



Bilkent University  
Department of Computer Engineering

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# CS 319- Object-Oriented Software Engineering

## CATCH UP

## Project Analysis Report

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# Analysis Report

*CatchUp: Classroom Helper*

## 1 Introduction

As group 1H, we are designing a classroom helper web-based application named “CatchUp”. Classroom helper applications ensure instructors, teaching assistants and students to easily interact with each other to complete the project of the ongoing semester. As we are the students of Bilkent University, there might be a more understandable application which organizes the semester by organizing the group assignments, group formations, projects, reports, etc.

Undoubtedly, there are many examples of classroom-helper applications with the same features. However, due to the fact that a classroom-helper application is appropriate for object-oriented design, we created the general features of the project as follows:

- Dashboard
- Message
- Announcements
- Profiles
- Calendar in which the students and teaching assistants can see his/her due dates for upcoming project assignments.
- Current grade calculations (average calculations)

- Instructor's timetables for students and groups to make a reservation (like office hours but appointment)
- Course Pages
- Random member adding when the number of the group members in a group is less than minimum person constant that is given by TAs

Also, the specified features of instructors, students, and teaching assistants are respectively:

**For Instructors:**

- Can create course pages,
- Assign Artifacts (Due Date-close assignment),
- Give feedback,
- Grading assignments,
- Lecture Notes,
- Example project artifacts,
- Project Description-syllabus,
- Can create polls,
- Reports for assignments after due dates of homework for example how many groups do the given assignment in time.
- Can see statistics

**For Students:**

- Can enroll course pages,

- Can view other groups pages,
- Their profiles will include peer review rates and comments,
- Default review questions,
- Review other group's work,
- Assess Team Members,
- Due date reminder that will notify each student,
- General message groups,
- Group formation request to instructor,
- All of them are admin in their groups
- Assistant reviews

#### **For Groups:**

- Deadline request for extension
- Notice for students for searching groups. For example, when a group needs one more person with specific requirements, they give ads.
- Add member according to requests
- Remove member
- Private message between group members

#### **For TAs:**

- Can enroll course pages,
- Grading for each assignment,
- Give feedbacks,
- Group formation according to the requests

- Can delete a group but can't add a person to an existing group

At the implementation stage of the project, we will use HTML5, CSS3, and JavaScript for the frontend developing, whereas, Spring framework of Java, and MongoDB for backend developing.

## **2 Overview**

### **2.1. Dashboard**

The dashboard screen will be displayed after the logging in process for every user, while it can be accessed from the menu. This page will include the general course page which they can see other groups and their own group page. Hereby, all students can see the overview of the process of the course and see how much progress has been made, or how much progress remains until the end of the course.

### **2.2. Message**

All users (teaching assistants, instructor, and students) can compose messages to each other. However, there are two types of message platforms. Group chats and direct messages. For example, by group chat there will be a conversation in which all students and teaching assistants enrolled in the course can see the written message. Therefore, students and teaching assistants enrolled in the course can interact with each other. Also, another chat will be created by groups chatting feature when the project groups get created and each project group can interact with each other to

design their project. Direct messaging ensures all users can interact with each other privately. None of the other users can see the messages between the two users.

### **2.3. Announcements**

Instructors can make announcements to the general course page. None of the students have permission to change this page. However, instructors will have permission to announce announcements.

### **2.4. Course Page**

There will be a course page that includes course materials which are respectively: Information about the basic course requirements, syllabus, project progress, report progress, topic progress, and link to group pages, etc. The layout of the course page will consist of the materials divided into weeks.

### **2.5. Group Pages**

Groups are formed by instructors according to the request of students. Each group has unique names, participants, reviews and rates given by other groups, uploaded assignments. The grades of these assignments can only be seen by group members. Participants can create group meetings and these meetings can be seen by all members of the group in their calendar. Meeting can be edited by all of the members of the group. Also students can see feedback of the instructors and TAs from their group pages.

## **2.6. Unique Profiles**

Each user has their own unique profiles with distinct features. Student profiles consist of name, surname, department information, group information, student id, grade, skills related to the project such as programming languages and peer review. Teaching Assistant profiles consist of name, surname, id, mail address and review. Instructor profiles consist of name, surname, course id, timetable, mail address, location of the office.

## **2.7. Calendar**

The calendar will help all of the students and teaching assistants, to keep track of their upcoming events such as group meetings, assignment deadlines, grading deadlines, feedback deadlines, etc. Students will receive notifications one day before the due date through a pop-up. Students can also be able to the one day reminder at their student profile.

## **2.8. Instructor's Timetable**

The instructor's timetable will be visible in the instructors' unique profiles for all the users to be aware of the times that an instructor is available. Both students and teaching assistants can send the message to the instructor after looking at the free hours from this page to make an appointment with the instructor.



### **3 Functional Requirements**

There will be functional requirements for each user type (instructor, student, teaching assistant, group).

#### **3.1. Instructor**

##### **3.1.1. Sign Up**

Instructors will sign up from their sign up part which wants information from the instructor such as name, surname, password and email address.

##### **3.1.2. Edit Instructor Profile**

Instructors will be able to change their profile by editing features such as name, surname, password, location of the office and timetables. Besides, they can add profile photos.

##### **3.1.3. Create Course Page**

Instructors will create the course page to be enrolled in by students and teaching assistants. As mentioned before, the course page will include information about the basic course requirements, syllabus, project progress, report progress, topic progress, and assigned artifacts, link to group pages, etc. After the course page is created, every course page will have unique code for students to enroll in this course page. Instructors can determine the content of the page and arrange it accordingly.

#### **3.1.4. Assign Assignments (Artifacts of The Project)**

Instructors will assign project related reports, source codes, demo dates etc. Also, there will be determined deadlines for students. The deadline, assignment type, also whether there will be feedback or not will be determined by the instructor. Instructors will determine the due date by entering date and time specifically. Instructors can upload assignments with a simple explanation and with or without a pdf file. Additionally, instructors will assign deadlines for teaching assistants to grade assignments.

#### **3.1.5. Edit Assignment**

Instructors can edit the assignment features. For example if they want to change the due date or want to extend the deadline they are able to change it through there. The changes will be done in the assignment section of the course page.

#### **3.1.6. Give Feedback**

Instructors can give feedback to the given assignments. Firstly, the instructor will enter the course page. Then, under the week section that homework's deadline is on, instructors can see which groups have uploaded their homeworks before and after the deadline in order to indicate late submissions. Then, the instructor can click these group links of the submissions and the system will direct him/her to the chosen group's page assignment part in order to give feedback. However, it is not mandatory

to give feedback to every assignment. Instructors will determine which assignment requires feedback or not when adding the assignment.

#### **3.1.7. Grading Assignment**

Firstly, the instructor will enter the course page. Then, under the week section that homework's deadline is on, instructors can see which groups have uploaded their homeworks before and after the deadline in order to indicate late submissions. Then, the instructor can click these group links of the submissions and the system will direct him/her to the chosen group's page assignment part in order to grade. It is mandatory to grade every assignment.

#### **3.1.8. Share Lecture Notes and Example Project Artifacts**

Instructors can share the slides or the lecture notes that they follow during the lectures week by week or the instructor can directly add the notes to the lecture notes part above the course page. Besides that, they can add example project artifacts from previous semesters.

#### **3.1.9. Share Syllabus (Course Description )**

Instructors can share the syllabus and course information for students to be ready for the semester. It will be shown on the syllabus link above the course page.

#### **3.1.10. Message**

Instructors can receive and send messages to all users privately. It is useful especially for students to ask the instructor about reserving a meeting or office hour after looking at their time tables. They are also able to have group chats.

#### **3.1.11. Create Polls**

Instructors can create polls for getting the opinions of the students about the progress of the course. They can create the poll from the course page. When they click “create poll”, the system will direct them to the poll creation page. Instructors will enter the question and options for students to choose. Results will be shown to the instructor at the end of the time that is determined by the instructor during the creation phase of the poll. This ensures the course to be more interactive.

#### **3.1.12. Report Assignment Statistics**

Instructors can see the stats of the assignments (artifacts of the project) as separate reports for each assignment consisting of the average grade, the number of students who upload the assignment on time, peer reviews. After entering all the grades of submissions, the instructor will be shown a button to see statistics. Every time the instructor clicks the button the report will be generated from starch. By that, if the instructor makes any change in grades, information will be updated in the report. The report will be shown in the course page of the instructor under the assignment part.

### **3.2. Student**

### **3.2.1. Sign up**

Students will sign up from their sign up section which wants information from the students such as name, surname, password, mail address, student number, department and grade.

### **3.2.2. Edit Student Profile**

Students will be able to change their profile by editing features such as name, surname, password, photos.

### **3.2.3. Enroll Course**

Each student will enroll in the course to know more about course related topics (artifacts of the project), interact with the instructor, teaching assistants or the students that take the same course. However, if they do not have the course code, they can't enroll in the course. After enrolling in a course, students will be able to access the course page. They enroll courses from their dashboards.

### **3.2.4. Upload Assignment**

Students can upload artifacts to the system in order to be graded and given feedback from teaching assistants and instructors. Students use the corresponding assignment's uploading place in their group's page and only the group members are

authorised to upload an assignment, However, the instructor, teaching assistants and other students can view the submission to give feedback.

#### **3.2.5. Send Message**

Students can send messages to all other users. They can either use the general messaging groups which enables them to communicate with students, instructors and teaching assistants, private messaging feature to communicate with someone privately, or the group messaging feature that helps group members to interact with each other. Hereby, the course progress will be more interactive. Also, students can send a message privately to the instructor to arrange an appointment within the available time slots in the instructor's timetable given in his/her profile or ask questions.

#### **3.2.6. Request to Form Group**

Undoubtedly, there will be groups for the projects. After students form their groups unofficially, they request from the teaching assistants to confirm their group formation and make it official.

#### **3.2.7. Find Groups for Students**

A student having no group who sees the ad of other groups on the course page under the ads part can communicate with the group which gives the ad via message. In case of agreement of the student and the group, the group is able to add the student to their group. Besides that, students can give ads individually if they are in search of a group. Ads will be shown in the course page.

#### **3.2.8. Assess Team Members (Peer Review)**

Each student can assess their group members. They can assess them by writing comments and giving rates out of 10. They can submit the peer reviews just once. The comments will be visible in the assessed student's page anonymously. Also, the rates given by the group members will be averaged and shown in the student's profile. However, instructors can see the owner of these comments and rates. At the end of each assignment, group

#### **3.2.9. Review and Give Feedback to Group's Work**

Students can give feedback and rates to others and their own groups' work to be more interactive. They can submit the feedback and reviews just once. Thereby, they can encourage themselves to develop better artifacts. The works done by each group can be rated out of 10. However, the given points and feedback will be anonymous for students, while visible for the instructor. Only their group name will be visible while grading. They can reach these group pages from the general course page.

### **3.2.10. Submit Polls**

Students will submit polls which are created by their course instructor. The poll will only be able to submit in the time period stated by the instructor. Polls will be shown in the course page. Students will be able to submit the poll just once.

## **3.3. Teaching Assistant**

### **3.3.1. Sign up**

Teaching assistants will sign up from their sign up part which wants information from the TA's such as name, surname, password, mail address.

### **3.3.2. Edit Teaching Assistant's profile**

Teaching assistants will be able to change their profile by editing features such as name, surname, password, location of the office, photos.

### **3.3.3. Enroll Course**

Each teaching assistant will enroll in the course by using the course code created by the instructor. If they do not have course code, they can not enroll in the course. They enroll courses from their dashboards.



### **3.3.4. Grade Assignments and Give Feedback**

Teaching assistants can grade the assignments and give feedback to them (artifacts of the project). Firstly, the teaching assistant will enter the course page. Then, under the week section that homework's deadline is on, teaching assistants can see which groups have uploaded their homeworks before and after the deadline in order to indicate late submissions. Then, the teaching assistant can click these group links of the submissions and the system will direct him/her to the chosen group's page assignment part in order to grade and give feedback. It is mandatory to grade every assignment before the deadline given them by the instructor. However, feedback is optional.

### **3.3.5. Assign Assignments**

Teaching assistants will assign project related reports, demo dates etc. Also, there will be determined deadlines for students. The deadline, assignment type, also whether there will be feedback or not will be determined by the teaching assistants. Teaching assistants will determine the due date by entering it specifically . Teaching assistants can upload assignments with a simple explanation and with or without a pdf file.

### **3.3.6. Edit Assignment**

Teaching assistants can edit the assignment features. For example if they want to change the due date or want to extend the deadline they are able to change it through there. The changes will be done in the assignment section of the course page.

### **3.3.7. Manage Requests**

Teaching assistants will receive requests from students who decide their group members and name. If the group does not exceed the maximum member limit, teaching assistants will confirm the request and create the group page. However, they will not be able to add or remove members from the group page. They are also able to delete the group pages. After accepting the request, the assistant will enter the mail addresses of group members and name of the group. After that the group page will be created automatically by the system for participants. It is possible to see these groups from the course page of any users.

## **3.4. Groups**

### **3.4.1. Request Deadline Extension**

Students can make a request in order to extend the due date of an assignment. The stats of how many students request deadline extensions will be visible on the course page. Groups can request this from under the assignment part.

### **3.4.2. Giving Ad for Group Member**

In the case of missing group members, students can place an ad on the course page to find remaining group members by specifying the qualifications they look for in the potential group member. Thanks to this feature, group formation can be completed in an easier way and a new group member who bridges the specific gap related to the project can be added.

### **3.4.3. Add Member**

In case of agreement with a student to join the group, groups can add the student and the student becomes capable of submitting reports or messaging with the other group members within the group chat window.

### **3.4.4. Remove Member**

When a student requests to leave the group or group members except a specific student decide not to be a group member with the specific student anymore, the group can remove the student.

## **4 Non Functional Requirements**

### **4.1. Usability**

#### **4.1.1 User-Friendly Interface**

The interface will not be complex, instead it will be simple and provide quick access to essential features and commands. Interface requires minimal explanation to understand how to use it.

#### **4.1.2 Group With No Member**

Teaching assistants cannot create groups with no members. Besides that, if all members of one group leave the group, the system will automatically delete this group.

