SG32 GROUP 2

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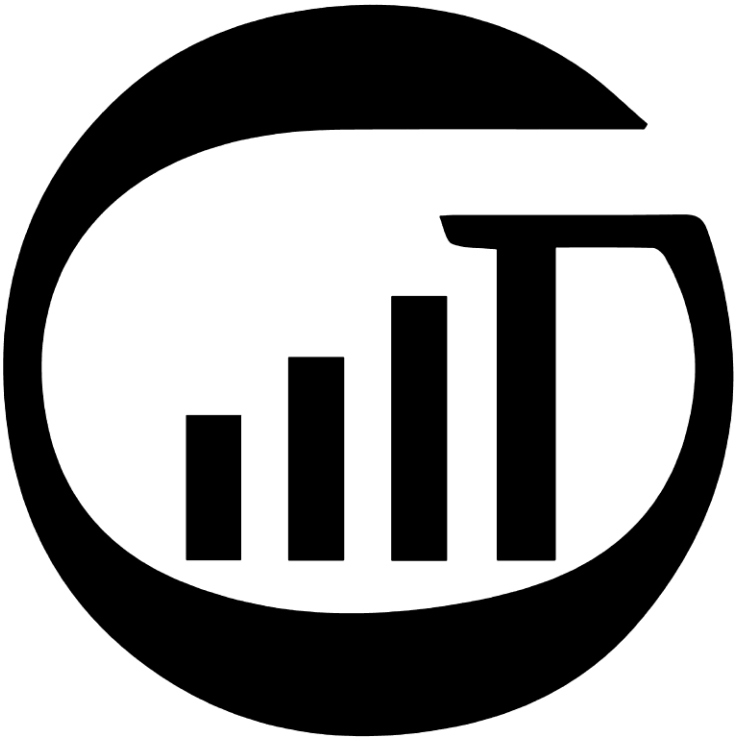

INDIAN INSTITUTE OF INFORMATION TECHNOLOGY GUWAHATI

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

CS321 - SOFTWARE ENGINEERING LAB

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LEARNING

PROJECT TITLE- FORUM FOR ONLINE LEARNING(FSL)

CATEGORY

Web Application

PURPOSE

The purpose of developing this "Forum for Student learning" is to create a common platform for all students and instructors to hold discussions and ask questions.

Why create a common platform for all students and faculty?

A lot of times students have doubts regarding something very specific to an assignment or course and wouldn't be able to get answers because of reasons like:

1. Constraints of Teacher's office hours
2. Google and other discussion forums were too general for those questions.
3. Working alone in their room, maybe during odd hours.
4. Having too few friends who don't know the answer either.
5. Too shy to ask fellow students or ask out in class.

We also realized that there a lot of hassles faced by the instructors as well in handling queries of students, managing class related announcements, class resources etc. It also became difficult for them to help students because of the constraints presented by office hours and mails.

And so we decided to resolve this issue by creating a single platform that helps both teachers and students where students can post their doubts and can get them answered by their classmates and instructors anytime and anywhere.

Instructors too have scope for greater interaction as they are no more under any constraints of communicating during office hours and by mails. They also are be able to answer student's questions once for all students to see thereby saving their time and energy and also are able to manage class related announcements and resources shared easily.

SCOPE

It acts like a single platform for all discussions and queries related to a course. This will provide an additional advantage to the traditional lecture based and office hours system. It acts like a real-time any-where, any-time type of a platform. This will allow students and faculty to interact from anywhere real time thereby enabling distance learning as well. It also provides a means for collaborative learning for students. It supplements online learning with an additional platform for online discussion. Faculty will find it easier to manage queries, post assignments and reference material. It has a lot of scope for future as the Educational Industry is increasingly moving online, generating commercial benefits as well.
Limitations:

It is not a platform where students can submit assignments. It does not allow video content based material to be posted. Real time collaborative Document editing facilities is also not available. Posts can only support limited file types with support for software like LaTeX also missing.

INTRODUCTION

Existing System:

The present system which we have been using for a lot of our courses is Google Classroom.

Disadvantages-
1.Searching of particular information is critical, there is no such feature. 2.A single thread for all class related announcements and student queries making it very cluttered and confusing to look through. 3.Not user friendly in terms of holding discussions and collaborating. 4.No provision for live chat.
5.There is no such feature to conduct topic wise discussion.

6. Students can't filter through their earlier questions and doubts.
7.No statistics of participation is provided.
8.A single place for both assignments and class related resources making it very difficult for students to search and locate.
9.No option to follow any post and recieve any updates.

Proposed System:

Our proposed Student Learning System aims to give students and teachers better experience than the existing system in terms of holding discussions and conducting classes.

There are obviously many advantages of this system to the student as well as the teacher.

The system after careful analysis has been identified to be presented with the following modules

Overview —

*Student Registration : Teachers can register a student for a specific Program.
*Q&A platform : Provides a forum for discussions and queries anytime and anywhere.
*Course Handling : Centralized Platform making class related announcements, posting assignments and class related resources.
*Authentication :Students are authenticated by the system before being permitted into a course.
*Record Storage :The user information files(students and teachers) should be stored in centralized database which can be maintained by the system.
” Statistics : Includes statistics of student participation.

Advantages for Students:

1. Anytime and Anywhere:

Students can now easily and quickly get answers from their classmates and instructors anytime and anywhere-even at 2AM working alone in their room.

2. Search and filter:

Search feature makes it easy to quickly locate relevant posts. Forum facilitates tagging and categorizing posts.

3.Anonymity:

Our platforms allows students to participate anonymously, to encourage participation from the shyest students

4.Encourages Collaborative Learning

This forum now provides an easy way for students to collaborate with instructors and other students.

Students in the course have the opportunity to benefit from the questions posed by other students in the class.

Advantages for Teachers.

1. Ease of Out-of-class communication:

It becomes easier for teachers to handle out-of-class communication. A lot of instructors receive queries through mails and they can be repetitive in nature. This platform makes it easier to handle all queries as everything is on a single platform and it also becomes easier for teachers to handle doubts as if they answer once it is there for everyone to see.

2. Ease of Course Handling:

Our forum provides a centralized platform for class related announcements, class assignments and resources.

It becomes very easy for faculty to manage what they have announced and posted as everything is on a single platform.

3. Effective Communication:

Another advantage to the teacher is that they have time to respond to

student communications in the forum, which gives the teacher a chance to construct the best possible response to the student. Instructors can also now correct incorrect advice received by students from their peers.

FUNCTIONAL REQUIREMENTS

Functional requirements of our system are explained below.

- Users must have valid User ID and password to login thus creating their individual profiles.
- Faculties can upload assignments, announcements in various formats as in pdf, power point presentation etc.
- Students can edit questions and answers wiki-style.
- Questions and posts needing immediate action are highlighted
- Instructors can respond to questions and endorse posts and comments.
- Instructors can allow students to participate anonymously.
- Statistics that help instructors monitor participation, identify top contributors, and adapt teaching strategies
- Students can comment on answers or post follow-up inquiries.
- Platform can be accessed by students and instructors 24/7.
- Students can search through posts on the platform.
- Instructors can create discussions to help segregate different topics which makes searching through them easier
- Platform supports tagging via discussions and categorizing of posts.

NON-FUNCTIONAL REQUIREMENTS

- Performance:

  Performance requirement by the user side is, web application should be developed as a lightweight web app so that it can work on almost any platform even with slower internet connections.

- Availability

The system is made to be available at all times, meaning the user can access it using a web browser, only restricted by the down time of the server on which the system runs.

- Security

Secure access of confidential data (user's details). All users should be authenticated before granting access to the Platform.All users should have access according to their respective authorization privileges. Student should be enrolled in a course before accessing its materials, viewing posts and participating on the Q&A platform.

- Portability

Portability means running on most number of different platform without an additional effort. To achieve this, web application is developed by using the common technologies and tools which are provided by all common web browsers and operating system such as HTML5, JavaScript etc.

- Usability

The app is easy to handle and navigates in a most expected way with no delays.

