

MICHIGAN STATE

UNIVERSITY

Project Plan

Classroom Engagement App

The Capstone Experience

Team Michigan State University

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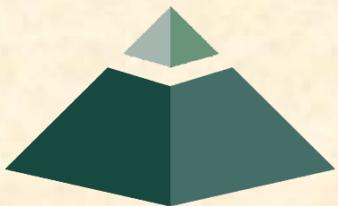
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Department of Computer Science and Engineering

Michigan State University

Spring 2018



*From Students...
...to Professionals*

Functional Specifications

- MSU instructors use a variety of tools for classroom interaction. A single, free platform is desired that maximizes student engagement.
- The application will allow instructors to ask in-class questions and view results in real time.
- The platform will include a forum that allows students and instructors to ask and answer questions.
- Attendance will be automatically taken through proximity sensors.
- The platform will be accessible through iOS, Android, and web applications.

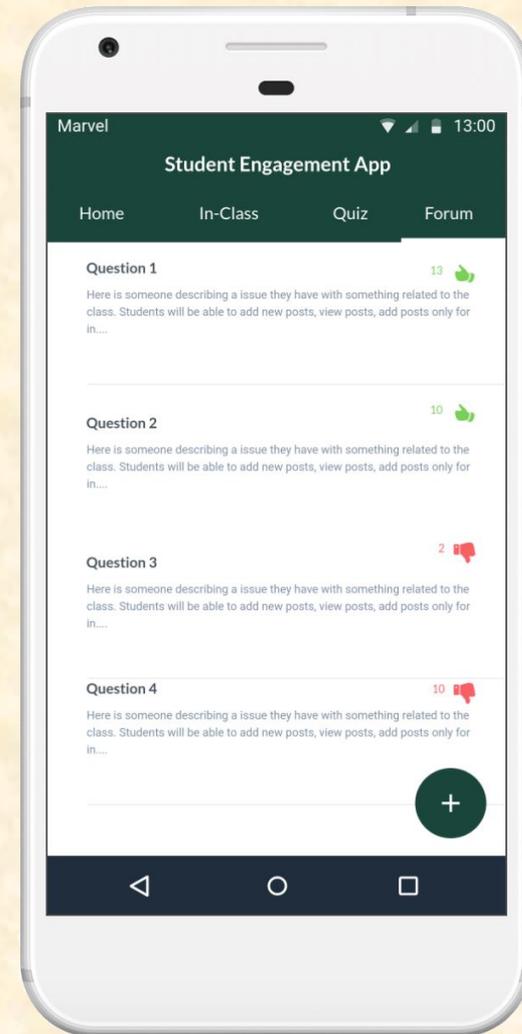
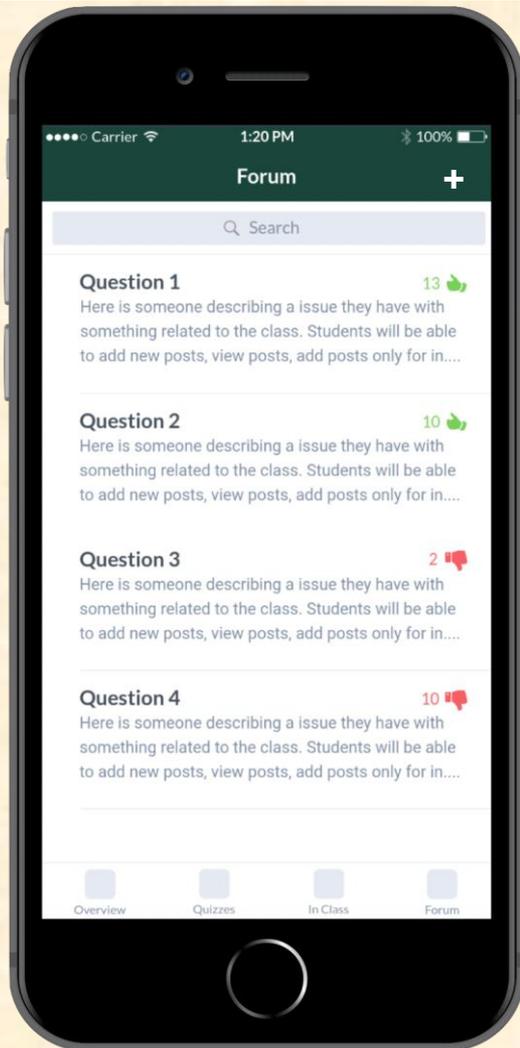


