



Software Requirements Specification for Online Classroom

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1. Introduction

1.1 Purpose

Online Classroom is a Cloud based application which allows teachers to create a classroom where they can invite students to join and upload study materials as well as assignments with deadlines. The application allows you to carry your classroom wherever you go as you can access the software from laptop, desktop, mobile phones and even tablets.

1.2 Product Scope and Features

This application is targeted towards educational institutes like schools and colleges where the academic proceedings have come to a standstill because of this pandemic. This application allows teachers to upload study materials as well as assignments with deadlines for which students are required to upload submissions in time. Teachers as well as students can add class comments or private comments to give a classroom-like feel.

1.3 References

None.

2. Overall Description

2.1 Product Perspective

The product is based on the pre-existing application by the name Google Classroom with some additional features to make it more user-friendly.

2.2 User Classes and Characteristics

User	Description
Students	Students need to sign up or login to the application to join a classroom using the classroom code shared with them by the teacher. After joining a classroom, they can view or download the files uploaded in the classroom by their teacher and see all the pending assignments in the assignment section along with their deadlines. Students are to submit the assignments within the deadline else their assignment gets submitted with a "Turned in Late" token attached to the file. The student might upload the assignment without submitting or they can even unsubmit a submitted assignment. The students can also check the grades of their graded assignments.

Teachers

Teachers, after signing up or logging into the application can create a classroom and generate a unique classroom code. They can add many email ids into the database so that the classroom code gets mailed to the student and they can join the classroom. The teacher might also send the code through some other process and the student might use the code to join the classroom. The teacher can upload files for the perusal of the students. They can also download the files for later use. The teacher can delete the files at any point of time. The teacher may upload assignments or schedule an upload of assignments at some later date for the students to submit. The teacher can also set a due date for the assignment to be submitted after which if the student submits the assignment, the assignment enters the database with a “Turned in Late” token attached to it. The teacher can grade the assignment and the grade will be visible only to the teacher and the student to whom the assignment belongs to. After grading, an email notification to the registered email address of the student. When the teacher posts something in the classroom or replies to a private comment or adds a classroom comment, a notification is automatically sent to the corresponding student’s registered email address.

2.3 Operating Environment

1. The system uses a minimum of Windows 7 and works on any version of Windows which is higher than it.
2. The system uses a minimum of Mac OS 10 and works in any version of Mac OS which is higher than it.
3. The system uses a minimum of Android SDK version 19 and works on any version of Android which is higher than it.
4. The system uses a minimum of iOS version 10.2.1 and works on any version of iOS which is higher than it.

2.4 Design and Implementation Constraints

1. The students should have enough memory in their device to download the contents.
2. The students should have a stable internet connection to download the contents.

2.5 User Documentation

1. Documentation to be prepared for all end users. The documentation will be available to all end users through the application itself.

2.6 Assumptions and Dependencies

1. All end users have enough storage in their phones to install the application.
2. Teachers have a stable internet connection for uploading study materials.
3. Students have a stable internet connection to download the content available on the app and upload the solution to the assignments.

3. Functional Requirements

3.1 Sign Up as a teacher

3.1.1 Description and Priorities

This function is for Teachers who want to join “Online Classroom” to create an Online classroom.

3.1.2 Stimulus/Response Sequences

Stimulus: Teachers should provide some details for sign up. These details include his/her Name, Phone Number, and Email ID. The teacher then clicks on the ‘Submit Details’ button.

Response: Teacher is asked to enter a password of his/her choice. Teacher is then asked to enter the password again to confirm it.

Stimulus: Teacher selects the ‘Generate OTP’ button

Response: A 6 digit One Time Password (OTP) will be sent on the teacher’s phone number and email address.

Stimulus I: Teacher enters the incorrect OTP.

Response I: Teacher is prompted to click the “Resend OTP” button and asked to enter the OTP until they enter the correct OTP for a maximum of 3 times after which they are prompted to cancel the sign up process.

Stimulus II: Teacher enters the correct OTP.

Response II: Teacher is registered successfully.

3.1.3 Functional Requirements

FR ID	Feature Name	Description
3.1.3.0	Submit Details	This button is clicked after teacher enters his/her Name, Phone no. and Email ID
3.1.3.1	Submit Password	This button is clicked after the teacher enters their password and reconfirms their password.

