

MICHIGAN STATE
UNIVERSITY

Project Plan

Classroom Engagement App

The Capstone Experience

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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.

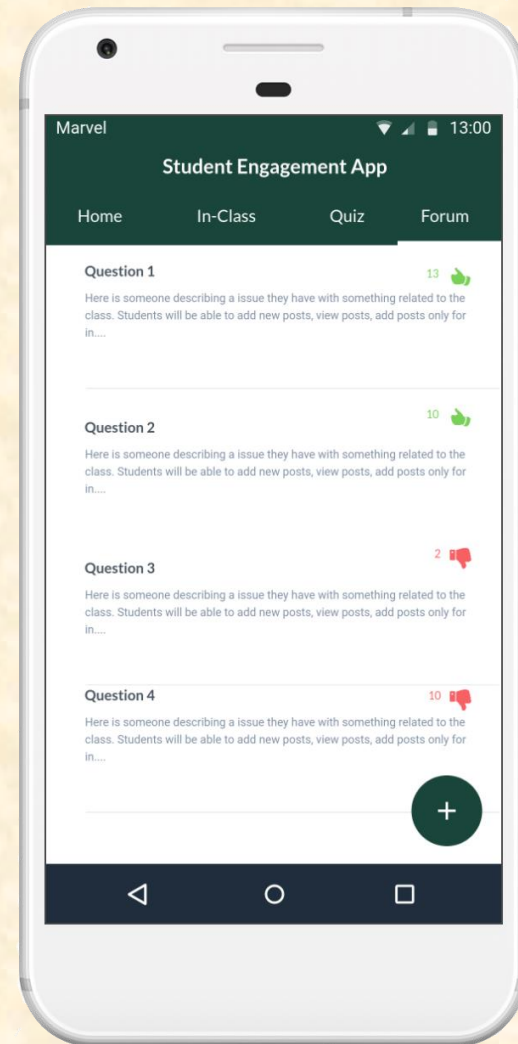
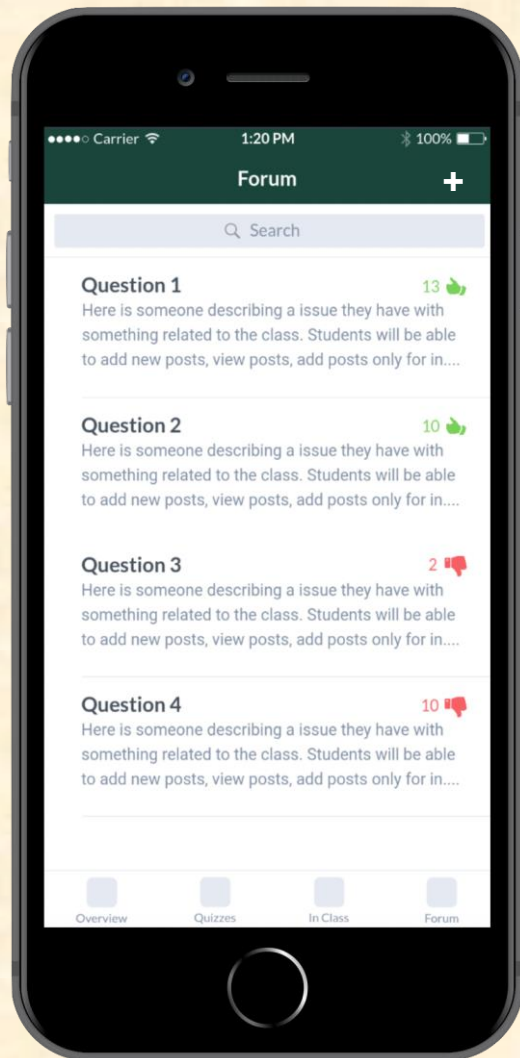


