MICHIGAN STATE
U N I V E R S I T Y

Project Plan Presentation
Rules Test Practice Tool

The Capstone Experience

Team Union Pacific

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From Students…
…to Professionals

Project Sponsor Overview

- Largest railroad network in the US by geographical coverage

- Constructed one of the first transcontinental railroads

- Covering 23 states and connecting borders

- Over 30,000 employees

UNION PACIFIC

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Project Functional Specifications

- Current quiz software not modern
  - Not dynamic-scaling, inflexible questions, not engaging
- Rules Test Practice Tool
  - Web and mobile app
  - More modern, customization, gamification
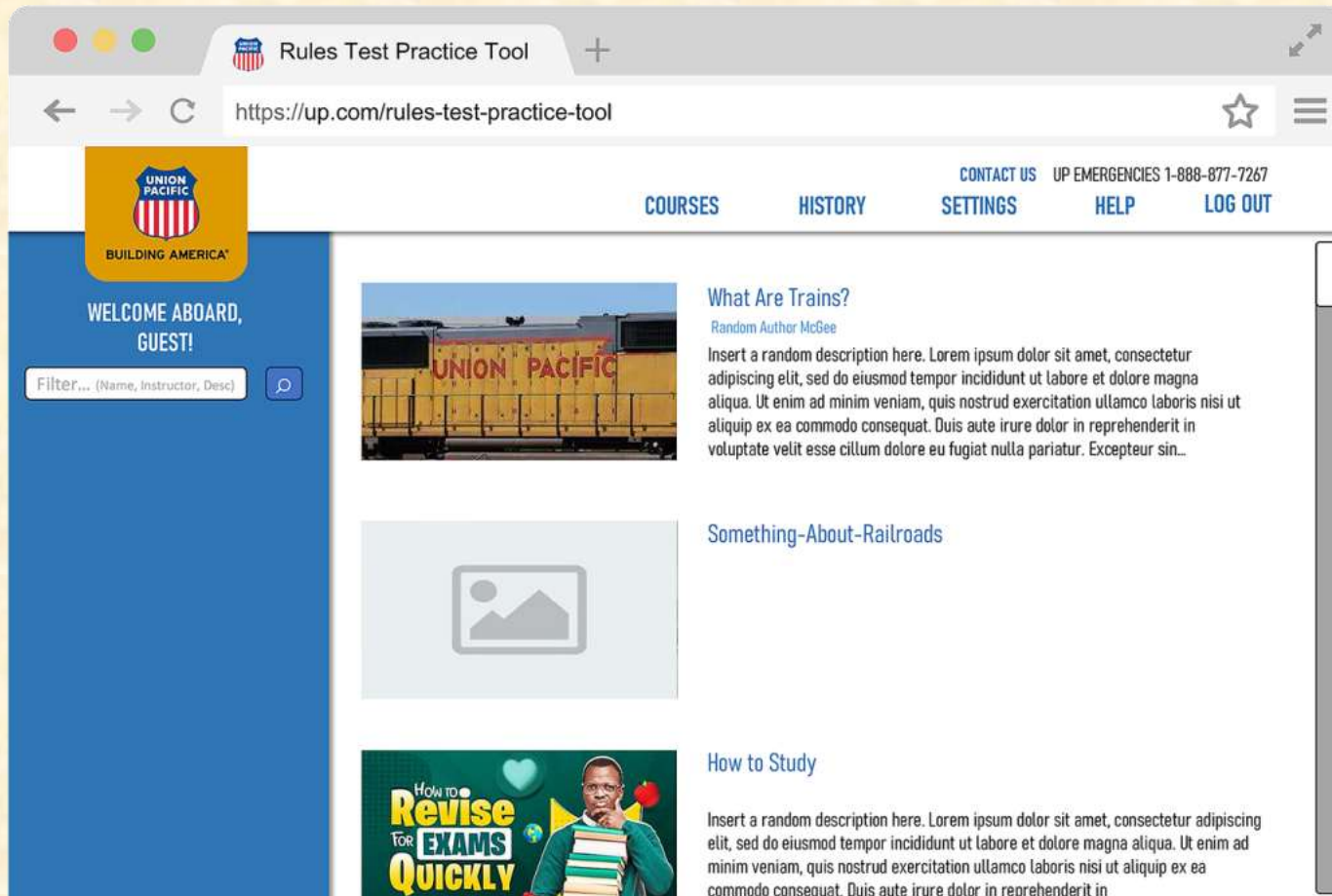- Goal is to encourage more employees to study and pass their license exams
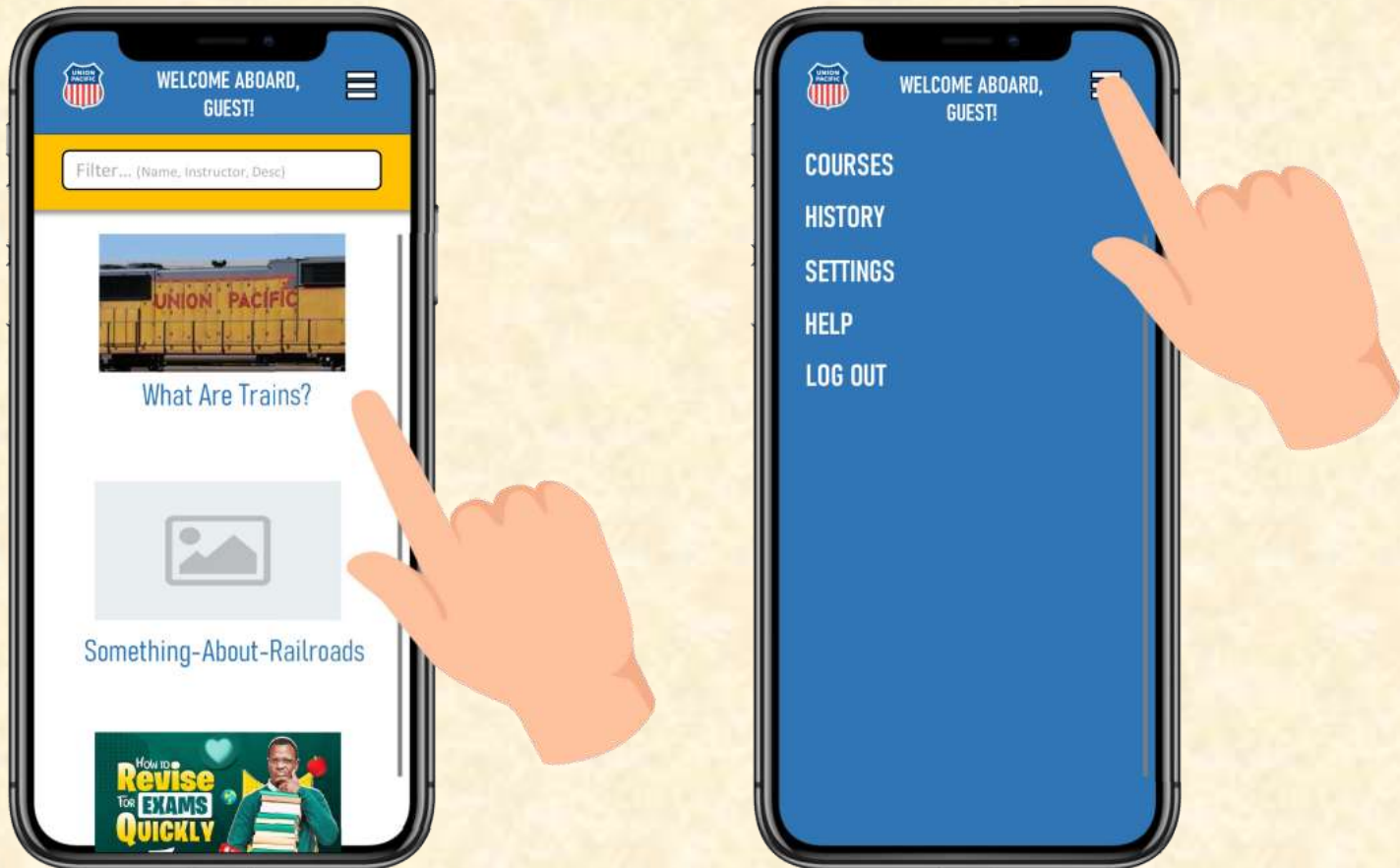
Project Design Specifications