SOFTWARE TOOLS

I. Database server - Firebase Firestore
II. Client - Any web browser
III. Dev Tools - VS code
IV. Programming Language - JavaScript
V. Frontend Library - React.js VI. Backend
- Firebase

DEPLOYMENT

Operating System Server - Windows, Linux, Unix

HARDWARE SPECIFICATION

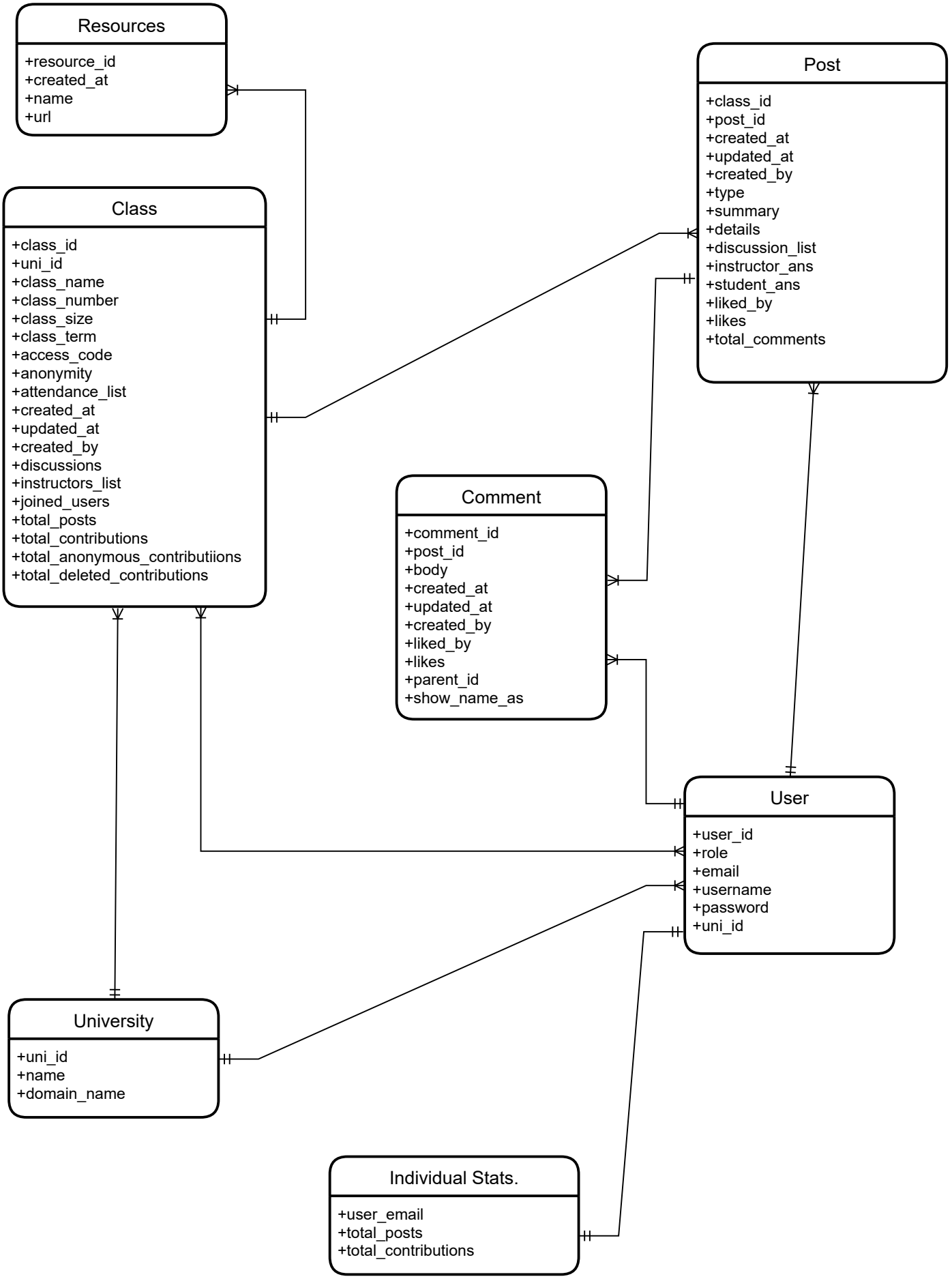
- Processor - Intel Core i3 equivalent or above
- RAM - 4GB or above
- Storage —100GB SSD/100GB HDD or more