3.1.3.2	Generate OTP	This button is clicked to generate a 6-digit OTP that will be sent to the teacher's phone and email address.
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3.2 Login as a teacher

3.2.1 Description and Priorities

This function is for already registered Teachers who want to access “Online Classroom” to create/open an Online classroom.

3.2.2 Stimulus/Response Sequences

Stimulus I: Teachers should provide the Email ID using which they registered into the application and the password associated with that account.

Response I.I: Teacher is logged in successfully.

Response I.II: Teacher is prompted that they are already logged in from 2 devices and asked to log out from at least 1 device to log in successfully.

Stimulus: Teacher enters wrong credentials.

Response: An error message is prompted and the teacher is asked to login using OTP.

Stimulus II: Teacher enters the incorrect OTP.

Response II: Teacher is prompted to click the “Resend OTP” button and asked to enter the OTP until they enter the correct OTP for a maximum of 3 times after which if they enter the wrong OTP, their account gets suspended for 24 hours.

Stimulus III: Teacher enters the correct OTP.

Response III.I: Teacher is logged in successfully.

Response III.II: Teacher is prompted that they are already logged in from 2 devices and asked to log out from at least 1 device to log in successfully.

3.2.3 Functional Requirements

FR ID	Feature Name	Description
3.2.3.0	Login	This button is clicked after the teacher enters his/her registered Email ID and password.
3.2.3.1	Login using OTP	This button is clicked after the teacher enters the OTP sent to their phone or Email address in case the teacher enters wrong credentials or chooses this option explicitly.

3.3 Create Classroom

3.3.1 Description and Priorities

This function is for already registered Teachers who want to create an Online classroom on “Online Classroom”.

3.3.2 Stimulus/Response Sequences

Stimulus: Teachers should click on the create a new classroom button.

Response I.I: If the teacher isn’t logged in, they are prompted to Sign Up or Login otherwise they get the “Response I.II”.

Response I.II: Teacher is prompted to add students where they can enter the email address of the students they want to add or skip this and click on “Generate Classroom Code”.

Stimulus: Teacher clicks the “Generate Classroom Code” button using which anyone with the unique code can join the classroom.

Response: A unique 8 character classroom code is generated using which anyone can join the classroom and is prompted to enter the name for classroom.

Stimulus: Teacher enters the name of the classroom and clicks on the “Confirm” button.

Response: The classroom is created and the teacher is redirected to the home page of their classroom.

3.3.3 Functional Requirements

FR ID	Feature Name	Description
3.3.3.0	New Classroom	This button is clicked if the teacher wants to create a new Online classroom.
3.3.3.1	Add Participants	This button is clicked if the teacher wants to add the email addresses of all their students else they can simply skip this step.
3.3.3.2	Generate Classroom Code	This button is clicked by the teacher to generate a unique 8 character classroom code which can be used to either access the class or join the class.
3.3.3.3	Confirm	After all the details of the classroom are entered, the teacher can click this button and the classroom is created.

3.4 Delete Classroom

3.4.1 Description and Priorities

This function is for already registered Teachers who want to delete an Online classroom created by them on “Online Classroom”.

3.4.2 Stimulus/Response Sequences

Stimulus I: Teachers should click on the delete an existing classroom option.

Response I.I: If the teacher isn’t logged in, they are prompted to Sign Up or Login otherwise they get the “Response I.II”.

Response I.II: Teacher is prompted to choose the classroom they want to delete from the list of classrooms they have created or enter the classroom code of the classroom they want to delete.

Stimulus II: Teacher selects a classroom from the list or enters the classroom code in the text box and clicks on the “Delete Classroom” button.

Response II.I: A prompt is displayed that the entered classroom code is invalid if no classroom with that code exists.

Response II.II: A prompt is displayed where they are asked whether they really wish to delete the classroom and that all the data is lost and the change is irreversible.

Stimulus III.I: Teacher clicks on the “Confirm” button.

Response III.I: The classroom is deleted and all the data is lost.

Stimulus III.II: Teacher clicks on the “Cancel” button.

