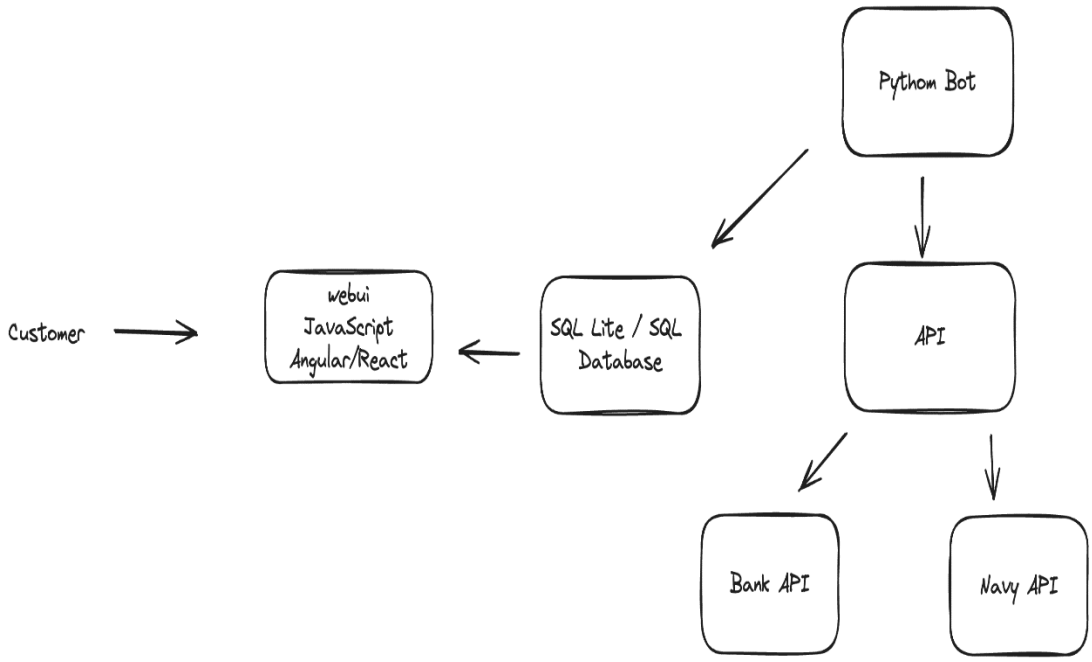
The Universal Banking Application

Naseem Brady - Kush Desai - Zahir Humphries - John Pluznyk

Chapter 1: Team Vision

Our vision is to create a universal banking application that will allow the consumer to interact with several of their bank accounts through one app. Building upon this foundation, we are dedicated to integrating advanced Python bot functionality alongside the bank APIs and SQL Lite technology. This holistic approach will enable users to seamlessly manage multiple accounts, access comprehensive financial insights, and execute transactions with ease. By consolidating disparate banking experiences into a unified platform, we aspire to streamline financial management and enhance user convenience. Our overarching goal is to redefine the banking experience, fostering greater efficiency, security, and accessibility for all users. This vision is a simple one but can positively impact many people.



Chapter 2: Team Proposal

Team:

We have divided the project into distinct components, with each team member tasked with specific responsibilities to ensure its completion:

Naseem: Responsible for handling SQL Database management and API calls.

Zahir: Responsible Developing the Python Bot functionality.

John: Responsible for Designing and implementing the Web UI.

Kush: Responsible for Developing the Bank System and API.

Vision:

In order to make our vision come to light our team will focus on four aspects for this project a web UI, SQL database, python bot, and our own banking system. The web Ui will allow consumers to interact with our system directly, that will allow them to seamlessly check the balances of several of their bank accounts. Our python bot should be up and running 24/7. This allows our bot to continuously retrieve updated data from users accounts and store data within our SQL database.

The web UI will directly interact with our database through a backend server. When users access the web UI and perform actions such as viewing account balances or transaction histories, the UI will send requests to the backend server. The backend server will then process these requests, retrieve the relevant data from the database (which stores user account information, transaction history, etc.), and send the requested information back to the web UI to be displayed to the user. In order to create this web UI we will use html and css to create a user friendly website. We will also use node.js which will allow use to directly interact with our SQL database.

Our bot will interact with the database using SQL queries. When users interact with the bot by asking for account balances or transaction details, for example, the bot will parse the user's request and formulate SQL queries to retrieve the necessary information from the database. Once the database returns the requested data, the bot will format it appropriately and present it to the user.

