MICHIGAN STATE UNIVERSITY

Project Plan

Training Scheduling and Optimization System II

The Capstone Experience

Team United Airlines

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From Students…
…to Professionals

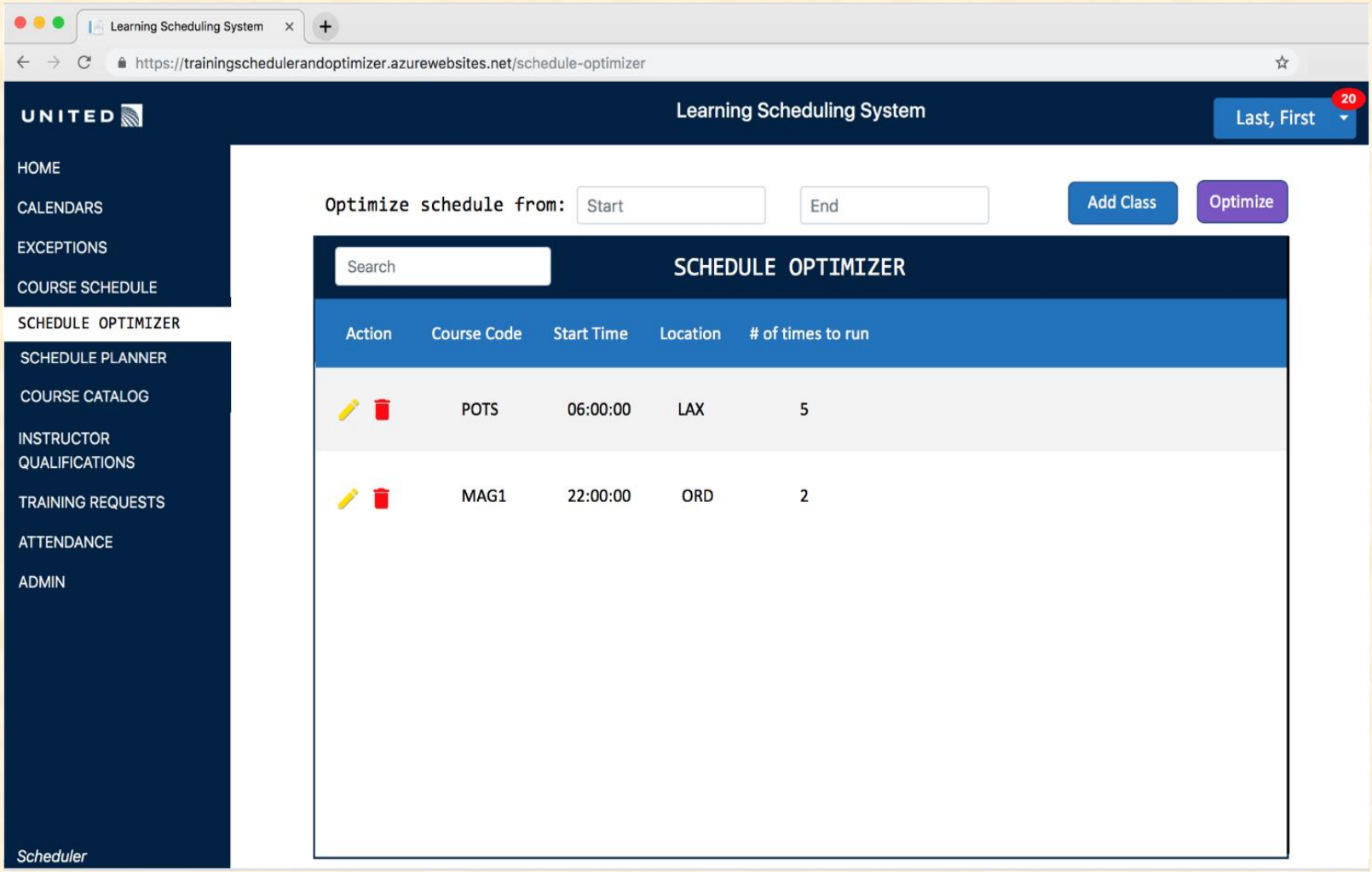
Functional Specifications

- Update and enhance the scheduling system from the spring semester
- Implement an optimizer to recommend a schedule based off different priorities
- Make the web application mobile friendly
- Warn the user of potential conflicts when scheduling a class

