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?