Due to constraints on accessing actual bank APIs, we will develop a custom API tailored specifically to our project's requirements. The development of our own API enables us to circumvent the limitations imposed by the unavailability of direct access to bank APIs. Our custom API will mimic the functionalities of real bank APIs, providing endpoints for retrieving account information, transaction history, and initiating transactions. By creating our own API,

we retain full control over the integration process and can ensure compatibility with our bot's functionality. This approach allows us to maintain security standards and data privacy while delivering a seamless user experience.

The API will interact with our banking system by establishing secure connections to the banks' servers. When a user requests information or initiates a transaction through our bot, the bot will send requests to the respective banking APIs. These requests will include authentication credentials and specific parameters related to the user's request. The banking APIs will then process these requests, verify the user's identity and permissions, and interact with the banks' systems to retrieve the requested information or perform the requested actions. The API will then return the results of these interactions (such as account balances or transaction confirmations) back to our bot, which will present them to the user.

Deployment:

The computing resources that our group will be utilizing will be provided to us by CloudLab. The service that CloudLab offers to us as software developers is IaaS (Infrastructure-as-a-Service). CloudLab provides us the control and visibility all the way down to the bare metal. This will let us configure our environments as needed to develop our application. By creating customized python configuration files, located within our teams github repo, we will be able to ask CloudLab for the computing resources needed for application. This configuration file will also allow us to install software such as Kubernetes and Docker giving us the ability to configure our components as needed.

To deploy our application to CloudLab's computing resources we will be using Kubernetes. Kubernetes is an open-source container orchestration platform used for automating the deployment, scaling, and management of containerized applications. Containers are lightweight, portable, and consistent environments that package applications and their dependencies, allowing them to run consistently across different computing environments. Kubernetes enables us to create and manage a cluster of the these running containers, which will be seamlessly orchestrated, scaled, and monitored to ensure deployment, optimal resource utilization, and high availability for our applications.

The containerization software that our group will be using is Docker. Docker is an open platform for developing, shipping, and running applications. Docker will enable us to separate each of our applications from our infrastructure. By using Docker, we will be able to develop each of our components without the headache of having to worry about the details of our infrastructure. Docker also empowers us to use the bare minimum resources needed to create our application. Lastly, Docker also enables us to pack all the necessary components for our application into our own custom Docker image. From there we will be able to deploy and manage our components using Kubernetes.

pluznyk02@gmail.com John Pluznyk

EDUCATION

West Chester University, West Chester, PA
Bachelor of Science, Computer Science (August 2020 – present; graduation May 2024)

- GPA: 3.6
- Member of the Computer Science Honor Society

WORK EXPERIENCE

West Chester University, West Chester, PA
Computer Science 2 Tutor (January 2022 – May 2022)

- Reinforced the fundamentals of coding and how to form simple programs.
- Communicated with students and assisted them in developing a learning plan.
- Helped students by listening to their struggles and generating solutions.

Mary Barness Tennis & Swim Club, Warrington, PA
Lifeguard, Swim Instructor (May 2016 – August 2020, seasonal)

- Monitored the wellbeing of guests and maintained a clean and safe pool.
- Taught patrons how to improve their swimming skills and how to be safe in water.

CERTIFICATES

Computer Security Certificate – From West Chester University

PROJECTS

MySQL JAVA GUI – This project is a simple GUI (Graphical User Interface) that allows the users to select the data table of their choosing from a database. I used Java's JFrame GUI interface to allow the user to select a table from a database. Upon selection of table, the entire table will be displayed. https://github.com/JohnPluznyk/JavaMySQL-GUI

Shell Interface C – For this project I created a simple shell interface for terminal users in Linux. https://github.com/JohnPluznyk/LinuxShell

Java Compiler (Back End) – For this project I used JavaCC as a parser generator and lexical analyzer generator to create my own Java like language. I then created a semantic analyzer to check for syntactical errors and make sure programs adhere to the intended semantics of my language. Lastly, after the Abstract Syntax Tree (AST) was created, I created target code generator that translated the AST in MIPS assembly.

CODING COURSEWORK

Design/Construction Compiler – Covers the basic topics in compiler design including lexical analysis, syntax analysis, error handling, symbol tables, intermediate code generation, and some optimization.

Data Base Management Systems – Studied characteristics of generalized database management systems and learned about the fundamentals of designing and implementing of a database system.

Software Engineering - Focused on more advanced topics in object-oriented programming, including project design, planning, and testing.

Data Structures and algorithms – Using object-oriented languages to explore data abstraction, recursion, lists, stacks, queues, linked lists, trees, hashing, and evaluating algorithm efficiency.

