Scenic Navigation App

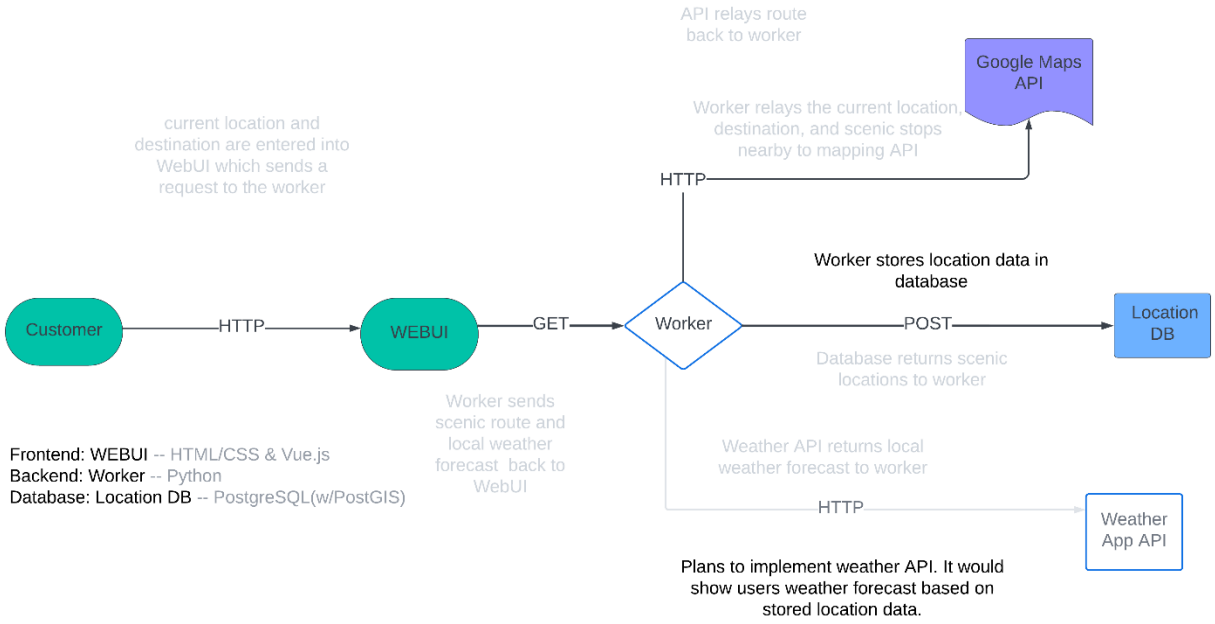
Kevin Buss, Jacob Marvel, Nicholas Santone, Robert Silver

CSC 468 – Group 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 navigations 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.

2. System Architecture Overview



2.1 Web UI

The Web UI serves as the primary interface for users to interact with our Scenic Navigation App. Developed with Vue.js, a contemporary and efficient JavaScript framework, and integrated with the Google Maps API, the Web UI provides an intuitive and responsive user experience. This choice simplifies the process of planning routes on a user-friendly platform. Users input their current location and destination, and the app provides turn-by-turn directions after the generation of the scenic route. Future enhancements will allow the user to upload their own destinations and scenic waypoints to expand the database of locations for route generation, as well as include weather updates to inform the user of conditions along their journey.

2.2 Data Flow and System Interaction

Users interact with the Web UI to enter their current location and destination. This interaction is facilitated through HTTP GET requests to the Python worker. The Python worker communicates with the PostgreSQL database using SQL queries over a TCP connection. It uses SELECT statements to fetch a set of scenic coordinates between the current location and the destination. The worker also sends out HTTP GET requests to the Google Maps API and a Weather Service API for routing and weather information. Afterwards, the Python worker takes the route coordinates and generates turn by turn navigation instructions to send back to the Web UI via and HTTP response, which the Web UI then displays to the user.

2.3 Data Management

We utilize a PostgreSQL database with PostGIS extension for geospatial data. This allows efficient storage and querying of location data integral to generating scenic routes. Standard SQL operations handle the storage, retrieval, and updates of travel information within the database. All database interactions are conducted through secure transactions to protect data against corruption.

2.4 Cloud Integration and CI/CD Pipelines

We leverage CloudLab's infrastructure to host our application along with CI/CD frameworks. Utilizing Docker Hub, we maintain a containerized version of our application to allow for live updates. Our CI/CD process tests new commits and automatically deploys changes to our Kubernetes-managed infrastructure.

3. Limitations/Concerns

Our primary limitation is the tight deadline of two months to complete the project, a challenging feat while balancing work and coursework. Fortunately, the API implementation shouldn't be a major hurdle. With the Google Maps API's 90-day free trial with $300 in credits, along with its free usage tier (up to $200 in routing requests), we anticipate our project's needs will be well covered. However, security is a key concern; Inadvertently exposing our API key could lead to unwanted charges, necessitating stringent key management practices.

4. Roles

Role	Responsibilities	Skills Required	Assigned to
Frontend Developer	Development of WebUI using HTML/CSS/Vue.js; integration of mapping libraries.	JavaScript, Vue.js, HTML, CSS.	Jacob Marvel
Backend Developer	Server-side logic and API development; database and third-party service integration.	Python, RESTful APIs, basic database knowledge.	Robert Silver
Database Admin/Developer	Database design and maintenance; geospatial queries with PostGIS.	SQL, PostgreSQL, PostGIS.	Nicholas Santone
System Administrator	App deployment on CloudLab; CI/CD pipelines, Docker, Kubernetes management.	Cloud platforms, Docker, Kubernetes, CI/CD tools.	Kevin Buss

Kevin Buss

kevinbbuss@gmail.com | github.com/KevBuss

Education

West Chester University — West Chester, PA
Bachelor of Science in Computer Science — *Sep. 2022 – est. May 2025*

Montgomery County Community College — Blue Bell, PA
Associate's of Science in Computer Science — *Sep. 2019 – May 2021*

Experience

Software Engineer Asc. — Sep. 2023 – Present
Lockheed Martin — *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 — Dec. 2020 – Apr. 2021
Geeks-on-site — *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 — May 2019 – July 2019
Academy of the New Church Secondary Schools — *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

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 | https://github.com/NS977255

Education

West Chester University — West Chester, PA
BS in Computer Science, Cyber Security Certificate — Aug. 2021 - May 2024

West Chester East High School — West Chester, PA
High School Diploma, Academic — Sep. 2016 – June 2020

Coursework

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

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 | https://github.com/NS977255

Education

West Chester University — West Chester, PA
BS in Computer Science, Cyber Security Certificate — Aug. 2021 - May 2025

Bensalem High School — Bensalem, PA
High School Diploma, Academic — Sep. 2017 – June 2021

Coursework

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

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

EDUCATION

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

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

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

• 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

• 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