Response III.II: The classroom is not deleted and the teacher is redirected to the home page.

3.4.3 Functional Requirements

FR ID	Feature Name	Description
3.4.3.0	Delete Classroom	This button is clicked if the teacher wants to delete a Online classroom.
3.4.3.1	Confirm	This button is clicked if the teacher wants to really delete the classroom even after reading the warning message.
3.4.3.2	Cancel	This button is clicked by the teacher if the teacher doesn’t want to delete the classroom anymore.

3.5 Modify Classroom

3.5.1 Description and Priorities

This function is for already registered Teachers who want to modify an Online classroom created by them on “Online Classroom”.

3.5.2 Stimulus/Response Sequences

Stimulus I: Teachers should click on the modify an existing classroom option.

Response I.I: If the teacher isn’t logged in, they are prompted to Sign Up or Login otherwise they get the “Response I.II”.

Response I.II: Teacher is prompted to choose the classroom they want to modify from the list of classrooms they have created or enter the classroom code of the classroom they want to modify.

Stimulus II: Teacher selects a classroom from the list or enters the classroom code in the text box and clicks on the “Modify Classroom” button.

Response II.I: A prompt is displayed that the entered classroom code is invalid if no classroom with the code exists.

Response II.II: A prompt is displayed where they are asked whether they wish to add students or remove students or modify classroom details.

Stimulus III.I: Teacher clicks add new students.

Response III.I: The prompt to enter email addresses of students appears .

Stimulus III.I.I: Teacher enters email addresses and clicks “Submit”.

Response III.I.I: If the student already exists, the prompt “The following student/s already exists in your classroom” is displayed.

Response III.I.II: The students get added to the classroom.

Stimulus III.II: Teacher clicks “Modify Classroom Details”.

Response III.II: Teacher is prompted to enter the new details and clicks “Submit”.

Stimulus III.III.I: Teacher clicks remove students.

Response III.III.I: The list of students with a delete button beside their name appears .

Stimulus III.III.II: Teacher selects multiple students at once/ single student and clicks “Delete”.

Response III.III.II: Teacher is asked to confirm whether the following students are to be removed from the classroom.

Stimulus III.III.III.I: Teacher selects “Confirm”.

Response III.III.III.I: The student/s gets removed from the classroom.

Stimulus III.III.III.I: Teacher selects “Cancel”.

Response III.III.III.I: The classroom remains unchanged.

3.5.3 Functional Requirements

FR ID	Feature Name	Description
3.5.3.0	Modify Classroom	This button is clicked if the teacher wants to modify a pre-existing Online classroom.
3.5.3.1	Add New Student	This button is clicked if the teacher wants to add students.
3.5.3.2	Modify Classroom Details	This button is clicked by the teacher if the teacher wants to edit the details of the classroom.
3.5.3.3	Remove Students	This button is clicked if the teacher wants to remove students.
3.5.3.4	Submit/Confirm	This button is clicked to save the changes made.

3.6 Upload Assignment

3.6.1 Description and Priorities

This function is for already registered Teachers who want to upload an assignment to an Online classroom created by them on “Online Classroom”.

3.6.2 Stimulus/Response Sequences

Stimulus : Teachers should click on the create assignment option.

Response : The teacher will get a prompt to upload the assignment.

Stimulus : Teachers should click on next after upload.

Response : Teacher asked to set time of upload.

Stimulus : Teacher sets date and time and clicks next.

Response : The teacher will get a prompt to set the due date of assignment.

Stimulus : Teacher sets due date and clicks upload.

Response: The assignment gets uploaded and all the students in the classroom get notified.

3.6.3 Functional Requirements

FR ID	Feature Name	Description
3.6.3.0	Create Assignment	This button is clicked if the teacher wants to upload an assignment in a pre-existing Online classroom.
3.6.3.1	Upload	This button uploads the assignment and notifies all students in the classroom.
3.6.3.2	Modify Assignment	This button is clicked by the teacher if the teacher wants to edit the details of the assignment or the assignment itself after upload.

3.7 View Submission

3.7.1 Description and Priorities

This function is for already registered Teachers who want to view submissions to an uploaded assignment on an Online classroom created by them on “Online Classroom”.

