MICHIGAN STATE UNIVERSITY

Project Plan Presentation

FCN Medical Database

The Capstone Experience

Henry Ford Innovations

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From Students…
…to Professionals

Project Sponsor Overview

- Founded in 1915 by Henry Ford and the City of Detroit. Grown from a single hospital to a leading integrated system with 13 hospitals and 55,000+ employees.
- They are the second largest health system in Michigan, operating hospitals across the Detroit, Flint, and Jackson areas.
- Faith Community Nursing (FCN): Partner with congregations to provide holistic care (spirit, body, mind) to underserved communities. Delivering health and wellness to those without access to traditional healthcare.

HENRY FORD HEALTH®
Innovations

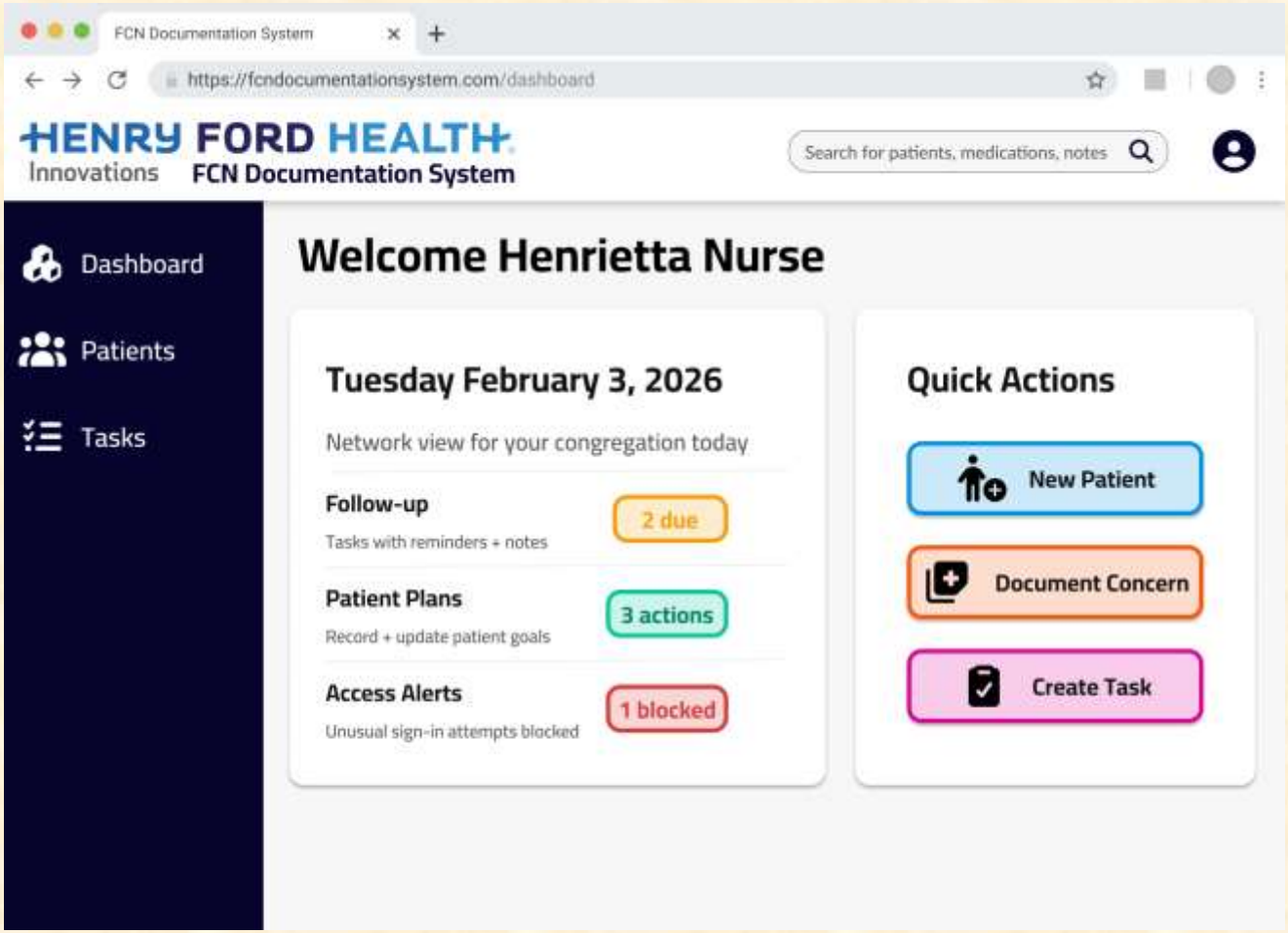
Project Functional Specifications

- The current system is nearly 20 years old and facing retirement. It cannot keep up with modern security standards, data types, or workflow efficiency.
- A web-based, fully responsive application built from the ground up using modern frameworks designed for ease of use for FCN Nurses.
- Comprehensive tracking of patient data including demographics, insurance, medications, and care history.
- Integrated task management, with nurses being able to create tasks and set reminders.
- Robust data ingestion system with built in privacy and security to protect sensitive patient data (HIPAA compliant).