NETWORK REQUIREMENT

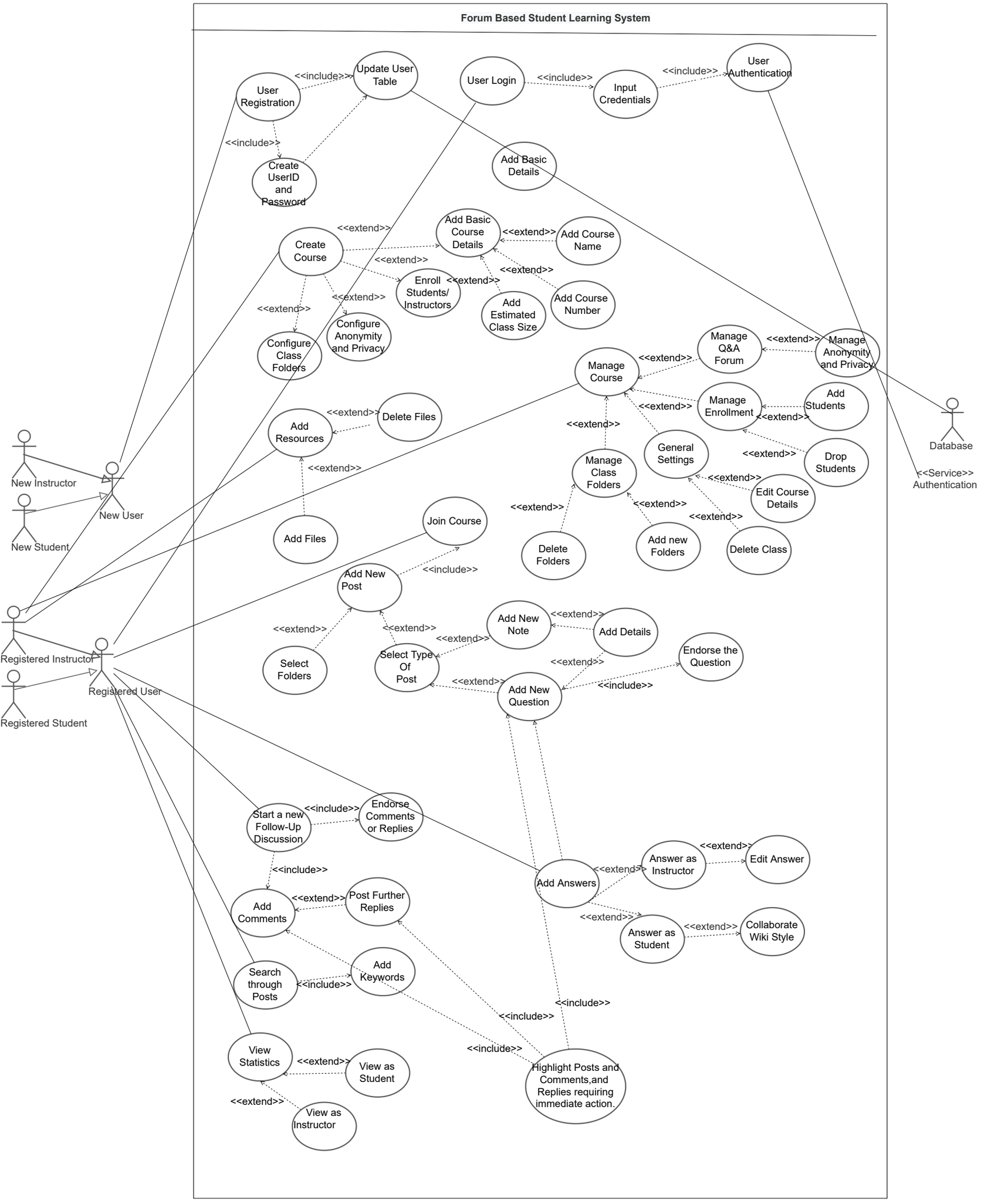
Reccomended-

- Bandwidth greater than 500kbps
- Latency under 100ms

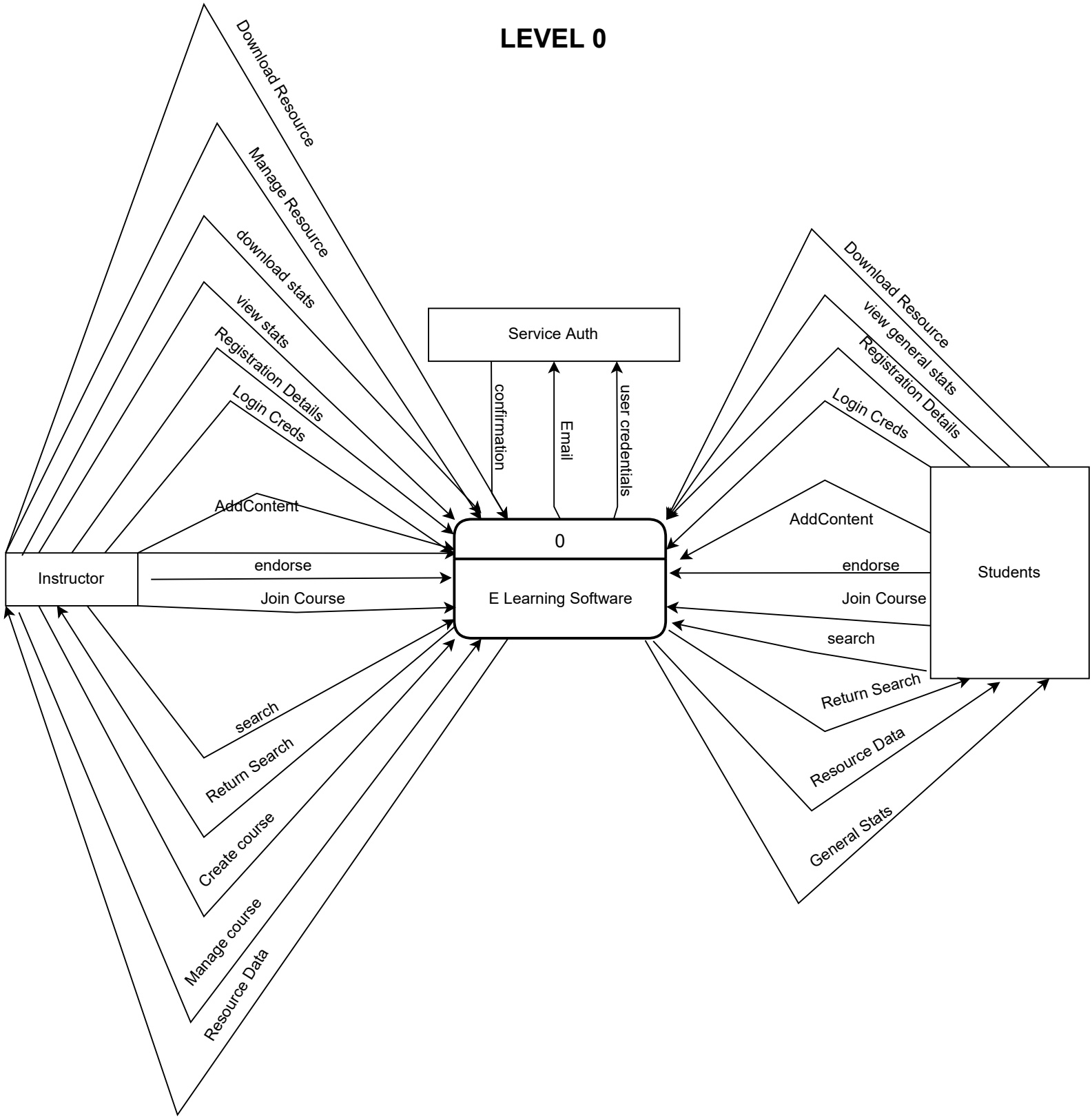
UML CLASS DIAGRAM



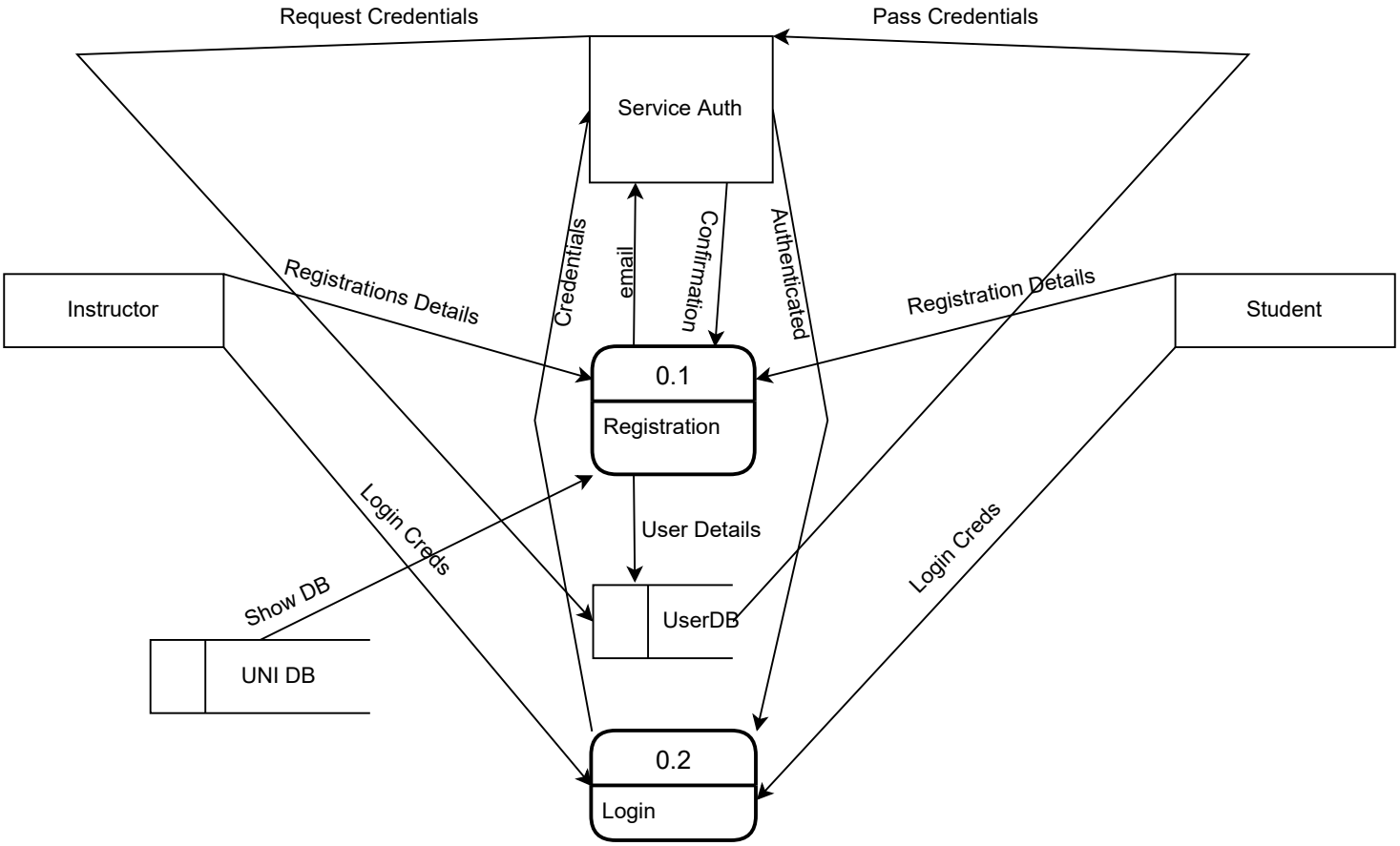
Use Case Diagram

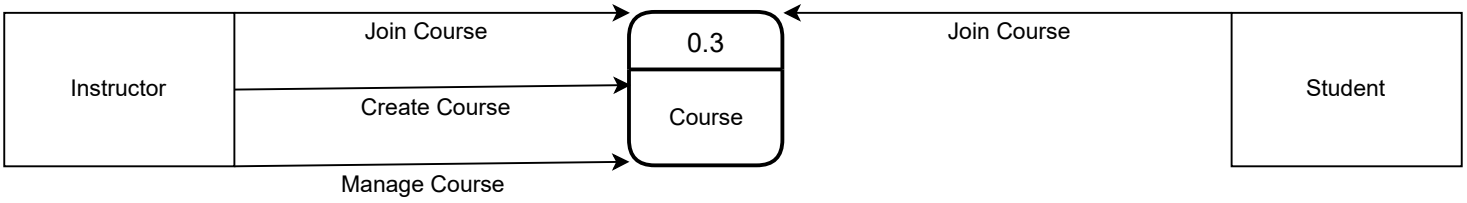


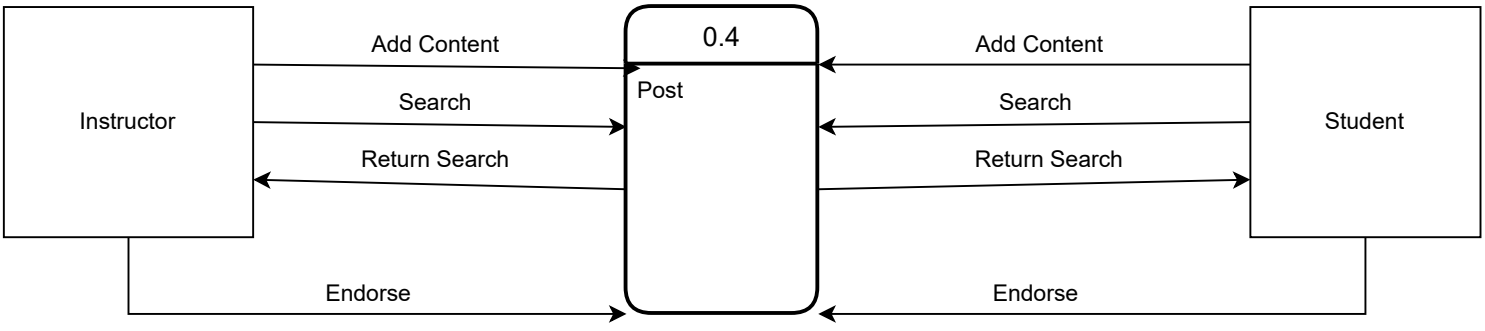
Data Flow Diagram



LEVEL 1


Request Credentials
Pass Credentials
Service Auth
Credentials
email
Confirmation
Authenticated
Registrations Details
Registration Details
Instructor
Student
0.1
Registration
User Details
Login Creds
Login Creds
Show DB
UserDB
UNI DB
0.2
Login


