MICHIGAN STATE UNIVERSITY

Project Plan Presentation

DSL IDE Test Harness

The Capstone Experience

Team Roosevelt Innovations Knowledge Science

Chase DeVries
Christian Lulaj
Jason Harris
Kristian Rica
Xinghe Zhang

Department of Computer Science and Engineering
Michigan State University

Fall 2022

From Students…
…to Professionals

Project Sponsor Overview

- Roosevelt Innovations is a software provider for the dental insurance provider Delta Dental
- Located here in Okemos
- Delta Dental initially developed their own software for internal use
- Branched off in January 2022 to develop "company agnostic software" that can be used by any insurance company

Roosevelt

simple. seamless. smart.

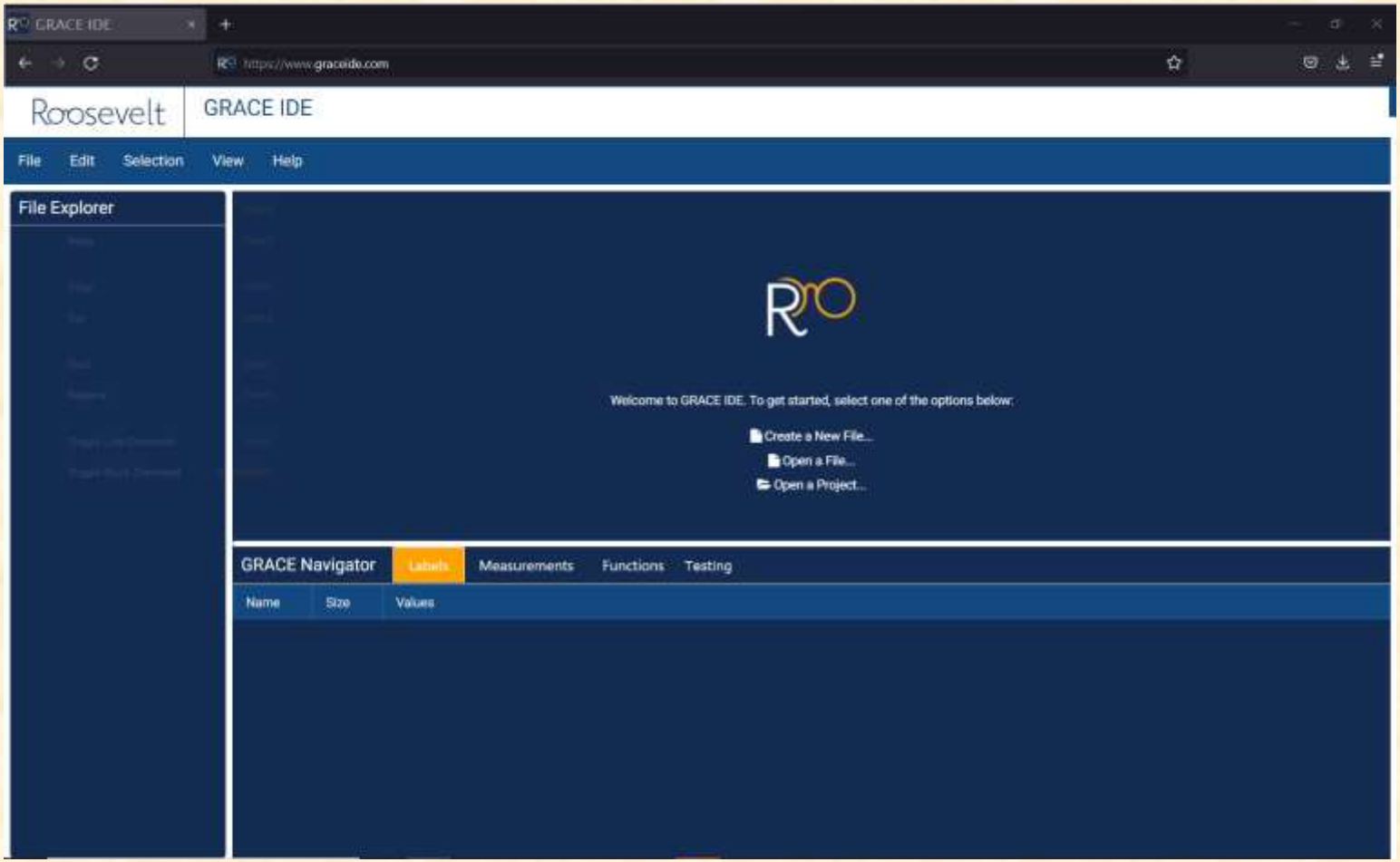
Project Functional Specifications

- Allow actuaries to input their own measurements for their calculation models used to perform rate calculations
- Provide the ability for actuaries to perform mock rate calculations using their user defined measurements in their calculation modes
- Improve the proficiency and operation time for actuaries when testing their calculation models
- Decrease the possibility for calculation models to give companies an incorrect rate

