

Frequency of Occurrence

As often as a user desires to see the contents of the priority queue.

2.2.7 UC13: Hogging Alert

Primary Actor

TA

Stakeholders and Interests

TAs: Know troublesome students who "hog" office hours and requests for help.

Offending Student: Limit the amount of help they actually get from TAs so they learn to not be overly dependent on others and understand the material themselves.

Other Students: Benefit from resources not being "hogged" by a few students.

Preconditions

The TAs' accounts have been authenticated for that course.

Success Guarantee

Upon the tenth attempt to enqueue or dequeue from the priority queue within an hour, the offending student has been locked out of all enqueueing and self-dequeueing operations. In addition, all TAs on duty and the professor of the course will receive a notification with the name of the student hogging the system for the purposes of record-keeping. The offending student is also notified of their behavior locking them out to prevent confusion and frustration with the queue.

Main Success Scenario

1. Student presses either the “Enqueue” Button or the “Dequeue” Button for the tenth time last time they were enqueued or dequeued respectively.
2. Student gets locked out of the present option to enqueue or dequeue.
3. All TAs on duty get a notification displaying the offending student’s name with some message detailing hogging behavior.
4. The professor for the course gets a notification displaying the offending student’s name with some message detailing hogging behavior regardless of if they are currently in office hours.
5. The offending student is also sent a notification explaining that their enqueue and dequeue operations have been locked temporarily due to 10 attempts to either enqueue or dequeue within an hour of each other.
6. After an hour, functionality to enqueue or self-dequeue returns to the offending student’s account.

Extensions

- 1a. General in-person queue is not active.

Note: This functionality does not trigger when the queue is inactive.

Technology & Data Variation List

- **Enqueue Auxiliary List:** A list to keep track of the number of times a student enqueues over the course of an hour. Refreshes back to 0 after an hour has passed since the last instance of a student enqueueing. When the counter reaches 10, locks the “Dequeue” Button so the student cannot self-dequeue for an hour when the counter refreshes. Note that the “Dequeue” Button should be the button on display following the tenth enqueue operation.
- **Dequeue Auxiliary List:** A list to keep track of the number of times a student self-dequeues over the course of an hour. Refreshes back to 0 after an hour has passed since the last instance of a student dequeueing. When the counter reaches 10, locks the “Enqueue” Button so the student cannot self-dequeue for an hour when the counter refreshes. Note that the “Enqueue” Button should be the button on display following the tenth dequeue operation.

Frequency of Occurrence

As often as a student enqueues or dequeues multiple times within an hour. Due to larger class sizes, this may never occur, unless a student is purposefully enqueueing and dequeueing from the priority queue.

2.2.8 UC14: Queue Deactivation

Primary Actor

TA

Stakeholders and Interests

TAs: Shut down the queue for the next office hour block to start anew.

Students: Have a refreshed state for things like placement in the priority queue and hogging-related values.

Preconditions

The TA’s account has been authenticated for that course. In addition, for the main flow, the TA is assumed to be the last TA in office hours during that office hour block.

Success Guarantee

For any given case, the TA deactivating the queue should be removed from the TA Auxiliary List (see UC8), and the “Log Out” Button should be replaced with the “Log In” Button (see UC8). For the case where the TA deactivating the queue is the last TA in office hours, the priority queue shuts down, clearing the data structure’s memory, in addition to all auxiliary data structures being cleared in a similar manner.

Main Success Scenario

1. The TA pulls up the general in-person priority queue menu.
2. The TA hits the “Log Out” Button.
3. The TA is removed from the TA Auxiliary List.
4. The priority queue is cleared of all student entries.
5. The Enqueue Auxiliary List is cleared of all student entries.
6. The Dequeue Auxiliary List is cleared of all student entries.
7. The Poll Auxiliary List is cleared of all student entries.
8. The “Log Out” Button transforms into the “Log In” Button for the deactivating TA.

Extensions

- 2a. The TA is not the only TA left in office hours.
 1. TA is removed from the TA Auxiliary List.
 2. The “Log Out” Button transforms into the “Log In” Button for the logged-out TA.
 3. The cached print response is cleared (see UC12).

Technology & Data Variation List

- **“Log In” Button:** Button on the general in-person priority queue menu given only to TA accounts to log out and clean up the queue. This would be labeled as “Log Out” if the queue is presently active. This button would change modes to the “Log In” Button (see UC8) if the TA has pressed the “Log Out” Button.

Frequency of Occurrence

Should occur only at the end of a TA’s office hours.

2.2.9 UC15: Student’s Location-Based Enqueue

Primary Actor

Student

Stakeholders and Interests

TAs: Have an organized list of students to help during in-person office hours, with order dictated by triage of occurrence.

Students: Automatically add themselves to the office hour queue to be helped by a TA during in-person office hours.

Preconditions

The Student’s account has been authenticated for that course. Said student also has given permission to the app to use their device’s location services.

Success Guarantee

The Student has been added to the general in-person priority queue. The Enqueue Auxiliary List increments the counter (see UC13) for the student entering the physical bounds of the office hours.

Main Success Scenario

1. Student walks to the location of in-person office hours.
2. Location services through the app notify the system of the physical location of the student being within the room where in-person office hours is occurring.
3. Priority queue is searched to see if the student is currently enqueued; finds that the student is not enqueued at the moment.
4. “Enqueue” Button deactivates temporarily so the student can be enqueued without repeated input from the same student.
5. Enqueue Auxiliary List increments the counter for the specific student (See UC13).
6. Priority queue references the number of times the student has been helped by a TA from the Poll Auxiliary List (see UC11). This value is what the priority queue sees and uses to heapify its contents upon every enqueue or dequeue operation.
7. Priority queue enqueues the student with the weighted value being the value retrieved in Step 6.
8. The cached print response is cleared, if applicable.
9. The “Enqueue” Button transforms into the “Dequeue” Button.
10. The “Dequeue” Button is reactivated for the student to remove themselves from the priority queue (see UC10).