Design Specifications

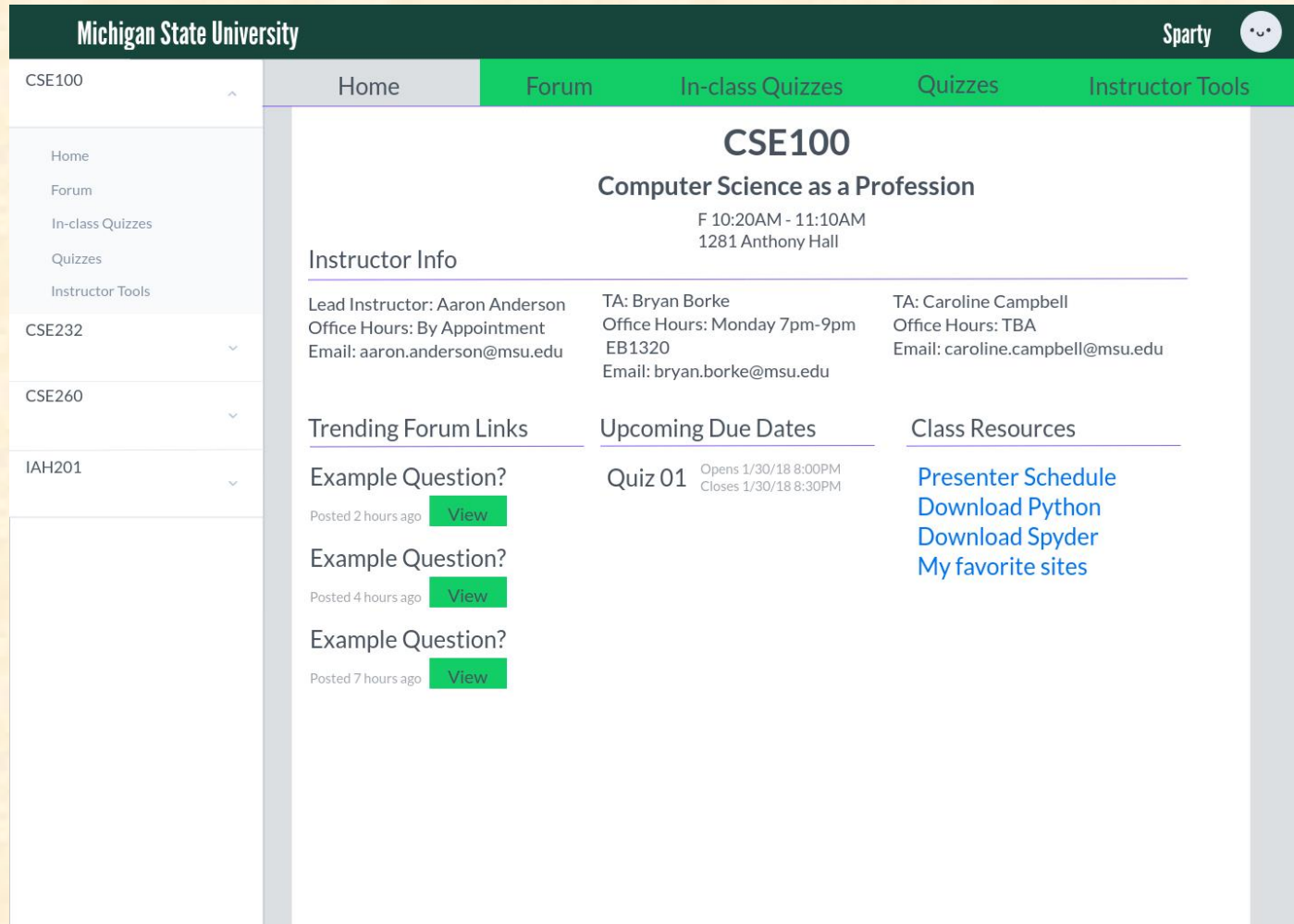
- Be able to quickly reach any class at any time
- When a new in-class question is asked, jump to the screen immediately
- iOS follows Apple's Human Interface guidelines
- Android and Web follow Google's Material design guidelines
- All colors and branding reflect Michigan State University