Instructor
Join Course
Create Course
Manage Course
0.3
Course
Join Course
Student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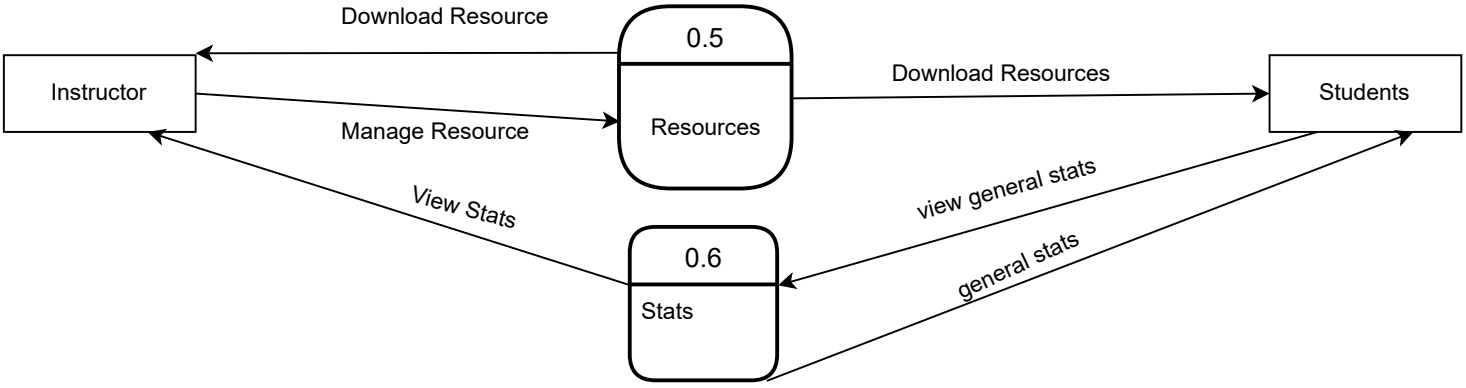
Add Content
Search
Return Search
0.4
Post
Add Content
Search
Return Search
Student
Endorse
Endorse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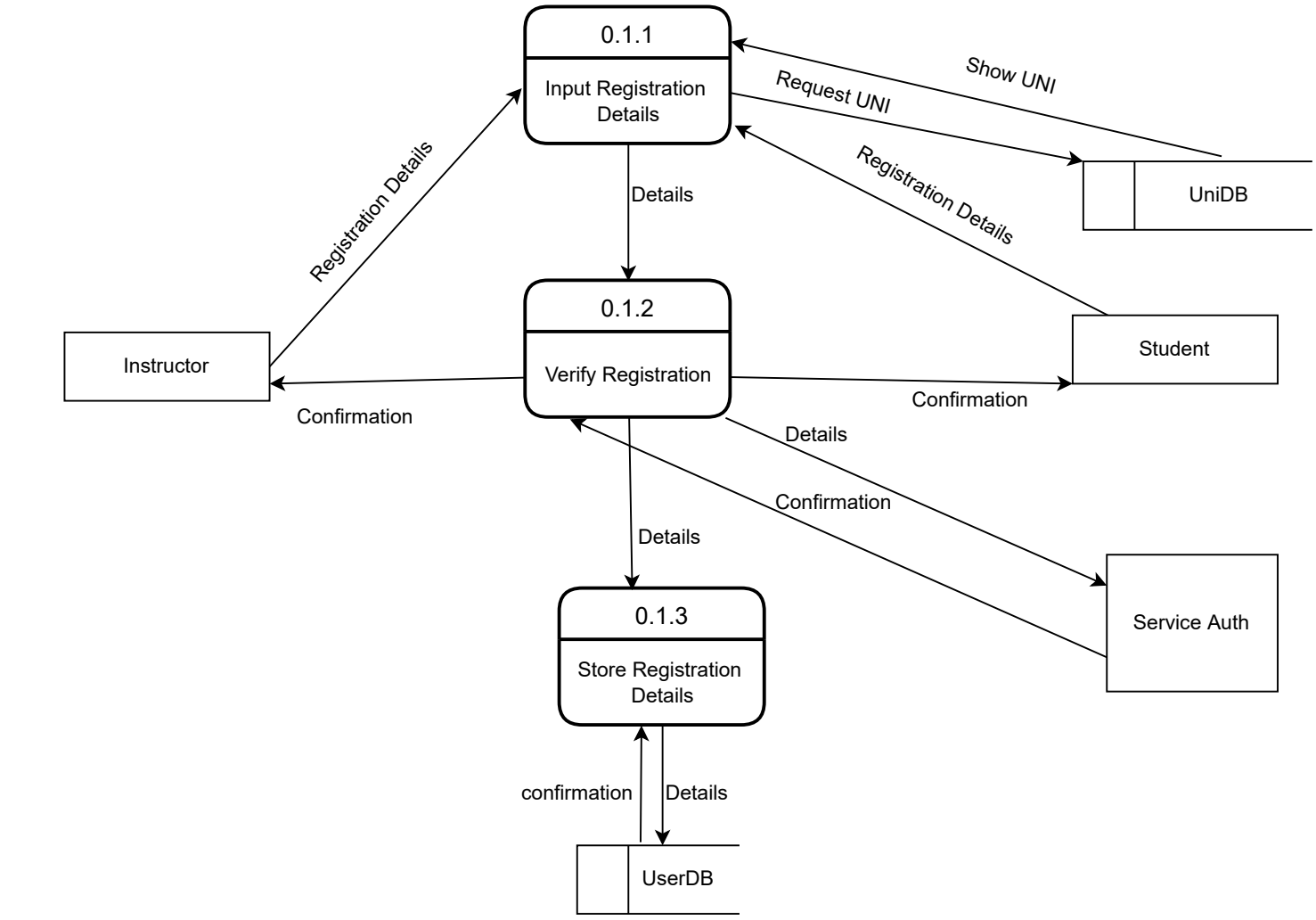
Instructor
Manage Resource
0.5
Resources
Download Resources
Students
View Stats
view general stats
general stats
0.6
Stats