Extensions

- 3a. General in-person queue is not active.
 1. System displays an error message detailing that the queue is not open since a TA is not available at the moment.
 2. “Enqueue” Button does not change to the “Dequeue” Button.
- 3b. Student is already enqueued.
 1. Nothing happens to the student’s account, nor do any values change relating to the student.

Technology & Data Variation List

- **Location Services Plug-In:** A feature to allow the location services of the user’s device to be used to get the present location of the student. This feature can be deactivated under the account’s settings.

Frequency of Occurrence

As often as a student needs help during office hours.

2.3 General Remote Priority Queue Use Cases

Note that the general remote priority queue also has similar use cases to UC8 to UC14. These were omitted for brevity, as the only differences between those for the general in-person queue and the general remote queue being the replacement of “in-person” with “remote,” and the preconditions being that the primary actor is prepared for or otherwise in online office hours instead of being in-person.

2.3.1 General Remote Priority Queue Special Use Case Diagram

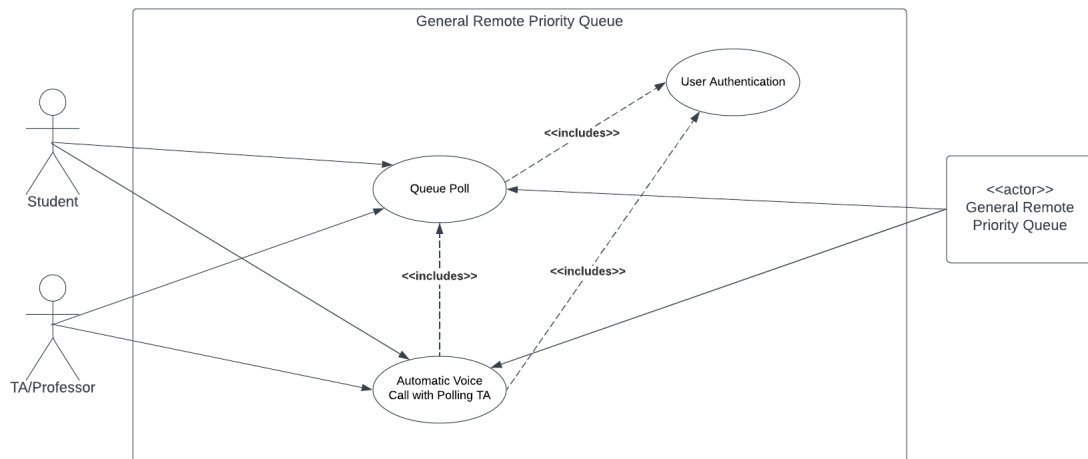


Figure 2.4: General Remote Priority Queue Special Use Cases

2.3.2 UC16: Automatic Voice Call with Polling TA

Primary Actor

TA

Stakeholders and Interests

TAs: Serve the next student in the queue.

Polled Student: Get served by the TA, and automatically get into a voice chat with a TA.

Other Students: Move closer to the front of the priority queue.

Preconditions

The TA's account has been authenticated for that course, and is conducting online office hours.

Success Guarantee

The Student has been removed from the general remote priority queue, and is able to be helped by the TA who polled them from the priority queue via online voice call.

Main Success Scenario

1. TA pulls up the general priority queue.
2. TA hits the "Poll" button.
3. The TA receives a message that gives the name of the student to be helped.
4. The student who was polled from the queue receives a notification on their device that gives the name of the TA.
5. Priority queue increments the counter for that student for the day in an auxiliary data structure.
6. Priority queue shifts its contents up, reheapifying the data structure with the remaining students in the queue.
7. The cached print response is cleared, if applicable.
8. Polled student is automatically linked to the TA in a voice call.

Extensions

2a. TA did not log into the queue.

1. System displays an error message detailing that the TA did not log into the queue.

Note: This should occur with or without an active queue.

2b. The queue is empty.

1. System displays an error message detailing that the queue is empty, and no students are in office hours to be helped.

Technology & Data Variation List

- **“Poll” Button:** This should be accessible only through a button on the general in-person priority queue menu given only to TA accounts, which has the label “Poll.” This button should be present at all times for every TA.
- **Poll Auxiliary List:** A list to keep track of the number of times students have been helped. The data from this list is used as the weight for students for heapification of the queue to arrange a new order.
- **Voice Chat System** System should already be in place to enable voice call. This system should automatically be activated through this feature.

Frequency of Occurrence

As often as the TAs on duty can serve students during online office hours.

2.4 TA-Specific Priority Queue Use Cases

Note that the TA-specific priority queue also has similar use cases to UC8 to UC14. For UC8 and UC14 specifically, there is no extension, as only that specific TA can activate and deactivate their personal priority queue, thus when they “log in” and “log out,” there is no other TA serving that queue. These use cases were omitted at length for brevity, as the only differences between those for the general in-person queue and the TA-specific queue being the replacement of “general in-person queue” and other similar verbiage to “TA-specific queue” and its analogues; as well as the preconditions being that the TA need not be in-person to hold office hours, and the student trying to attend need be in the same medium (in-person and online) as the TA. In addition, instead of any TA being able to perform operations like setting up, altering, or taking down the priority queue, these actions are specific to the hosting TA only, with additional permissions given to departmental faculty for monitoring the service.

The point of this special queue is to allow students to guarantee they personally meet with a specific TA, especially to follow up on a previous appointment.