- Homepage and Study Course Selection
  - Adaptive, responsive, and interactive layout, User login and dashboard with progress tracking, navigation bar
  - Course listings and search bar, course previews and mode selection
- Exam Practice Interface
  - Various question formats, media integration, process indicators, timer, question navigator
- Interactive Learning Tools
  - Flashcards, history page
- Additional Features
  - Content management, multi-platform compatibility, data management
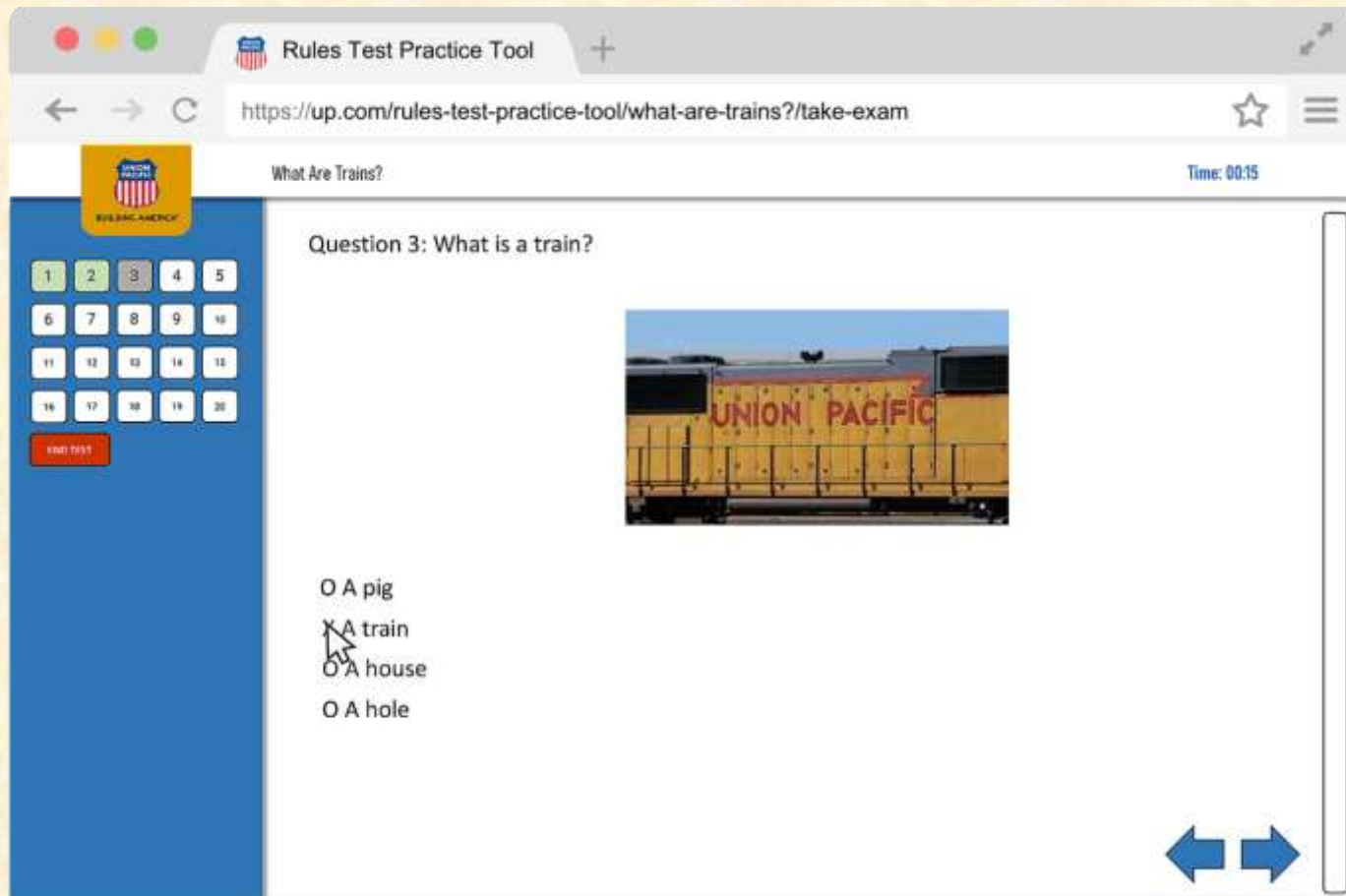
Screen Mockup: Web Homepage