#### **4.1.3 Enrollment Failure**

When a student enters the wrong course code, or the email of the instructor the system does not allow the student to enroll in the course and show error to the user.

#### **4.1.4 Invalid Password or Email Address**

When a user enters the wrong password or email address, the system will not accept this information and show error to the user.

#### **4.1.5 Time Limitation Of Polls**

There is limitation for the time of the polls and this is determined by the instructor. After time out for polls, students cannot make changes in their choices.

#### **4.1.6 Poll submission once**

Students have only one attempt to submit their poll answers. After submitting they can not change the options they chose.

#### **4.1.7 Peer and Artifact Review Limitation**

Students can make only one attempt to rate their group members', other groups' and themselves' works. After submitting they can not change the grades or feedback they have given.

### **4.2 Reliability**

#### **4.2.1 Exception Handling**

Program will have an exception handling mechanism to prevent errors. It will display error messages if the error is caused by the users.

### **4.3 Performance**

#### **4.3.1 Maximum Submission Size**

Files with size 15 MB can be accepted through the submissions of assignments. Files that exceed that limit will give error.

### **4.4 Security**

#### **4.4.1 Time out for Accounts**

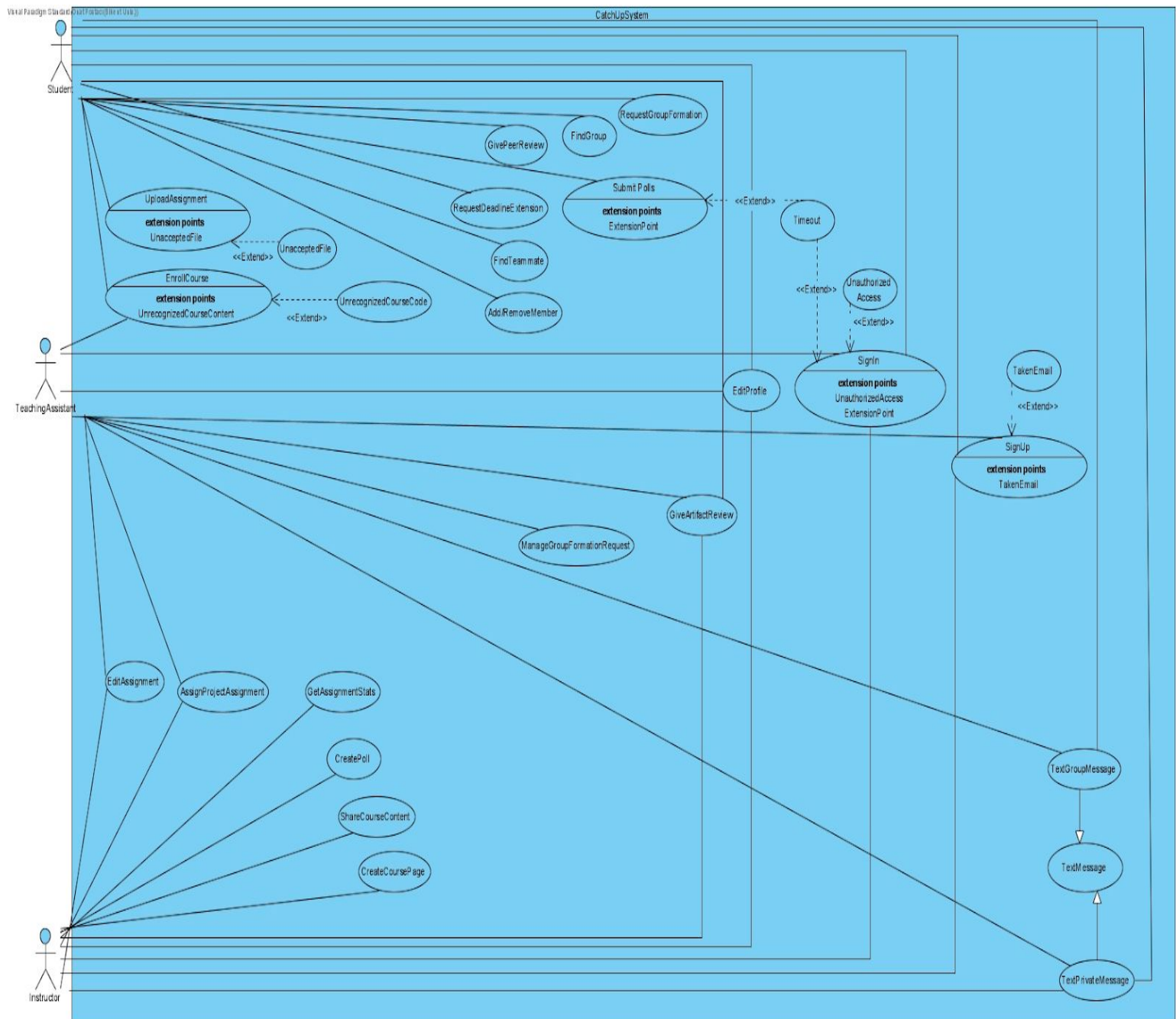
Time out can occur during the session of the user. In this case, to protect against certain types of computer attacks, the system will close the users' accounts.

### **4.5. Compatibility**

#### **4.5.1. Assignment types (pdf,txt,source codes)**

System will only accept submissions in forms such as pdf, txt or files that contain source codes (such as .l , .htm, .html). Otherwise, the submission files will not be accepted.

## 5 System Models



## **5.1 Use-Case Model**

### **5.1.1 Use-Case #1**

Use Case: Sign Up

Primary Actor(s): Student, Teaching Assistant, Instructor

Stakeholders and Interests:

- Actor wants to register to the system.
- System checks the entered information and registers the actor to the system.

Entry Condition:

- There is no entry condition.

Exit Condition:

- The player is directed to the “Sign In” page.
- User has received a message about the success of the operation.

Success Scenario Event Flow:

1. Actor presses the “Sign Up” button.
2. Actor enters his/her name, surname, email, and password to register to the system.
3. If the entered information is verified by the system, then the actor registers to the system.

### **5.1.2 Use-Case #2**

Use Case: Sign In



Primary Actor(s): Student, Teaching Assistant, Instructor

Stakeholders and Interests:

- Actor wants to sign in to the system.
- System checks the entered information and lets the actor into the application.

Entry Condition:

- There must exist an account with entered email and password.

Exit Condition:

- The actor is directed to the “Dashboard” page.

Success Scenario Event Flow:

1. Actor enters an email, and password to enter the system.
2. If the entered information is verified by the system, then the actor enters the system.

### **5.1.3 Use-Case #3**

Use Case: Create Course

Primary Actor(s): Instructor

Stakeholders and Interests:

- Instructor wants to create a course with a course page.

Entry Condition:

- The instructor should be registered to the system.

Exit Condition:

- User has received a message about the success of the operation.

Success Scenario Event Flow:

1. Instructor will press the “+” button from his/her dashboard.
2. Instructors will enter information such as the course name.
3. System will generate unique course code and courses will be created.

#### **5.1.4 Use-Case #4**

Use Case: Enroll in Course

Primary Actor(s): Student, Teaching Assistant

Stakeholders and Interests:

- Actor wants to enroll in the system.
- System checks the entered information and lets the actor enroll in the course.

Entry Condition:

- There should be a course which was created by the instructor.
- Students or Teaching Assistants should be signed in for this operation.

Exit Condition:

- User has received a message about the success of the operation.

Success Scenario Event Flow:

1. The actor (student or teaching assistant) presses the “+” button from the dashboard.
2. The actor (student or teaching assistant) enters the course code.

3. If entered information (course code) is recognized by the system, then the actor can enroll in the course.

#### **5.1.5 Use-Case #5**

Use Case: Assign Project Assignment

Primary Actor(s): Teaching Assistant, Instructor

Stakeholders and Interests:

- Actor wants to assign a new project assignment.

Entry Condition:

- There should be a course which was created by the instructor.
- Actors (teaching assistants or instructors) should be signed in.

Exit Condition:

- User has received a message about the success of the operation.

Success Scenario Event Flow:

1. The actor (instructor or teaching assistant) enters the “Course Page” from the dashboard.
2. The actor (instructor or teaching assistant) presses the “+” button then chooses the “Add Assignment” button from the course page.
3. The actor (instructor or teaching assistant) assigns a new project assignment by giving title, description, due date to it. Besides, actors can upload files that describe the assignment.

### **5.1.6 Use-Case #6**

Use Case: Create Polls

Primary Actor(s): Instructor

Stakeholders and Interests:

- Instructor wants to create a new poll.

Entry Condition:

- There should be a course which was created by the instructor.
- Instructors should be signed for this operation.

Exit Condition:

- User has received a message about the success of the operation..

Success Scenario Event Flow:

1. The actor (instructor) enters the “Course Page” from the dashboard.
2. The actor (instructor) presses the “Create New Poll” button from the course page and is directed to the poll creation page.
3. The actor can write questions and multiple choices for answers.

Besides, s/he can specify the due date of this poll.

### **5.1.7 Use-Case #7**

Use Case: Edit Assignment

Primary Actor(s): Instructor, Teaching Assistant

Stakeholders and Interests:

- The actor( instructor, teaching assistant) wants to edit the assignment.

Entry Condition:

- The actor should be signed in.
- There should be a course which was created by the instructor.
- There should be an existing assignment assigned by an instructor or teaching assistant.

Exit Condition:

- User has received a message about the success of the operation..

Success Scenario Event Flow:

1. The actor (instructor or teaching assistant) presses the “Edit” button from the course page and edits its information such as due date, file, description, etc.

Alternative Scenario Event Flow:

1. If the teaching assistant gets notification from groups to extend the deadline and decides to do it, S/he can achieve this by editing the assignment.

#### **5.1.8 Use-Case #8**

Use Case: Share Course Content

Primary Actor(s): Instructor

Stakeholders and Interests:

- Instructor wants to share course content to the students and TAs.

Entry Condition:

- There should be a course which was created by the instructor.
- Instructors should be signed in.

Exit Condition:

- User has received a message about the success of the operation.

Success Scenario Event Flow:

1. Instructor presses the “Share Course Content” button from the course page and shares content by uploading documents from his/her desktop .

#### **5.1.9 Use-Case #9**

Use Case: Upload Assignment

Primary Actor(s): Student

Stakeholders and Interests:

- Student wants to upload the assignment assigned for him/her.

Entry Condition:

- Students should be signed in.
- There should be a course which was created by the instructor.
- There should be an existing assignment assigned by an instructor or teaching assistant.

Exit Condition:

- User has received a message about the success of the operation.

Success Scenario Event Flow:

1. Student enters the group page from the dashboard
2. Under the assignment in the group page, students will press the “upload” button.
3. Then, students submit assignments by uploading documents from his/her desktop.

#### **5.1.10 Use-Case #10**

Use Case: Request Deadline Extension

Primary Actor(s): Students

Stakeholders and Interests:

- Students want an extension for his/her assignment deadlines.

Entry Condition:

- There should be a course which was created by the instructor.
- There should be an existing assignment assigned by an instructor or teaching assistant.

Exit Condition:

- User has received a message about the success of the operation..

Success Scenario Event Flow:

1. Student presses the “Group Page” button from the dashboard.
2. Student presses the “Request Deadline Extension” button from the group page.

#### **5.1.11 Use-Case #11**

Use Case: Request Group Formation

Primary Actor(s): Student

Stakeholders and Interests:

- Students want to request a group formation from teaching assistants.

Entry Condition:

- There should be at least one student in the group.
- The student should be signed in.

Exit Condition:

- User has received a message about the success of the operation.

Success Scenario Event Flow:

1. Student enters the “Course Page” from the dashboard.
2. Students press the “Request Group Formation” button from the course page.
3. A pop-up window will be shown for the request form which takes text as input from student.

#### **5.1.12 Use-Case #12**

Use Case: Give Peer Review

Primary Actor(s): Student

Stakeholders and Interests:

- The student wants to review their group members.

Entry Condition:

- There should be a group formed by different students.
- The student should be signed in.

Exit Condition:

- User has received a message about the success of the operation..

Success Scenario Event Flow:

1. Student presses the “Group Page” button from the dashboard.
2. Student chooses the group assignment which s/he wants to assess.
3. Student clicks the “peer review” button to give feedback and grades to his/her teammates in a pop-up window.



#### **5.1.13 Use-Case #13**

Use Case: Add/Remove Member

Primary Actor(s): Student

Stakeholders and Interests:

- Student wants to add a group member or remove a member from a group.

Entry Condition:

- There should be a group formed by a specific number of students.
- Student should be signed in.

Exit Condition:

- User has received a message about the success of the operation..

Success Scenario Event Flow:

1. Student enters the “Group Page” from the dashboard.
2. Student presses the button near the name of another student reached from the ads or group page, and presses the “Remove” or “Add” button.

#### **5.1.14 Use-Case #14**

Use Case: Find Group

Primary Actor(s): Student

Stakeholders and Interests:

- Student wants to find a group.

Entry Condition:

- There should be existing groups created by different students.
- The student should be signed in.

Exit Condition:

- User has received a message about the success of the operation.

Success Scenario Event Flow:

1. Student enter the “Course Page” from the dashboard.
2. Student presses the “Give Ad” button from the course page to be visible to other groups/students.

#### **5.1.15 Use-Case #15**

Use Case: Submit Polls

Primary Actor(s): Student

Stakeholders and Interests:

- Student wants to submit a poll created by the instructor.

Entry Condition:

- There should be a course which was created by the instructor.
- There should be an existing poll created by the instructor.
- Students should be signed in for this operation.

Exit Condition:

- User has received a message about the success of the operation..

Success Scenario Event Flow:

1. The student enters the “Course Page” from the dashboard.
2. Poll is visible at the top of the course page.
3. The student answers the poll and presses “Submit” buttons.

Quality requirements:

- Students can only make one poll submission.
- Students can make a submission only before the due date which is given by the instructor.

#### **5.1.16 Use-Case #16**

Use Case: Manage Group Formation

Primary Actor(s): Teaching Assistant

Stakeholders and Interests:

- The Teaching Assistant wants to manage the requested group formations by students.