2.4.1 TA-Specific Priority Queue Special Use Case Diagram

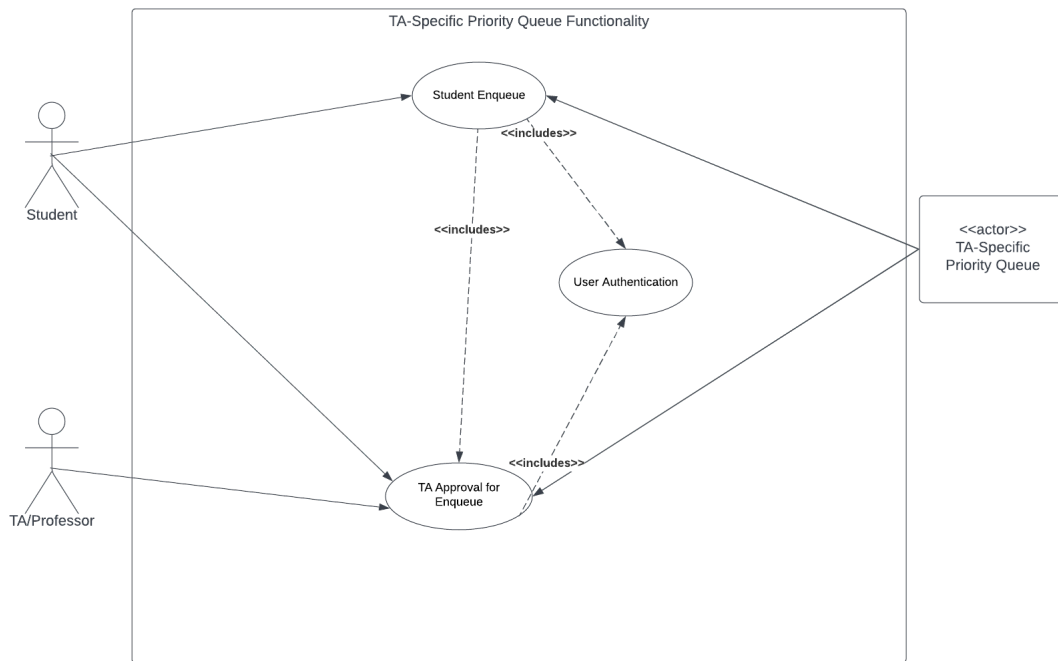


Figure 2.5: TA-Specific Priority Queue Special Use Cases

2.4.2 UC17: TA Approval for Enqueue

Primary Actor

TA

Stakeholders and Interests

TAs: Control who is in their personal TA-specific priority queue.

Students: Add themselves to the office hour queue to be helped by a specific TA during in-person office hours.

Preconditions

The Student's account has been authenticated for that course. The TA-specific priority queue must also have been activated.

Success Guarantee

The Student has been added to the TA-specific priority queue for that particular TA for the main flow. The student's value in the Enqueue Auxiliary List is incremented after this operation (see UC13). In addition, the "Enqueue" Button transformed into the "Dequeue" Button.

In the extended case where the student is rejected by the TA, the student's "Enqueue" Button has been temporarily disabled.

Main Success Scenario

1. Student pulls up the general in-person queue menu.
2. Student enqueues themselves into the queue using the "Enqueue" Button.
3. "Enqueue" Button deactivates temporarily so the student can be enqueued without repeated input from the same student.
4. System sends TA a notification detailing that the student wants to join their personal queue by name.
5. System also gives the TA two options for the student: "Accept" and "Reject."

6. TA accepts the student into their personal queue.
7. Enqueue Auxiliary List increments the counter for the specific student (See UC13).
8. Priority queue references the number of times the student has been helped by a TA from the Poll Auxiliary List (see UC11). This value is what the priority queue sees and uses to heapify its contents upon every enqueue or dequeue operation.
9. Priority queue enqueues the student with the weighted value being the value retrieved in Step 8.
10. The cached print response is cleared, if applicable.
11. The “Enqueue” Button transforms into the “Dequeue” Button.
12. The “Dequeue” Button is reactivated for the student to remove themselves from the priority queue (see UC10).

Extensions

- 2a. General in-person queue is not active.
 1. System displays an error message detailing that the queue is not open since a TA is not available at the moment.
 2. “Enqueue” Button does not change to the “Dequeue” Button.
- 5a. The TA rejects the student asking to join the queue.
 1. “Enqueue” Button is deactivated for two minutes before the student can enqueue again.
 2. Student is given a message detailing that the TA (by their name) has rejected them from joining their personal queue.
 3. “Enqueue” Button reactivates after two minutes have passed since they were rejected from the queue.

Technology & Data Variation List

- **“Enqueue” Button:** This should be accessible only through a button on the general in-person priority queue menu given only to Student accounts. This would be labeled as “Enqueue” if the queue is presently active or if the student is not already in the queue. This button would change modes to the “Dequeue” Button (see UC10) if the student is presently in the queue. This button is deactivated if the student triggers the Hogging Alert (see UC13), and reactivates after an hour. In this case, the button is also temporarily disabled in the case of the TA rejecting the student.

Frequency of Occurrence

As often as a student needs help during office hours.