Design Specifications

- Be able to quickly reach any class at any time
- When a new in-class question is asked, jump to the screen immediately
- iOS follows Apple's Human Interface guidelines
- Android and Web follow Google's Material design guidelines
- All colors and branding reflect Michigan State University



Android and iOS Design



Screen Mockup: Home Page - Web

The screenshot displays a web application interface for Michigan State University. At the top, the university's name is on the left, and a user profile icon labeled 'Sparty' is on the right. Below this is a navigation bar with 'Home' selected and other options: 'Forum', 'In-class Quizzes', 'Quizzes', and 'Instructor Tools'. A left sidebar lists course numbers: CSE100 (expanded), CSE232, CSE260, and IAH201. The main content area is for 'CSE100 Computer Science as a Profession', with a schedule of 'F 10:20AM - 11:10AM' at '1281 Anthony Hall'. Under 'Instructor Info', it lists: Lead Instructor: Aaron Anderson (Office Hours: By Appointment, Email: aaron.anderson@msu.edu); TA: Bryan Borke (Office Hours: Monday 7pm-9pm, EB1320, Email: bryan.borke@msu.edu); and TA: Caroline Campbell (Office Hours: TBA, Email: caroline.campbell@msu.edu). The 'Trending Forum Links' section shows three 'Example Question?' posts with 'View' buttons, posted 2, 4, and 7 hours ago. The 'Upcoming Due Dates' section features 'Quiz 01' with dates 'Opens 1/30/18 8:00PM' and 'Closes 1/30/18 8:30PM'. The 'Class Resources' section includes links for 'Presenter Schedule', 'Download Python', 'Download Spyder', and 'My favorite sites'.



Screen Mockup: Home Page - Mobile

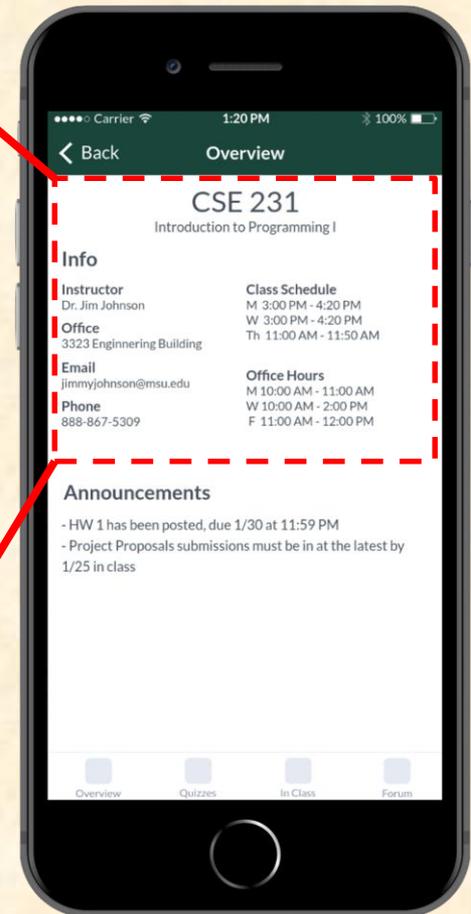
CSE 231
Introduction to Programming I

Info

Instructor Dr. Jim Johnson	Class Schedule M 3:00 PM - 4:20 PM W 3:00 PM - 4:20 PM Th 11:00 AM - 11:50 AM
Office 3323 Enginnering Building	Office Hours M 10:00 AM - 11:00 AM W 10:00 AM - 2:00 PM F 11:00 AM - 12:00 PM
Email jimmyjohnson@msu.edu	
Phone 888-867-5309	

Announcements

- HW 1 has been posted, due 1/30 at 11:59 PM
- Project Proposals submissions must be in at the latest by 1/25 in class