Entry Condition:

- Teaching assistant should be signed in.
- There should be a course for assistants to form groups.

Exit Condition:

- User has received a message about the success of the operation..

Success Scenario Event Flow:

1. The teaching assistant enters the “Course Page” from the dashboard.
2. The teaching assistant can create a group according to the group requests which are given to him/her as notification.
3. The teaching assistant can remove any group.

#### **5.1.17 Use-Case #17**

Use Case: Give Artifact Review

Primary Actor(s): Student, Teaching Assistant, Instructor

Stakeholders and Interests:

- Actor (student, teaching assistant, instructor ) wants to review the artifacts of the groups.

Entry Condition:

- There should be a course created by the instructor.
- There should be groups formed by students.

Exit Condition:

- User has received a message about the success of the operation..

Success Scenario Event Flow:

1. Actor enters the “Course Page” from the dashboard and from here s/he can view all group links.
2. After clicking the group link, s/he will be directed to this group page .
3. Under the assignments, the actor can view these group’s artifacts by clicking the document link.
4. The actor can give grades and feedback to these artifacts from the group pages of others.

#### **5.1.18 Use-Case #18**

Use Case: Edit Profile

Primary Actor(s): Student, Teaching Assistant, Instructor

Stakeholders and Interests:

- Actor (student, teaching assistant, instructor ) wants to edit their personal profiles.

Entry Condition:

- The actor should have signed up.

Exit Condition:

- User has received a message about the success of the operation.

Success Scenario Event Flow:

1. Actor presses the “Profile” button which is at the right corner of every page.
2. Actor edits his/her profile.

#### **5.1.19 Use-Case #19**

Use Case: Text Message

Primary Actor(s): Student, Teaching Assistant, Instructor

Stakeholders and Interests:

- Actor (student, teaching assistant, instructor ) wants to text a message to a specific person or a group.

Entry Condition:

- There should be a group.
- There should be at least two actors.

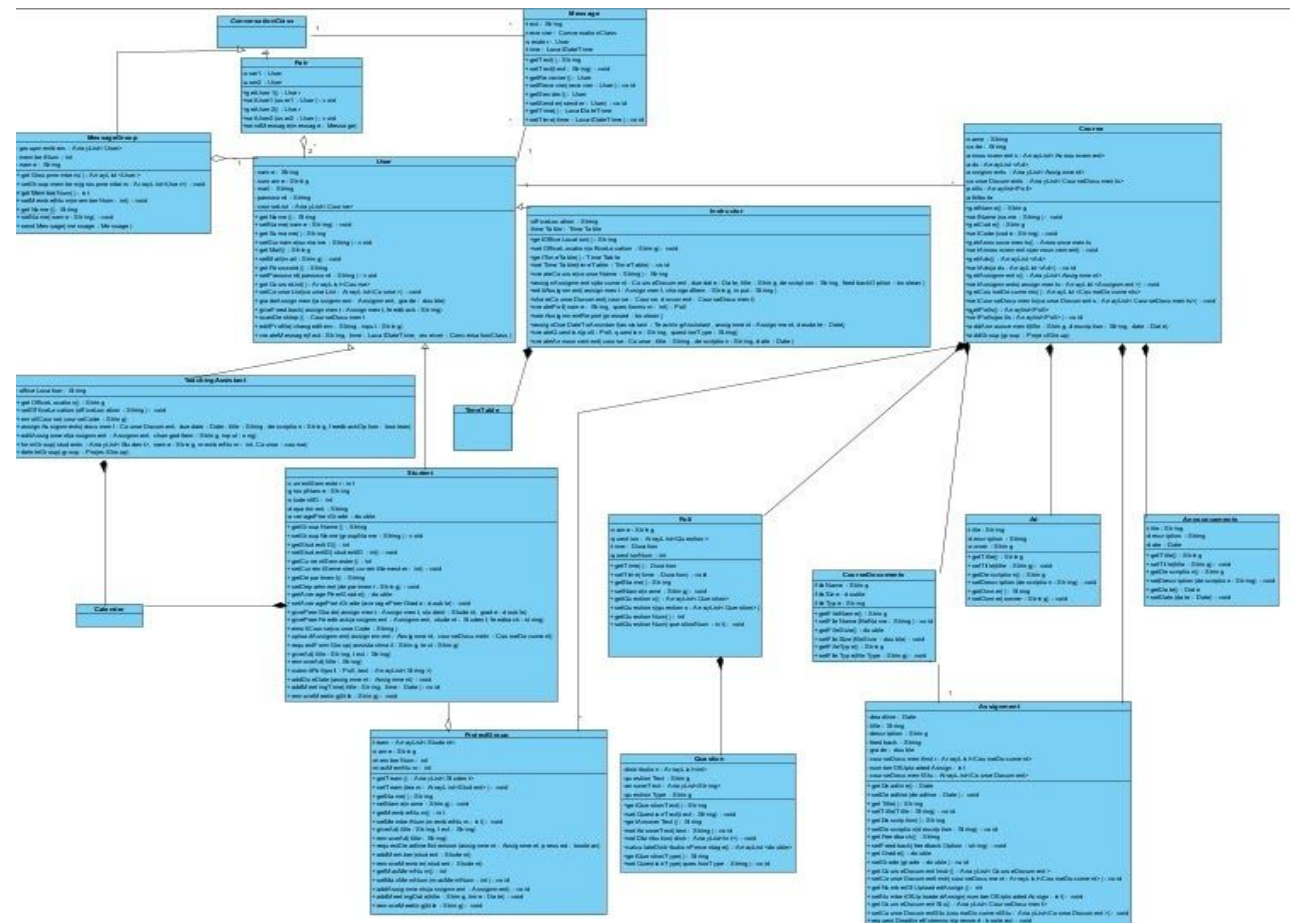
Exit Condition:

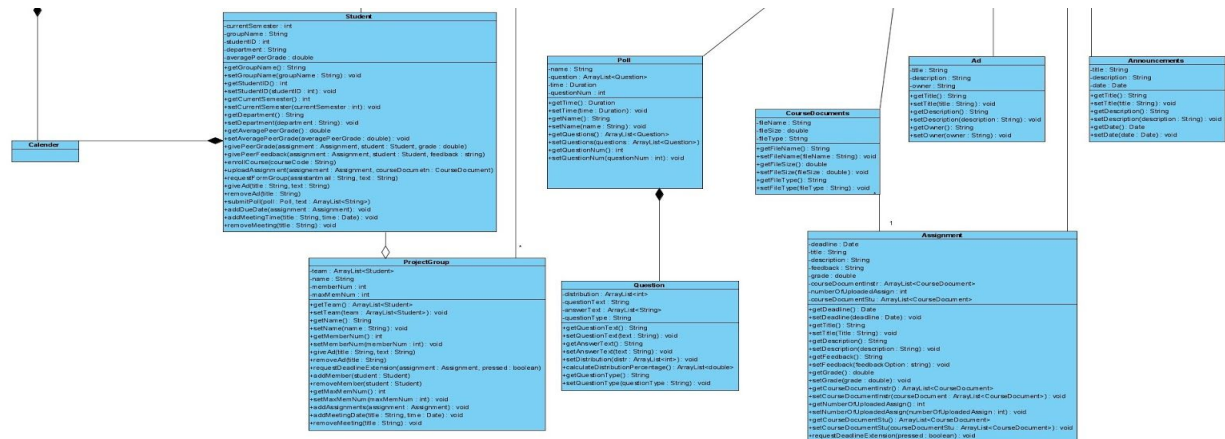
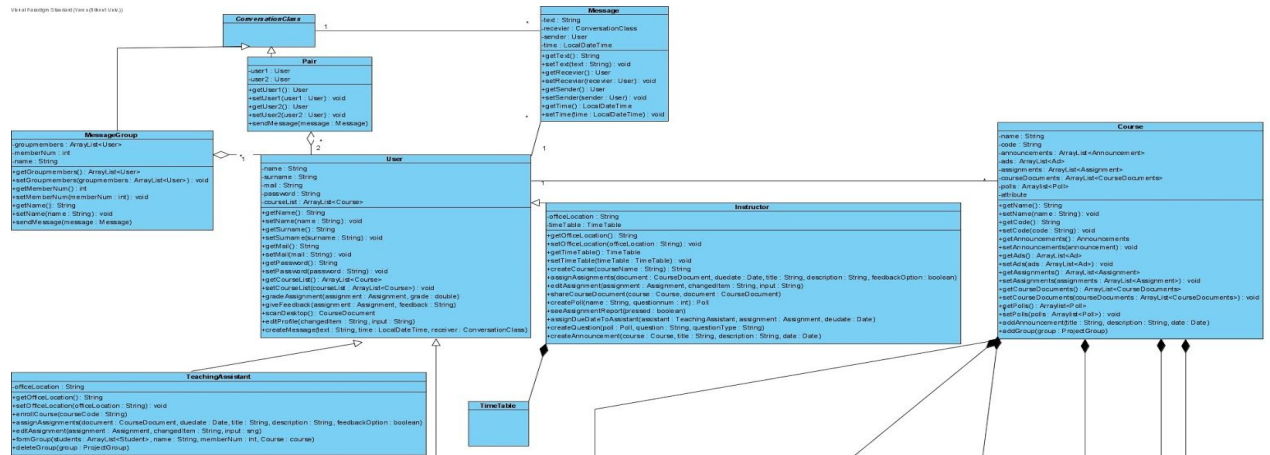
- User has received a message about the success of the operation.

Success Scenario Event Flow:

1. Actor presses the “Message” button which is at the right corner of every page.
2. Actor can either choose to text message to group message, or direct message and text message

## 5.2 Object and Class Model





## 5.2.1 User Class

This class represents and defines the features and actions of all the user options in the Catch Up. All users in the system have name, surname, mail address, password and a list of courses.

## 5.2.2 Student Class

This class is a subclass of the user class. Besides the user features, students have the information of their current semester, group name, id, department and peer grade average in the system.

### **5.2.3 ProjectGroup Class**

Project groups consist of students. Thus, this class has the list of students that are in the project group. Also, every project group has a name, number of current members and number of maximum members that can be in a group.

### **5.2.4 Instructor Class**

This class is a subclass of the user class. Besides the user features, instructors have their office location and time table information in the system.

### **5.2.5 TeachingAssistant Class**

This class is a subclass of the user class. Besides the user features, teaching assistants have their office location information in the system.

### **5.2.6 Course Class**

All users in the system can have many courses. These courses have a name and a unique code. Also, there are many assignments, ads, course documents and polls in every course.

### **5.2.7 Poll Class**

Polls can be created by instructors for students to reflect their opinions on course subjects. Each poll has a name, certain number of questions and a time duration to be answered.

### **5.2.8 Question Class**

This class represents poll questions. Every question has a question type, question text to ask the question, list of answer text to demonstrate different answer options and list of distribution for each answer option.



### **5.2.7 Ad Class**

This class is for individual students and groups to give ads for a team or a team member to make group formation easier.

### **5.2.8 Assignment Class**

This class is for instructors to give project related assignments such as reports to project groups and for project groups to submit the assignment. Each assignment has a title, description, a deadline. Also, it has two different course documents list one for instructors to give assignment details with a document such as pdf and another list that includes each groups' submitted assignments. Finally, assignments have grades and feedback that provides artifact and peer review features to the system.

### **5.2.9 CourseDocuments Class**

This class is for instructors to share project related slides or assignments in the system. Each course document has a file name, file size and a file type. It is for uploading files to the related course by all users.

### **5.2.10 Announcement Class**

This class is for instructors to make announcements to all of the course's students. Each announcement has a title, description and a date.

### **5.2.11 TimeTable Class**

This class is for instructors to show their time table at the system so that students can see the empty time slots of the instructor in order to ask them for an appointment.

### **5.2.12 Calendar Class**

This class is for students and teaching assistants to see the upcoming assignments or meetings on a calendar with due dates.

### **5.2.13 Message Class**

This class is for messaging in the system. Messages have a sender, a receiver, time and a text that includes the message information.

### **5.2.16 ConversationClass Class**

This class is for representing people that take roles in messaging. Each conversation class can have one or more messages.

### **5.2.14 Pair Class**

This class is the subclass of conversation class. It is for private messages between two users. Thus, every pair has user1 and user2.

### **5.2.15 MessageGroup Class**

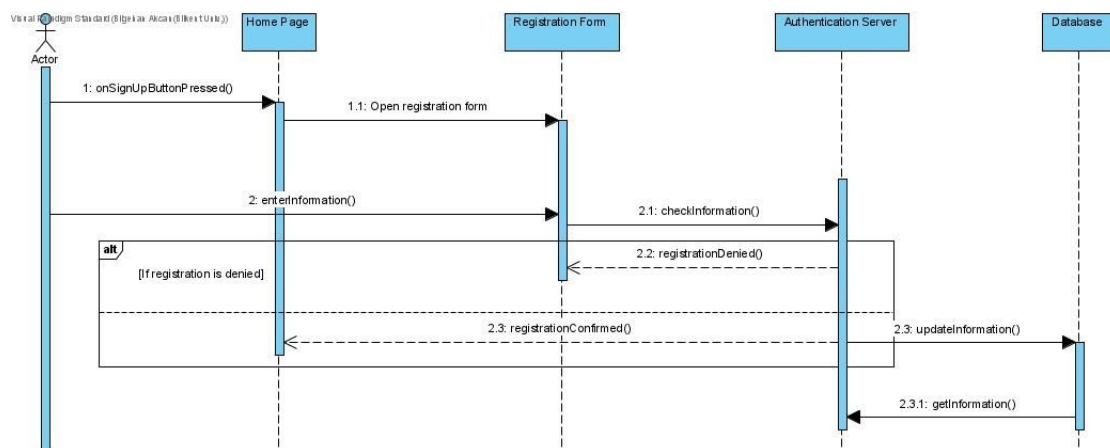
This class is the subclass of conversation class. It is for group messages in the system. Message groups consist of one or more users. Every message group has a name, number of members and list that includes the users in the group.