Chapter 3

Asynchronous Interactions Use Cases

3.1 Asynchronous Interactions Use Case Diagram

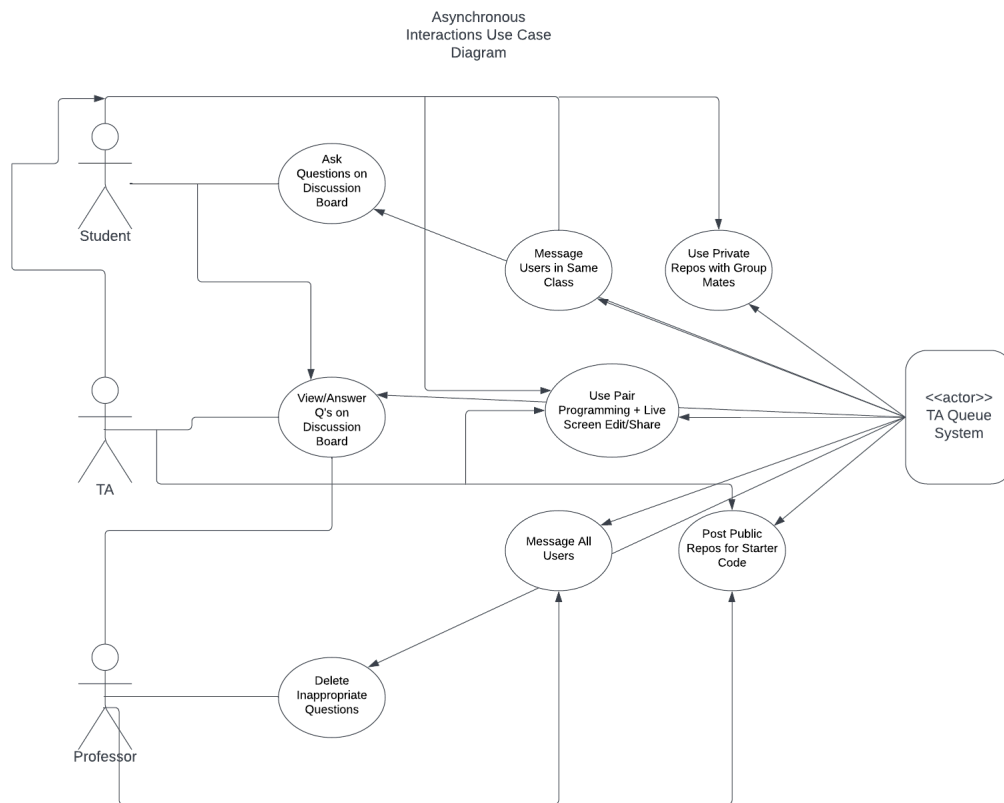


Figure 3.1: Asynchronous Interactions Use Case Diagram

3.2 UC18: Public Questions Section

Primary Actor

Student

Stakeholders and interests

Student: Wants to ask questions to clarify misunderstandings in material.

TAs and professors: Want to answer common questions in a public place to avoid repeating themselves and make office hours more efficient.

Preconditions

User is logged in, verified and enrolled for a certain class. Professor has enabled the questions board. Users must have internet access and enter questions with a keyboard.

Success Guarantee

Student can ask, answer, view questions. Super user can delete questions.

Main Success Scenario

1. Student clicks on Public Question Tab.
2. Student clicks on Ask A New Question.
3. Student types and submits question.
4. Other students, TAs, and professor can view, answer, and comment on the question.

Extensions

- 3a. Professor or TA can mark question as duplicate.
- 3b. Professor or TA can delete question if it contains too much information of a personal solution to an individual exercise (see UC33).

Special Requirements

- Questions board should hold at least 1024 questions per course at a minimum.
- Unicode should be supported.

Technology & Data Variation List

- **Ask A New Question** Button for students to ask a new question in the public forum. Should be labeled with “Ask A New Question.”

Frequency of Occurrence

High: Several questions a week.

3.3 UC19: Private Text Channels

Primary Actor

Student

Stakeholders and interests

Student: Communicate with each other to discuss assignments and coordinate work privately; message TAs quick questions without sitting in office hours.

TAs and professors: Answer direct questions in an asynchronous manner.

Preconditions

Both sender and recipient of a message are authenticated accounts, and enrolled/registered for the same course. In addition, for a message to send, the sender must have a valid, working Internet connection.

Success Guarantee

Student can message text, links, or files to other students, TAs, and professors. Asynchronous communication between any two parties can occur.

Main Success Scenario

1. Student clicks on Messages Tab.
2. Student searches for a user by name.
3. Student selects the desired text channel.
4. Student types and submits message to other user.

Extensions

- 2a. User can select a recently used channel to message in.
- 4a. User can block or report message as inappropriate.
- 4b. Messages can be deleted by either party.
- 4c. User can respond to a message with a reaction.
- 4d. User can directly respond to a message with another message or file.
- 4e. Sender does not have access to the Internet.
 1. System displays an error describing that the message could not be sent due to a lack of Internet connection.

Special Requirements

- Files up to 256 MB should be supported in this medium.
- Unicode should be supported.

Technology & Data Variation List

- **Messages Tab** Button with the label “Messages” that when pressed pulls up the messages menu and recently used channels.

Frequency of Occurrence

Very Very High: Should be able to support thousands of messages per course per hour.

3.4 UC20: Integrated Version Control Systems

Primary Actor

Student

Stakeholders and interests

Student: Share programs with their partners in a stable, agile manner.
TAs and professors: Track version history and teach good habits.

Preconditions

User is authenticated for the course, and has a valid, working Internet connection. Files are also present to push to the git version control service.

Success Guarantee

Student can push, pull, and clone git repositories to which their account has access. Faculty can view all repositories, regardless of public or private access.

Main Success Scenario

1. Student clicks on Git Tab.
2. All repositories connected to the student's account are visible.
3. Student selects the repo to access.

Extensions

- 2a. Student edits repo.
- 2b. Student deletes repo.

Technology & Data Variation List

- **Version Control/Git Tab** Button with the label "Git" that when pressed pulls up the version control menu and all recent repositories.

Frequency of Occurrence

Very Very High: Should be able to support hundreds of commits per course per day.

3.5 UC21: Pair Programming Capability

Primary Actor

Group of Students

Stakeholders and interests

Student: Develop pair programming skills and be more comfortable with synchronous teamwork.

Preconditions

Both users are authenticated accounts, and enrolled/registered for the same course, and have valid, working Internet connections.

Success Guarantee

Student can create and edit file simultaneously with another student.

Main Success Scenario

1. Student clicks on Messages Tab (see UC19).
2. Student searches for a user by name.
3. Student selects the desired user.
4. Student presses the Pair Session Button.
5. Student selects the home repository for the file to be saved in.
6. Pair Programming mode activates, opening a text editor that both students can access, add, and remove text from. The text editor is auto-saved once every minute, with the file being saved to the repository that the initiating student chose.

Extensions

- 6a. Student manually saves file.

Special Requirements

- File editing should be automatic and immediately updated for all parties.
- Unicode should be supported.

Technology & Data Variation List

- **Pair Session Button** Button with the label “Start Pair Session” that when pressed pulls up the text editor that can be seen by both editing parties.

Frequency of Occurrence

Very High: Should be able to support tens of pair programming sessions per day.

3.6 UC22: Live Screen Editing and Sharing

Primary Actor

Students

Stakeholders and interests

Student: Work with either other students or a TA to work together or get help respectively.
TAs and professors: Help students in a more direct manner.

Preconditions

Both host and guest on a call are authenticated accounts, and enrolled/registered for the same course. In addition, both parties must already be on a video call, in a manner similar to UC1.

Success Guarantee

Student can share live screen with another user, and the other user can make live edits to the host's screen.

