HandRaise - Group 40 Faculty Panel Design Review Presentation

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Client: Dr. Md Maruf Ahamed

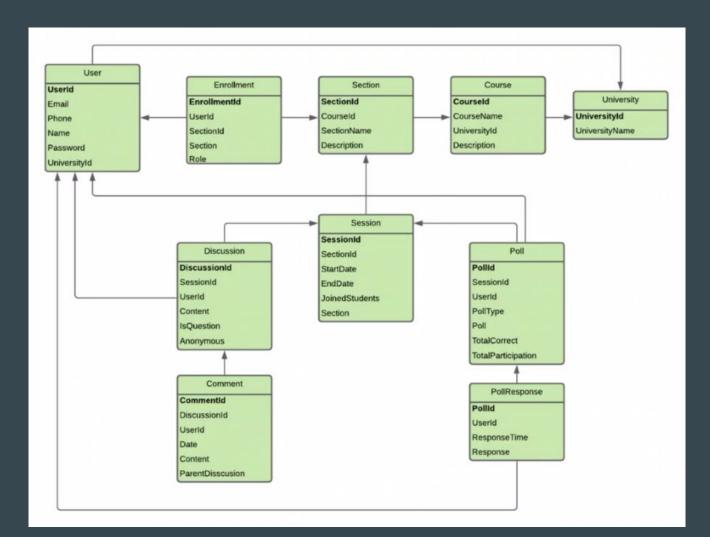
Project Vision

- Our project vision is to design a web-based interactive learning platform for large lectures
- HandRaise allows professors to:
 - Open polls and discussions
 - View engagement statistics
 - Include classroom polls, quizzes, and more and save student responses
- HandRaise allows TAs to:
 - Participate in polls
 - Participate in discussions
 - View restricted engagement statistics
- HandRaise allows students to:
 - Ask questions anonymously/by name
 - Participate in polls
 - Participate in discussions

Conceptual/Visual Sketch

Welcome Page	NewProfessor	Welcome Page (Professor)							
Welcome to HandRaise	New Professor	Hello <enter here="" name=""></enter>							
		Enter Classroom							
	First Name	<class name=""></class>							
New User? Existing User?	Last Name	<class name=""></class>							
Teacher / Professor Sign in	Email	<class name=""></class>							
Teacher's Assistant	Password								
Student	Repeat Password	Make New Classroom							
JUWERI	Affiliated School (Optional)								
		User Settings							
LoginPage	NewTA	Welcome Page (TA & User)							
		Hello <enter here="" name=""></enter>							
1010	New TA	Enter Classroom							
	First Name	<class name=""></class>							
	Last Name	<class name=""></class>							
€mail	Email	<class name=""></class>							
Password	Password								
	Repeat Password	Find Classroom							
Submit	Affiliated School (Optional)	Enter Class Code No class found with code							
Popul Passed?		User Settings							

Conceptual Entity Relationship Diagram



Requirements

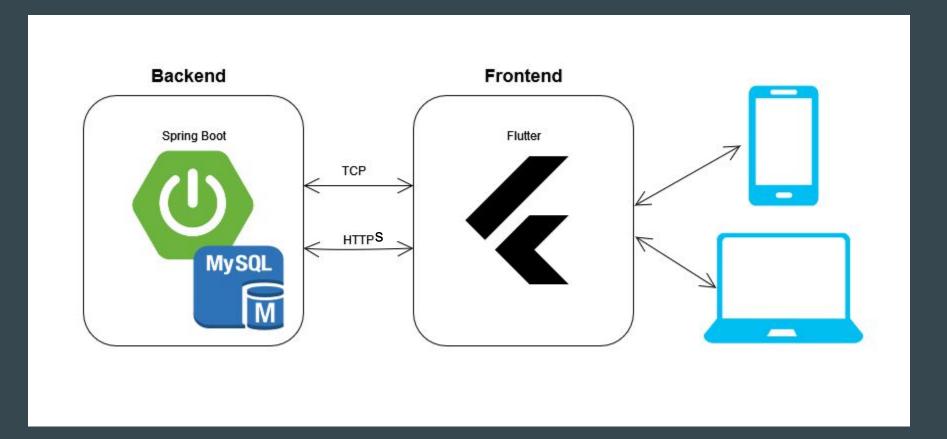
- Functional Requirements
 - Ability to run on different browsers and OS.
 - Handle up to 2000 concurrent users. (Estimated using the top five largest lecture halls at Iowa State)

• UI Requirements

- Front end shall be intuitive and easy to navigate for every user.
- Web pages should be consistent across the site. Buttons, navigation aids, and other data should have the same feel and location as previous pages
- Realistic Constraints
 - Maintain security with multiple levels of access.
 - Project should be testable by anyone working on it.
- Resource Constraints
 - All code shall be either archived, deleted, or pushed to the dev branch each week. Once working, code will be pushed to master.
 - Project must be completed within 1,500 person hours.