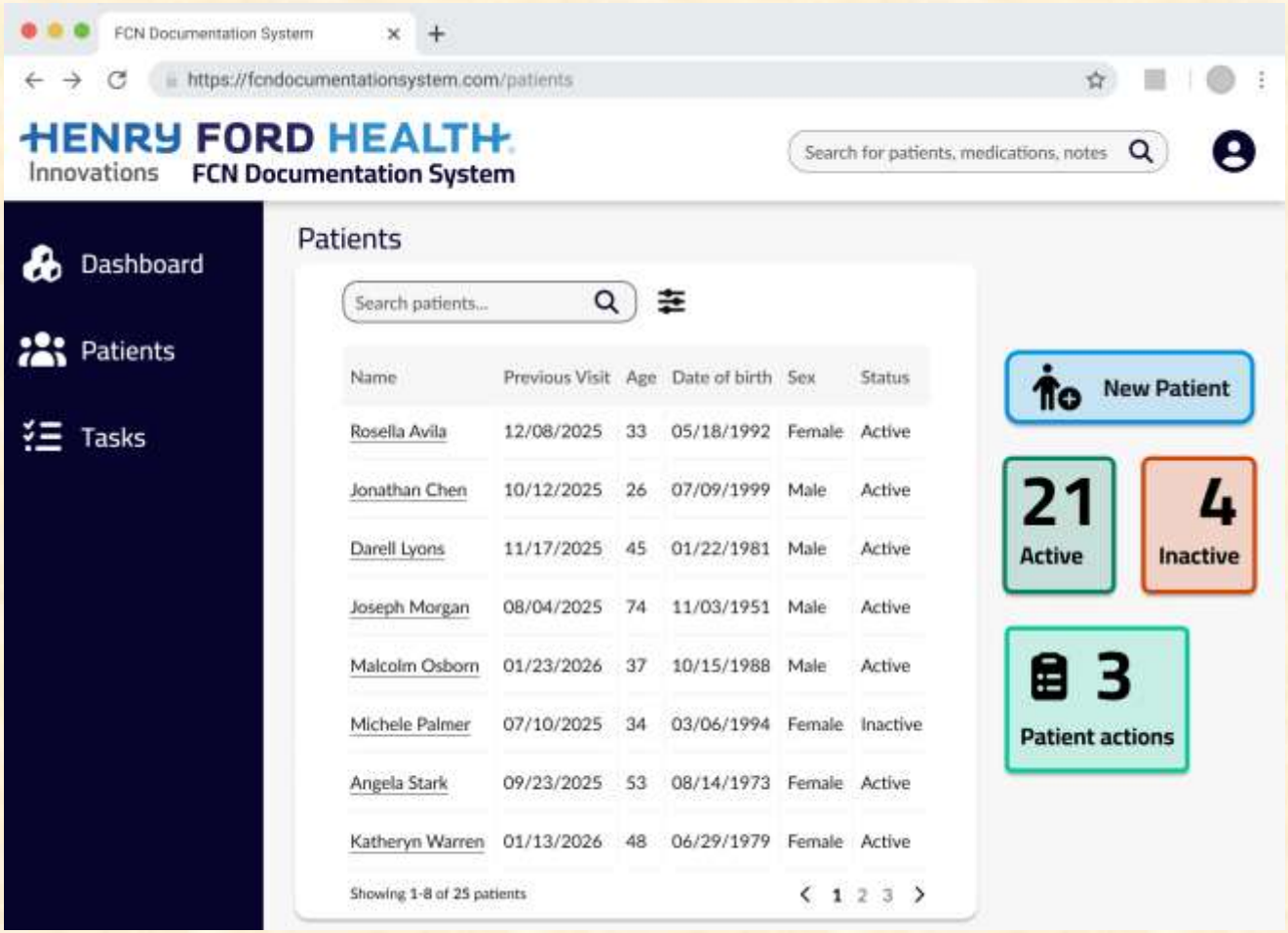
Project Design Specifications

- Client-server web application
- Streamlined workflow for efficiency and minimized cognitive load
- Header with search bar and nurse profile
- Left navigation pane (collapses into hamburger menu on smaller devices)
  - Dashboard
  - Patients
  - Tasks