Main Success Scenario

1. Guest asks for screen editing permission via call settings button on the side of the screen.
2. Host account grants access to the guest account.
3. Both host and guest can directly edit the screen.

Extensions

- 2a. Host rejects screen editing permission
 1. The guest user receives a message from the system detailing the rejection of screen editing permissions.

Special Requirements

- Minimal delay should occur over the call.

Technology & Data Variation List

- **Call Settings Button** Button on the side of the screen during a voice call that allows for screen editing permissions. Screen editing should only be hosted on student accounts for security and privacy reasons.

Frequency of Occurrence

High: Should be able to support dozens of editing sessions simultaneously.

Chapter 4

Course-Based Functionality & Use Cases

4.1 Course-Based Use Case Diagram

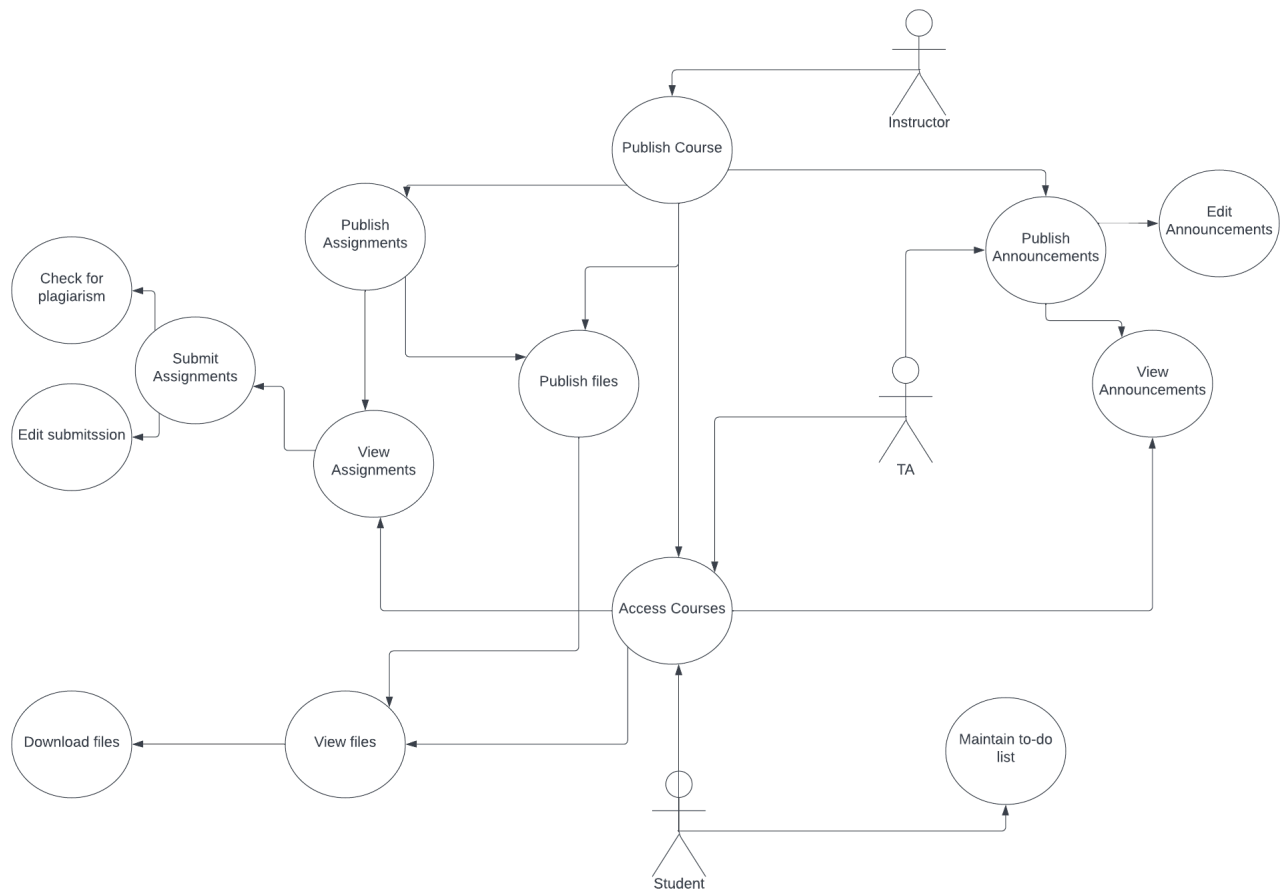


Figure 4.1: Course-Based Use Case Diagram

This chapter will tackle the course management aspects of the system. It will go over the use cases of course viewing, announcements, submissions and plagiarism checking, and a to-do list.

4.2 UC23: Access to Enrolled Courses

Primary Actor

Student

Stakeholders and Interests

Student: need full record of enrolled courses.

TA: need courses they take as student and as TA separated.

Instructor: need access to all the courses they teach.

Preconditions

User is authenticated and currently logged in.

Success Guarantee

User has access to organized list of courses.

Main Success Scenario

1. User clicks on Courses Button.
2. Organized list of courses is displayed.

Extensions

- 2a. Account is not registered for any courses.
 1. Empty list is displayed on the screen.

Special Requirements

- Ability to sort courses by term or major or level.

Technology & Data Variation List

- **Courses Button:** Button to display the courses that an account is registered for.
- **Filter and Sort Button:** Button to bring up filtering and sorting menu for courses.

Frequency of Occurrence

High: Whenever a student needs to access a course.

4.3 UC24: Announcement Creation

Primary Actor

Faculty or TA

Stakeholders and Interests

Student: need timely alerts for announcements.

Faculty or TA: need to ensure their announcements are seen.

Preconditions

User is authenticated and enrolled in a course that they are authorized to send announcements to. Primary actor is also presently logged in.

Success Guarantee

Faculty and TAs are able to send announcements to students.

Main Success Scenario

1. Faculty or TA accesses the relevant course.
2. Faculty or TA clicks on the announce button.
3. Faculty or TA is presented with text box to enter a title and a text editor to construct the announcement body.
4. When the announcement is constructed the Faculty or TA sends the announcement by clicking the send announcement button.
5. The Faculty or TA is taken to the final announcement view.