## 5.3 Dynamic Models

### 5.3.1 Sequence Diagrams

#### 5.3.1.1 Sign Up

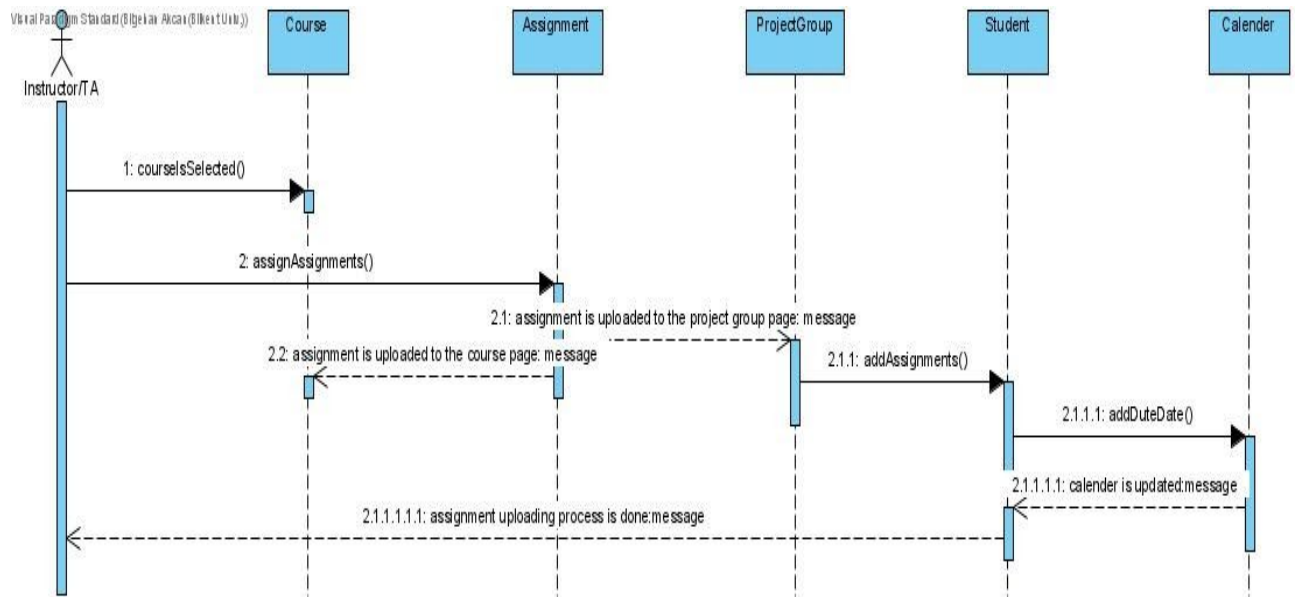
**Scenario:** User without an account presses the sign up button on the home page. Then the registration form is opened. After, the information that the user entered was checked from the authentication server. If information is sufficient and correct registration is confirmed and information is added to the database. Else if information already exists in other account registration is denied.



#### 5.3.1.2 Assign Assignments

**Scenario:** In order to give assignments, the first instructor or TA selects which course to be assigned. Then they assign the assigned course. After that assignment is added to the projects' group pages. A group page assignment is added to the students which are members of the group. Then, the due date of the assignment is added to the

calendar of the student. Then, the calendar is updated and the process is done.



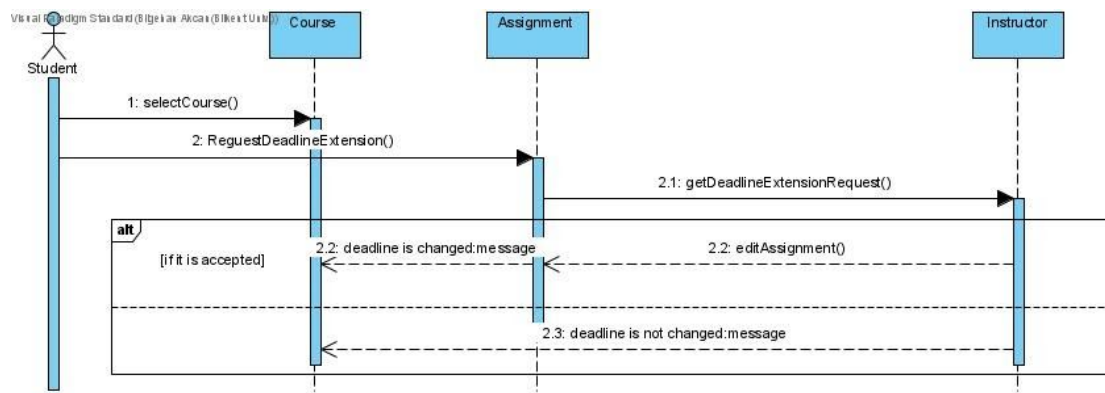
### 5.3.1.3 Request Deadline Extension

**Scenario:** In order to request deadline extension a student first selects the related course. Then from the assignment part she/he requests an extension for the deadline.

This request reaches the instructor. If the instructor decides to extend the deadline

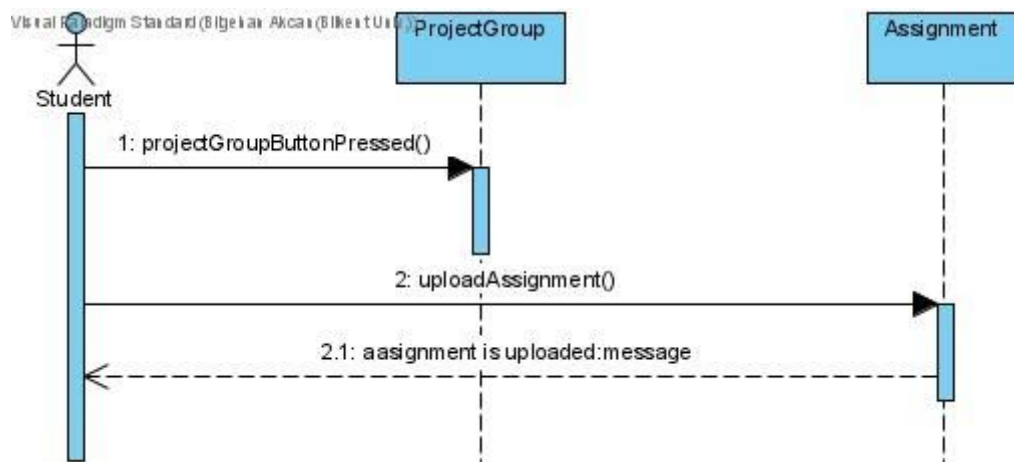
he/she edits the assignment and the deadline is changed message will be displayed.

Else if the instructor rejects the request deadline is not changed message is displayed.



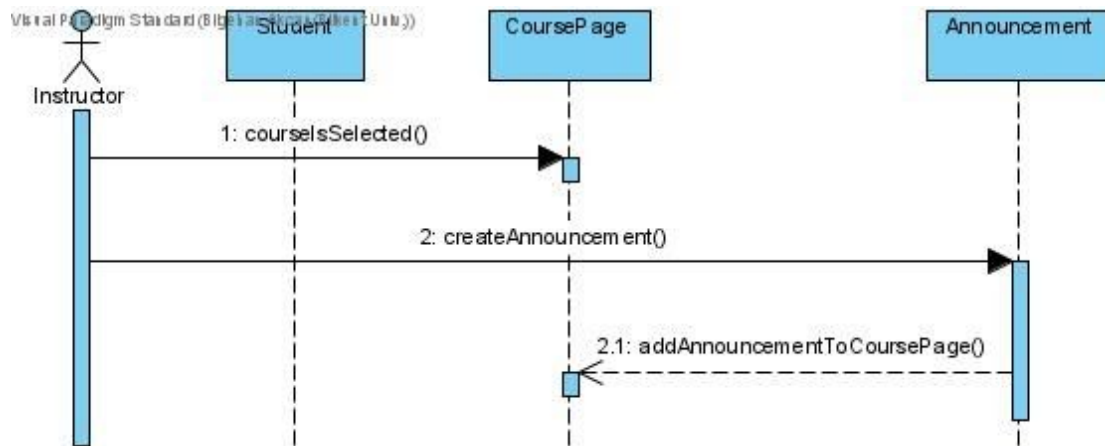
### 5.3.1.4 Upload Assignments

**Scenario:** In order to upload the assignment the student needs to press the project group button that leads her/him to the project group. Then the student can upload the assignment to the relevant place in the project group page. After that assignment is uploaded a message will be displayed.



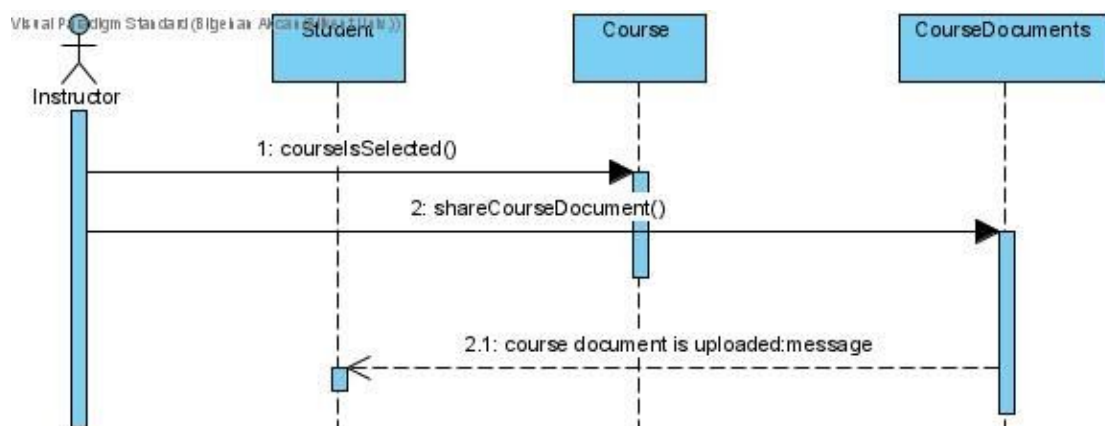
### 5.3.1.5 Make Announcements

**Scenario:** In order to make an announcement the instructor selects the relevant course. Then, he/she creates an announcement. After the announcement is created it is added to the course page.



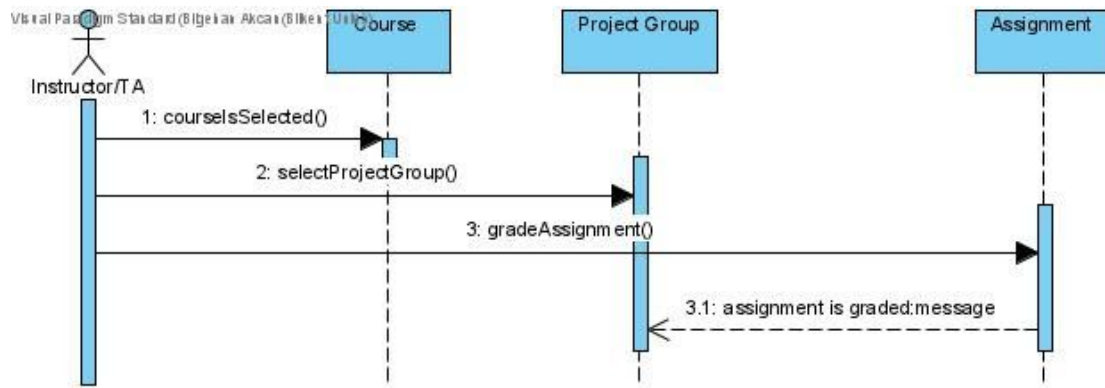
### 5.3.1.6 Share Course Documents

**Scenario:** Instructor needs to choose the relevant course first. Then, he/she will share the course document about the selected course. After that course document is uploaded a message will be displayed.



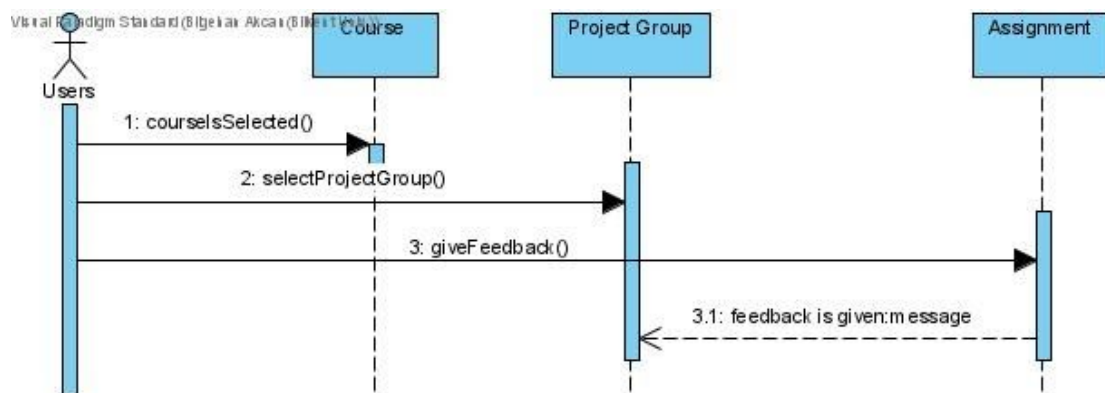
### 5.3.1.7 Give Grades

**Scenario:** In order to give grades first the relevant course needs to be selected. After that the project group which it's work will be graded needs to be selected. Then, the chosen group's assignment is graded. After that assignment is graded message will be displayed.