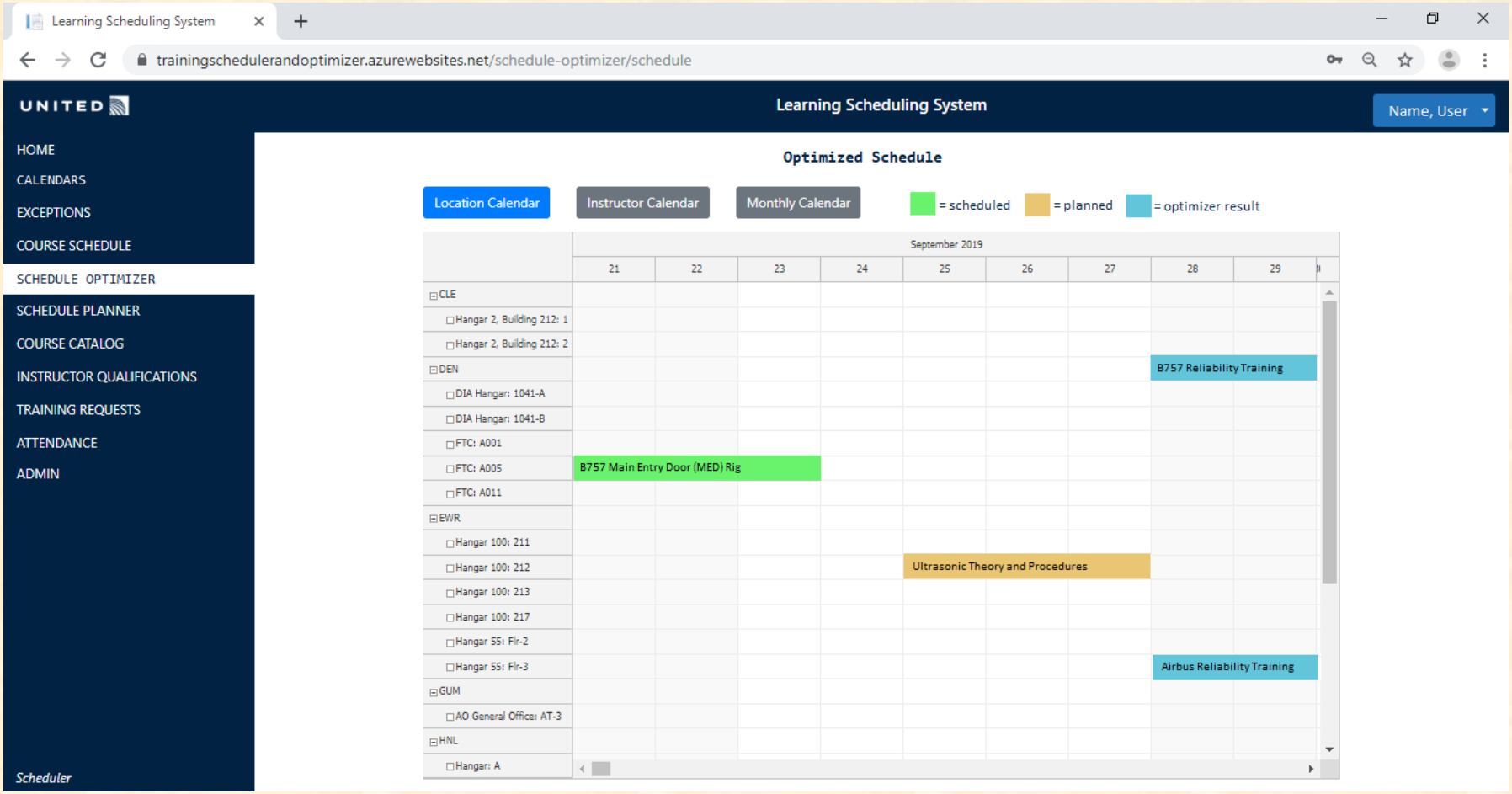
Design Specifications

- Schedule Optimizer
  - The user can input a time frame, specific classes, and locations, then hit “Optimize”
- Notification system
  - Include popup notifications whenever the user tries to schedule a class that will cause a conflict
- Training requests
  - Connecting training requests with the current schedule
- Support for mobile browser
  - Currently only desktop version of application is correctly displayed
- Updating Calendars
  - Changing the view, adding pop out calendars, adding a planned courses calendar
- Access levels
  - Six different user levels, including guest, manager and admin
  - Users can view specific pages based on their level