LEVEL 2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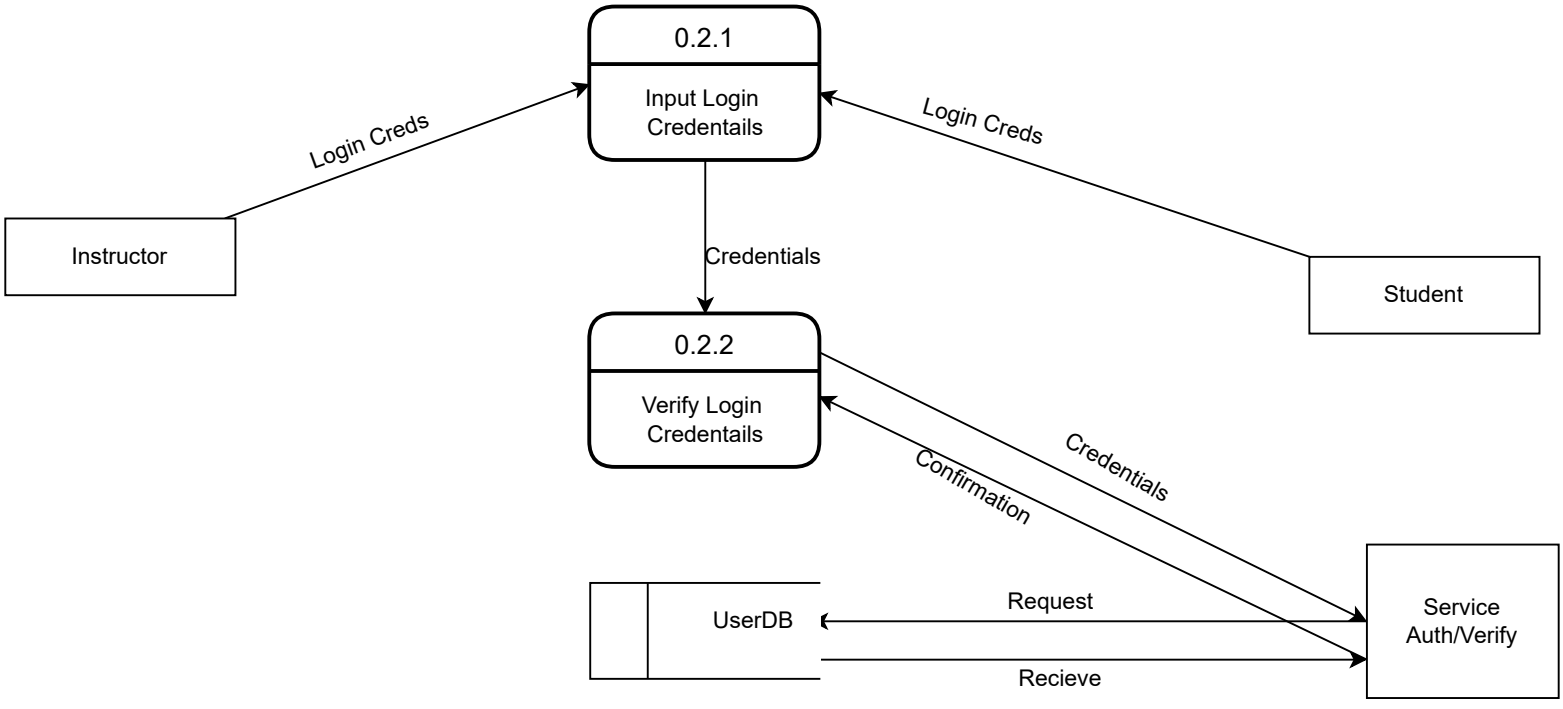
Input Registration Details
Show UNI
Request UNI
Registration Details
UniDB
Details
Registration Details
0.1.2
Verify Registration
Student
Instructor
Confirmation
Confirmation
Details
Confirmation
Details
Service Auth
0.1.3
Store Registration Details
confirmation
Details
UserDB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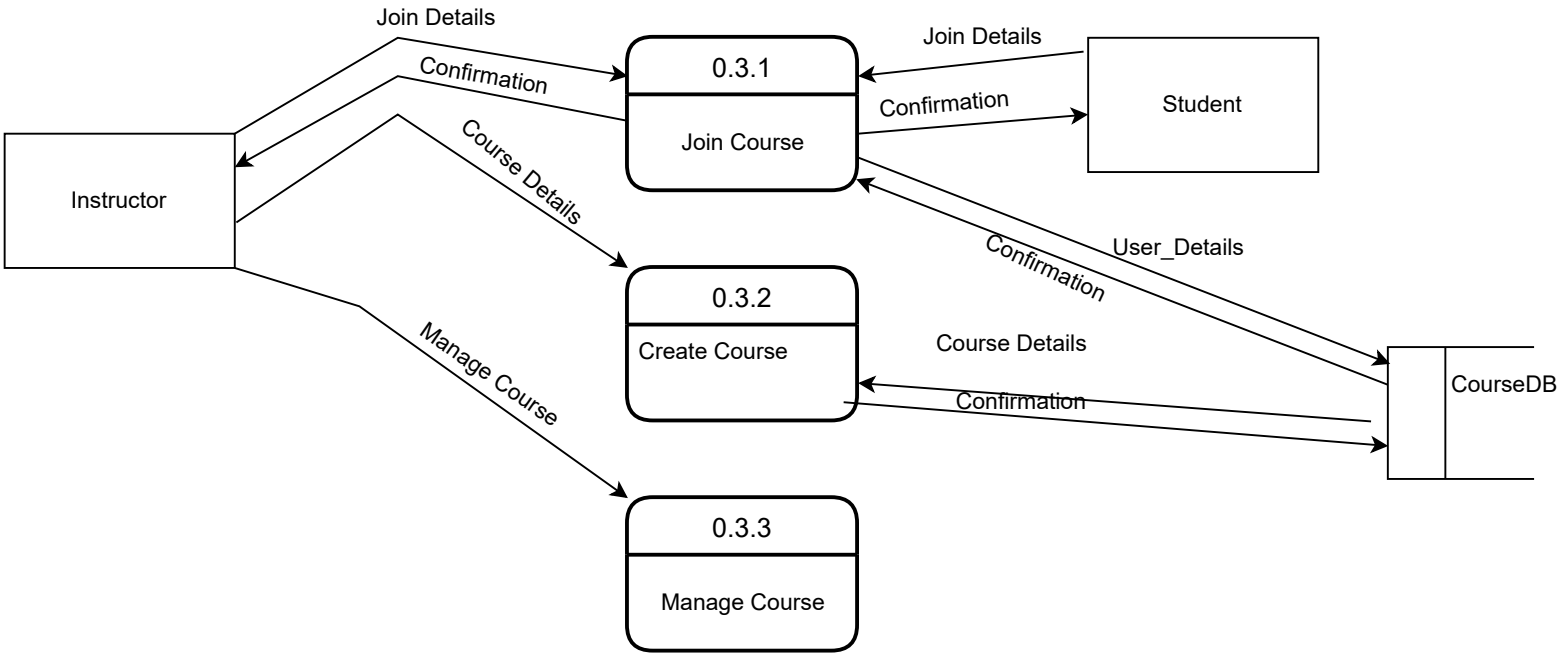
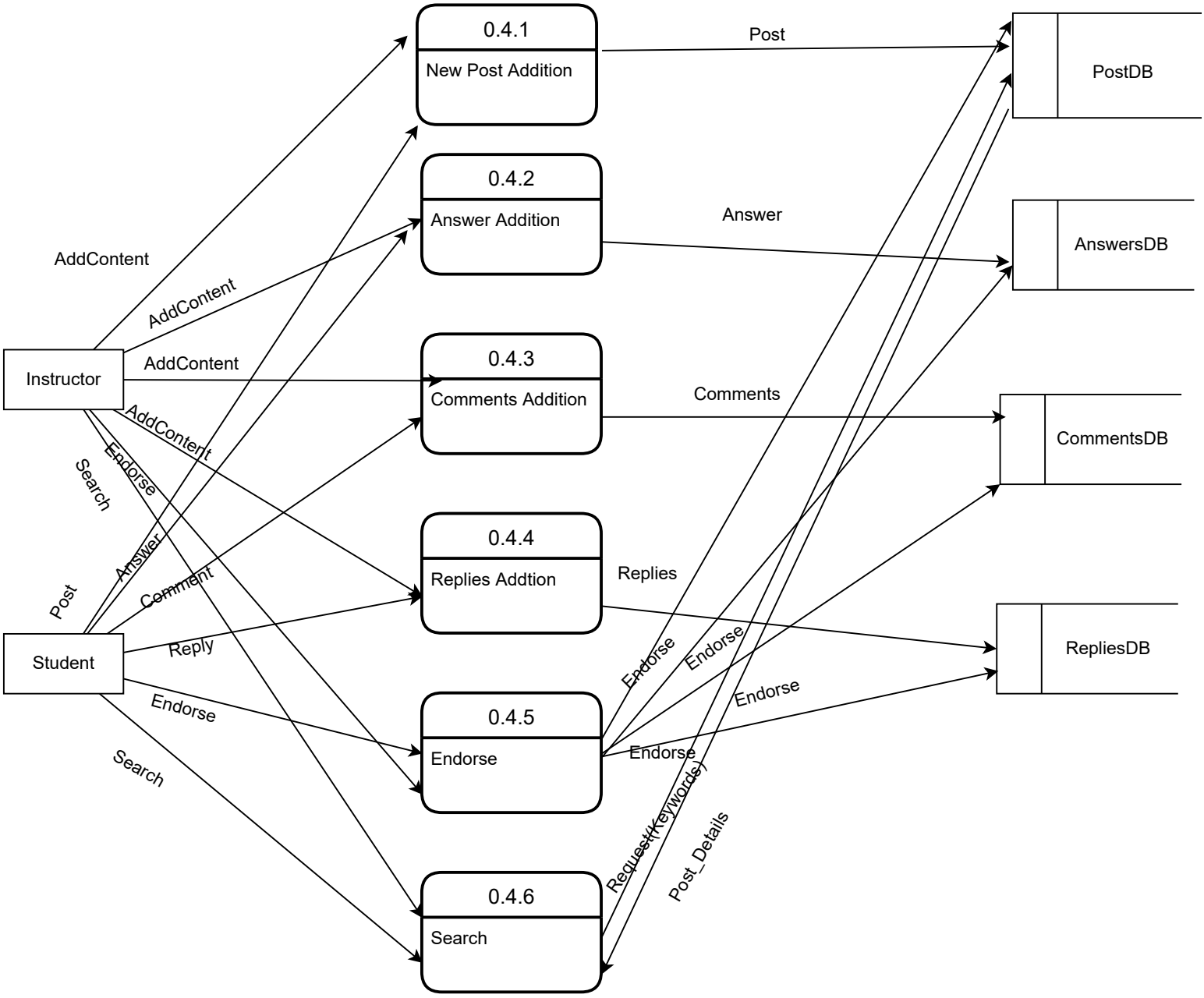
Input Login Credentails
Login Creds
Login Creds
Instructor
Credentials
Student
0.2.2
Verify Login Credentails
Credentials
Confirmation
UserDB
Request
Recieve
Service Auth/Verify