3.7.2 Stimulus/Response Sequences

Stimulus : Teachers should click on the view submissions option.

Response : The teacher will get a list of files with names of students.

Stimulus : Teacher clicks on a particular file to view it.

Response : The file gets opened.

Stimulus : Teacher clicks on Grade Assignment button.

Response : The teacher will get a prompt to set marks.

Stimuli : The teacher enters marks and clicks submit.

Response : The marks get shown on the student end against their submissions.

3.7.3 Functional Requirements

FR ID	Feature Name	Description
3.7.3.0	View Submissions	This button is clicked if the teacher wants to view submission to an assignment in a pre-existing Online classroom.
3.7.3.1	Grade Assignment	This button is used to grade an assignment.

3.8 Upload Document

3.8.1 Description and Priorities

This function is for already registered Teachers who want to upload notes to an Online classroom created by them on “Online Classroom”.

3.8.2 Stimulus/Response Sequences

Stimulus : Teachers should click on the upload document.

Response : The teacher will get a prompt to upload the document.

Stimulus : Teachers should click on next after upload.

Response : Teacher is asked to add some comment concerning the document.

Stimulus : Teacher writes something in the prompted text box and clicks upload.

Response: The document gets uploaded and all the students in the classroom get notified.

3.8.3 Functional Requirements

FR ID	Feature Name	Description
3.8.3.0	Upload Document	This button is clicked if the teacher wants to upload a document in a pre-existing Online classroom.
3.8.3.1	Upload	This button uploads the document along with some comments and notifies all students in the classroom of the upload.
3.8.3.2	Modify Document	This button is clicked by the teacher if the teacher wants to edit the details of the document or the document itself after upload.

3.9 Add comments

3.9.1 Description and Priorities

This function is for already registered Students/Teachers who want to add comments in an Online classroom created by them on “Online Classroom”.

3.9.2 Stimulus/Response Sequences

Stimulus : Teacher/student should click on the add comment button.

Response : The teacher/student will get a prompt to write a comment.

Stimulus : Teacher/Student writes comment and clicks submit.

Response : The comment gets uploaded in the classroom.

3.9.3 Functional Requirements

FR ID	Feature Name	Description
3.9.3.0	Add comment	This button is clicked if the teacher/student wants to add comment in a pre-existing Online classroom.

3.10 Sign Up as a student

3.10.1 Description and Priorities

This function is for Students who want to join “Online Classroom” to join an Online classroom.

3.10.2 Stimulus/Response Sequences

Stimulus: Students should provide some details for sign up. These details include his Name, Phone Number, and Email ID. The student then clicks on the ‘Submit Details’ button.

Response: Student is asked to enter a password of his/her choice. Student is then asked to enter the password again to confirm it.

Stimulus: Student selects the ‘Generate OTP’ button

Response: A 6 digit One Time Password (OTP) will be sent on the student’s phone number and email address.

Stimulus I: Student enters the incorrect OTP.

Response I: Students are prompted to click the “Resend OTP” button and asked to enter the OTP until they enter the correct OTP for a maximum of 3 times after which they are prompted to cancel the sign up process.

Stimulus II: Student enters the correct OTP.

Response II: Student is registered successfully.

3.10.3 Functional Requirements

FR ID	Feature Name	Description
3.10.3.0	Submit Details	This button is clicked after student enters his/her Name, Phone no. and Email ID

3.10.3.1	Submit Password	This button is clicked after the student enters their password and reconfirms their password.
3.10.3.2	Generate OTP	This button is clicked to generate a 6-digit OTP that will be sent to the student's phone and email address.

3.11 Login as a student

3.11.1 Description and Priorities

This function is for already registered Students who want to access "Online Classroom" to join/open an Online classroom.

3.11.2 Stimulus/Response Sequences

Stimulus I: Students should provide the Email ID using which they registered into the application and the password associated with that account.

Response I.I: Student is logged in successfully.

Response I.II: Student is prompted that he/she is already logged in from 2 devices and asked to log out from at least 1 device to log in successfully.

Stimulus: Student enters wrong credentials.

Response: An error message is prompted and the student is asked to login using OTP.

Stimulus II: Student enters the incorrect OTP.