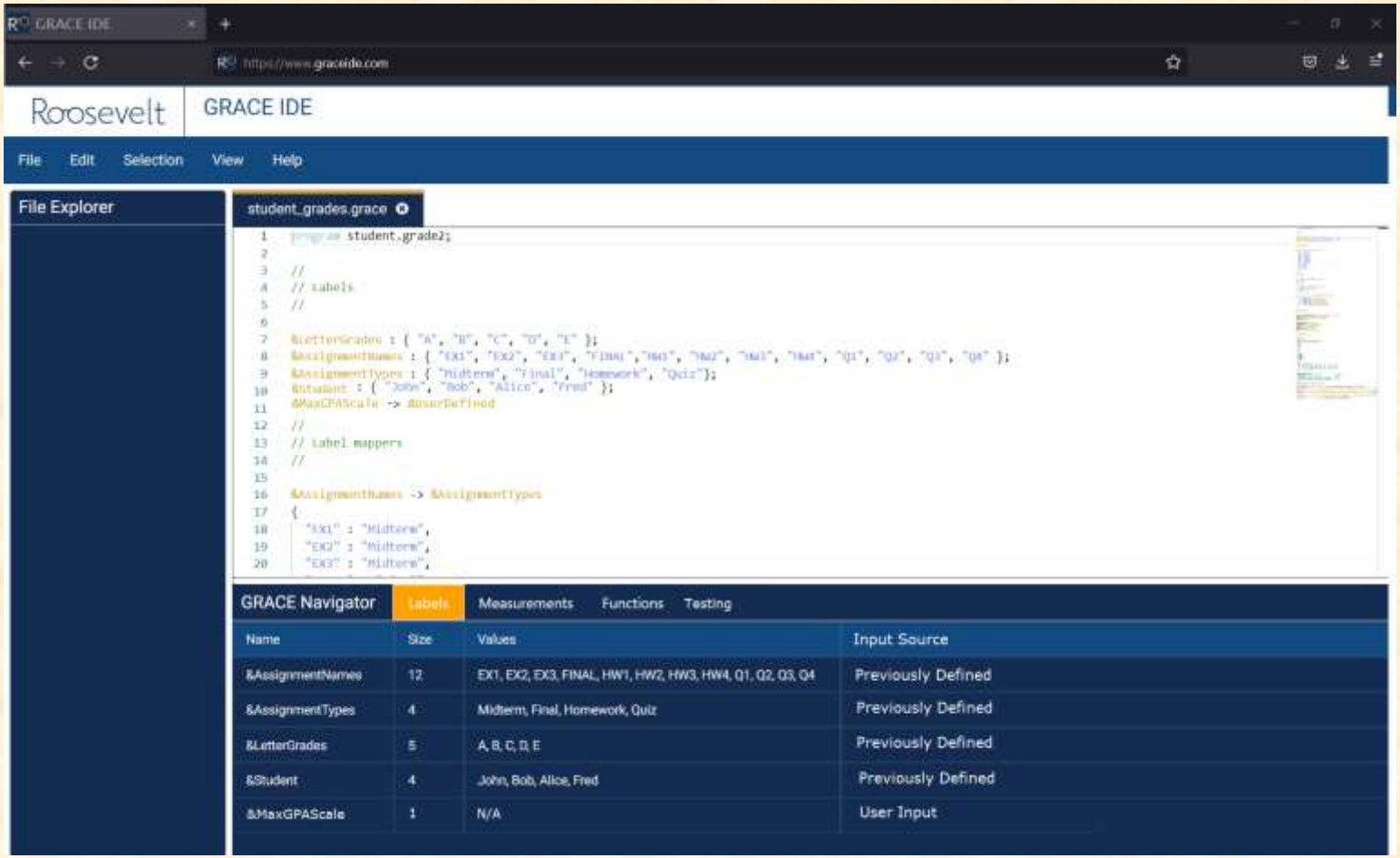
Project Design Specifications

- Enhance the existing UI
  - User Interface menu
  - Differentiating User Inputs
  - Testing Screen
  - Results Page