Extensions

- 5a. The Faculty or TA finds an error after posting and needs to correct it.
 1. The Faculty or TA clicks on the edit button.
 2. The Faculty or TA is taken back to the announcement constructor page.
 3. The Faculty or TA makes the edits and clicks on the update announcement button.
 4. A new version of the announcement is posted, but the old version is still accessible.

Special Requirements

- Limit announcement titles to be brief.
- Show announcement urgency level.

Technology & Data Variation List

- Email Notifications: check box to send emails about the announcement.

Frequency of Occurrence

Moderate: announcements are supposed to be for unusual happenings.

4.4 UC25: Announcement Viewing

Primary Actor

Student

Stakeholders and Interests

Student: Need timely alerts for announcements.

Faculty or TA: Need to ensure their announcements are seen.

Preconditions

Student is authenticated and logged in, and enrolled in a course which has an announcement.

Success Guarantee

Student has access to the most correct version of announcements as soon as they are posted. Announcement viewed as marked.

Main Success Scenario

1. Student goes to the home page.
2. The home page has an announcement section. The announcement section has a list of announcement titles with embedded links to the announcements' views.
3. The student has a new unread announcement.
4. They click on the announcement's title.
5. They are taken to the announcement pages.

Extensions

- None

Special Requirements

- Prevent clutter by hiding seen announcements.
- Provide full list of all announcements with useful filters.

Technology & Data Variation List

- Disable Email Notifications: check box to disable receiving emails about announcements.

Frequency of Occurrence

High: Whenever a course has a new announcement.

4.5 UC26: File Viewing

Primary Actor

Student

Stakeholders and Interests

Instructor: Needs a file system for students to access materials.

Student: Needs fast access to course materials.

Preconditions

Student is authenticated. Student has an enrolled course. Student is enrolled in course

Success Guarantee

Student can access files in uploaded to a course.

Main Success Scenario

1. Student navigates to desired course.
2. Student clicks on files section of the course.
3. Student is presented with directory tree that represents the files for the course.

Extensions

- None

Special Requirements

- A standardized file system for courses, to streamline navigating different courses.
- Linking file system to assignments, so that every new assignment is represented automatically in the file system, to make maintaining an organized file section easy.

Technology & Data Variation List

- **Button to download files:** button to allow user to download a file or folder.
- **File converter:** converts between popular formats (txt, pdf, docx, etc).
- **View change button:** button to switch between directory tree view and a more user friendly view.

Frequency of Occurrence

High: whenever course materials are accessed.

4.6 UC27: Assignment Viewing

Primary Actor

Student

Stakeholders and Interests

Student: Needs access to assignments.

Instructor: Needs assignments to appear accurately.

Preconditions

Student is authenticated and logged in.

Success Guarantee

Student has access to an organized list of assignments.

Main Success Scenario

1. Student goes to the home page.
2. The home page has an assignments section. The assignments section has a list titles with hyper links to the assignment body.
3. They click on an assignment's title.
4. They are taken to the assignments pages.

Extensions

- None

Special Requirements

- Important information need to be displayed at the top of the assignment page.

Technology & Data Variation List

- Q&A integration: make Q&A linked to assignment page.

Frequency of Occurrence

High: Whenever a student needs to view an assignment.

4.7 UC28: Assignment Submission

Primary Actor

Student

Stakeholders and Interests

Student: need a reliable and communicative system for submissions

Faculty and TAs: need to be able to view the submissions

Preconditions

Student is authenticated and has the files required to submit. Student is enrolled in a course and presently logged in.

Success Guarantee

Submission is recorded and can be viewed by the student, instructor, and verified graders.

Main Success Scenario

1. Student is presented with the home page with the assignments section.
2. The student selects the assignment they want to submit.
3. They are taken to the assignment's page.
4. They drag and drop or use the file explorer to pick files to submit.
5. They click "submit" to finalize their submission.

Extensions

- 4a. Student submits two files with the same name.
 1. The system should detect duplicates and prevent them.

Special Requirements

- Submission needs to be reactive and communicative. A student needs to know the status of their submission exactly.

Technology & Data Variation List

- Drag and drop box: An area of the submission page that accepts dragging and dropping files.
- System explorer button: Shows a screen that allows selecting files via system file explorer.

Frequency of Occurrence

High: whenever a student has an assignment they need to submit.

4.8 UC29: Submission Editing

Primary Actor

Student

Stakeholders and Interests

Student: need to fix their mistakes on older submissions.

Faculty and TAs: need to be able to view the full history of edits.

Preconditions

Student is authenticated and has submitted before. The assignment has multiple submissions allowed.

Success Guarantee

Submission is edited and logged.

Main Success Scenario

1. Student navigates to the assignment they want to edit.
2. The student has already submitted so they click on the "edit submission" button that has taken the place of the "submit" button,
3. The presented with the submission editor view where they can select files and remove them.
4. The student makes the desired changes.
5. They click "update submission" to finalize their submission.
6. The edit is logged.

Extensions

- 2a. Student needs to edit past the deadline.
 1. The system should alert the student and mention any preset penalties and ask if they would like to proceed or go back.

Special Requirements

- Changes log: an area of the submission page that displays a briefing view of all changes done with time stamps.

Technology & Data Variation List

- None

Frequency of Occurrence

High: whenever feedback is given and multiple submissions are allowed.

4.9 UC30: Plagiarism Checking

Primary Actor

Student

Stakeholders and Interests

Student: needs to verify their work is not plagiarized.

Teachers: needs to make following the academic honor code easy.

Preconditions

Student is verified. Assignment has plagiarism checker linked.

Success Guarantee

Student is notified on whether plagiarism is detected or not.

Main Success Scenario

1. Student is in the assignment page, and has pressed the submit assignment button.
2. The system submits to the plagiarism detection software linked to by the assignment maker.
3. The system reports the result of the plagiarism check.

Extensions

- 3a. Declined submission.
 1. If the assignment creator specifies, the system will decline a plagiarized submission.

Special Requirements

- Give student access to plagiarism checker directly in case communication fails.