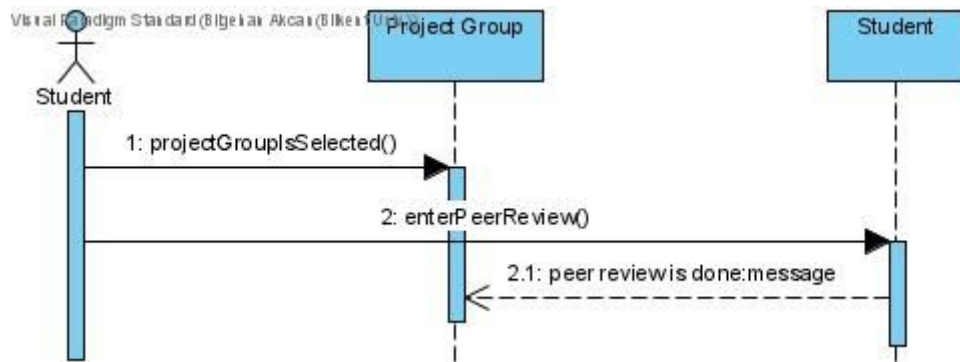
### 5.3.1.8 Give Feedback

**Scenario:** In order to give feedback first the relevant course needs to be selected. After that the project group which it's work will be given feedback has to be selected. Then, the feedback is given to the chosen group's assignment. After that feedback is given message will be displayed. All users can give feedback.



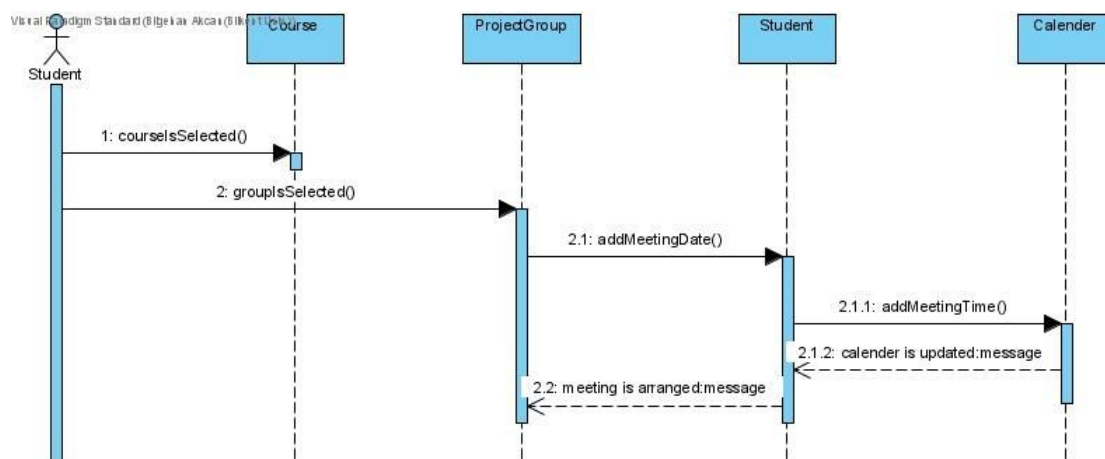
### 5.3.1.9 Peer Review

**Scenario:** In order to give feedback students must choose the project group first. Then for a particular student in the group, actor student will give reviews. After that peer review is done message will be displayed.



### 5.3.1.10 Project Group Meeting

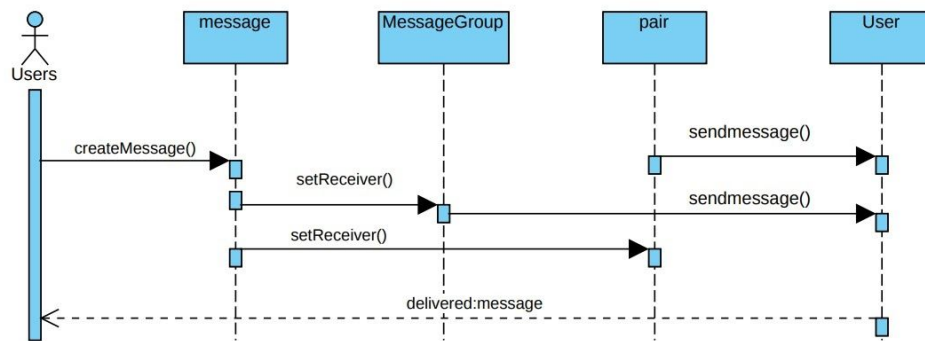
**Scenario:** In order to arrange a group meeting a student needs to choose the relevant course first. Then he/she chooses the project group of hers/him. Then the decided date will be given for students. After that meeting time will be added in the calendar and the calendar is updated message will be displayed. Then meeting is arranged message will be sent to the group.



### 5.3.1.11 Send Message

**Scenario:** In order to send a message first users need to create a message. For group messages they set the receiver as a message group then send it to other users. If it is a private message they set the receiver and send it directly to another user.

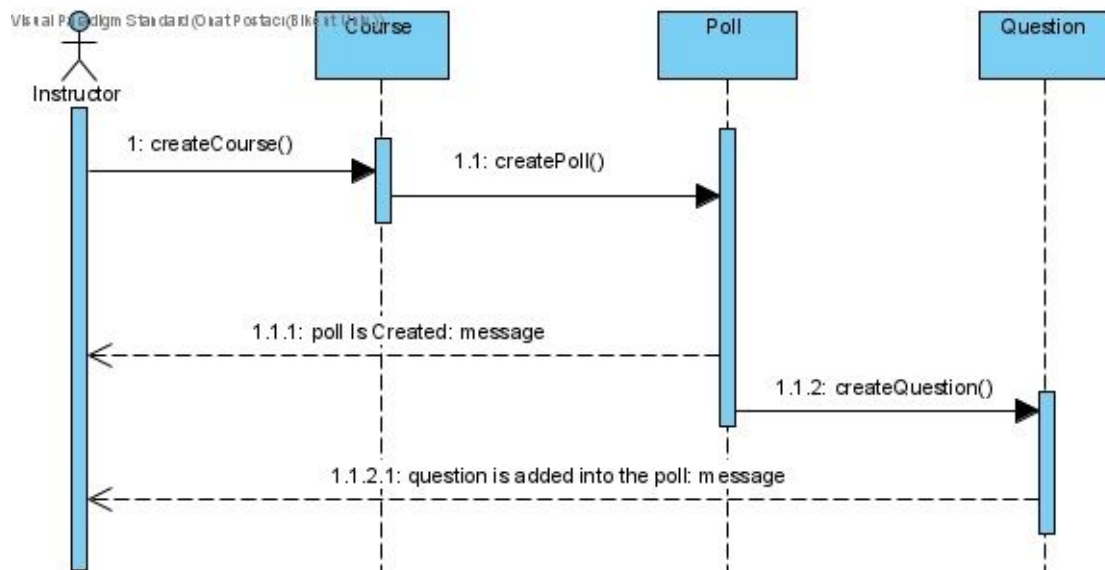




### 5.3.1.12 Create Poll

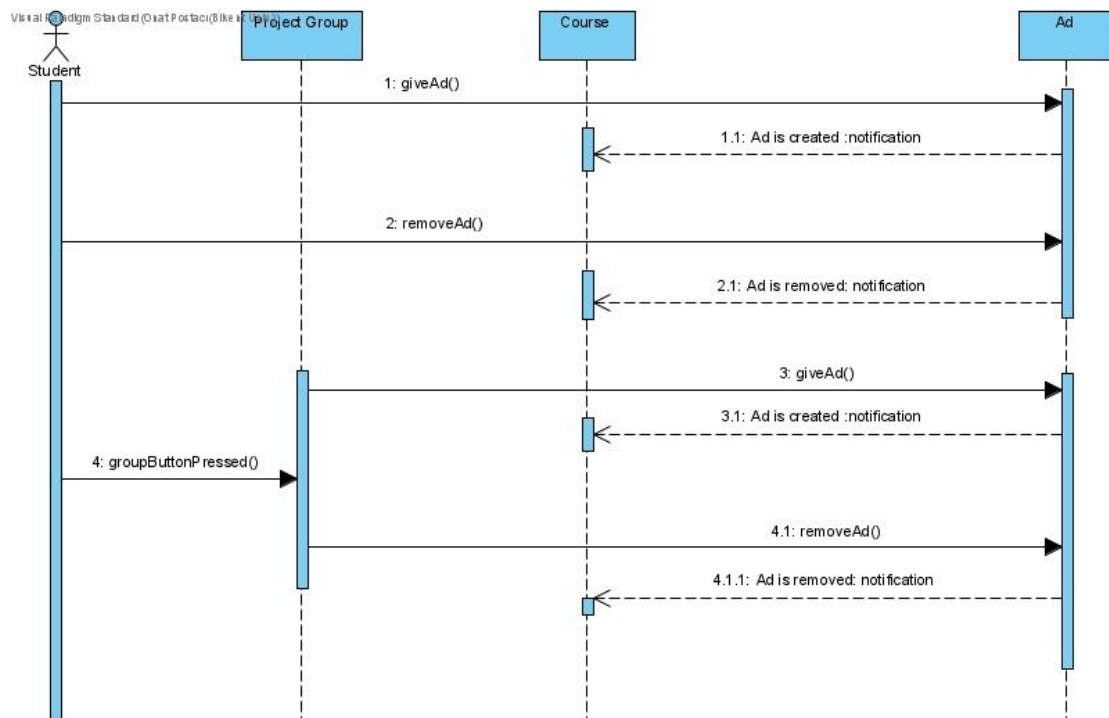
**Scenario:** First instructor chooses which course he/she wants to create a poll about.

Then the instructor chooses to create a poll. After the poll is created message comes to the instructor he/she can create questions for the poll. Then the question is added to the poll message will be displayed.

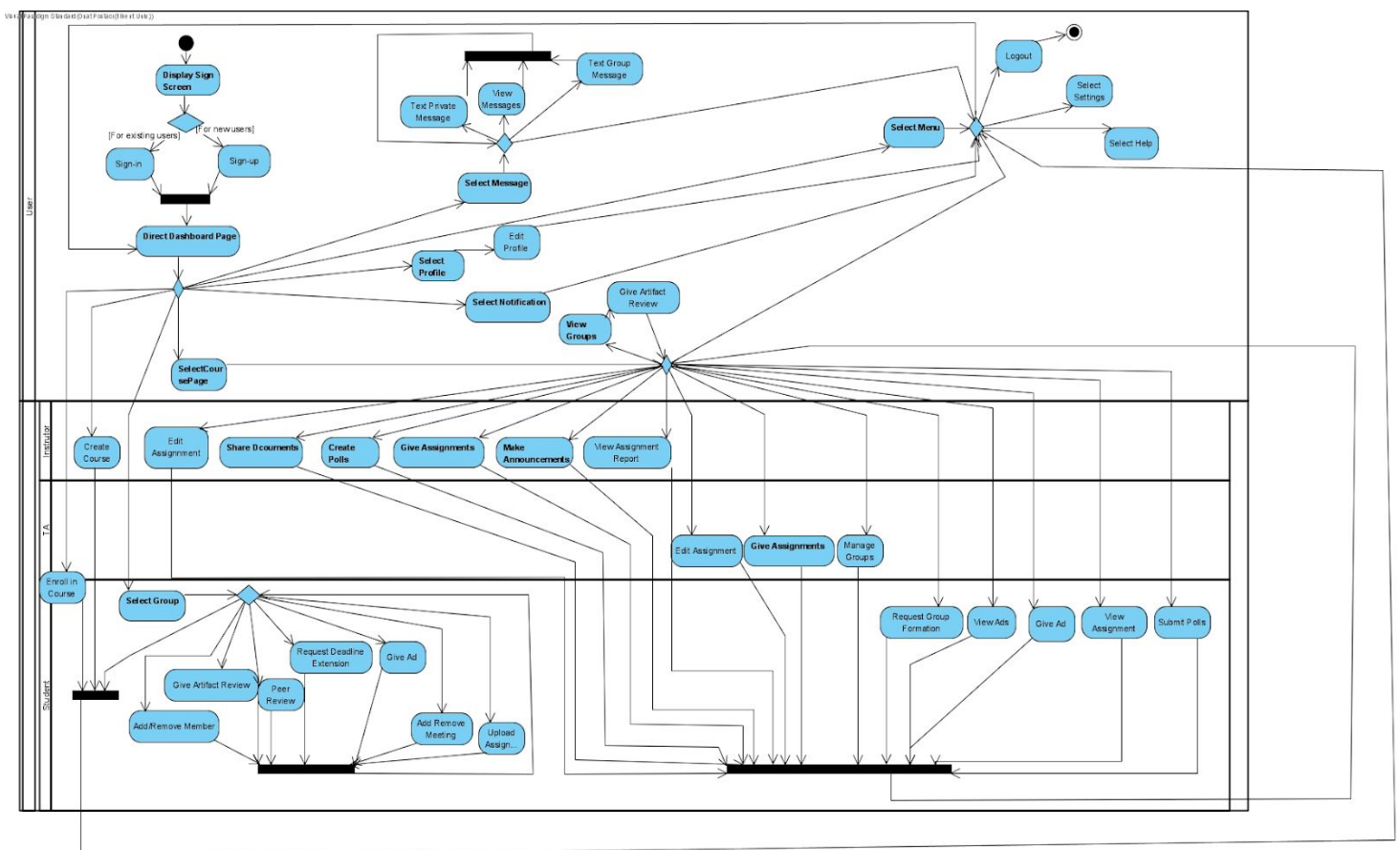


### 5.3.1.13 Remove Ad

**Scenario:** After a student gives an individual ad and received ad is created notification, he/she removes this ad and receive ad is removed notification. Or a student can give an ad for the group after pressing the group button and reaching to his/her group. Student receive the ad is created notification. Then the student can remove this ad and receive the ad is removed notification.



### 5.3.2 Activity Diagram



The Activity diagram demonstrates how the system works in terms of the action flows of different actors.

Initially, the system waits for the choice of the user. If the user chooses sign up, then the user will be registered to the system, whereas if the user chooses sign in, then the user will be authenticated by the system to see his/her dashboard. From the dashboard there are eight cases. All of the users can select:

- Case 1: Select Coursepage
- Case 2: Select Profile
- Case 3: Select Notification
- Case 4: Select Message
- Case 5: Select Menu.

However, in the diagram the swimlane indicates the specific user activities. Therefore the cases are respectively:

- Case 6: Create a course (Just the instructor can do.)
- Case 7: Enroll in Course (Teaching assistants and students can do.)
- Case 8: Select Group Page (Just students can do.).