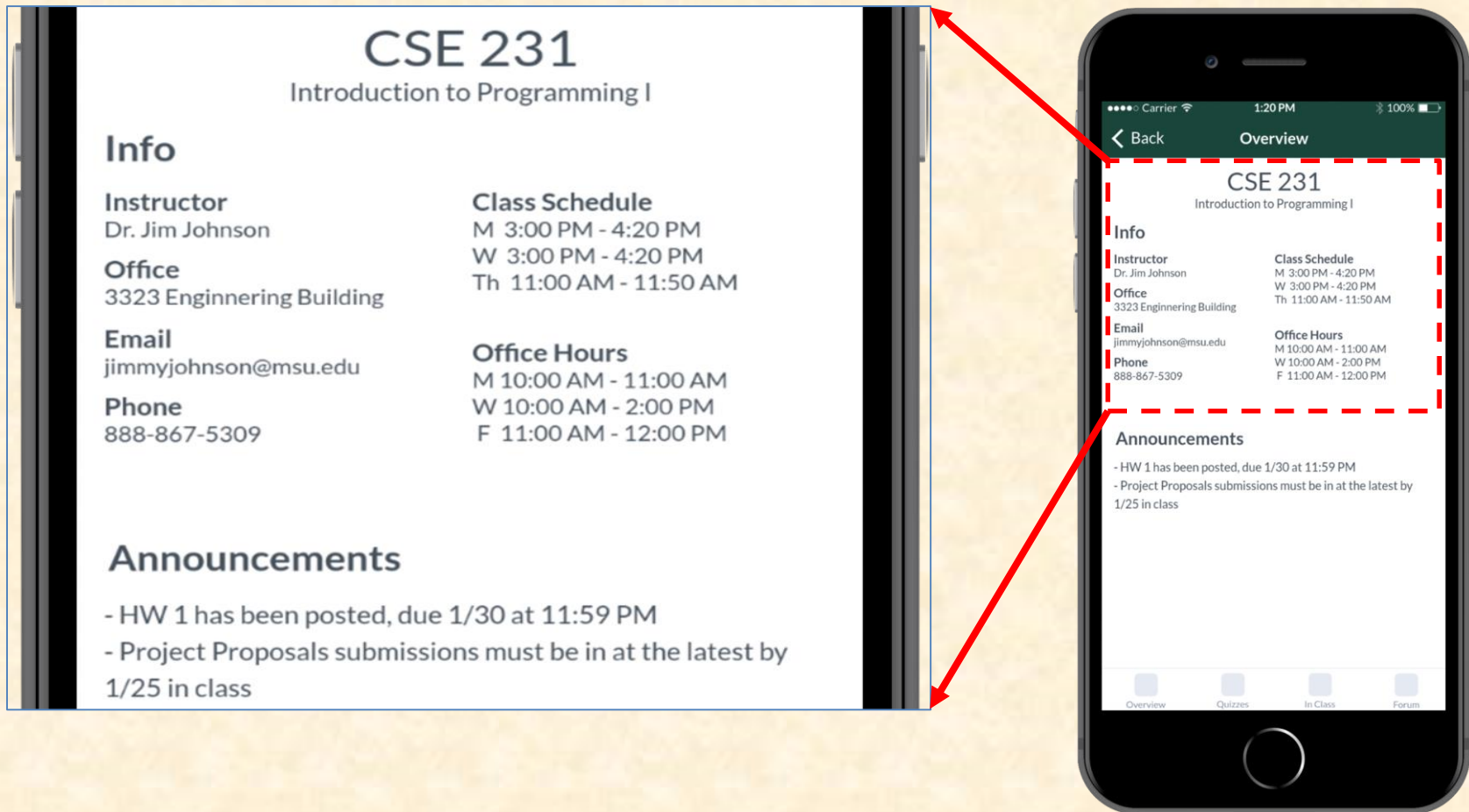
Android and iOS Design



Screen Mockup: Home Page - Web



Screen Mockup: Home Page - Mobile



Screen Mockup: Forums - Web

The screenshot shows a web forum interface for Michigan State University. The top navigation bar is dark green with the university name on the left and a user profile icon labeled 'Sparty' on the right. Below this is a secondary green bar with navigation links: 'Home', 'Forum' (highlighted), 'In-class Quizzes', 'Quizzes', and 'Instructor Tools'. A left sidebar lists course categories: CSE100, CSE232, CSE260, and IAH201, each with a dropdown arrow. Under CSE100, there are links for 'Home', 'Forum', 'In-class Quizzes', 'Quizzes', and 'Instructor Tools'. The main content area displays forum posts. It starts with two announcements, each preceded by a pin icon: 'Updated Syllabus' and 'Midterm Information', both posted by 'Dan Daniels' on '1/22/18 10:00AM'. Below these is a 'Sort By:' dropdown menu set to 'Relevant'. The forum posts themselves are identical, each starting with 'This is an example question, anyone have an answer?' and followed by 'Posted by Dan Daniels 1/22/18 10:00AM'. Each post has a vote icon (up and down arrows) and a numerical value: 18, 10, 9, 4, 1, and -1 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