Join Details
Confirmation
Instructor
0.3.1
Join Course
Join Details
Confirmation
Student
Course Details
Confirmation
User_Details
0.3.2
Create Course
Course Details
Confirmation
CourseDB
Manage Course
0.3.3
Manage Course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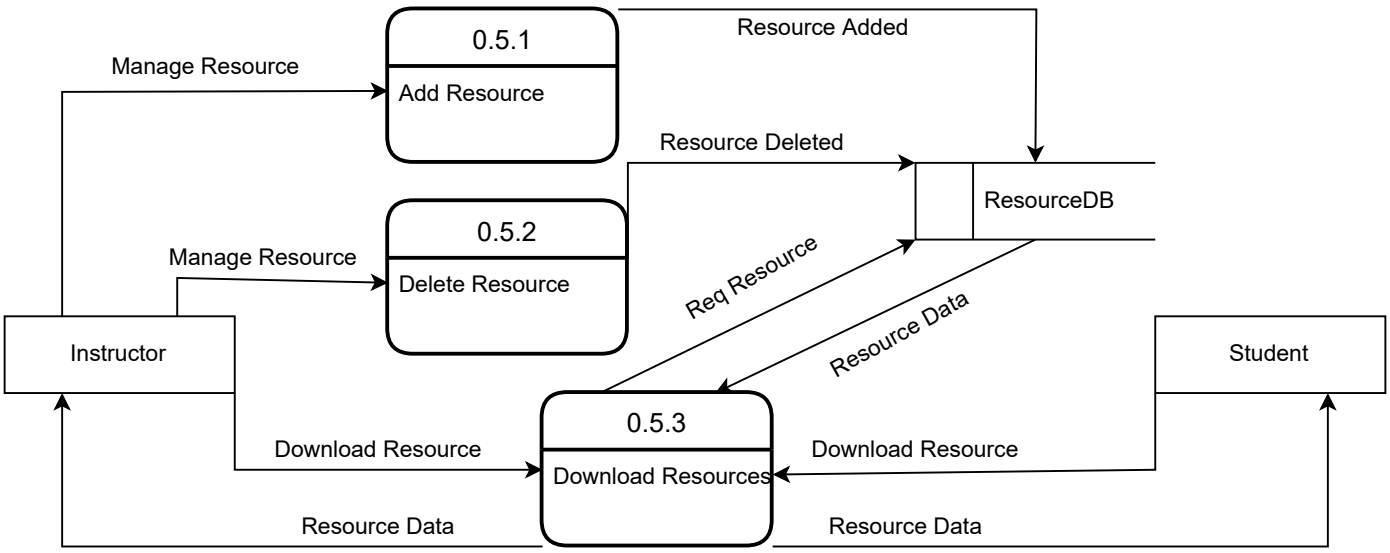
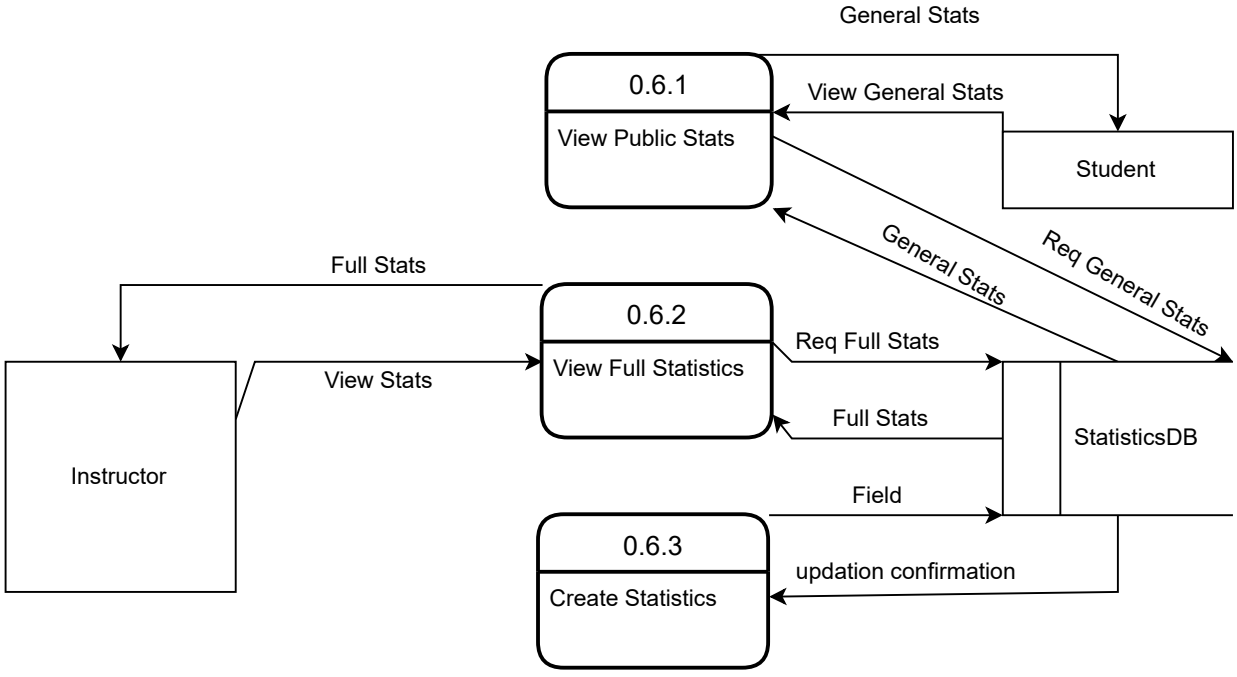
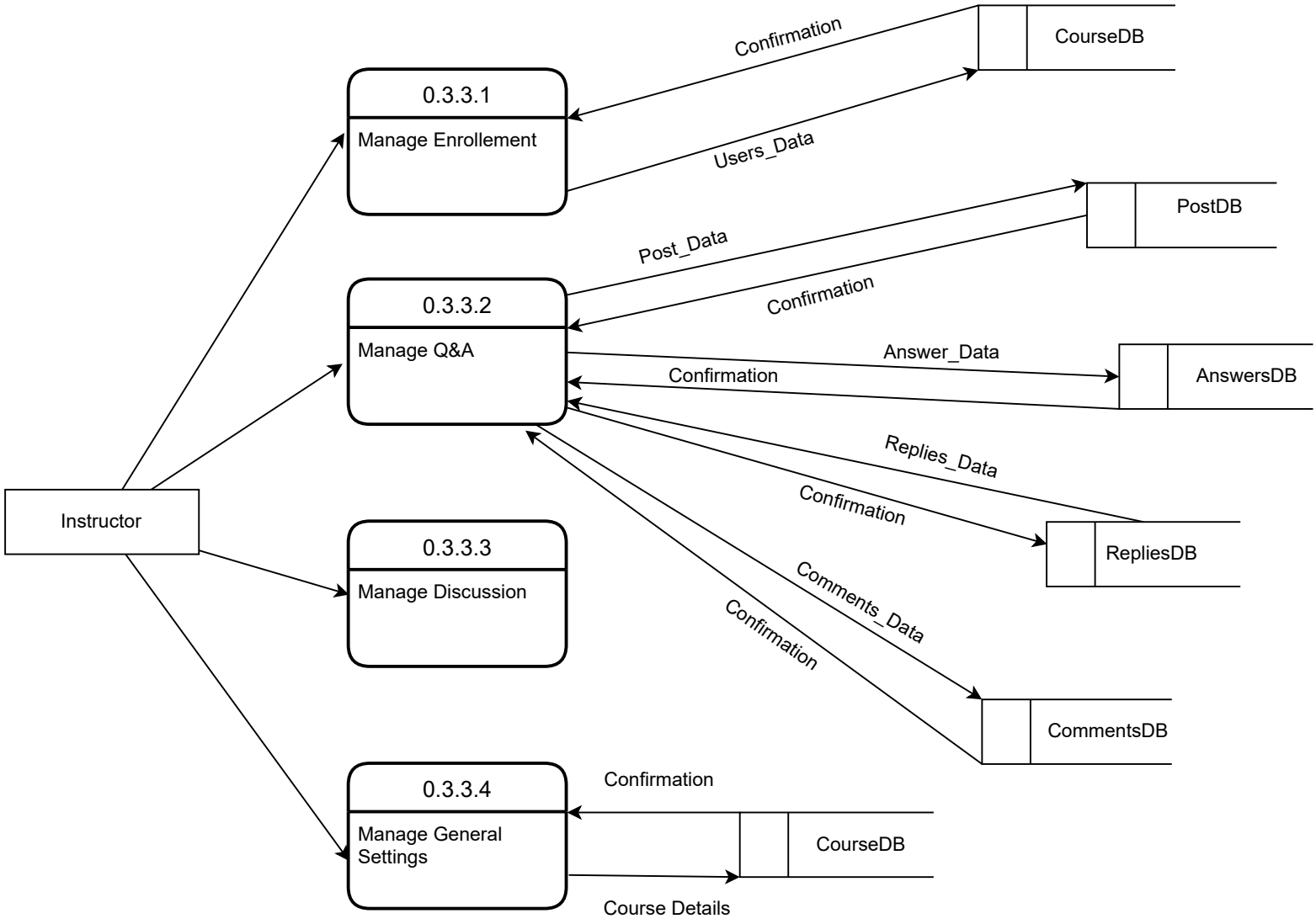
New Post Addition
Post
PostDB
0.4.2
Answer Addition
Answer
AnswersDB
AddContent
AddContent
AddContent
AddContent
Instructor
0.4.3
Comments Addition
Comments
CommentsDB
Search
Endorse
Answer
Comment
Post
0.4.4
Replies Addtion
Replies
RepliesDB
Reply
Student
Endorse
Endorse
Endorse
Endorse
Endorse
0.4.5
Endorse
Search
Request(Keywords)
Post_Details
0.4.6
Search