Apart from case numbers 3, 6, and 7, each case has nested cases accordingly:

For Case 1:

- Case 1.1: Edit Assignment (Just the instructor can do.)
- Case 1.2: Share Document (Just the instructor can do.)
- Case 1.3: Create Poll (Just the instructor can do it.)
- Case 1.4: Give Assignment (Teaching assistants and the instructor can do.)
- Case 1.5: Make Announcement (Just the instructor can do.)
- Case 1.6: View Assignment Report (Just the instructor can do.)
- Case 1.7: Edit Assignment (Teaching assistants and the instructor can do.)
- Case 1.8: Give Assignment (Teaching assistants and the instructor can do.)
- Case 1.9: Manage Groups (Just teaching assistants can do.)

- Case 1.10: Request Group Formation (Just students can do.)
- Case 1.11: View Ads (Just students can do.)
- Case 1.12: Give Ad (Just students can do.)
- Case 1.13: View Assignment (Just students can do.)
- Case 1.14: Submit Polls (Just students can do.).

For Case 2:

- Case 2.1: Edit Profile.

For Case 4:

- Case 4.1: Text Private Message
- Case 4.2: View Messages
- Case 4.3: Text Group Message

For Case 5:

- Case 5.1: Select Help
- Case 5.2: Select Settings
- Case 5.3: Logout.

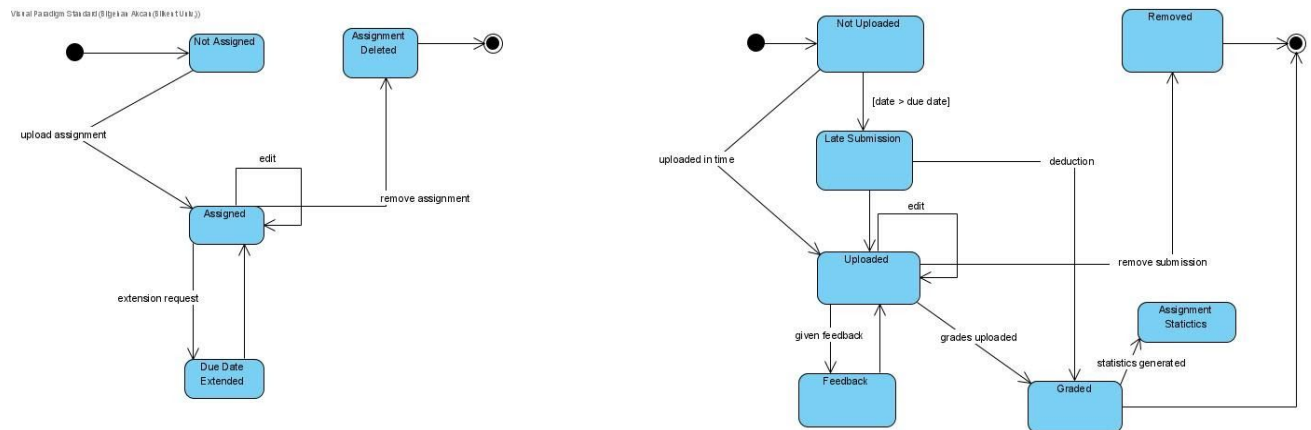
For Case 8:

- Case 8.1: Add/Remove Member (Just students can do.)
- Case 8.2: Give Artifact Review (Just students can do.)
- Case 8.3: Peer Review (Just students can do.)
- Case 8.4: Request Deadline Extension (Just students can do.)
- Case 8.5: Give Ad (Just students can do.)
- Case 8.6: Add/Remove Meeting (Just students can do.)
- Case 8.7: Upload Assignment (Just students can do.).

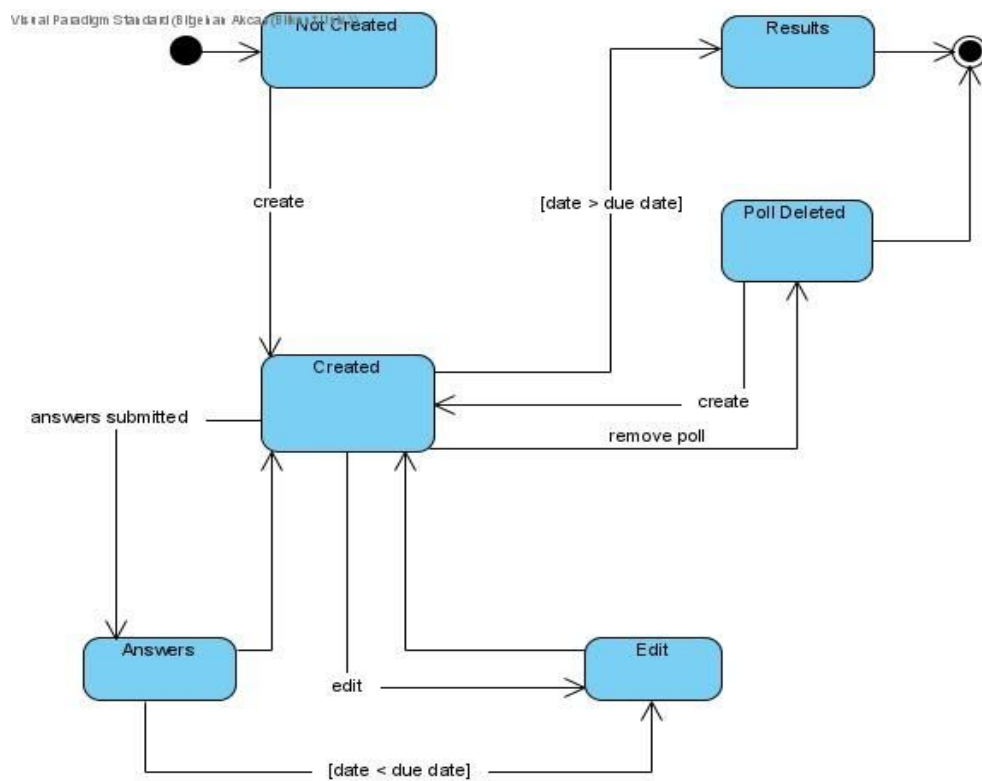
Each case has control flow with the case 5 since the logout option is there. Thereby, users can choose to open the menu and logout from the system.

## 5.3.3 State Diagrams

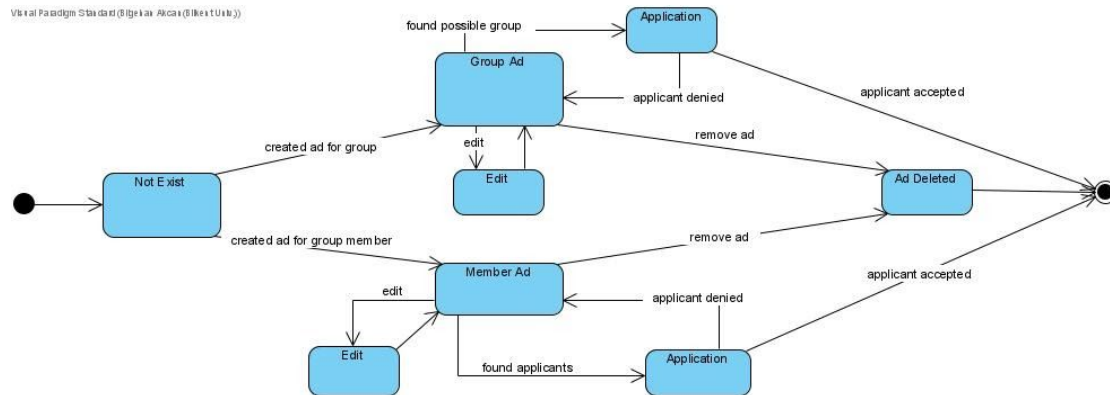
### 5.3.3.1 Assignment State Diagram



### 5.3.3.2 Poll State Diagram



### 5.3.3.3 Ad State Diagram



## 5.4 User Interface

### 5.4.1 Sign In Page

Users will sign in to the web page server by entering their email and password. If they try to enter with the wrong password or email they will receive an error message. If they do not have an account they will click the sign up button and will be forwarded to sign up page.

### Sign In

Email

Password

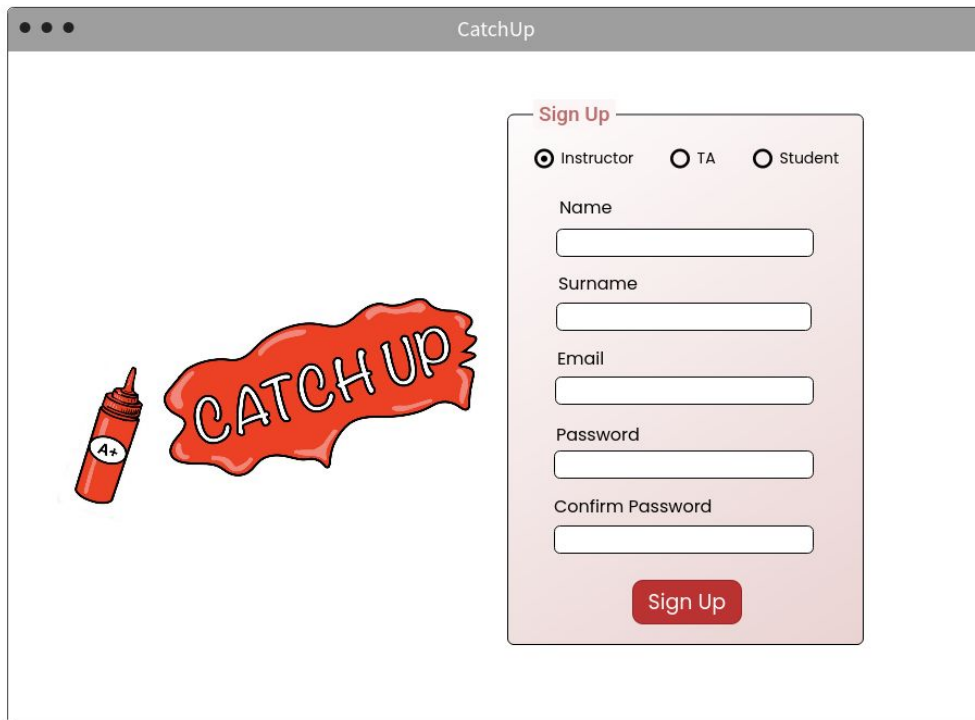
[Sign In](#)

If you don't have an account:

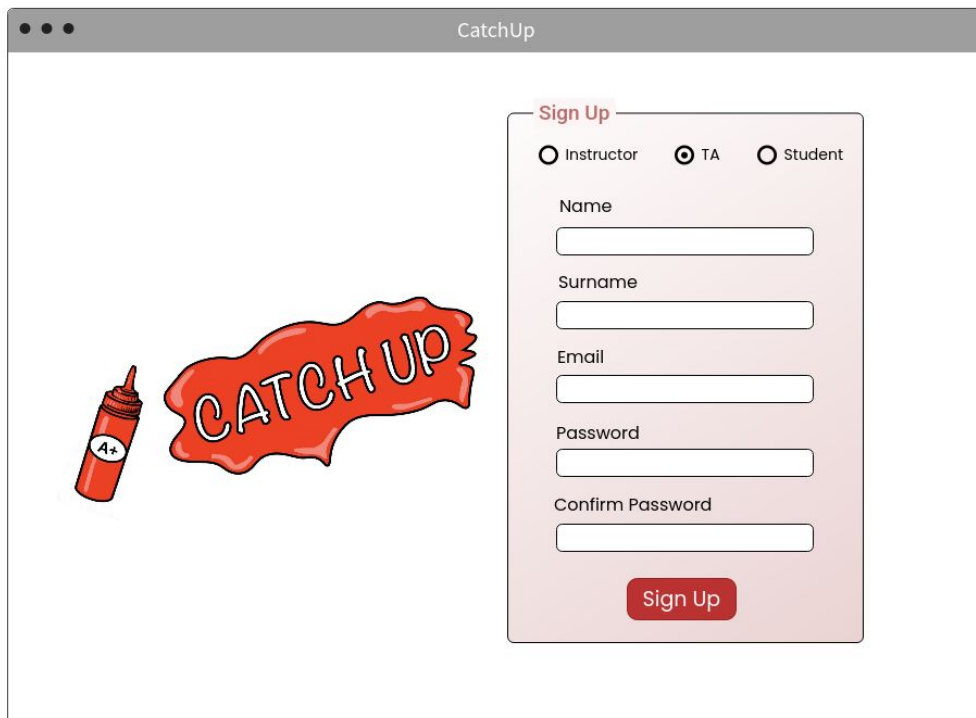
[Sign Up](#)

### 5.4.2 Sign Up Page

Users who have not registered yet will sign up through this page. The users have to choose their profile kind and they will enter the data according to their choice.




The screenshot shows a web browser window titled "CatchUp". On the left, there is a cartoon illustration of a red marker with "4+" on its label, next to a red, ink-blot-like shape containing the text "CATCHUP". On the right, there is a "Sign Up" form. The form has a title "Sign Up" and three radio buttons for profile selection: "Instructor" (selected), "TA", and "Student". Below these are five text input fields labeled "Name", "Surname", "Email", "Password", and "Confirm Password". At the bottom of the form is a red "Sign Up" button.



This screenshot is identical to the one above, showing the "CatchUp" sign-up page. However, the "TA" radio button is now selected, while "Instructor" and "Student" are unselected. All other elements, including the illustration and input fields, remain the same.