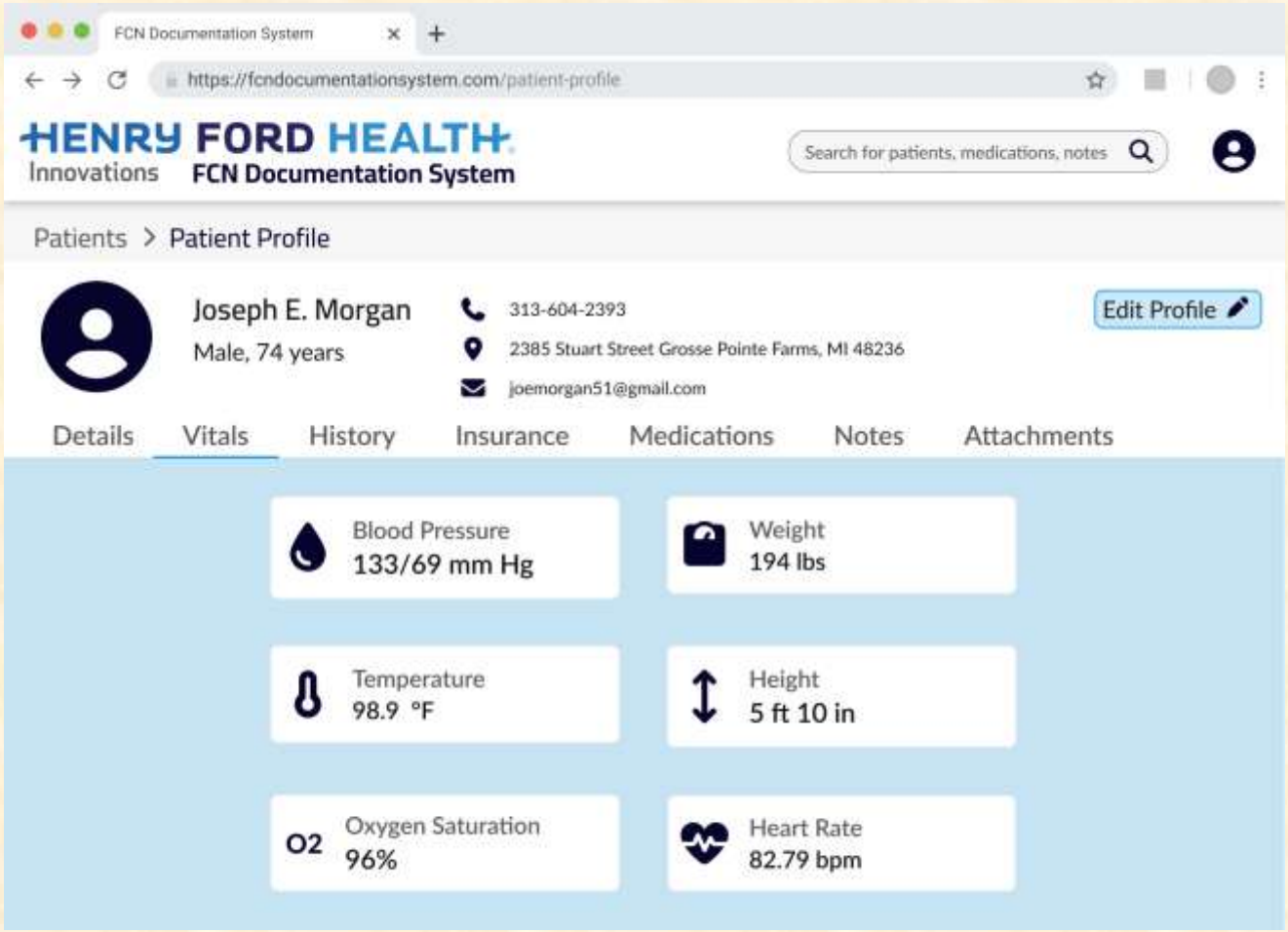
Screen Mockup: Dashboard



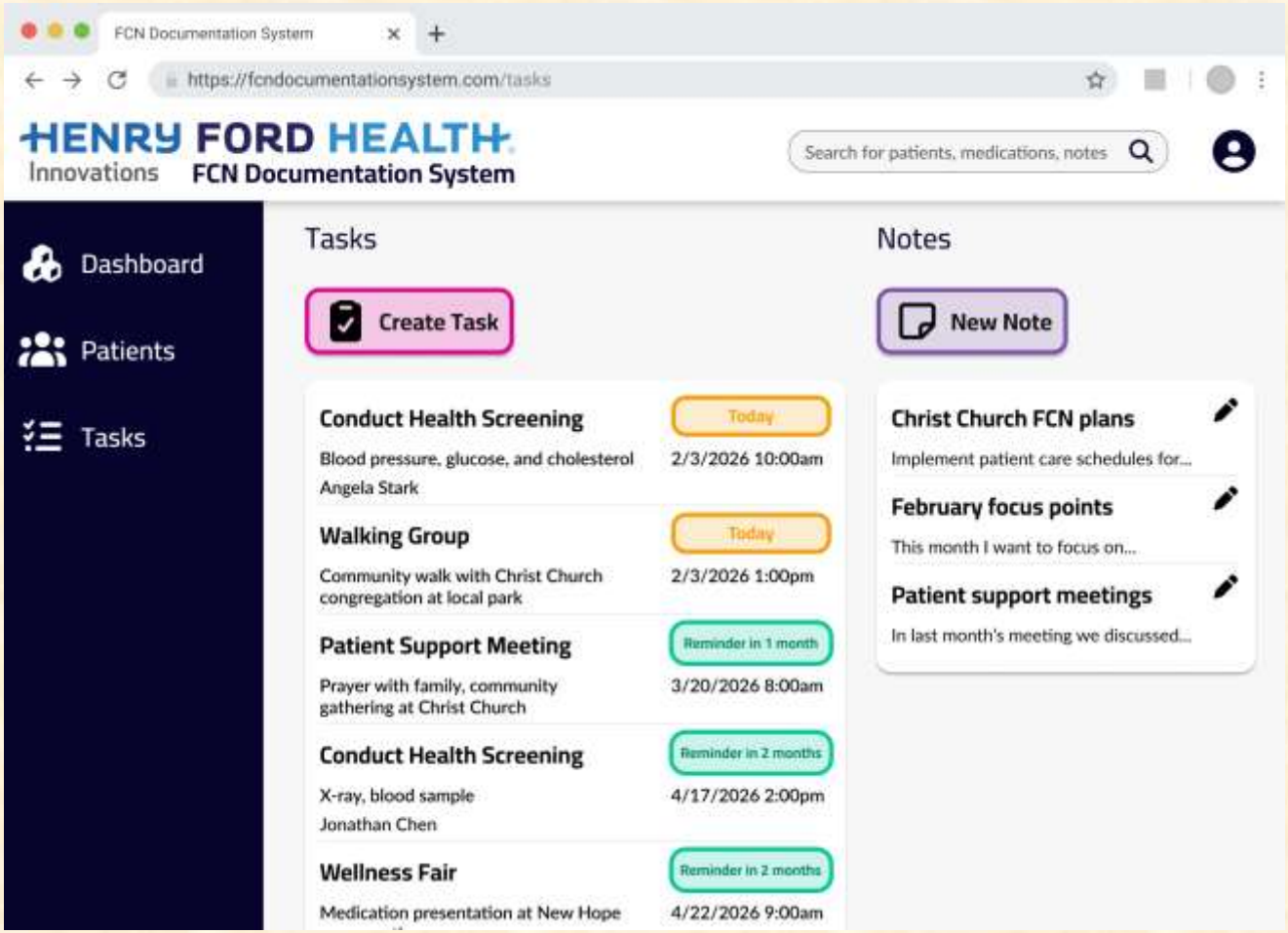
Screen Mockup: Patients



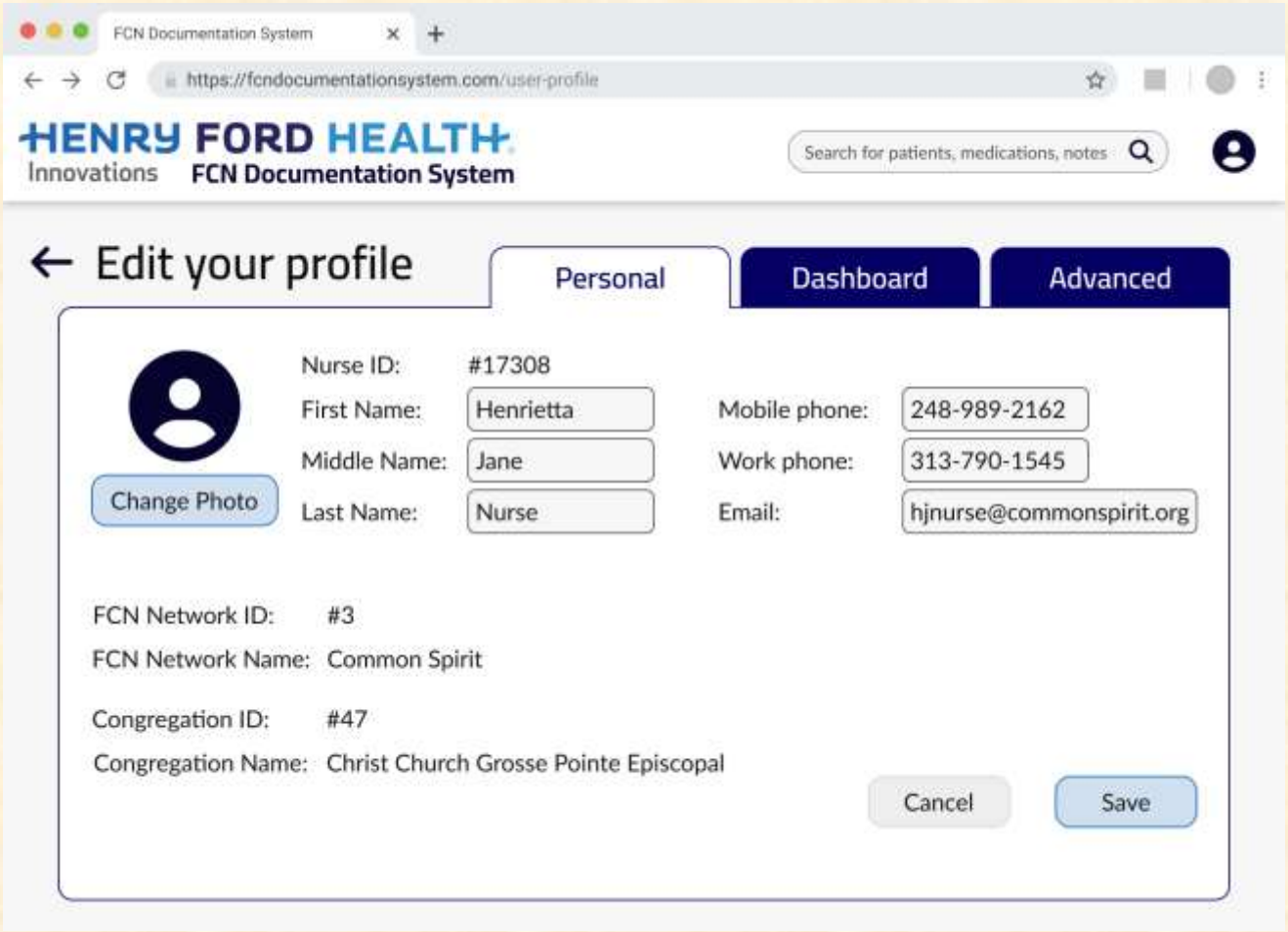
Screen Mockup: Patient Profile



Screen Mockup: Tasks



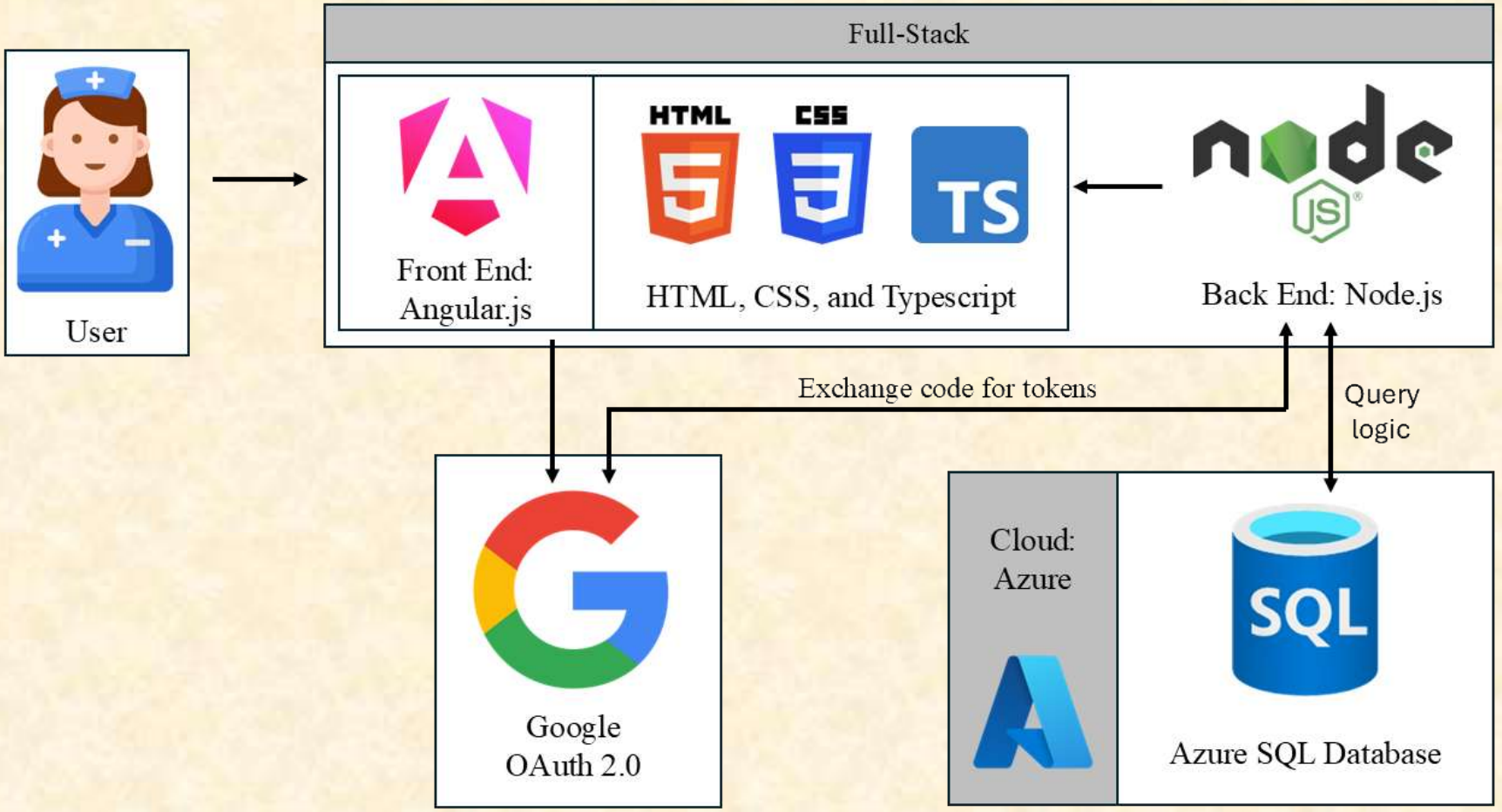
Screen Mockup: Nurse Profile



Project Technical Specifications

- Angular
  - Uses Typescript
  - Built in libraries
- Node.js
  - Connects all parts of the application
- Azure SQL Database
  - Uses firewall rules
  - TDE encryption
  - TLS is used for all connections
- Google OAuth 2.0
  - Simplistic authorization
  - Exchanges code for tokens

Project System Architecture



Project System Components

- Software Platforms / Technologies
  - **Azure:** Azure is a cloud computing platform developed by Microsoft. We are using Azure to host and manage our database.