0.5.1
Add Resource
Resource Added
Manage Resource
Resource Deleted
ResourceDB
0.5.2
Delete Resource
Manage Resource
Req Resource
Resource Data
Instructor
Student
0.5.3
Download Resources
Download Resource
Download Resource
Resource Data
Resource Data


General Stats
0.6.1
View Public Stats
View General Stats
Student
General Stats
Req General Stats
Full Stats
0.6.2
View Full Statistics
Req Full Stats
View Stats
Full Stats
StatisticsDB
Instructor
Field
0.6.3
Create Statistics
updation confirmation

LEVEL 3


Instructor
0.3.3.1
Manage Enrollement
0.3.3.2
Manage Q&A
0.3.3.3
Manage Discussion
0.3.3.4
Manage General Settings
CourseDB
PostDB
AnswersDB
RepliesDB
CommentsDB
CourseDB
Confirmation
Users_Data
Post_Data
Confirmation
Answer_Data
Confirmation
Replies_Data
Confirmation
Comments_Data
Confirmation
Confirmation
Course Details

TESTING REPORT SE-PROJECT SG32 GROUP 2

Application element	Input	Valid Equivalence Class	Invalid Equivalence Class	Test Case	Output (link to output image)	Functional Requirement Tested
1) Signup Email ID	Email ID = s1@s2, Where s1 can *contain* letters (a-z), numbers (0-9), dashes (-), underscores (_), apostrophes ('), and periods (.) and same for s2. (given s2 is same domain as university entered)	[s1@s2]	Anything other than s1 and s2 is considered invalid. We have created 3 invalid equivalence classes below : 1) String s where s is non empty, 2) String s where s is empty, 3) [s1@] 4) [@s2] 5) [s1@s3], where s3 is not the same domain as university entered	VALID TEST CASES - Eg. Abc@gmail.com INVALID TEST CASES - Eg. 1) Abc 2) 3) abc@ 4) @gmail 5) abc@abc	Valid: https://drive.google.com/file/d/11uveYIX2LRyoqzQHTZEsRx152EXYmugf/view?usp=sharing Invalid: 1) https://drive.google.com/file/d/1akcY1Js7ytZBsz75596wOvS_B_6XhUBk/view?usp=sharing 2) https://drive.google.com/file/d/1BY7IFQUy7s1ym9knRtPlJq2rtCTm3ZnP/view?usp=sharing 3) https://drive.google.com/file/d/1EsTa0EldeMe7WTokwY8P5Mse-3YD1OPy/view?usp=sharing 4) https://drive.google.com/file/d/1m39c9daqBrR-qVTQciG_SPsApbTHZ2Rm/view?usp=sharing 5) https://drive.google.com/file/d/1A4b1cnxUGWSmXGajUWHbFd50W2DKpjs0/view?usp=sharing	Users must have valid User email to signup thus creating their individual profiles.
2) Login Email ID	Email ID = registered user's email ID	All email IDs that have been registered	All email IDs that haven't been registered	VALID TEST CASES - Eg. instructor@gmail.com INVALID TEST CASES - Equivalence class input, Where the below emails do not exist in database 1) Abc@gmail.com	Valid: https://drive.google.com/file/d/1UN-imaV0-Cyq8EXGfvNB543oY1thq6Vb/view?usp=sharing Invalid: 1) https://drive.google.com/file/d/1rPDwNVnDz6z2QbtxVasvVpwZtBU1o_CZ/view?usp=sharing	Users must have valid User email to login thus creating their individual profiles.

TESTING REPORT SE-PROJECT SG32 GROUP 2

3) Signup Password	Signup Password, Where password is more than 6 characters	Any string s where s is non empty	1) s, where s is less than 6 characters 2) s, where s is empty	VALID TEST CASES - Eg. s, where s is more than 6 characters INVALID TEST CASES - Eg. 1) Abc 2) s, where s is empty	Valid: https://drive.google.com/file/d/18DjR__gGhJpWFXXzFbdhLN1qhN0ehzkZ/view?usp=sharing Invalid: 1) https://drive.google.com/file/d/1QWkRwSk_8gQnRUGU4e3tkvcjoi7Dxwe6/view?usp=sharing 2) https://drive.google.com/file/d/12UHa3WbgpDExpRAvqdOd5NQ2-piv7dtt/view?usp=sharing	Users must have valid User password to signup thus creating their individual profiles.
4) Login password	Login password = registered user's password	All passwords that have been registered	All passwords that haven't been registered	VALID TEST CASES - Eg. inspass INVALID TEST CASES - Equivalence class input, Where the below universities do not exist in database 1) Randompassword	Valid: https://drive.google.com/file/d/1a1mbIfx6ZNNQvQdrHxE33QUl8zRbuurz/view?usp=sharing Invalid: 1) https://drive.google.com/file/d/1Gp-CAnChc5IEDNaSwGEhnevB0ArmUfVP/view?usp=sharing	Users must have valid User email to login thus creating their individual profiles.

TESTING REPORT SE-PROJECT SG32 GROUP 2

5) Signup University	Select a university from the given list	Selected university	Not selected university	VALID TEST CASES - Eg. Google University INVALID TEST CASES - Equivalence class input, Where the below universities do not exist in database 1) Empty string	Valid: https://drive.google.com/file/d/1UJzs34yD2uG998z1O3uVrTx99Htpx7PB/view?usp=sharing Invalid: 1) https://drive.google.com/file/d/1g0WOV2y3O0qSxdmXghqdSaErRVXD5ly5/view?usp=sharing	Users must enter valid universities to create their profiles
6) Signup Role	Select a role from the given list	Selected role	Not selected role	VALID TEST CASES - Eg. Instructor INVALID TEST CASES - Equivalence class input, Where the below roles do not exist in list 1) Empty string	Valid: https://drive.google.com/file/d/1D-uCq4s-BTkaOylbq5LmgYxH64rRFCpz/view?usp=sharing Invalid: 1) https://drive.google.com/file/d/1gt_w1gRgxCdNugjpjV3gTxjfzxkEWLoN/view?usp=sharing	Users must enter valid roles to create their profiles

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7) Wiki-style answers	Any input string given by a user who hasn't originally answered	Any string 's'			https://drive.google.com/file/d/1DooY3Fd-c_pVPd5Xt67DVaY-rorv3Ca7/view?usp=sharing	Students can edit questions and answers wiki-style.
8) Respond to comment	Any input string	Any string 's'			https://drive.google.com/file/d/1a_QVa526CHad7yJz0aIJxN_omClP8Ci4/view?usp=sharing	Instructors can respond to questions and comments

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9) Endorse a post/comment	Click event for liking a post or comment	1) Endorsing a post 2) Endorsing a comment			1) https://drive.google.com/file/d/1tQjubkehngu5_oSZiqcZnYbQr2zJo4EP/view?usp=sharing 2) https://drive.google.com/file/d/1suFZWZOQjY-9nvdMwcYVaziMRmoc3NzO/view?usp=sharing	Instructors can endorse questions and comments
10) Allowing anonymous participation	Click event for turning on anonymity of a class	Turning on anonymity of a class		1) Anonymous post 2) Anonymous comment	Anonymity of class - https://drive.google.com/file/d/1CfCI6a1-Re0d4g98BOD2BKeOT4wN6GyE/view?usp=sharing 1) https://drive.google.com/file/d/1L3R8r0rnKRvlPbAaiigkCQDLPnYHT6DJ/view?usp=sharing 2) https://drive.google.com/file/d/14n4sm3bDELqVRjrsH62Xt64PFwZsZjgq/view?usp=sharing	Instructors can allow students to participate anonymously.