CatchUp



### Sign Up

☐ Instructor ☐ TA ☒ Student

Name

Surname

Email

Department

Grade

Student ID

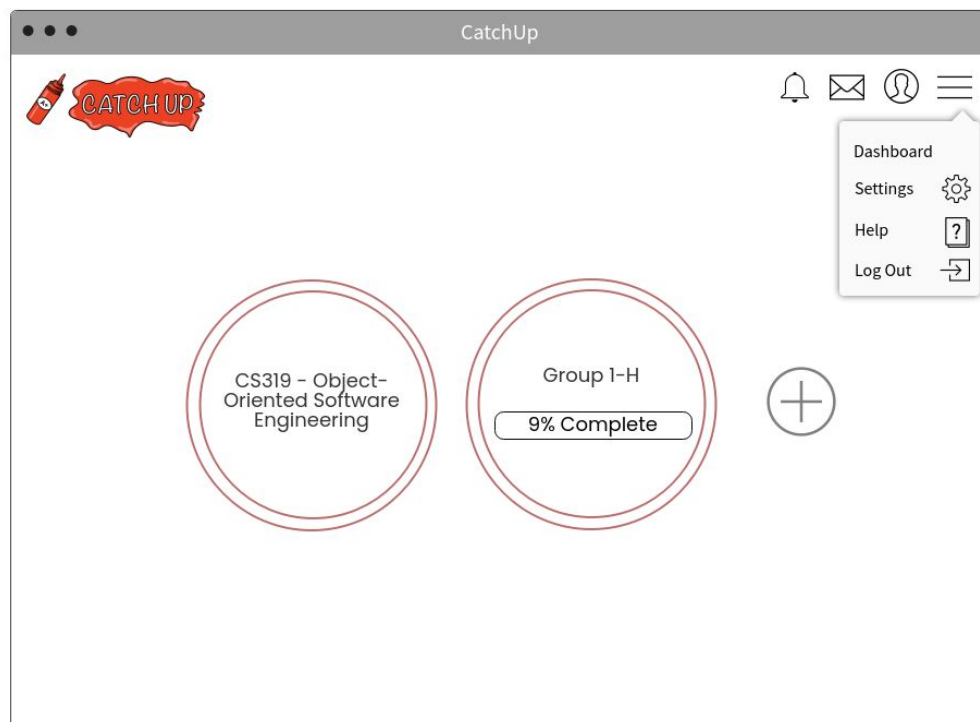
Password

Confirm Password

Sign Up

### 5.4.3 DashBoard Pages

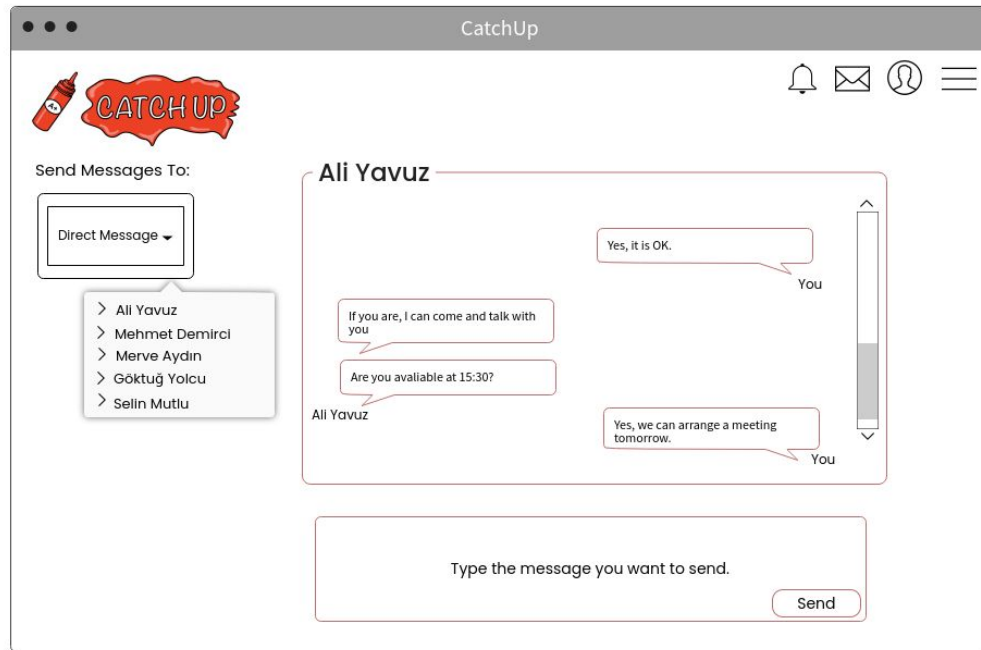
Users will be forwarded to the dashboard page in order to choose which page they will enter. If the user is an instructor as in the first page example they will encounter a plus button to add courses and see their courses. If it is a student as in the second page they will encounter a plus button to enroll courses through code and they will see their own project group.

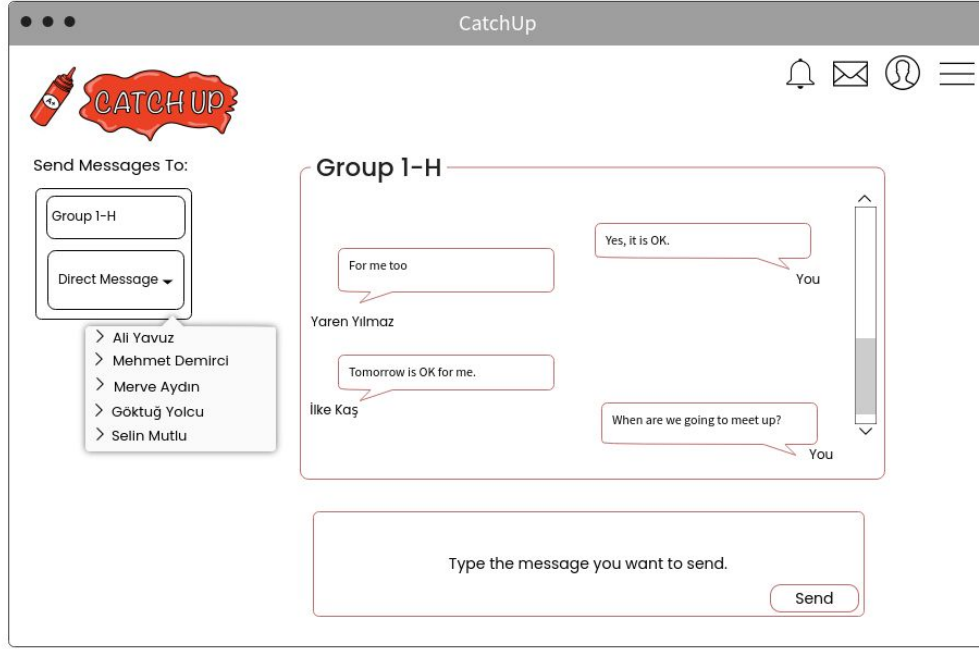




#### 5.4.4 Message Pages

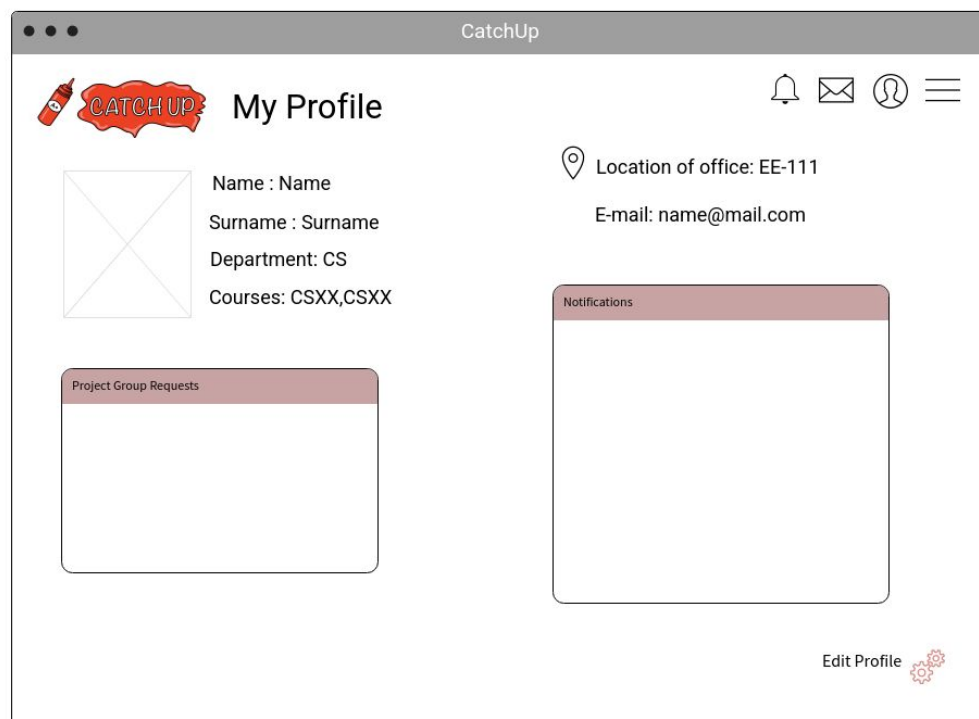
Users will enter the message page through the message button above in every page or when they click to send message buttons at profiles. There are two kinds of messaging scenarios: one is direct messaging in the first page and other one is the group chats as in the second page.






### 5.4.5 Own Profile Pages


Users will see their profile pages differently according to their account kind but they all will see registering information and notifications. For instance in a student's profile one will see s/her comments, peer reviews and a calendar. In the instructor profile they will add their time table to indicate their free time to see students. In the Teaching assistant's page there will be project group requests..



CatchUp



# My Profile



Name : Name  
 Surname : Surname  
 Department: CS  
 Grade:3rd      E-mail: name@mail.com  
 Group:XX      ID:21XXXXXX


Review Grade: X/10

Comments


< January 2017 >
 

Mo	Tu	We	Th	Fr	Sa	Su
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				


Notifications

[Edit Profile](#)


CatchUp



# My Profile



Name : Name  
 Surname : Surname  
 Department: CS  
 Courses: CSXX,CSXX


Location of office: EE-111

E-mail: name@mail.com

Time Table
 

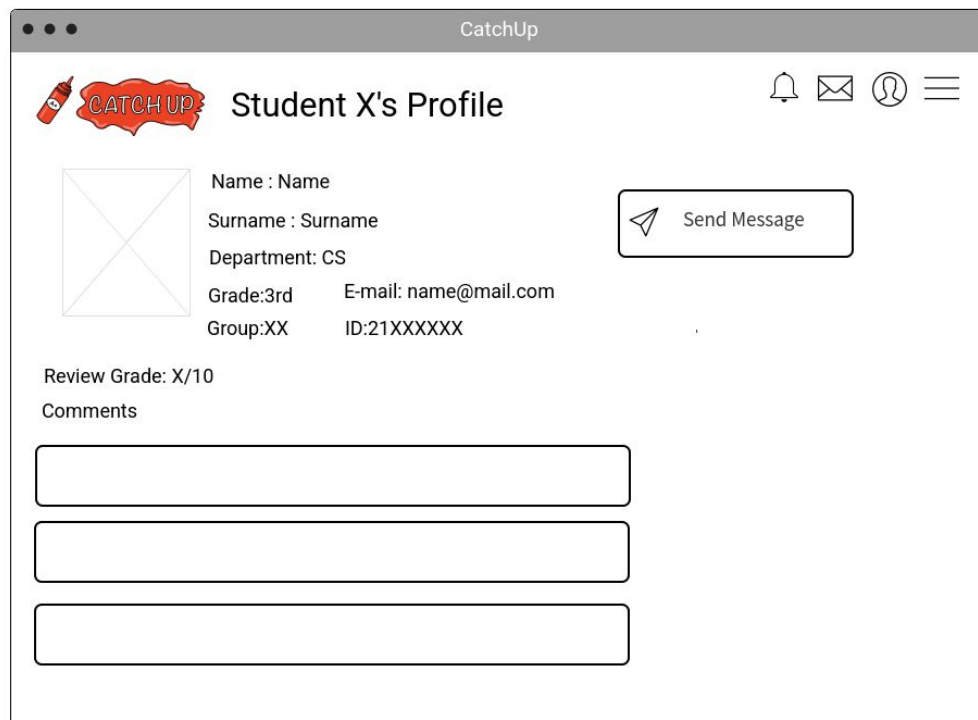
	Monday	Tuesday	Wednesday	Thursday	Friday
07:30 - 08:25	IT INFO CYCLE (1) Subj:Info (4E) B22				
08:25 - 09:15	IT INFO CYCLE (1) Subj:Info (4E) B22	READING SKILLS (1) Language (1E) B22			
09:15 - 10:00	IT INFO CYCLE (1) Subj:Info (4E) B22	READING SKILLS (1) Language (1E) B22	INTRODUCTION PROGRAMS FORBENEFITS (1) Subj:Info (4E) B22	IT INFO CYCLE (1) Subj:Info (4E) B22	
10:00 - 10:50	CALCULUS (1) Subj:Info (4E) B22	CALCULUS (2) Subj:Info (4E) B22	INTRODUCTION PROGRAMS FORBENEFITS (1) Subj:Info (4E) B22	IT INFO CYCLE (1) Subj:Info (4E) B22	
10:50 - 11:40	CALCULUS (1) Subj:Info (4E) B22	CALCULUS (2) Subj:Info (4E) B22	INTRODUCTION PROGRAMS FORBENEFITS (1) Subj:Info (4E) B22		
11:40 - 12:30				CALCULUS (1) Subj:Info (4E) B22	
12:30 - 13:25	INTRODUCTION PROGRAMS FORBENEFITS (1) Subj:Info (4E) B22	DISCRETE MATHEMATICS (1) Language (4E) B22		CALCULUS (1) Subj:Info (4E) B22	
13:25 - 14:15	INTRODUCTION PROGRAMS FORBENEFITS (1) Subj:Info (4E) B22	DISCRETE MATHEMATICS (1) Language (4E) B22	STATISTICS (1) Language (4E) B22		
14:15 - 15:00	STATISTICS (1) Language (4E) B22	DISCRETE MATHEMATICS (1) Language (4E) B22	STATISTICS (1) Language (4E) B22		
15:00 - 15:50	STATISTICS (1) Language (4E) B22	DISCRETE MATHEMATICS (1) Language (4E) B22	STATISTICS (1) Language (4E) B22		

Notifications

[Edit Profile](#)


### 5.4.6 Profile Pages


Users will have their unique profiles according to the information they entered while signing in. The instructor, teaching assistant and student profiles are different from one another. For instance in student profile s/her comments and peer review will be shown. In the instructor profile there will be a time table to see their office hours or make an appointment.