Screen Mockup: Forums - Web

The screenshot displays a web forum interface for Michigan State University. At the top, the course is identified as CSE100. The navigation bar includes links for Home, Forum, In-class Quizzes, Quizzes, and Instructor Tools. The forum content shows two announcements: 'Updated Syllabus' and 'Midterm Information', both posted by Dan Daniels on 1/22/18 at 10:00AM. Below these is a 'Sort By' dropdown menu set to 'Relevant'. The main forum area lists seven example questions, each with a vote count and a post date of 1/22/18 at 10:00AM. The questions are: 'This is an example question, anyone have an answer?' with 18, 10, 9, 4, 1, and -1 votes respectively.

Michigan State University

Sparty

CSE100

Home Forum In-class Quizzes Quizzes Instructor Tools

Home
Forum
In-class Quizzes
Quizzes
Instructor Tools

CSE232

CSE260

IAH201

Updated Syllabus
Posted by Dan Daniels 1/22/18 10:00AM

Midterm Information
Posted by Dan Daniels 1/22/18 10:00AM

Sort By: Relevant

18 This is an example question, anyone have an answer?
Posted by Dan Daniels 1/22/18 10:00AM

10 This is an example question, anyone have an answer?
Posted by Dan Daniels 1/22/18 10:00AM

9 This is an example question, anyone have an answer?
Posted by Dan Daniels 1/22/18 10:00AM

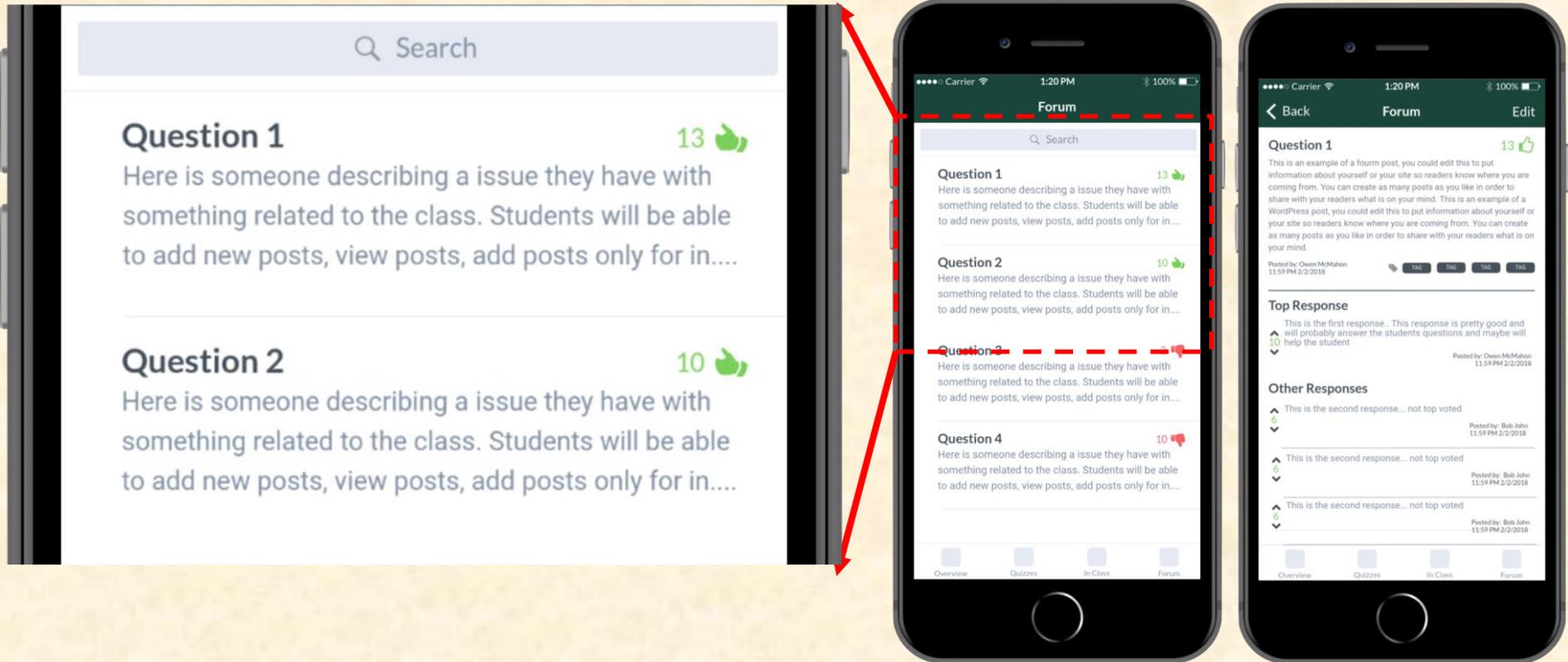
4 This is an example question, anyone have an answer?
Posted by Dan Daniels 1/22/18 10:00AM