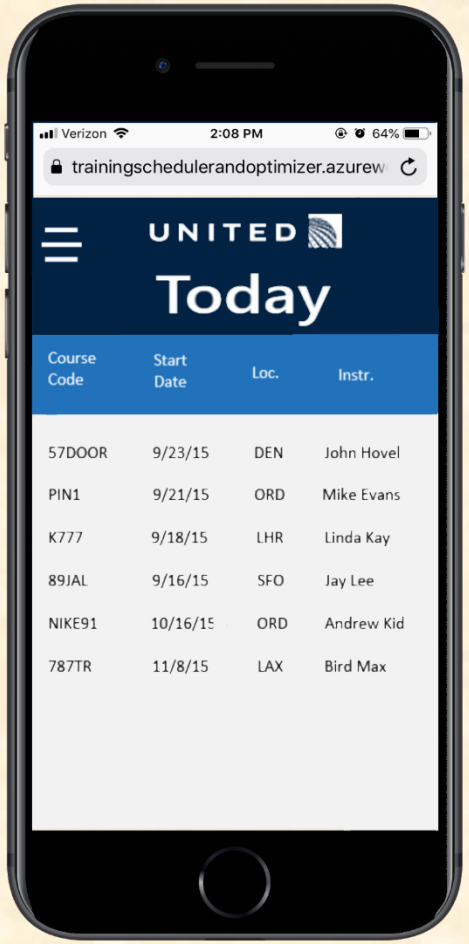
Screen Mockup: Schedule Optimizer



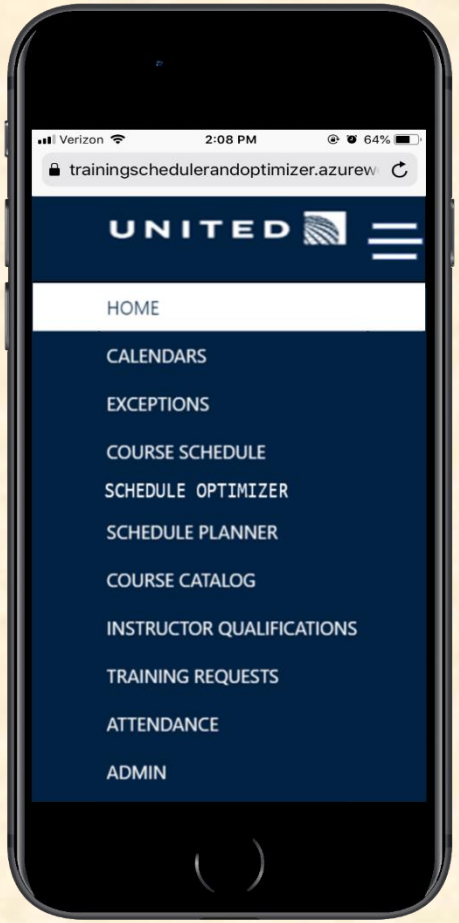
Screen Mockup: Optimized schedule



Screen Mockup: Mobile Home Screen



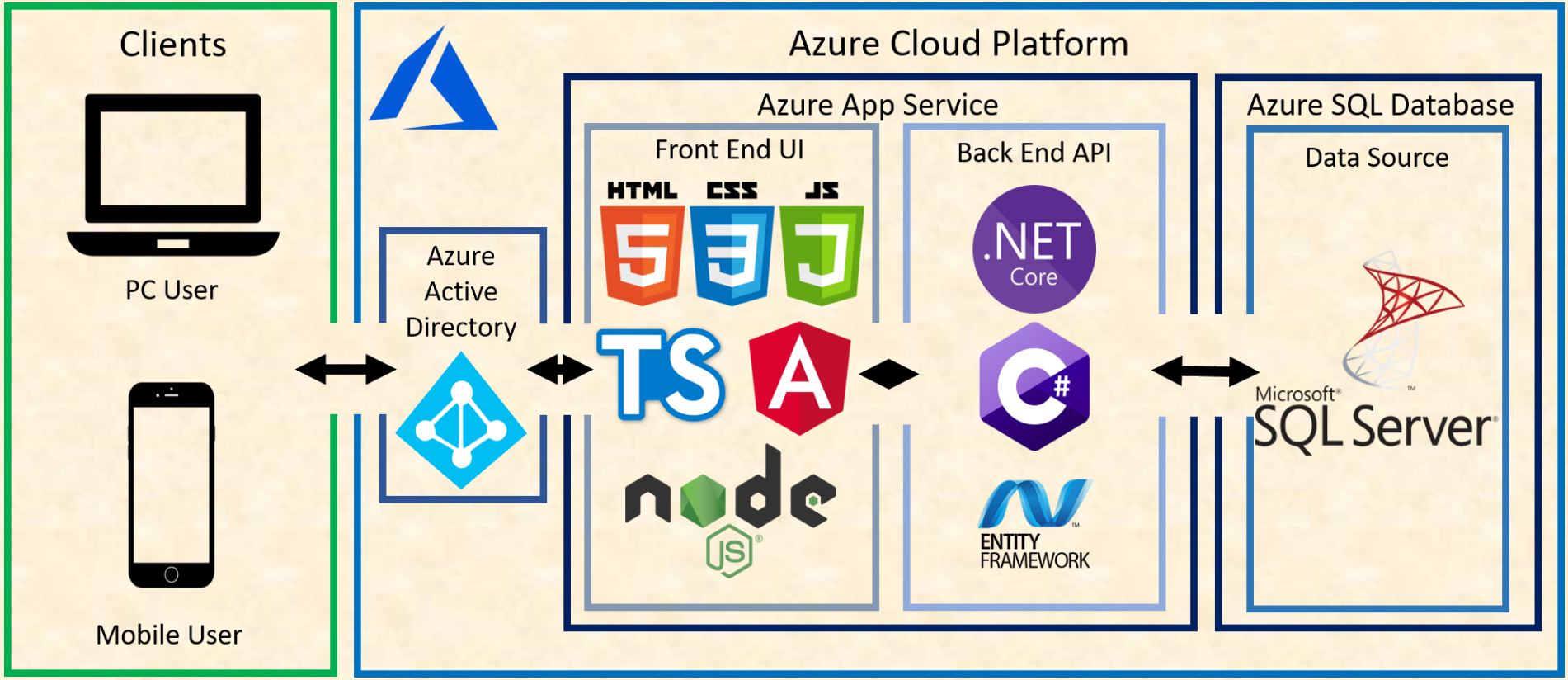
Screen Mockup: Mobile Side Menu



Technical Specifications

- Web Application
  - ASP.NET Core with Angular UI hosted as an App Service on the Azure Cloud Platform
- Mobile Compatibility
  - Each Angular component will have a unique mobile HTML and CSS to optimize the UI for a smartphone
- Azure Active Directory
  - Will utilize Azure Active Directory for authentication during development and will migrate to OAM for handoff
- Azure SQL Database
  - The client provided testing data will be hosted on Azure

System Architecture



System Components

- Hardware Platforms
  - iMacs and personal laptops
  - MS SQL Server hosted on Azure
- Software Platforms / Technologies
  - Visual Studio 2019 Community Edition
  - DayPilot Calendar Plugin
  - Angular, Node.js, Entity Framework, ASP.NET Core, C#, Azure SQL Database

Risks

- Handoff of Final Code between Team and Client
  - The team will send United a beta version of the code at the end of November to deal with any issues early.
  - Add an app configuration page for the LDAP and email server.
- Runtime for Schedule Optimizer
  - Creating a recursive tree to represent all possible schedules within a time frame will cost a substantial amount of time.
  - Bounding will be used extensively on the recursive tree to minimize the number of branches that are created.
- Oracle Access Manager (OAM)
  - We are unsure if it is possible to integrate OAM with our web application if it is hosted on Azure.
  - We will rebuild the login page of the application to utilize Azure Active Directory.
- Accuracy of Data
  - Currently, we are using test data provided by United.
  - The group will communicate with the client to gain access to the existing data.

Questions?