The screenshot shows a web browser window with the title 'CatchUp'. The page is titled 'Student X's Profile'. On the left, there is a placeholder for a profile picture (a square with an 'X'). To the right of the placeholder, the following information is displayed: Name : Name, Surname : Surname, Department: CS, Grade:3rd, E-mail: name@mail.com, Group:XX, and ID:21XXXXXX. A 'Send Message' button with a paper plane icon is located to the right of the contact information. Below the contact information, there is a 'Review Grade: X/10' section and a 'Comments' section with three empty text input fields. The top right of the page features navigation icons: a bell, an envelope, a user profile icon, and a hamburger menu icon.



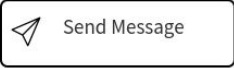
CatchUp




# TA X's Profile




Name : Name  
 Surname : Surname  
 Department: CS  
 E-mail: name@mail.com  
 Courses:CSXX






Location: EE-111

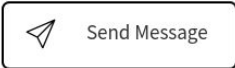
CatchUp




# Instructor X's Profile



Name : Name  
 Surname : Surname  
 Department: CS  
 E-mail: name@mail.com  
 Courses:CSXX





Location: EE-111

	Monday	Tuesday	Wednesday	Thursday	Friday
07:30-08:20	CT LIFE CYCLE (T) Evelyn (BA) B212				
08:20-09:10	CT LIFE CYCLE (T) Evelyn (BA) B212	HEATING SYSTEMS (T) Liam (BA) B212			
09:10-10:00	CT LIFE CYCLE (T) Evelyn (BA) B212	HEATING SYSTEMS (T) Liam (BA) B212	INTRODUCTION TO PROGRAMMING (T) Suzanne (BA) B212	CT LIFE CYCLE (L) Nigel (BA) B214	
10:00-10:50	CALCULUS (T) Nigel (BA) B212	CALCULUS (T) Nigel (BA) B212	INTRODUCTION TO PROGRAMMING (T) Suzanne (BA) B212	CT LIFE CYCLE (L) Nigel (BA) B214	
10:50-11:40	CALCULUS (T) Nigel (BA) B212	CALCULUS (T) Nigel (BA) B212	INTRODUCTION TO PROGRAMMING (T) Suzanne (BA) B212		
11:40-12:30			INTRODUCTION TO PROGRAMMING (T) Suzanne (BA) B212	CALCULUS (T) Nigel (BA) B212	
12:30-13:20	INTRODUCTION TO PROGRAMMING (L) Suzanne (BA) B212	DISCRETE MATHEMATICS (T) Suzanne (BA) B212		CALCULUS (T) Nigel (BA) B212	
13:20-14:10	INTRODUCTION TO PROGRAMMING (L) Suzanne (BA) B212	DISCRETE MATHEMATICS (T) Suzanne (BA) B212	STATISTICS (T) Suzanne (BA) B212		
14:10-15:00	STATISTICS (T) Suzanne (BA) B212	DISCRETE MATHEMATICS (T) Suzanne (BA) B212	STATISTICS (T) Suzanne (BA) B212		
15:00-15:50	STATISTICS (T) Suzanne (BA) B212	DISCRETE MATHEMATICS (T) Suzanne (BA) B212	STATISTICS (T) Suzanne (BA) B212		

### **5.4.7 Course Pages**

Users will be shown different kinds of course pages according to their profile abilities but they all see weekly materials and project groups through these pages.

#### **5.4.7.1 Student Course Pages**

As in these pages which are for students, there will be a request extension button, a request group formation button and a give ad button. Polls above the page will be clickable and when clicked there will be a pop up window in which questions will be shown. Syllabus, example artifact and other materials will be clickable and they forward students to pdf links. Due assignment will be shown in a list form with radio buttons to choose which of them extension requests are for. Advertisements will be clickable and group links will also be clickable.

CatchUp

CS319

POLLS

Poll Y

Submit

Poll X

PROJECT GROUPS

1A >

1B >

2C >

4A >

Request Group Formation

ADVERTISEMENT

Group plus... >

Group search... >

Looking for a... >

In search of... >

Give Ad

WEEK 1

✓ Slides

✓ Notes

WEEK 2

WEEK 3

✓ Assignment2

✓ Assignment3

WEEK 4

✓ Notes

✓ Slides

WEEK 5

✓ Assignment4

WEEK 6

ANNOUNCEMENTS

-In this course our plan ....

-Hw2 second question...

Course Progress

%43

SYLLABUS

EXAMPLE ARFTIFACT

Other Course Materials

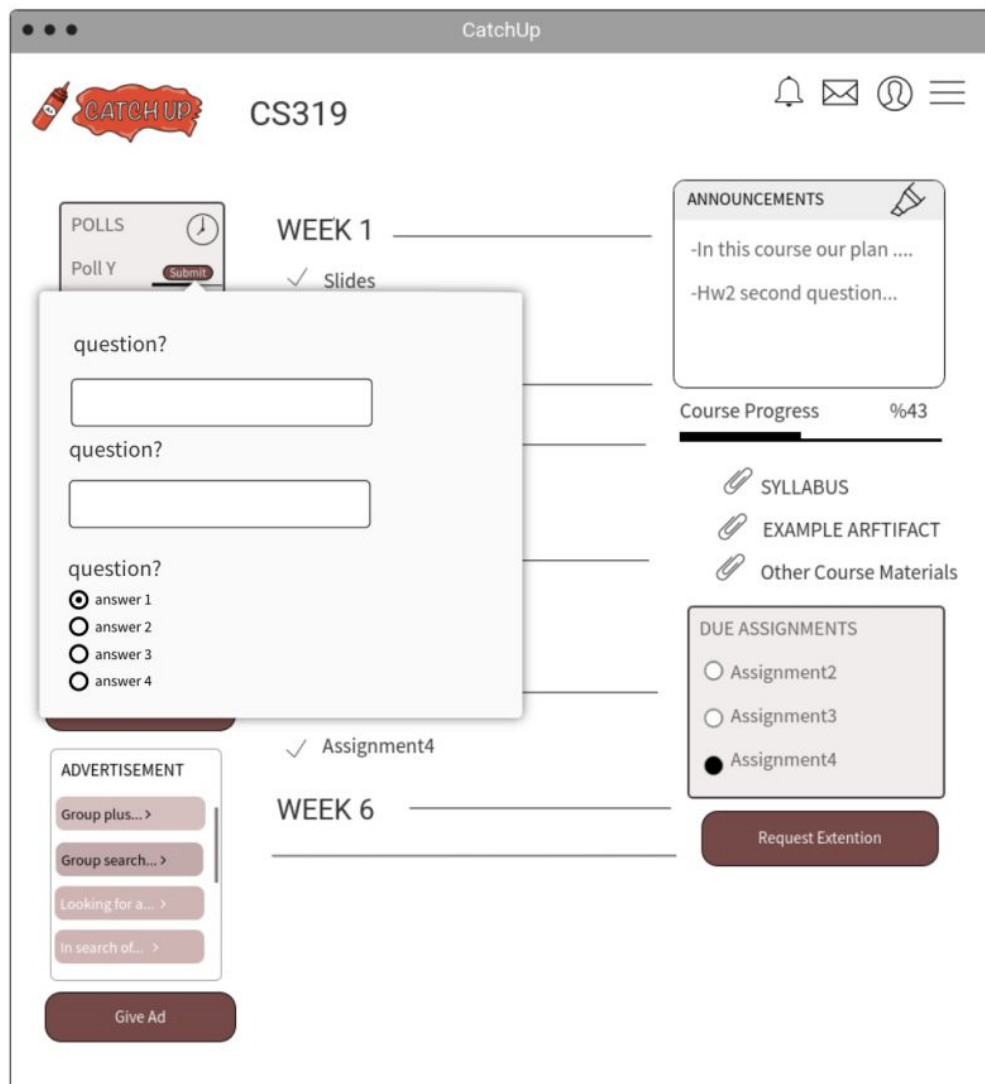
DUE ASSIGNMENTS

Assignment2

Assignment3

Assignment4

Request Extention



#### 5.4.7.2 Instructor Course Pages

Instructors will see groups through this page and assign assignments through this page by pressing the plus button and choosing add assignment. they can also add other materials through this plus button above each week. they can create polls through this page and see the results. They can add announcements through clicking the pencil sign and they can add syllabus and example artifacts by clicking the paperclip sign. They can edit the assignments by choosing one of the above in the box.

CatchUp

CS319

POLLS

Poll Y

Poll X

Create New Poll

PROJECT GROUPS

1A >

1B >

2C >

4A >

SEE STATS

WEEK 1

✓ Slides

✓ Notes

+

WEEK 2

+

WEEK 3

✓ Assignment2

✓ Assignment3

+

WEEK 4

✓ Notes

✓ Slides

+

WEEK 5

✓ Assignment4

+

WEEK 6

+

ANNOUNCEMENTS

course our plan ....

and question...

Course Progress

%43

SYLLABUS

EXAMPLE ARRTIFACT

Other Course Materials

SHARE COURSE CONTENT

DUE ASSIGNMENTS

Assignment2

Assignment3

Assignment4

EDIT

Add Assignment

Add other content

### 5.4.7.3 Teaching Assistant Course Pages

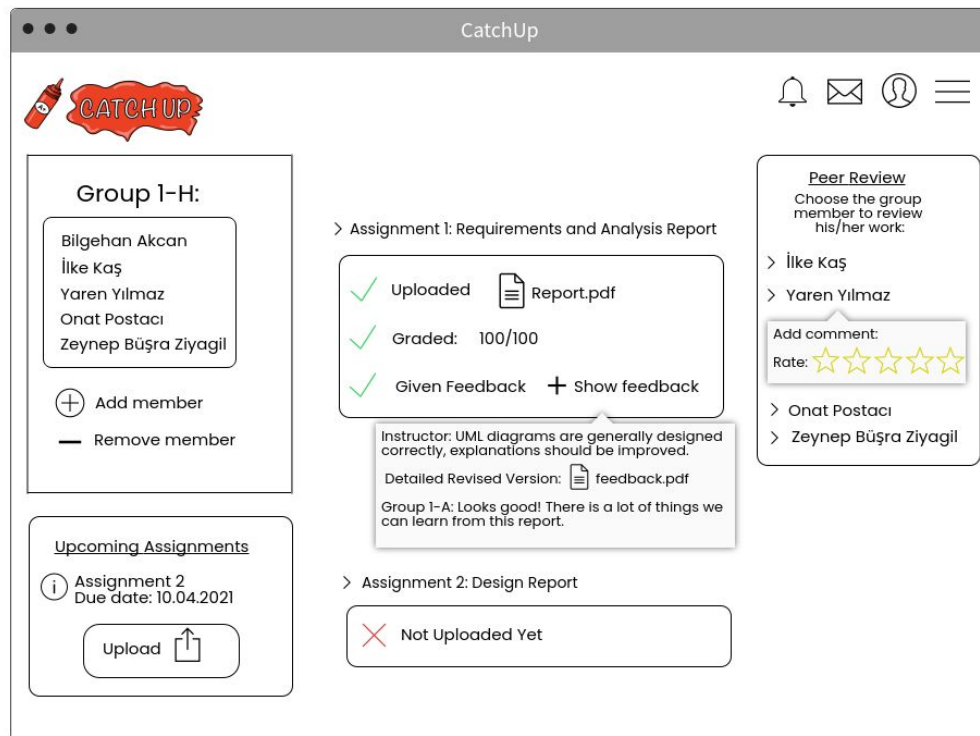
Teaching assistants will see groups, polls, announcements and other materials through this page. However, they can only edit the assignments by choosing one of the above in the box.

The screenshot shows the 'CatchUp' interface for course 'CS319'. The page is organized into several sections:






- Left Sidebar:**
  - POLLS:** A section with a clock icon containing 'Poll Y' and 'Poll X'.
  - PROJECT GROUPS:** A list of groups: '1A >', '1B >', '2C >', and '4A >'.
- Central Content Area:**
  - WEEK 1:** Includes 'Slides' and 'Notes' with checkmarks.
  - WEEK 2:** Includes 'Assignment2' and 'Assignment3' with checkmarks.
  - WEEK 3:** Includes 'Notes' and 'Slides' with checkmarks.
  - WEEK 4:** Includes 'Assignment4' with a checkmark.
  - WEEK 5:** Includes 'Assignment4' with a checkmark.
  - WEEK 6:** Currently empty.
- Right Sidebar:**
  - ANNOUNCEMENTS:** A section with a pencil icon containing the text: '-In this course our plan ....' and '-Hw2 second question...'
  - Course Progress:** A progress bar showing '%43'.
  - Other Course Materials:** A list of links: 'SYLLABUS', 'EXAMPLE ARFTIFACT', and 'Other Course Materials'.
  - DUE ASSIGNMENTS:** A section with radio buttons for 'Assignment2', 'Assignment3', and 'Assignment4' (which is selected).
  - EDIT:** A red button at the bottom of the right sidebar.

### 5.4.8 Group Pages

There will be two kinds of group pages. One of them will be for group members and the other is for non-members to give feedback and grade. In the first page which is for members and they can submit assignments and can arrange group meeting dates. They can see their feedback, peer reviews and grades. In the second page other user can give feedback to artifacts.



CatchUp



Group 1-H:

Bilgehan Akcan

İlke Kaş

Yaren Yılmaz

Onat Postacı

Zeynep Büşra Ziyagil

☆☆☆


☆☆☆☆

☆☆☆☆

☆☆☆☆


☆☆☆☆

> Assignment 1: Requirements and Analysis Report

✓ Uploaded  Report.pdf

✓ Given Feedback + Show feedback

Instructor: UML diagrams are generally designed correctly, explanations should be improved.

Detailed Revised Version:  feedback.pdf

Group 1-A: Looks good! There is a lot of things we can learn from this report.

+ Give Feedback

Type to give feedback to Group 1-H's submission.

> Assignment 2: Design Report

✗ Not Uploaded Yet



## **6 Glossary**

Glossary for any domain-specific terms you use in your report.

## **7 References**

[1] Object-Oriented Software Engineering, Using UML, Patterns, and Java, 2nd Edition, by Bernd Bruegge and Allen H. Dutoit, Prentice-Hall, 2004, ISBN: 0-13-047110-0.

[2] <https://www.mockflow.com/>