



## Scenic Navigation App

Kevin Buss, Jacob Marvel, Nicholas Santone, Robert Silver

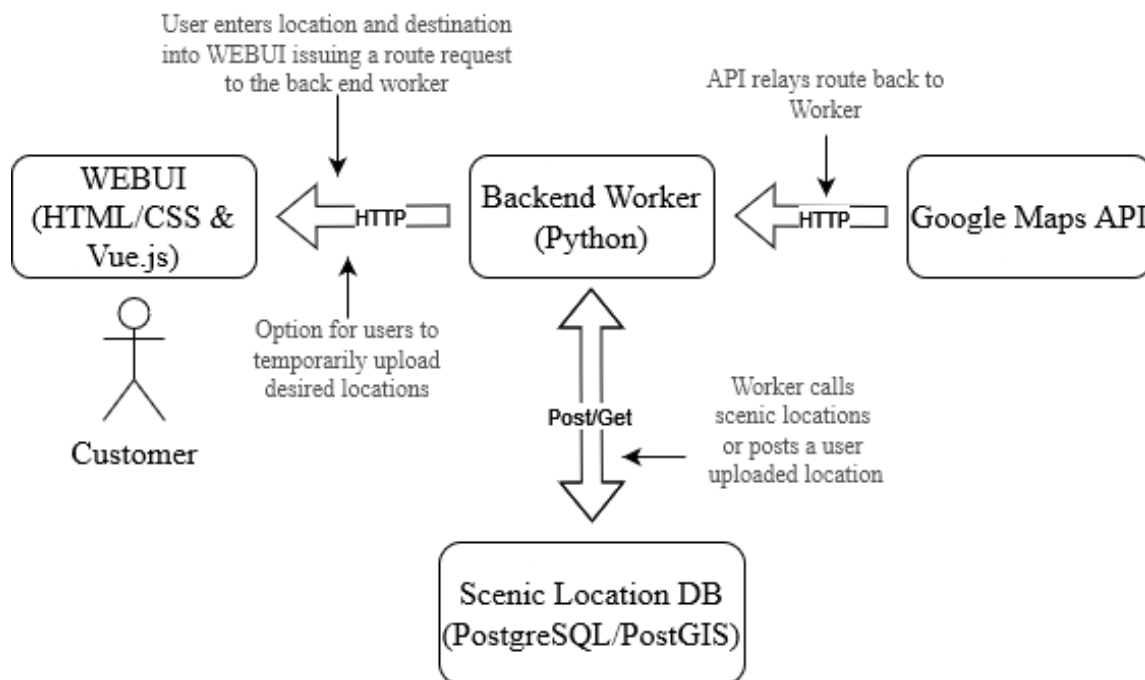
## Chapter 1: Team Vision

### 1.1 Motivation

"It's not about the destination, it's about the journey." With our Scenic Navigation App, we take this adage to heart, transforming mundane routes into something memorable. Today's navigation apps are optimized to reach your destination as quickly as possible. We aim to reimagine everyday travel by prioritizing enjoyment over speed. Input your destination, and our app crafts a personalized journey, weaving through picturesque roads and landmarks to achieve this goal.

### 1.2 System Architecture Overview

Our cloud-based application follows a modern, microservices-oriented architecture. The frontend, built with Vue.js, provides an intuitive user interface for entering locations and viewing scenic routes. The backend, powered by Python, handles route generation logic and interfaces with the Google Maps API and our scenic locations database. The database, managed with PostgreSQL and PostGIS, stores curated scenic points of interest. The entire system is containerized using Docker for portability and scalability, and will be orchestrated using Kubernetes. Continuous Integration and Continuous Deployment (CI/CD) pipelines ensure smooth development and deployment workflows.



## Chapter 2: Implementation Proposal

### 2.1 Web UI

The Scenic Navigation App's frontend will be developed using Vue.js. The user interface will allow users to input their desired start and end locations, and display the generated scenic route with turn-by-turn directions. The map component will be integrated using the Google Maps API, enabling features such as autocomplete location search and dynamic route rendering.

### 2.2 Backend Development and Data Management

The backend server, written in Python, will serve as the central hub for the application's functionality. It will handle incoming requests from the frontend, retrieve scenic coordinates from the database, and communicate with the Google Maps API to generate optimized scenic routes. The server will also manage the storage and retrieval of user preferences and route history.

### 2.3 Containerization with Docker

Each component of the application will be containerized using Docker to ensure portability and ease of deployment. Dockerfiles will be created for the frontend, backend, and database components, specifying the necessary dependencies and configurations. Multi-stage builds will be employed to optimize image sizes and improve build efficiency.

```
# Stage 1: Building Vue.js
FROM node:lts-alpine as build-stage
WORKDIR /app
COPY package*.json ./
RUN npm install
COPY . .
RUN npm run build

# Stage 2: Start the http-server
FROM node:lts-alpine
WORKDIR /scenic-navigation-app
COPY --from=build-stage /app/dist /scenic-navigation-app
RUN npm install -g http-server
EXPOSE 8080
CMD ["http-server", "/scenic-navigation-app", "-p", "8080"]
```

### 2.4 Cloud Integration and CI/CD Pipelines

The application will be deployed on CloudLab infrastructure. CI/CD pipelines will be set up to automate the build, test, and deployment processes. Code changes will trigger the CI pipeline, which will build Docker images, run automated tests, and push the validated images to a container registry. The CD pipeline will then deploy these images to the CloudLab environment.