  - **Node.js:** Node.js is an open-source JavaScript runtime environment. We are using it for the server, to manage user requests, and to communicate between the front and back end.
  - **Angular:** Angular is a frontend framework used to build interactive web applications. We are using angular to build the interface of our application
  - **HTML and CSS:** HTML is a language used to create the structure and content of websites. We are using it to create our page layout, buttons, and text elements. CSS is used for styling the layout of a webpage and we are also using it to design our system's pages.
  - **TypeScript:** TypeScript is a language that adds error checking to JavaScript. We are using it to write safer code for our application.
  - **Google OAuth 2.0:** Google OAuth 2.0 is an authentication method that uses your Google account and Google servers to verify users.

Project Risks

- Risk 1: User Interface Usability
  - Description: Nurses require an easily accessible system that performs exactly as they intend to ensure accurate and efficient data entry. If the user interface is confusing, cluttered, or slows workflow, it can lead to errors and frustration.
  - Mitigation: Simplified UI, limited menus, labeled high contrast buttons, icons and visual cues, feedback from nurses.
- Risk 2: Azure Integration Compatibility
  - Description: After development is complete, Henry Ford Health plans to transfer the system to their own hosting environment with existing backend infrastructure and authentication, which may introduce integration challenges due to differences in system management and Azure configurations.
  - Mitigation: Modular development principles including containerization, an easy to switch out authentication system. Make sure application is compatible with Henry Ford Health IT deployment requirements.
- Risk 3: Maintaining Trust of Faith-Based Communities
  - Description: Since this application will be used in faith-based communities, making sure our use of language and implementation of their beliefs are integrated with our application is vital.
  - Mitigation: Ensuring that we use inclusive language that focuses on all aspects of patient's beliefs. Include functionality that helps document the whole person (spirit, body, mind, and relationships). Meet with the nurses involved to discuss what language to avoid.
- Risk 4: Testing System Search Algorithm Performance
  - Description: Nurses will be able to use the search bar to search for patients, notes, or tasks. Our free version of Azure limits the data storage available to us. We are not able to simulate the large amount of patient data the system will need to support, so we are unable to test our search algorithm for efficiency to ensure it does not cause performance issues.
  - Mitigation: Test with the most amount of data we can have on our free version of Azure. Research most efficient search algorithms for large databases. Optimize database design for quick access. Potentially test search algorithm options on a large amount of random data not through Azure to determine most efficient method.

Questions?