Technology & Data Variation List

- API compatability: need to be able to communicate with APIs for plagiarism checker.

Frequency of Occurrence

High: plagiarism checking is used as often as assignments are submitted.

4.10 UC31: To-Do List

Primary Actor

Student

Stakeholders and Interests

Student: needs a way to manage their assignments.

Preconditions

Student is verified.

Success Guarantee

Student is able to build a to-do list with tasks tied to courses.

Main Success Scenario

1. Student logs in.
2. Student is taken to home page with a "to-do list" button.
3. Student clicks on to-do list.
4. Student can view their to-do list.
5. Student clicks on "add task" button.
6. Student adds tasks to the to-do list, and can tag them with courses to organize them.

Extensions

None

Special Requirements

- Color coding tasks based on course.
- Making custom tag groups for tasks.

Technology & Data Variation List

- Clear button: button to clear all the items from the list.
- Change view button: button to change view between conventional to-do list and a to-do list with items grouped by course or tag.

Frequency of Occurrence

Very Very High: Should occur whenever a student signs in.

Chapter 5

Security & Quality of Life Use Cases

5.1 Security & Quality of Life Use Case Diagram

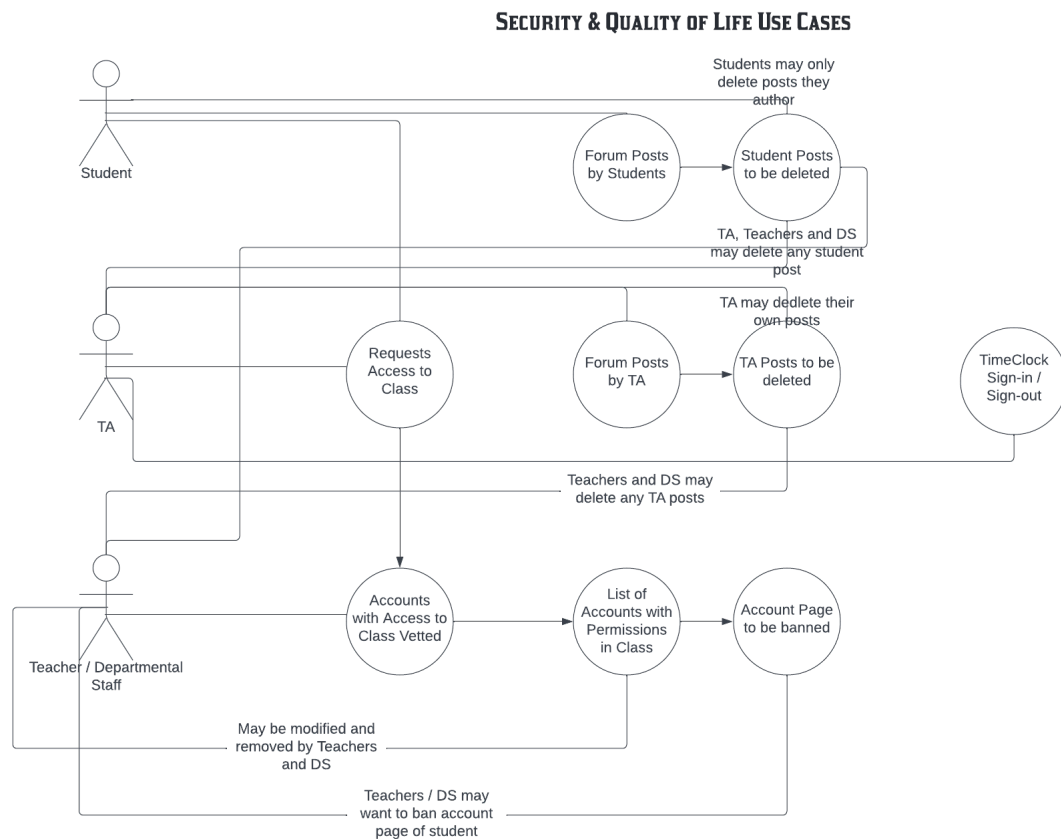


Figure 5.1: Security & Quality of Life Use Case Diagram

5.2 UC32: Different Levels of Access per Account Type

Primary Actor

Departmental Staff

Stakeholders and Interests

Professor: Have the highest control to monitor and track all matters for the course.

TAs: Have elevated access for monitoring and tending to the course and office hours.

Students: Have access to the course and its functions.

Preconditions

Student, TA, or Professor needs to have an account made for a particular class. This can happen when courses are added to a student's schedule or a TA is newly hired, or the professor changes for the course at a point in the future.

Success Guarantee

The party who needs a new account is granted access at the proper level: Student, TA, or Professor.

Main Success Scenario

1. The department receives a notification that a new person needs an account, with their PID for TAs or Students who need an account, or some other identifier if a professor.
2. The department creates a new profile for the course requested.
3. The department inputs the identifier information for the new account.
4. The new account is granted the proper permissions per requested level.
5. The account for that class is then linked to the person's TA Queue account, so they can now access the course.

Frequency of Occurrence

High at the beginning of the semester, low at any other point: Every time that someone is added to a course.

5.3 UC33: Removing Forum Posts

Primary Actor

Student, Teacher, or TA

Stakeholders and Interests

1. Student: wants to remove their own post from the forum
2. Teacher/TA: wants to remove any post from the forum

Preconditions

1. Student: student must be the author of the post
2. TA: any student post, or a post authored by that TA
3. Teacher: any student or TA post, or a post authored by that teacher

Success Guarantee

Post is removed from the forum, cannot be viewed by any student, TA, or teacher in the future.

Main Success Scenario

1. User prompts post to delete, through the post options.
2. User is asked whether they are sure they want to delete post.
3. User clicks yes.
4. Browser refreshes with post deleted.

Extensions

- 1a. User is not authorized to delete post.
 1. Post options does not include the delete option for the post.
- 3a. User clicks no.
 1. Returns to previous view, without deleting post.

Frequency of Occurrence

Low - Medium: Most posts will not be deleted.