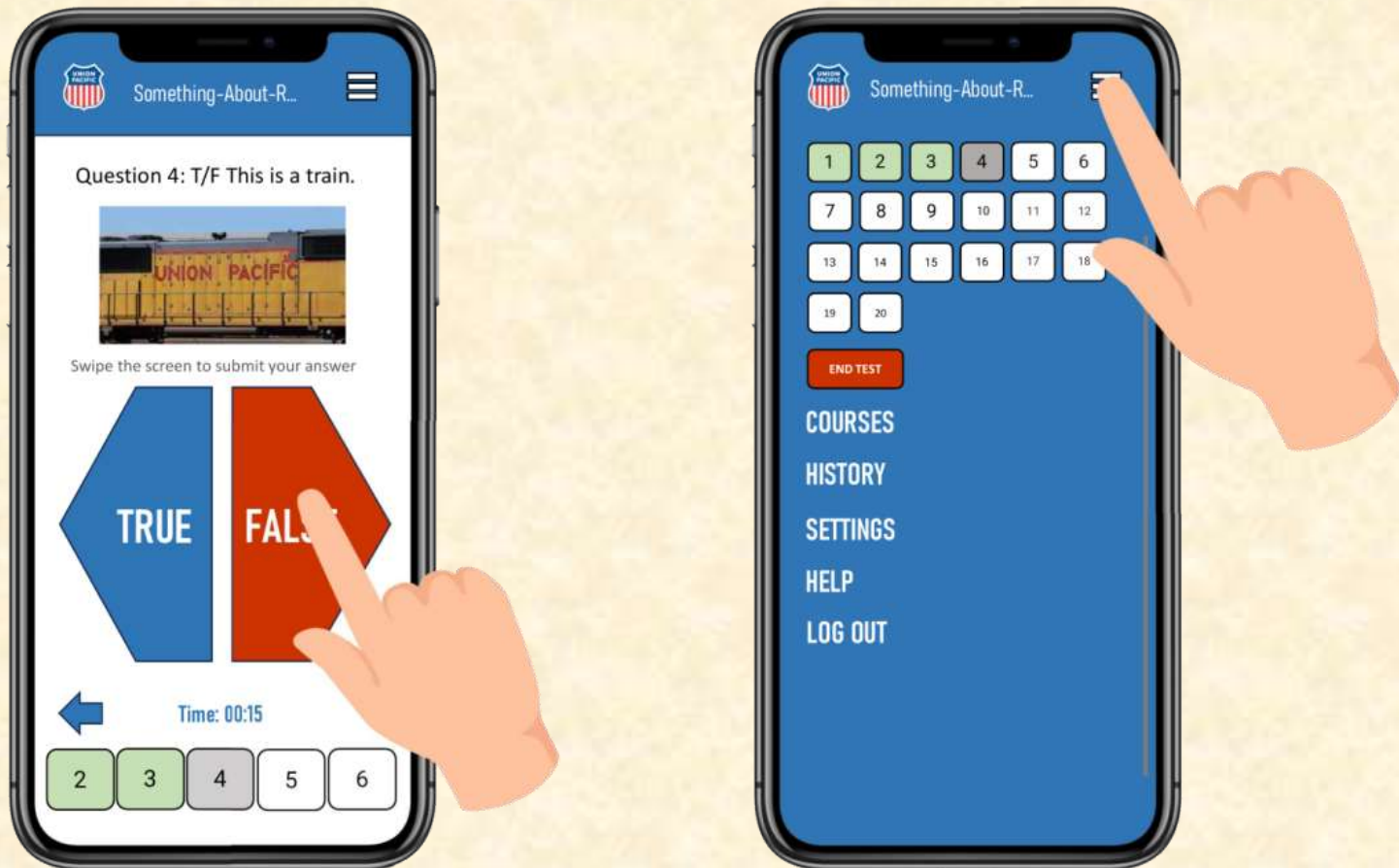# Screen Mockup: Mobile Homepage

Screen Mockup: Web Exam Page
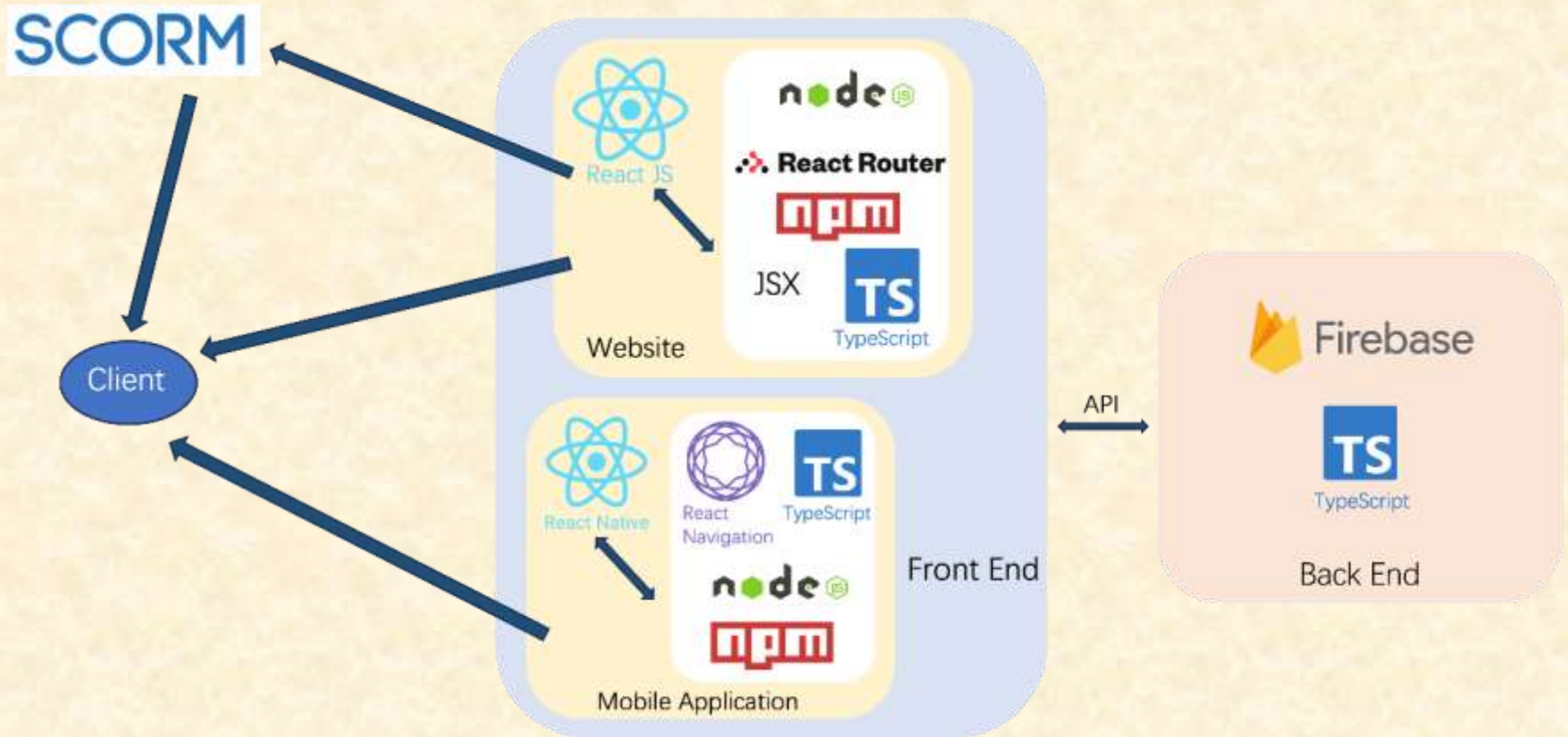
Screen Mockup: Mobile Exam Page

Project Technical Specifications

- We will be using Firebase as our backend database to store our question files

- Our frontend web application will be developed using ReactJS and will connect to our backend to extract files through an API call

- Similarly, our mobile application will be developed using React Native

- To integrate with Union Pacific's LMS we will be creating a SCORM package

Project System Architecture

Project System Components

- Hardware Platforms
  - Laptops
  - Smartphone
- Software Platforms / Technologies
  - Website: React JS, Node.js, JSX, npm, React Router, TypeScript
  - Mobile Application: React Native, React Navigation, Node.js, npm, TypeScript
  - Database: Firebase, TypeScript
  - SCORM
  - Learning Management System (LMS)

Project Risks

- Cross-Platform Compatibility
  - Libraries/plugins may not be compatible with all platforms
  - Identify incompatibilities and find an alternative solution that can still accomplish the desired outcome
- Accessing External Database within LMS
  - Unable to access external database used for web/mobile in LMS
  - Ensure quiz data can be transferred in and out of the LMS
- Scalability of Data
  - Must effectively store many quizzes, questions, quiz results, images, etc.
  - Stress testing our database using large datasets to determine and document limitations
- Standard Formatting of Input Files
  - Three ways to input files, no current standard for how files are formatted
  - Create and document a standard layout for all input files

Questions?

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