System Design

System Architecture



Tech Stack

- Flutter
 - Frontend app development
- Spring Boot
 - REST API
 - Used to access all of the data
 - Websockets to enable live poll features
- MySql Server
 - Stores the data

Backend Entity Relationship

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	 discussionid INT sessionid INT userid INT date_posted DATETIME content VARCHAR(255) is_question BIT(1) is_anonymous BIT(1) 	∮ jpined_students VARCHAR(255) Indexes ►	 pollid INT sessionid INT userid INT date_posted DATETIME poll_type VARCHAR(255) poll_content VARCHAR(255) correct INT
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	Comment V		
	commentid INT discussionid INT userid INT date_posted DATE content VARCHAR(255) Indexes		pollresponse pollresponsed INT pollid INT userid INT response_time INT response VARCHAR(255) Indexes

Prototype Implementations (Demo)

Design Complexity

- HandRaise requires instant responses from the server after a user's input
- The product must have a professional appearance and be intuitive to students
- HandRaise must comply to security standards all user information must remain private and confidential
- HandRaise seeks to go above and beyond accessibility standards in order to be as inclusive as possible

Project Plan

• Frontend

• Flutter

- Create UI mockup
- Decide how to interact with backend
- Display data

- Backend
 - Spring boot
 - Setup database architecture
 - Setup server
 - Encrypt passwords
 - MySQL
 - Design tables
 - Implement relations

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	October			Novembe	a.			Decemb	er		Winter Break	January		Febuary				March				April					May		
Week	2	3	4	5	6	7	8	9	10	11		12	13	14	15	16	17	18	19	20	21	22	23	24	25	28	27	28	
Create UI mockup																													
Design database architecture																													
Design tables																												1	
Decide on necessary React components											4																		
Backend handles accounts								-											-		-		-					25	_
Backend hosts sessions								· · · · ·																					
Backend archives sessions								1																					
Backend can retrieve data/stats																	-											1	
Create frontend UI from mockup						-																							
Send data to frontend																													
Fetch data from back end																													
Display data correctly													-															1	
Write and implement backend tests																			-										
Write frontend tests																													_
third party review process (UI)											Î. I. A																		
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Testing and Updating Application in classes																													
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Project Plan - Risks/Mitigations

Risks	Mitigations
ISU servers may not be able to handle 2000 concurrent users	Optimize our application
ISU servers may not be able to archive all data	Add features to limit the amount of data stored or how long data is stored
May not have enough person hours to implement all desired features	Plan which features should be done first to ensure the main use cases are satisfied
Students or professors may not want to use our application	Advertise our application to both groups
Sensitive data leaks	Encrypt data traffic. Hash email and passwords. Limit data access between roles.

Project Milestone, Metrics, and Evaluation

- Design phase is complete
- Frontend to Backend round trip
- SQL database is set up
- Backend connected to database
- 2000 concurrent users connected
- Implement features
 - Question and replies are posted
 - Conversations archived
 - Polls
 - etc...

Testing Plan

- Integration testing used to mock up fake users and ensure entities and table relationships work as intended
- System testing Use unit testing, integration testing, widget testing, manual testing, and more
- Regression testing All branches and new code must pass all prior unit tests
- Acceptance testing We continue to check in with our client about additional requirements
- Security testing Use algorithms to encrypt data and use JUnit testing to verify the security of these algorithms

Frontend Testing

- We will test our frontend using Flutter widget testing, unit testing, integration testing, and more as we complete our app development
- All features that we add will be unit tested for functionality
 - Page switching
 - User submissions
 - User logins
 - Error outputs
- We have been doing manual testing at the moment, as the app is still early in development.

Backend Testing

- We will be using Mockito to mock objects as part of our backend unit testing.
 We can mock objects to test the functionality of several controller and repository methods
- We will use JUnit for unit testing the Spring Boot application
- We will also be writing integration tests for our Spring WebSocket Endpoints for the chat feature of our app.

Conclusions

- We are slightly behind (1 2 weeks) of our schedule according to our Gantt chart.
 Cearning Flutter and other frameworks
- We plan to get the chat functionality finalized first, and then we can begin on the many options available for each profile.
 - Creating classrooms
 - Joining specific classes
 - Statistics for users
 - etc.
- However, we will continue refining the app, including testing, during second semester
- If we finish early we will start to refine our mobile application

Thank you! Questions?