Response II: Student is prompted to click the "Resend OTP" button and asked to enter the OTP until he/she enters the correct OTP for a maximum of 3 times after which if he/she enters the wrong OTP, his/her account gets suspended for 24 hours.

Stimulus III: Student enters the correct OTP.

Response III.I: Student is logged in successfully.

Response III.II: Student is prompted that he/she is already logged in from 2 devices and asked to log out from at least 1 device to log in successfully.

FR ID	Feature Name	Description
3.11.3.0	Login	This button is clicked after the student enters his/her registered Email ID and password.

3.11.3.1	Login using OTP	This button is clicked after the student enters the OTP sent to their phone or Email address in case the student enters wrong credentials or chooses this option explicitly.
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3.12 Join Classroom

3.12.1 Description and Priorities

This function is for already registered Students who want to join an Online classroom.

3.12.2 Stimulus/Response Sequences

Stimulus I: Students should provide a classroom code and click join classroom.

Response I.I: Student joins a classroom.

Response I.II: Student is prompted that classroom code is invalid.

FR ID	Feature Name	Description
3.12.3.0	Join Classroom	This button is clicked after the student enters classroom code to join the classroom.

3.13 View or Download Assignment & Submit Assignment

3.13.1 Description and Priorities

This function is for already registered Students who want to view or download already uploaded assignments.

3.13.2 Stimulus/Response Sequences

Stimulus : Student clicks on view assignment.

Response : The assignment opens.

Stimulus : Student clicks on download assignment.

Response: Assignment gets downloaded.

Stimulus : Student clicks upload submission.

Response: Student is prompted to upload the file.

Stimulus : Student clicks submit after uploading.

Response: The submission gets saved for the teacher to grade.

Stimulus : Student clicks on unsubmit assignment to edit submission.

Response: Assignment gets unsubmitted.

FR ID	Feature Name	Description
3.13.3.0	View Assignment	This button is clicked to view an assignment.
3.13.3.1	Download Assignment	This button is clicked to download an assignment.
3.13.3.2	Upload Submission	This button is clicked to upload submission to assignment.
3.13.3.3	Unsubmit Assignment	This button is clicked to unsubmit an already submitted assignment.

3.14 View or Download Document

3.13.1 Description and Priorities

This function is for already registered Students who want to view or download already uploaded documents.

3.13.2 Stimulus/Response Sequences

Stimulus : Student clicks on view document.

Response : The document opens.

Stimulus : Student clicks on download document.

Response: Document gets downloaded.


FR ID	Feature Name	Description
3.13.3.0	View Document	This button is clicked to view a document.
3.13.3.1	Download Document	This button is clicked to download a document.

4. Non Functional Requirements

4.1 Performance Requirements

The response time should be low and throughput should be high.

4.2 Security Requirements



A particular classroom created by a particular teacher can only be joined by those who possess the unique classroom code. Students as well as teachers need to log in to their account from the device every time they've been logged out from their account to access the classroom. A particular account can be logged in from a maximum of 2 devices at a particular time. In case you are logged in from 2 devices and you want to login from a third device, you need to select 1 device from which you would like to log out.

4.3 Availability

The classroom should be highly available, that is, it should be accessible readily 24 x 7.

4.4 Reliability

The classroom should be highly reliable, that is, the files uploaded by teachers should be accessible to the students for viewing/ downloading at any point of time unless the teacher deletes them from the classroom. The files uploaded by students should also be accessible to the teacher at any point of time unless the student unsubmits their work.

4.5 Scalability

The classroom should be highly scalable, that is, the software should be able to handle growing amounts of work by adding resources to its system.

4.6 Capacity

The classroom should be such that it allows concurrent access by at least a million users at any point of time.

4.7 Maintainability

The software should be easily maintainable.

4.8 Recoverability

The data associated with the software should be recoverable in case of system failure.