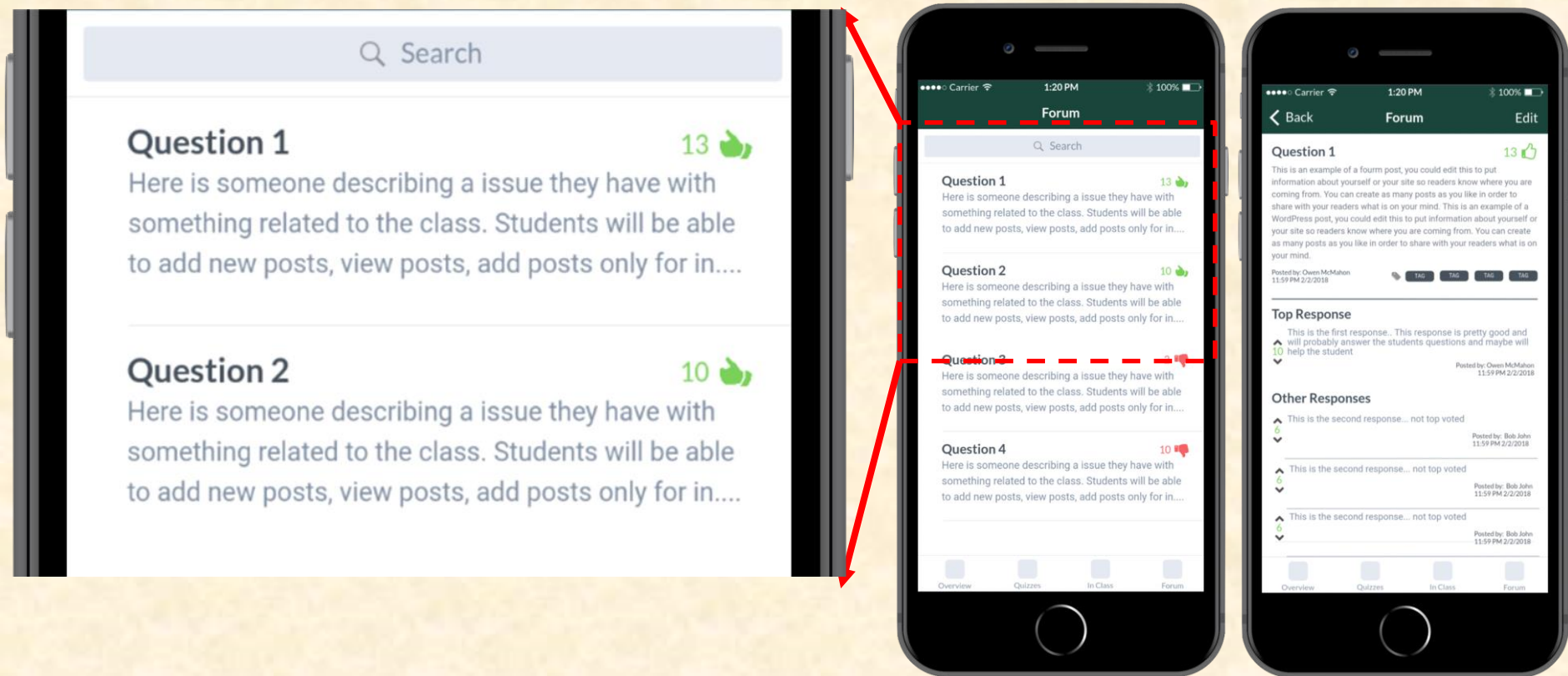
4 This is an example question, anyone have an answer?
Posted by Dan Daniels 1/22/18 10:00AM