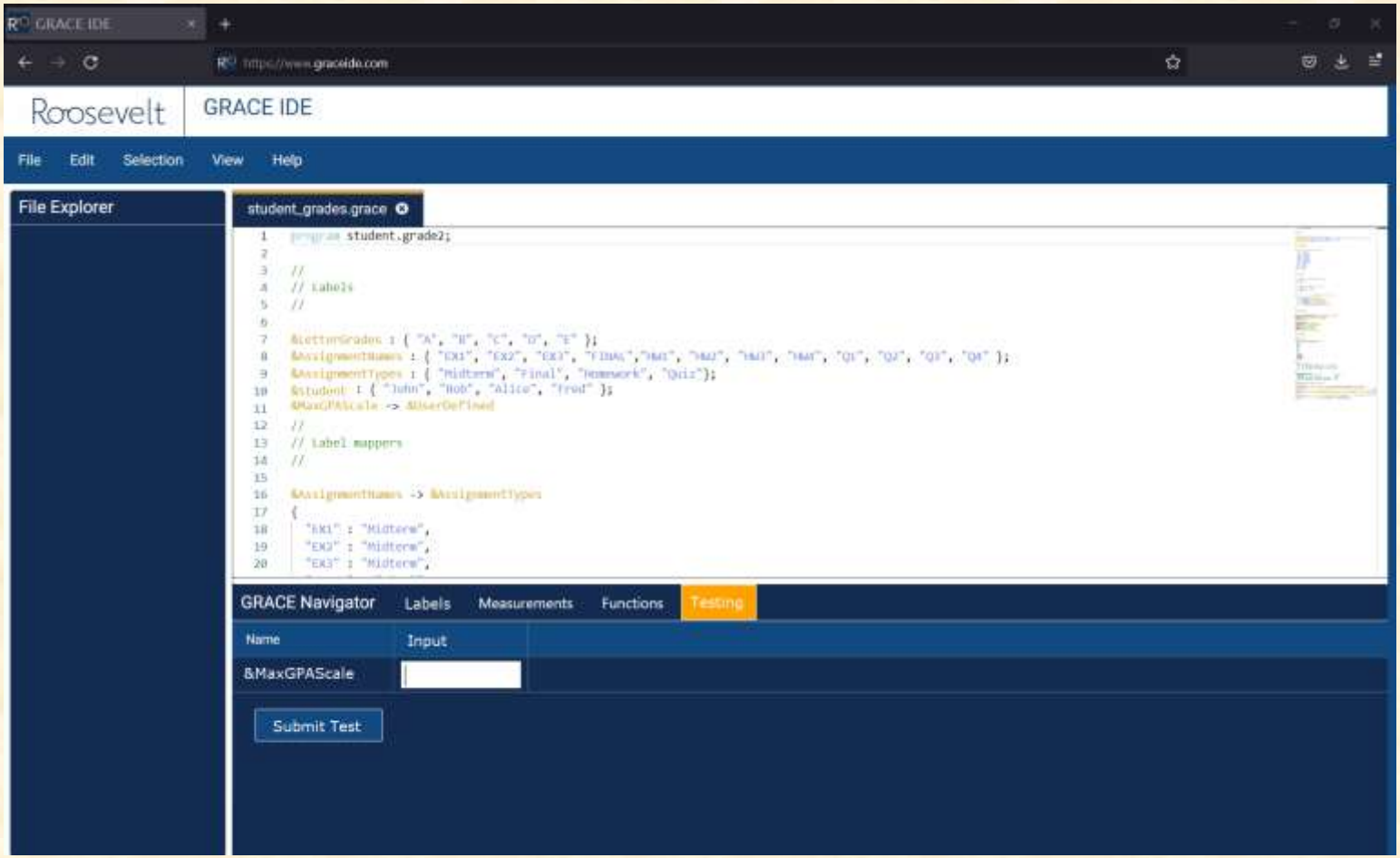
Screen Mockup: Navigation Bar



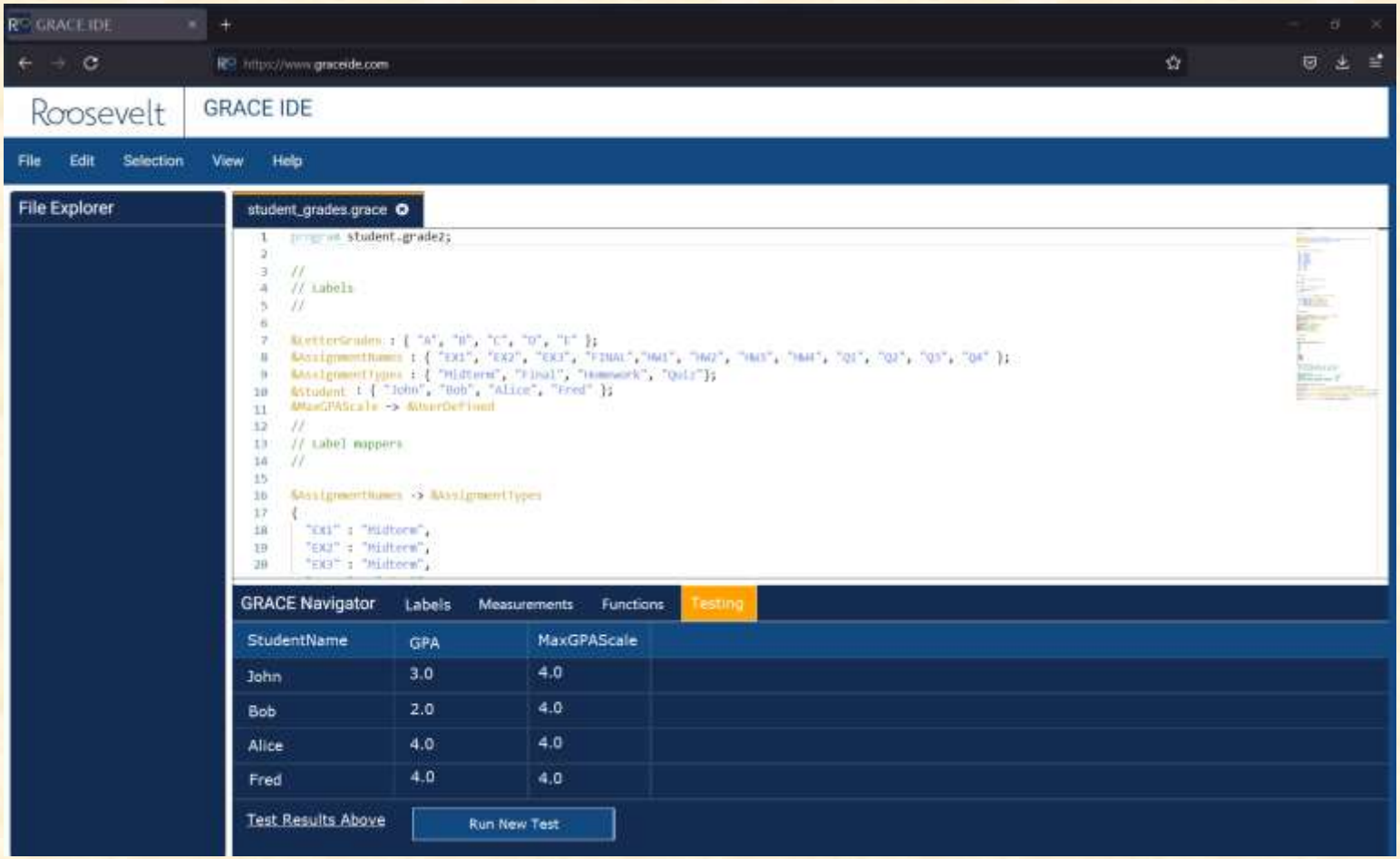
Screen Mockup: Input Classification



Screen Mockup: User Input



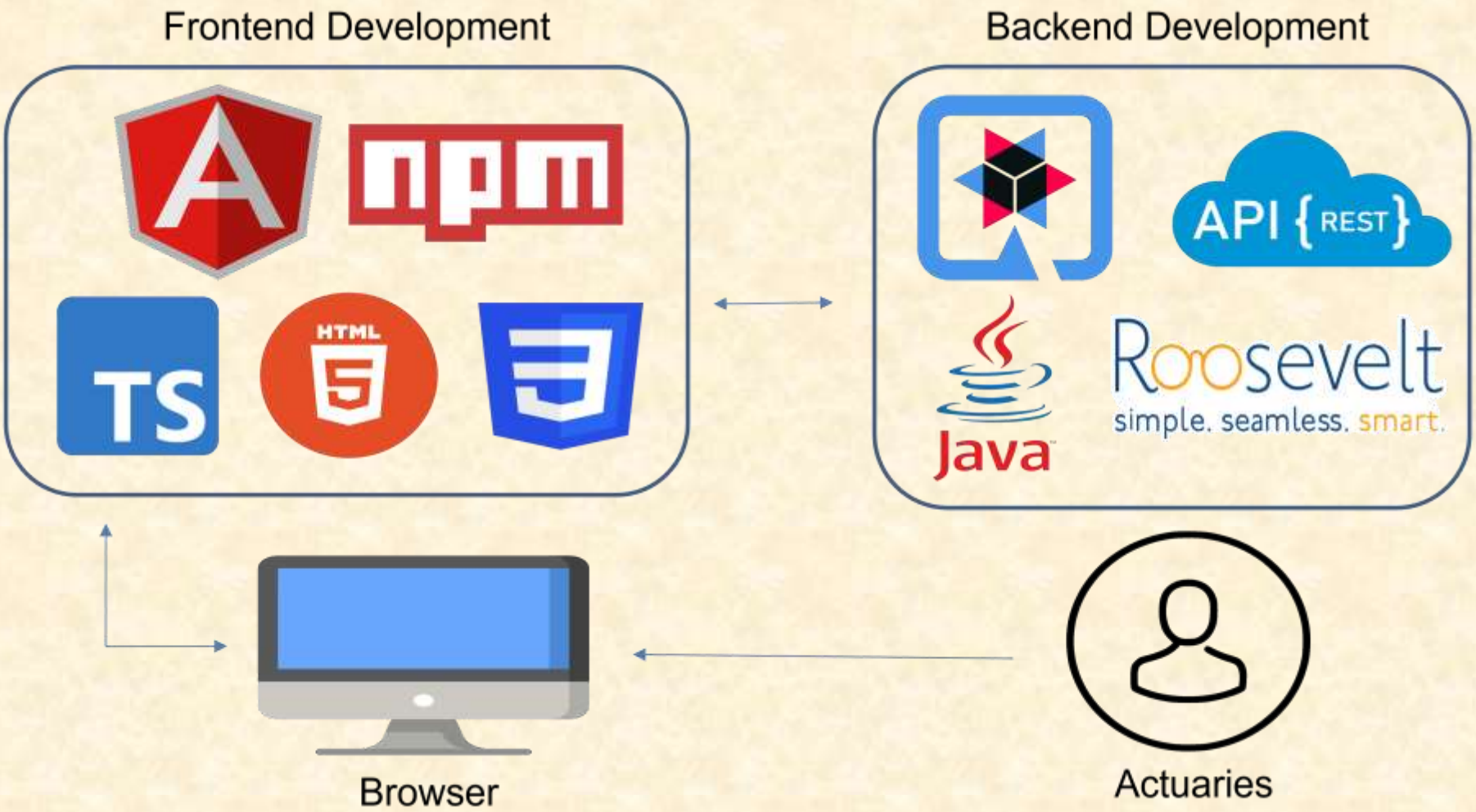
Screen Mockup: Results



Project Technical Specifications

- Use Angular framework to enhance the existing UI
- Host a Java microservice environment using Quarkus
- Use a REST API to request for a GRACE program from the microservice
- Use ANTLR to parse the GRACE file and populate the UI with user entry fields
- Use rate calculation services to perform mock rate calculations and send that data back to the UI to display to the user

Project System Architecture



Project System Components

- **Frontend Components**
  - Angular - is a TypeScript-based free and open-source web application framework. We will be using his framework for dynamically updating frontend components on the user interface.
  - HTML/CSS - These components are used for the styling and structure of the user interface.
