# MICHIGAN STATE UNIVERSITY 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



## **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

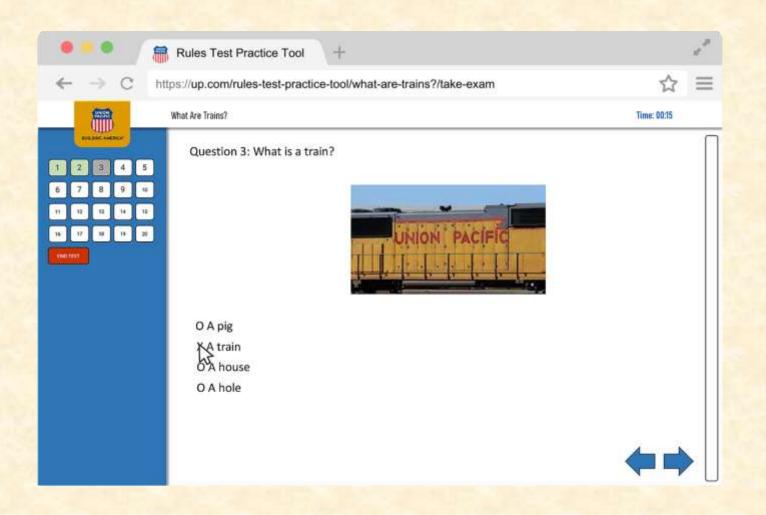
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#### Team Union Pacific Project Plan Presentation

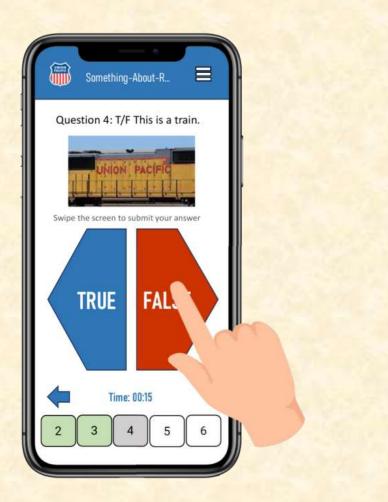
# Screen Mockup: Mobile Homepage



# Screen Mockup: Web Exam Page



# Screen Mockup: Mobile Exam Page

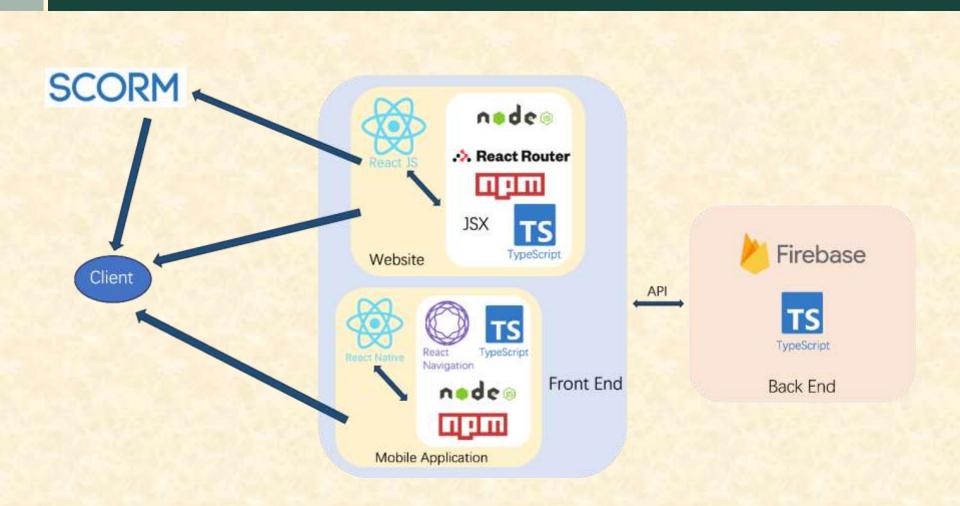




# **Project Technical Specifications**

- 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?**