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

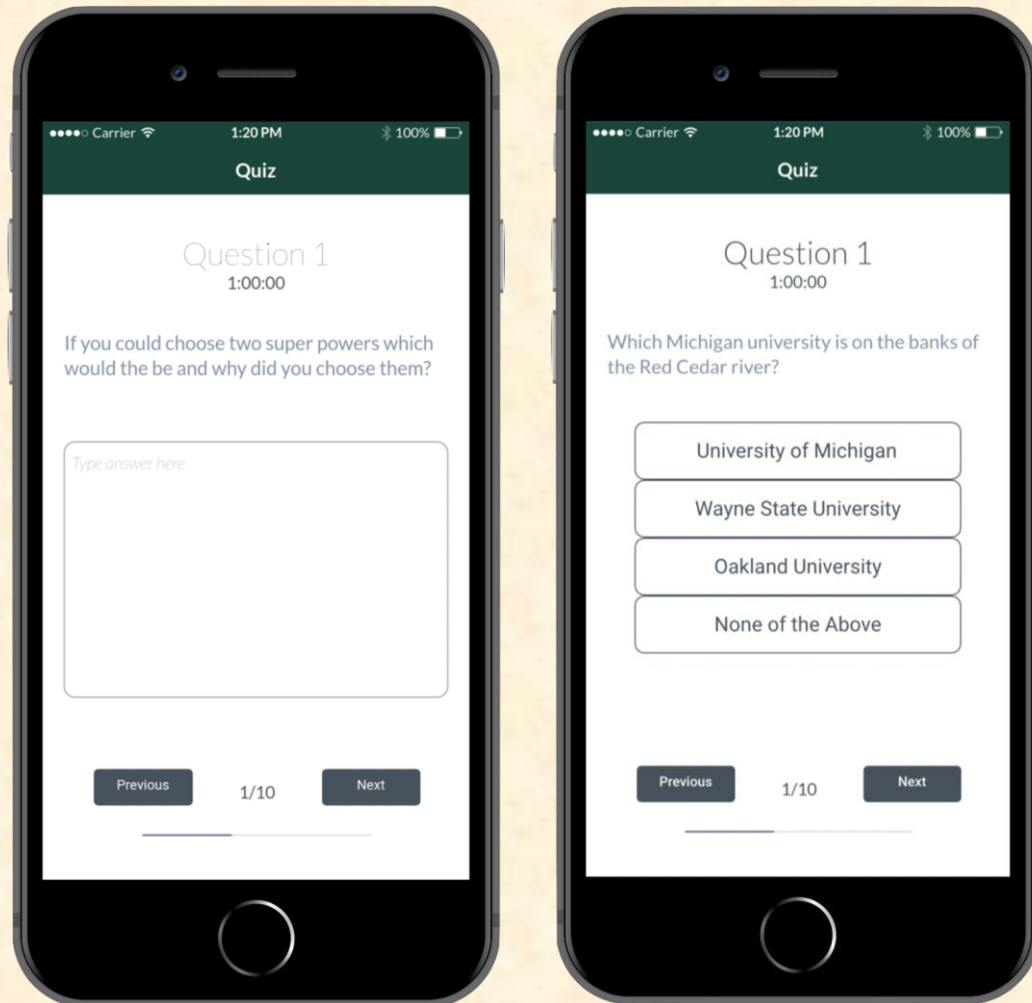
-1 This is an example question, anyone have an answer?
Posted by Dan Daniels 1/22/18 10:00AM



Screen Mockup: Forums - Mobile



Screen Mockup: Quizzes



Screen Mockup: Quizzes

Michigan State University

Spartan

CSE100

Home Forum In-class Quizzes Quizzes Instructor Tools

Home Forum In-class Quizzes Quizzes Instructor Tools

CSE232 CSE260 IAH201

Question Text:

Options:

Option A

Option B

Option C

Option D

+

Default Timer (Leave Blank for no timer):

Question Type:

Multiple Choice

Multiple Choice

Short Answer

Matching

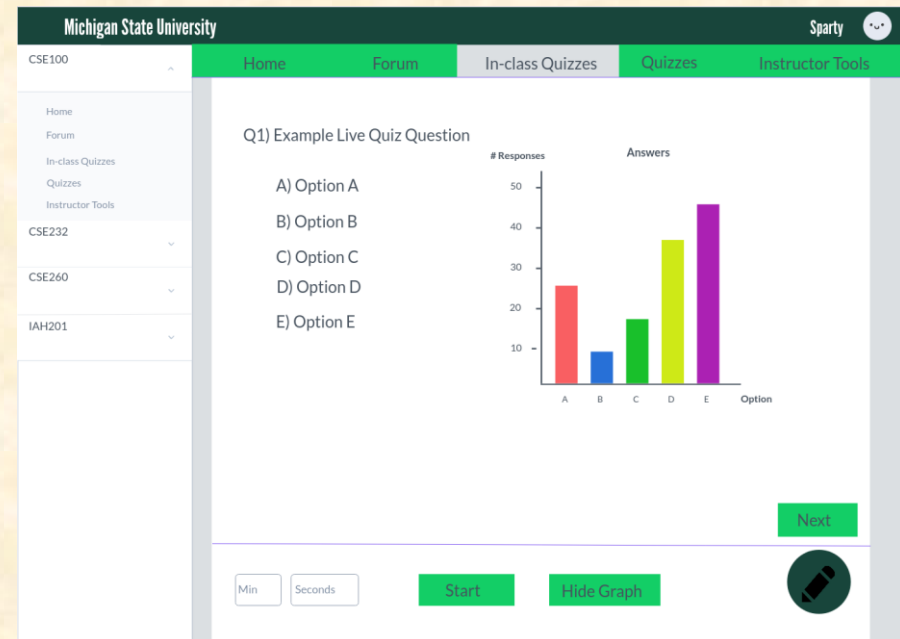
Multiple Choice

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

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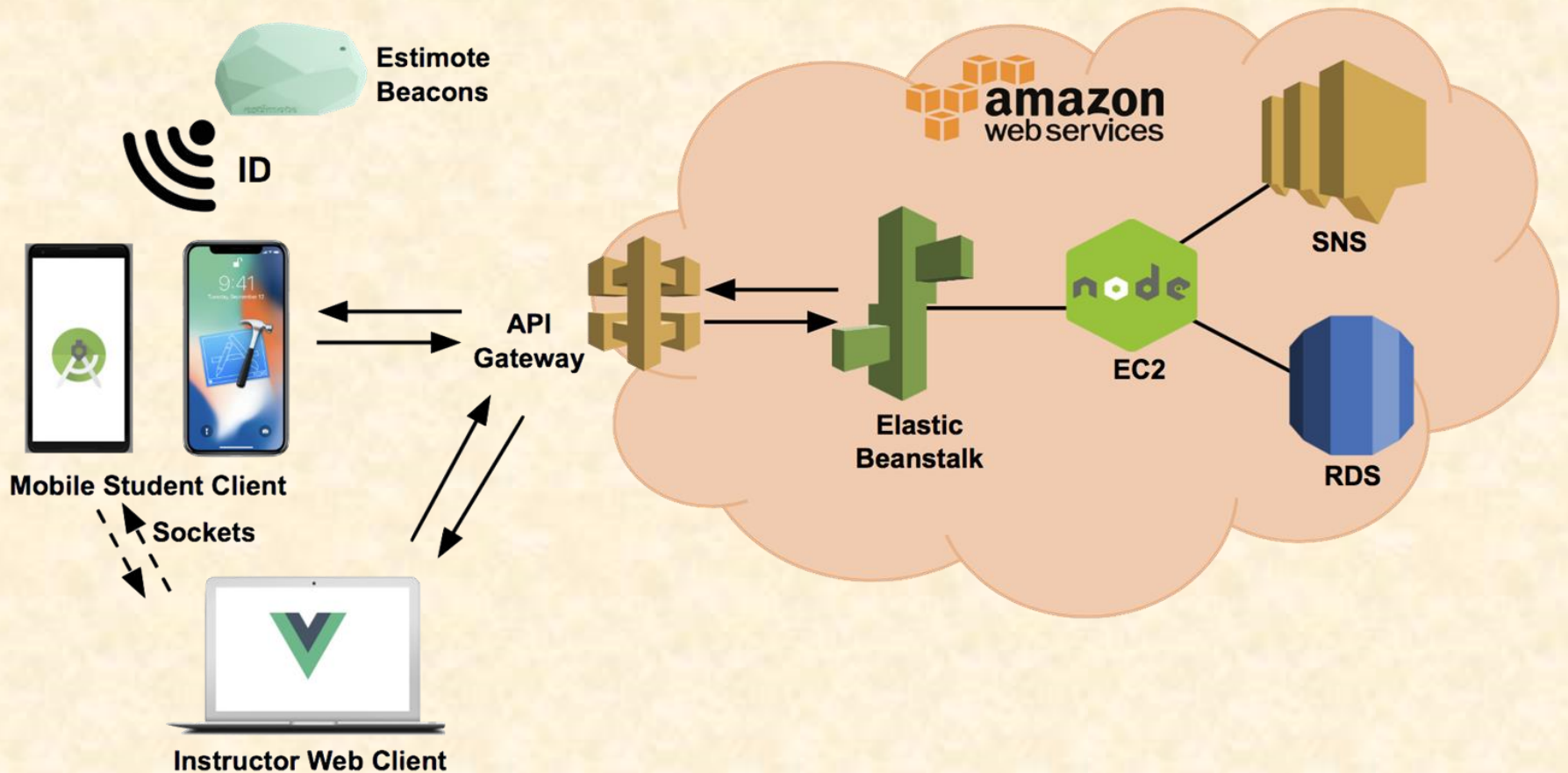


Technical Specifications

- 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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