  - NPM - is our package manager and installer.
- **Backend Components**
  - GRACE/ANTLR - a powerful parser generator for reading, processing, executing, or translating structured text or binary files.
  - Quarkus (Java) - Quarkus optimizes Java and makes it efficient for container, cloud, and serverless environments with memory consumption optimization and a fast response time.
  - Restful API - communicate via HTTP requests to perform standard database functions like creating, reading, updating, and deleting records.

Project Risks

- Dynamically generate Angular user interface
  - When the user executes a rate calculation file an Angular page is generated dynamically to request information.
  - Implement an Angular user interface that generates a variable number of labeled input boxes and records the user's input.
- Create a Java microservice to calculate rates for the GRACE IDE
  - When the user inputs sufficient information, the application will send the data to our Java microservice where the rate will be calculated and made available to the user.
  - Create a Java microservice that can perform some arbitrary calculation using values from the IDE and provide the result.
- Create GRACE files for testing purposes using the existing ANTLR grammar
  - The GRACE IDE uses a language that only exists in this application and is not documented as extensively as the languages we have experience with.
  - Create a small functional GRACE file that compiles in the IDE and results in a request to the user for at least one input.
- Design a user interface for users who may not be tech savvy
  - The actuaries using the GRACE IDE may have very limited experience interacting with technical software, and IDE's can present an overwhelming amount of information.
  - Coordinate with actual actuaries at Delta Dental and Roosevelt Innovations to achieve a solution that fits their expectation. Their idea of a good experience is likely different than ours.

Questions?