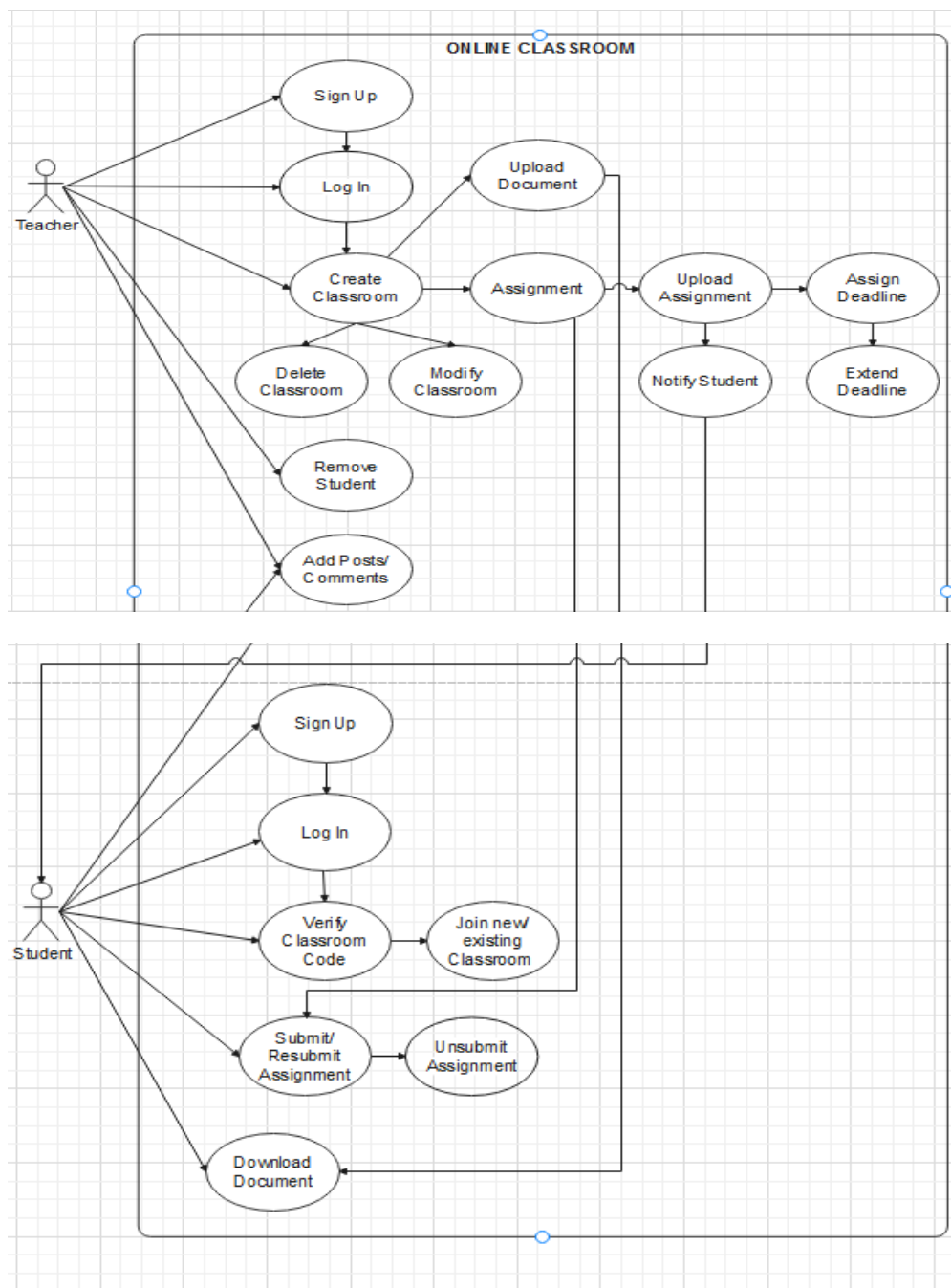
4.9 Privacy Requirements

The private comments created by the student should only be accessible to the teacher and the teacher's reply to a private comment should only be accessible to the student concerned. The classroom comments should be visible to only the members of the particular classroom. The grades of the assignment should only be accessible to the student who submitted the assignment and the teacher who graded the assignment.

4.10 Database Requirements

The database where comments, assignments and submissions are stored should be accessible only to the teacher. The database should be accessible and fault tolerant. The database storing the login id and password should store the password's hashed values.

5. Use Case Diagram



6. Class Diagram