5.4 UC34: Removing Account Permissions

Primary Actor

Teachers

Stakeholders and Interests

1. Teacher: needs to be able to modify student accounts as TAs or students in the class.

Preconditions

Must be a teacher.

Success Guarantee

Target account gets permissions removed.

Main Success Scenario

1. Navigate to class page.
2. Navigate to account permissions to access list of students with permissions in the class.
3. Click [x] next to user whose permission you want to remove.
4. Verify that you want to remove account permissions of the account.
5. Browser refreshes with account removed from list.

Extensions

- 3a. Choose other permission status (TA, student, etc.) for the student
 1. Verify that the change to new permission status should be performed.
 2. Browser refreshes with account permission status changed.
- 4.a Say 'No' to the verification that the permissions should be removed.
 1. Return to browser without any changes being applied.

Frequency of Occurrence

Low - medium: Changing permission status should be accomplished irregularly.

5.5 UC35: Banning Accounts

Primary Actor

Teachers

Stakeholders and Interests

1. Teacher: needs to be able to modify student permissions to suit their needs.

Preconditions

Account logged in has Teacher permissions.

Success Guarantee

Student does not have access to teacher's classes.

Main Success Scenario

1. Navigate to student page.
2. Click "Ban" under student options.
3. Verify that you want to ban account.
4. Browser refreshes with banned account stating that account is banned, and presenting an unban prompt.

Extensions

- 3a. Say no to the ban verification.
 1. Return to student page without any changes.

Frequency of Occurrence

Low: Bans occur few and far between so very unlikely to happen.

5.6 UC36: TimeClock Integration

Primary Actor

TA's

Stakeholders and Interests

TA's need to log in their hours spent while serving as a teacher's assistant.

Preconditions

Logged in as a TA account.

Success Guarantee

Records the time into the TimeClock system.

Main Success Scenario

1. Navigate to the TimeClock section.
2. Click on sign in.
3. Refresh browser with sign notifying that user is signed into TimeClock. Sign in button converted to sign out.
4. Click on sign out once time to work as a TA has been completed.
5. Records time into TimeClock. Refresh browser with sign notifying that user is signed out of TimeClock. Sign out button converted to sign in.

Extensions

None

Frequency of Occurrence

High: Every time the TA wishes to work as a TA, they will use this system.

Chapter 6

TA Queue Class Diagram

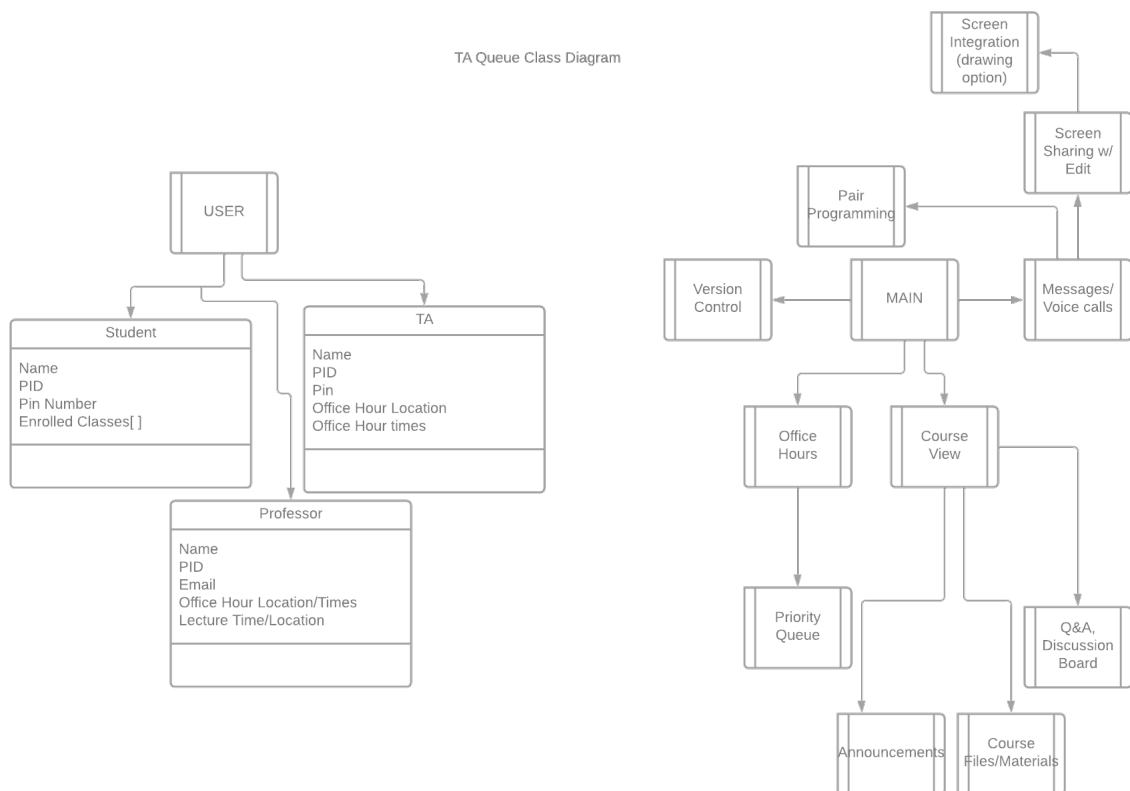


Figure 6.1: TA Queue Class Diagram

Chapter 7

Supplementary Specifications

This section is a list of specific non-functional requirements that describe criteria and benchmark requirements for an effective, usable product.

- Limited latency: less than 250 ms response time to server requests.
- Text made accessible through large font size scaling, from 8 pt to 48 pt font.
- Supports differing display sizes such as 4:3, 1080P or 4K resolutions.
- Supports ability to zoom into pictures and small text to improve readability.
- Different coloring schema to support color-blindness for mono-chromatic, blue-yellow, or red-green color blindness.
- Cross-platform capability, usable on Desktop, Mobile, Tablet.
 - Supports Windows, MacOS, iOS, Android, Linux.
- Ability to access resources in an offline mode for those in remote areas.
- Resources back up every 24 hrs to remote cloud servers.
- Users are able to send files of up to 5 GB through system at one time.