## 2.5 Database Development

The database will be developed using PostgreSQL with the PostGIS extension to support spatial data. The logical schema will include tables for storing scenic locations, user preferences, and route history. The database will be accessed by the backend server through a Data Access Object (DAO) pattern, which encapsulates the database operations and provides a clean interface for data retrieval and manipulation.

## Chapter 3: Implementation Details

### 3.1 Building Docker Images and Testing Docker

Images for each component will be built using Dockerfiles. Challenges may include managing dependencies, optimizing image sizes, and ensuring proper configuration. Testing will involve running the containers and verifying their functionality through unit tests and integration tests. Health checks will be implemented to monitor the containers' status and ensure their reliability.

### 3.2 Data Collection and Management

Initially, data on scenic locations around West Chester will be collected manually by finding coordinates of relevant landmarks using Google Maps. These coordinates will be inserted into the PostgreSQL database table to populate the app's initial dataset. Additional data collection methods will allow users to add scenic points through the app's interface.

The backend server will interact with the scenic locations database through a data access object (DAO) layer, which will encapsulate the logic for querying and inserting location records. This will provide a clean interface for the server to request or upload scenic waypoints when generating routes or users uploading scenic points.

### 3.3 Limitations and Concerns:

The primary limitation is the tight deadline for completing the project, which may pose challenges in terms of balancing development efforts with other commitments. However, the utilization of the Google Maps API and its generous free usage tier is expected to alleviate some of the technical challenges. Security concerns, particularly related to API key management, will be addressed through secure key storage and rotation practices.

# Kevin Buss

[kevinbbuss@gmail.com](mailto:kevinbbuss@gmail.com) | [github.com/KevBuss](https://github.com/KevBuss)

## EDUCATION

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### West Chester University

*Bachelor of Science in Computer Science*

West Chester, PA

*Sep. 2022 – est. May 2025*

### Montgomery County Community College

*Associate's of Science in Computer Science*

Blue Bell, PA

*Sep. 2019 – May 2021*

## EXPERIENCE

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### Software Engineer Asc.

*Lockheed Martin*

Sep. 2023 – Present

*King of Prussia, PA*

- Collaborate with a software development team to design, develop, and debug software applications, focusing on service-to-service communications, frontend, and backend development
- Demonstrate technical accomplishments to key stakeholders
- Acted as Scrum Master, facilitating daily stand-ups, sprint planning, and retrospectives
- Improved proficiency in Java, JavaScript, Python, SQL, HTML, and CSS

*Programmer*

*Oct. 2021 – Sep 2023*

- Contributed to the automation of end-to-end testing processes using Playwright, significantly improving testing efficiency and reliability
- Developed and implemented comprehensive testing strategies, ensuring robustness and high quality of software applications

### Information Technology Consultant

*Geeks-on-site*

Dec. 2020 – Apr. 2021

*Coral Gables, FL*

- Provided on-site IT solutions, diagnosing and solving software-related issues
- Managed and scheduled regular consultations with clients
- Recommended and purchased essential software and hardware equipment

### Website Designer

*Academy of the New Church Secondary Schools*

May 2019 – July 2019

*Bryn Athyn, PA*

- Worked closely with stakeholders to ensure the website reflected the institution's branding and messaging
- Led the design, build, and maintenance of the institution's website using advanced HTML and CSS
- Regularly updated website content, ensuring accuracy and relevance

## TECHNICAL SKILLS

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**Languages:** Java, Python, SQL (Postgres), JavaScript, HTML/CSS

**Frameworks:** React, Node.js, Flask, JUnit, WordPress, Material-UI, FastAPI

**Developer Tools:** Git, Docker, VS Code, Eclipse

**Methodologies:** Agile, Scrum, Kanban

# Jake Marvel

[nicholassantone@gmail.com](mailto:nicholassantone@gmail.com) | <https://github.com/NS977255>

## Education

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### West Chester University

BS in Computer Science, Cyber Security Certificate

West Chester, PA  
Aug. 2021 - May 2024

### West Chester East High School

High School Diploma, Academic

West Chester, PA  
Sep. 2016 – June 2020

## Coursework

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Computer Science I – Intro to Java