1 This is an example question, anyone have an answer?
Posted by Dan Daniels 1/22/18 10:00AM

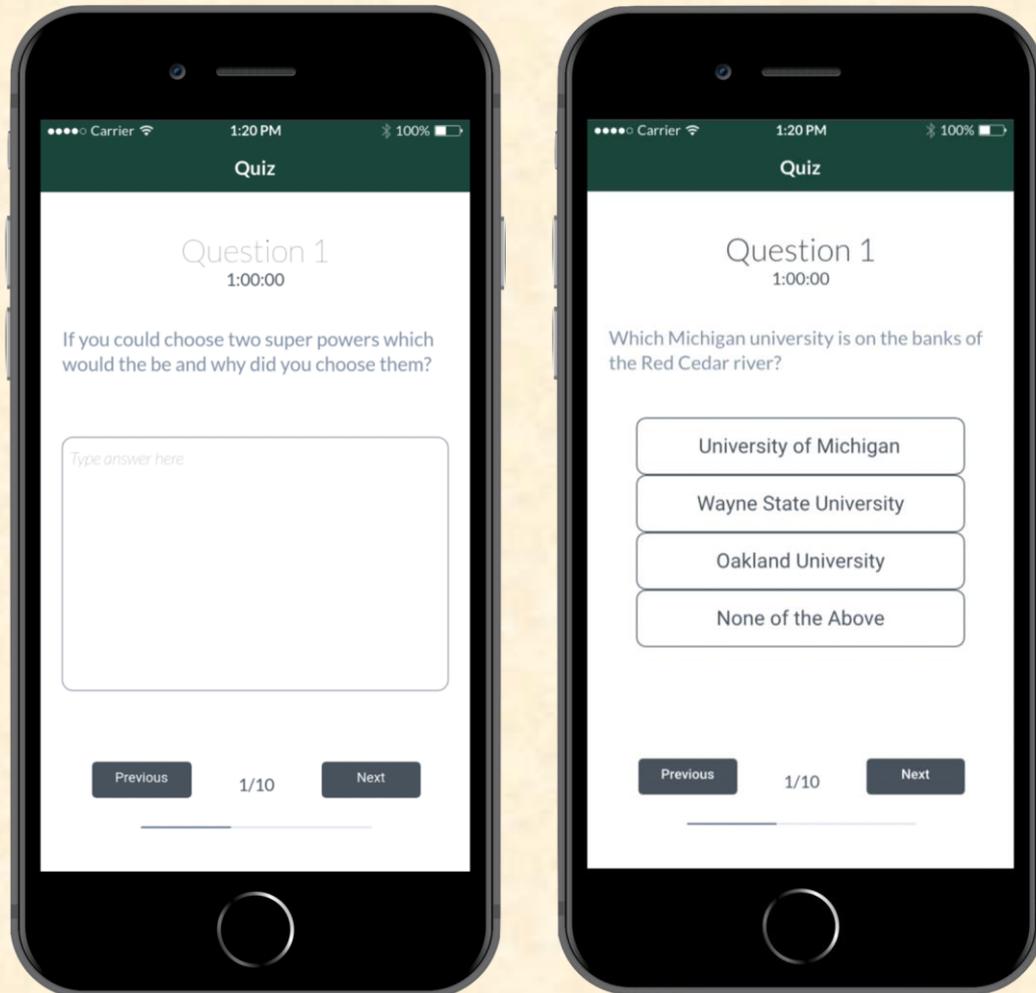
-1 This is an example question, anyone have an answer?
Posted by Dan Daniels 1/22/18 10:00AM