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11) View Statistics	Adding a post or comment, or deleting a post or comment	1) Adding a post 2) Deleting a post 3) Adding a comment 4) Deleting a comment		1) Adding a post 2) Deleting a post 3) Adding a comment 4) Deleting a comment	Original Stats - https://drive.google.com/file/d/1CfZxk8sKsbx69A4FopaBhZQslcr9XQpG/view?usp=sharing 1) https://drive.google.com/file/d/1mcpf2h1p-ktxR23g72x6szciAPJbHS6A/view?usp=sharing 2) https://drive.google.com/file/d/1YO42yyUXR0ylT5XG5vT-LsZKgUjTCarU/view?usp=sharing 3) https://drive.google.com/file/d/11kK0jRpc0jUd4RjykgvGCzBNwu_gpHqe/view?usp=sharing 4) https://drive.google.com/file/d/1f37Cl6mjEulnP13LKTX84DTy1R_E2305/view?usp=sharing	Statistics help instructors monitor participation, top contributors, and adapt teaching strategies
12) Search filter	Any string	1) String matches post summary 2) String matches post details		Eg. Electrifying	https://drive.google.com/file/d/1g4HCu6CGXm9QB-DlvGJRl6vpF7GhOyfY/view?usp=sharing	Students can search through posts on the platform.

TESTING REPORT SE-PROJECT SG32 GROUP 2

13) Create Discussions (tagging)	Any string	Any non empty string	Empty string	Valid test cases - 1) Test Discussion Invalid test cases - 1) s, where s is an empty string	https://drive.google.com/file/d/11SuI0WP2g72jCyVGE3VoNA9lZfAaQeMI/view?usp=sharing	Instructors can create discussions to help segregate different topics which makes searching through them easier
14) Filtering posts by tagging	Click event to select a discussion	Select any discussion		Valid test case Eg. 1) electro	https://drive.google.com/file/d/1A9bGmR4CRqoMKhCMp0E-7GG8HEoXJknH/view?usp=sharing	Platform supports tagging via discussions and categorizing of posts.

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15) Create post: Post type	Radio input : choose between ‘question’ or ‘note’	1) Chosen ‘question’ option 2) Chosen ‘note’ option	1) Did not choose a post type (empty input)	Valid Test cases - 1) Chosen ‘question’ option 2) Chosen ‘note’ option Invalid test cases - Did not choose a post type (empty input)	Valid: 1) https://drive.google.com/file/d/1vAykVAYF_coa-ePJb-X-GT4wdzOo2Swh/view?usp=sharing 2) https://drive.google.com/file/d/10z2R2MD_VxymCDwphDyfDXdq2uO-3vJO/view?usp=sharing Invalid: https://drive.google.com/file/d/19bI331Atmenf2hbliuMHLyBHoTqdcZWB/view?usp=sharing	Students can comment on answers or post follow-up inquiries.
16) Create post: Summary	Any string	Any non empty string	Empty string	Valid test cases - 1) Test summary Invalid test cases - 1) s, where s is an empty string	Valid: https://drive.google.com/file/d/1vvae6vxMIscOqgbqwnf2eUX1DPCll1PG/view?usp=sharing Invalid: https://drive.google.com/file/d/1wDFqL5qUuNjy64hhx8lTmMAk2hnzFs6G/view?usp=sharing	Students can comment on answers or post follow-up inquiries.

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17) Create post: Details	Any string	Any non empty string	Empty string	Valid test cases - 1) Test details Invalid test cases - 1) s, where s is an empty string	Valid: https://drive.google.com/file/d/17tpZrSIxDkdw6qHLMaJIbHMkeaML222Z/view?usp=sharing Invalid: https://drive.google.com/file/d/19d9soQUku64BhN7giNzgtBgNZBG9Vlim/view?usp=sharing	Students can comment on answers or post follow-up inquiries.
18) Create post: Show name	Radio input : choose between your email or 'Anonymous' (if class anonymity is set as true)	1) Chosen your name as option 2) Chosen 'Anonymous' as option	Did not choose any option (empty input)	Valid Test cases - 1) Chosen your name as option 2) Chosen 'Anonymous' as option Invalid test cases - 1) Did not choose any option (empty input)	Valid: 1) https://drive.google.com/file/d/1LfziJftAvFrD7z2x4XqRpSeFEydnH41d/view?usp=sharing 2) https://drive.google.com/file/d/1BN5wt8Yl09NwXeaCADhs1yiwNYUSXGo4/view?usp=sharing Invalid: 1) https://drive.google.com/file/d/1MTpxuJnc776rvuPqotF9McUmxECHisvp/view?usp=sharing	Students can comment on answers or post follow-up inquiries.

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19) Create comment: Comment details	(Only when post type is question) Input any string ‘s’ for details of comment	Any non empty string	Empty string	Valid Test Cases - 1) Test comment Invalid Test Cases - 1) s, where s is an empty string	Valid: https://drive.google.com/file/d/14ebG6Qeln5Yj0fXvhqIbKgM80SHqsQq2/view?usp=sharing Invalid: https://drive.google.com/file/d/1-ry7IfBATkRXBPYCp7G0ISYexSwVPFWJ/view?usp=sharing	Students can comment on answers or post follow-up inquiries.
20) Create comment: Comment show name	Select a show name from given list of options	1) Chosen your name as option 2) Chosen ‘Anonymous’ as option	Did not choose any option (empty input)	Valid Test cases - 1) Chosen your name as option 2) Chosen ‘Anonymous’ as option Invalid test cases - Did not choose any option (empty input)	Valid: 1) https://drive.google.com/file/d/13_nu2OJFtfHSPjojH00pw1ax5Pb9yNlh/view?usp=sharing 2) https://drive.google.com/file/d/1MM1mGzMcab8N5TQ9MLfM5MSjMbSCQYMZ/view?usp=sharing Invalid: https://drive.google.com/file/d/1jZXg9aykD5f61-c4BUhXNeE7G2K_NFkc/view?usp=sharing	Students can comment on answers or post follow-up inquiries.

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21) Post Highlighting	If the post is not endorsed or doesn't have any comments then it'll be highlighted for immediate action	no comments or likes on posts	More than 1 comment or likes on posts	Valid Test Cases - 1) No action that triggers highlighting Invalid Test Cases - 1) Adding a comment 2) Liking a post	Valid: 1) https://drive.google.com/file/d/1CJgSNPZ5qKGNNh2FGr8ZHe6QSZsQ8McU/view?usp=sharing Invalid: 1) https://drive.google.com/file/d/1JD2sAu2qQ2PFb-HyR7YVS1xHeNxJ-Opj/view?usp=sharing 2) https://drive.google.com/file/d/1JE3Cfm5rpSedbe51GgU7SW6PqWlQywdV/view?usp=sharing	Questions and posts needing immediate action are highlighted

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Testing of Non Functional Requirements

We have also tested our non functional requirements thoroughly.

Performance Requirement:
To test the performance of our application, we ran the web application with different network speeds, particularly with lower speeds, and found the application to be running well.

Availability:
Our backend is handled by Firebase so the system will be made available all the time as ensured by the Firebase Service Agreement.

Security:
The application has been designed in such a manner that the security isn't compromised.
All users will be authenticated before accessing the platform and students should be enrolled in a course before accessing its materials, viewing posts and participating on the Q&A platform.Our database has security rules that only authenticated users to access it.We have also carried out Role Based Authentication where only users with appropriate roles can access the platform.

Portability:
We have tested our application on various web browsers and found it to work well and as expected.

Usability:
We navigated throughout our application thoroughly and found it run in the most expected way with no delays.