Aug. – Dec. 2020

- Variables, data types, I/O, loops

Computer Science II – Java

Jan. – May 2021

- Arrays, sorting algorithms, GUI

Computer Science III – Java

Aug. – Dec. 2021

- Classes, methods, polymorphism, OOP

Computer Systems – C

Aug. – Dec. 2021

- Memory allocation, bitwise, hexadecimal

Foundations of Computer Science

Jan. – May. 2022

- Optimizing variable usage, function reusability, problem solving

Data Structures and Algorithms – Java

Jan. – May. 2022

- Linked lists, queues, BFS and DFS

Computer Security & Ethics

Aug. – Dec. 2022

- Understanding cyber defense structures and ethical dilemmas

Programming Language Concepts and Paradigms - Haskell

Jan. – May. 2023

- Underlying foundation of programming languages

Software Engineering - Java

Jan. – May. 2023

- Object-oriented programming, inheritance, polymorphism

## Technical Skills

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**Languages:** Java, Python, C, SQL, Haskell, Linux

**Developer Tools:** Git, Docker, jGrasp, VS Code, IntelliJ

**General Skills:** Problem-solving, openness to other ideas, following directions, teamwork

**Interests:** Video games, Drawing, Music, Writing

# Nicholas Santone

| [nicholassantone@gmail.com](mailto:nicholassantone@gmail.com) | <https://github.com/NS977255>

## Education

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### West Chester University

BS in Computer Science, Cyber Security Certificate

West Chester, PA

Aug. 2021 - May 2025

### Bensalem High School

High School Diploma, Academic

Bensalem, PA

Sep. 2017 – June 2021

## Coursework

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Computer Science I – Intro to Java

Aug. 2021 – Dec. 2021

- Variables, data types, I/O, loops

Computer Science II – Java

Dec. 2021 – May 2022

- Arrays, sorting algorithms, GUI

Computer Science III – Java

Aug. 2022 – Dec. 2022

- Classes, methods, polymorphism, OOP

Data Structures – Java

Dec. 2022 – May. 2023

- Linked lists, queues, BFS and DFS

Computer Systems – C

Dec. 2022 – May 2023

- Memory allocation, bitwise, hexadecimal

Foundations of Computer Science

Aug. 2023 – Dec. 2023

- Optimizing variable usage, function reusability, problem solving

## Technical Skills

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**Languages:** Java, C/C++, OOP

**Developer Tools:** Git, Visual Studio, jGrasp

**General Skills:** Problem solving, teamwork

**Interests:** Camping/Hiking, Martial arts

## Robert Silver

[RobertSilver011@outlook.com](mailto:RobertSilver011@outlook.com)

### EDUCATION

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#### West Chester University of Pennsylvania

West Chester, PA

Bachelor of Science, Computer Science

Expected Graduation May 2026

Recipient of Academic Excellence Scholarship

2022-2026

Recipient of Dean's List Academic Achievement

2022-2023

### COURSEWORK

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#### Computer Science 1 - Intro to Java

Aug 2022 – Dec 2022

- Program design, control flow, input/output, variables, data types, and string manipulation

#### Computer Science 2 - Java

Jan 2023 – May 2023

- Implemented recursive algorithms to solve multilayered computational problems
- Utilized arrays to store and manipulate datasets, increasing processing speed
- Implemented search and sorting algorithms to sort a large data set or search for a value within it
- Developed a GUI Java calculator application capable of evaluating required arithmetic functions

#### Computer Science 3 - Java

Aug 2023 – Dec 2023

- Advanced Object-oriented Programming: inheritance, polymorphism, abstraction, exception handling, random access files, serialization, and fundamental data structures

#### Computer Systems – Intro to C

Aug 2023 – Dec 2023

- Analyzed CPU architecture and memory systems to grasp system execution
- Utilized parallel and distributed programming techniques to reduce processing time

### SKILLS & INTERESTS

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**Skills:** Object-oriented programming, Java, C, jGrasp/VSCode, GitHub, Terminal/CLI Use, Collaboration, Problem-Solving, Self-Driven, Mechanically Inclined, Writing Shells and Testing Programs

**Interests:** Automotive Maintenance, Electronic Upgrades/Repairs, Hiking/Outdoors

### LEADERSHIP

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- Eagle Scout Rank Achievement & Leadership Project Jul 2020
- Reading Berks Science and Engineering Fair (RBSEF) – Honorable Mention 2019 & 2020
- Kennedy House Soup Kitchen – Prepared/served meals, clean up, delivered donations 2016 - 2020
- Habit for Humanity – Collect and organized donations for sale at Habitat for Humanity 2018-2022

### PERSONAL EXPERIENCES

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- Basic vehicle maintenance: changing oil, coolant, belts, power steering fluid, tires, alternator, battery
- Vehicle Bodywork: drilling out spotwelds, grinding/cutting metal, mounting engines
- Personal 3D modeling with SolidWorks and printing with Creality Ender 3 S1
- iPhone screen, battery, back glass, and earpiece assembly replacements
- Laptop Ram/SSD upgrades/replacement and internal cleaning for dust buildup
- Booting removable OS from BIOS, Disk Partitions, Configuring Storage Devices