Screen Mockup: Forums - Mobile



Screen Mockup: Quizzes



Screen Mockup: Quizzes

Michigan State University Spartans

CSE100 Home Forum In-class Quizzes **Quizzes** Instructor Tools

Home Forum In-class Quizzes Quizzes Instructor Tools

CSE232 CSE260 IA201

Question Text:

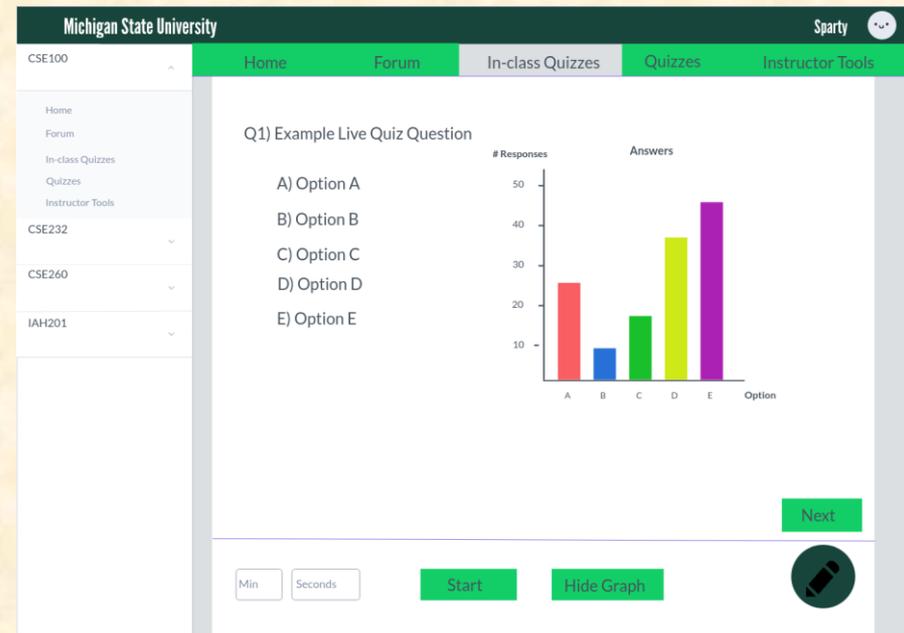
Question Type:
Multiple Choice
Multiple Choice
Short Answer
Matching

Options:
Option A
Option B
Option C
Option D
+

Default Timer (Leave Blank for no timer):

Multiple Choice
Short Answer
Matching

Prev 1 / 20 Next +



Screen Mockup: Create Quiz

Michigan State University Sparty 

CSE100 Home Forum In-class Quizzes **Quizzes** Instructor Tools

Home
Forum
In-class Quizzes
Quizzes
Instructor Tools

CSE232
CSE260
IAH201

Question Text:

Question Type:

- Multiple Choice
- Multiple Choice
- Short Answer**
- Matching

Options:

- Option A
- Option B
- Option C
- Option D

Default Timer (Leave Blank for no timer):

Multiple Choice
Short Answer
Matching

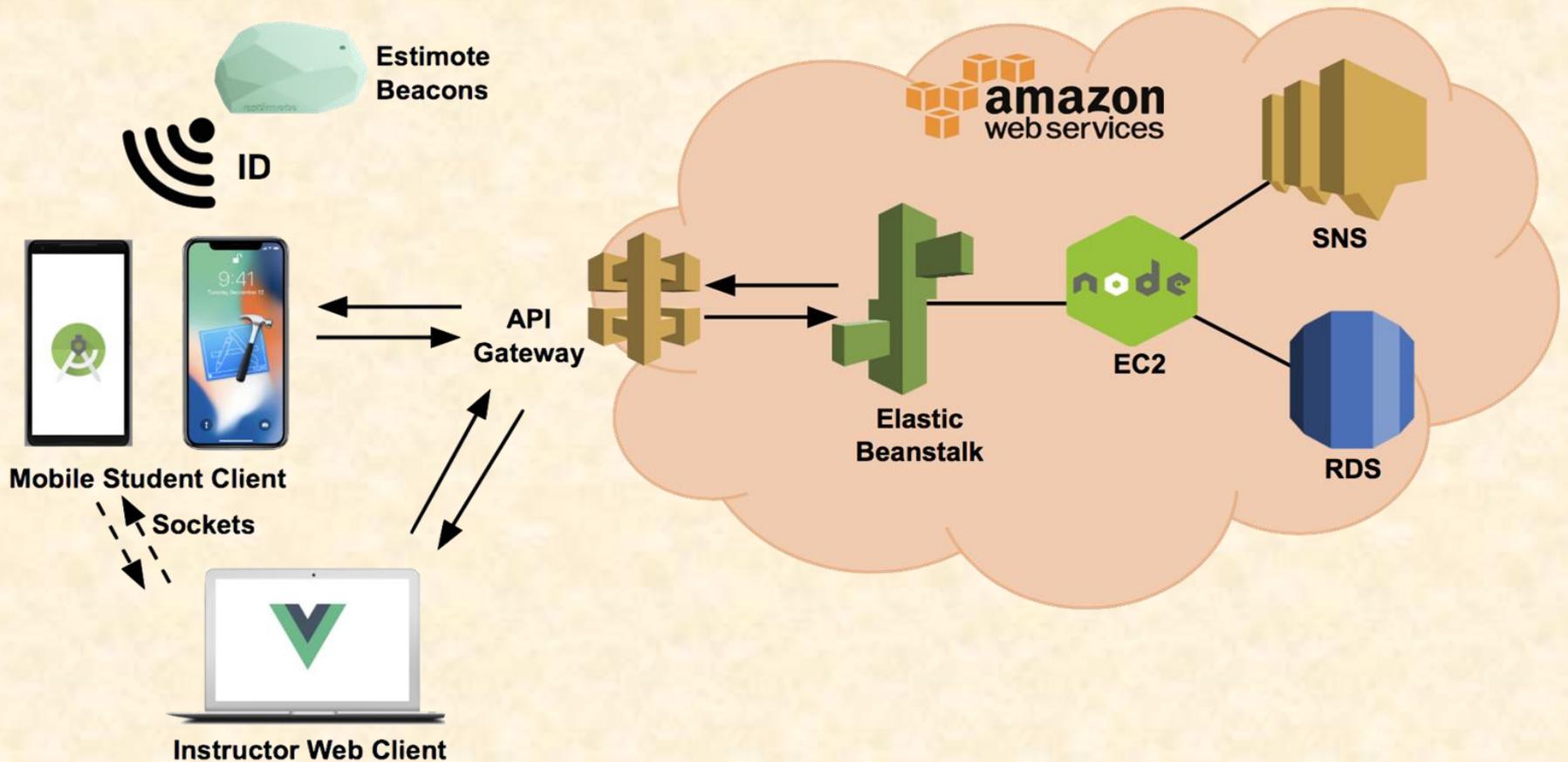
Prev 1 /20 Next +

Technical Specifications

- Estimote Beacons for Location Awareness
- AWS for hosting
 - Node.js for server-side application
 - PostgreSQL for database
- Vue.js for single-page web application
 - d3.js, Bootstrap



System Architecture



System Components

- Hardware Platforms
 - 3 Estimote iBeacons
 - iPhone and Android phones
 - Windows and MacOS Laptops
- Software Platforms / Technologies
 - Amazon Web Services
 - MSU Gitlab
 - XCode, Android Studio, Visual Studio Code
 - For Swift4, Kotlin and JavaScript, respectively
 - Postman



Risks

- Estimote beacon integration with Android
 - Easily integrated on iOS, needs external libraries on Android.
 - Mitigation: research and examine available packages.
- Application scalability and performance
 - Expectation of fast and reliable service to big numbers of data.
 - Mitigation: Testing sufficiently-developed apps in large classes.
- Poor quality WiFi in some classrooms
 - Some classrooms on MSUNet 2.0
 - Mitigation: Focus on size on packets and multi-path routing



Questions?

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