Operating Systems - Surveyed elements of an operating system with in-depth studies of certain features of specific operating systems (Linux). Focused on topics such as process scheduling and deadlock avoidance, memory management, and organization and protection of a file system.

Digital Image Processing – Focused on the fundamental concepts about the visualization of various data in the disciples of digital image processing, computer graphics, photometric processing, and image analysis.

Computer Systems – Exploring fundamental concepts of modern CPUs, memory, storage, networking, operating systems.

TECHNICAL SKILLS

Coding Languages: Java, C, MySQL, Python, HTML, CSS
Other: Linux, Docker, Kubernetes, data analytics
GitHub: https://github.com/JohnPluznyk
Linkedin: https://www.linkedin.com/in/john-pluznyk-4399b6225

kdd4203@gmail.com

Kush Desai

Computer Science Major at West Chester University
https://www.linkedin.com/in/kdesai442/

Education:

West Chester University — West Chester, Pennsylvania
Bachelor of Science in Computer Science — 2021 - 2025

Experience:

Target — Target Dec 2019 & Dec 2021 – Jan 2022

- Inventory management and customer service

IS&T Student Intern — West Chester University - Aug 2022 – Present

- Resolving various technological issues
- Collaborating with other student interns
- Pick up and recycling various electronic equipment around campus

Certifications:

Responsive Web Design — FreeCodeCamp – July 2020
JavaScript Algorithms and Data Structures — FreeCodeCamp – July 2020
Front End Development Libraries — FreeCodeCamp – October 2021
Data Visualization — FreeCodeCamp – October 2021
JavaScript Coding Fundamentals — Google Grasshopper – November 2021
JavaScript Coding Fundamentals II — Google Grasshopper – December 2021
Scientific Computing with Python — FreeCodeCamp – Currently in Progress

Technical Skills:

Java (Intermediate) HTML (Beginner) Python (Novice)
JavaScript (Beginner) C (Basics)

Involvement:

Computer Science Club — 2021 - 2023

- Served as Vice President of the club for the Fall 2022 and Spring 2023 semesters

- Learned about and used various CS related topics outside of the university curriculum

Cyber Security Club 2021 - Present

- Introduced to various elements of cyber security
- Experimented with different applications such as WireShark
- Served as Treasurer of the club for the Fall 2023 and Spring 2024 semesters

NCAE Cyber Games
Feb 2022

- Collaborated as a team to set up, secure, protect, and maintain servers using Linux

Game Development Club 2022 - 2023

- Learned about software such as Unity for creating various types of games
- Created games and applications individually and as groups

Relevant Courses:

Computer Security and Ethics	Data Structures and Algorithms	Cloud Computing
Computer Systems Concepts/Paradigms	Foundations of Computer Science	Computer Language

Projects:

Unity Projects using C# Scripting

- Flappy Bird Clone
- Notepad Application

Interactive Discord Bot (Using Java and the Discord API) (In Progress)

- Typical Discord Bot with various messaging features and allowing user interaction

Python Projects (Using Python Library Imports)

- Snake Game
- YouTube Video Downloader (to MP4)
- Personal Password Manager with Encryption
- Slot Machine Casino Game

Naseem Brady

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nasbrady@gmail.com

OBJECTIVE

To complete this project.

EDUCATION

West Chester University, West Chester, PA
Bachelor of Science, Computer Science (August 2020 – present; graduation May 2024)

- GPA: 3.1

WORK EXPERIENCE

West Chester, Pa
1. The Giant Company – Produce Associate (Oct 2021 – June 2022)

PROJECTS

Text-Based Adventure-RPG "Unnamed": A project in development, made with Java, I started this project to showcase the skills, techniques, and concepts I've learned about programming after being in school for a couple years.

CODING COURSEWORK

Software Engineering - Focused on more advanced topics in object-oriented programming, including project design, planning, and testing.
Data Structures and algorithms – Using object-oriented languages to explore data abstraction, recursion, lists, stacks, queues, linked lists, trees, hashing, and evaluating algorithm efficiency.
Digital Image Processing – Focused on the fundamental concepts about the visualization of various data in the disciples of digital image processing, computer graphics, photometric processing, and image analysis.
Computer Systems – Exploring fundamental concepts of modern CPUs, memory, storage, networking, operating systems.

TECHNICAL SKILLS

Coding Languages: Java, Python, C++, HTML, CSS
Other: Linux, Mac, Windows

GitHub: https://github.com/Naseem-Brady

Zahir Humphries

Comp. Sci. Major at West Chester University | Philadelphia, PA | (215) 581-5099 |
zh921063@wcupa.edu

OBJECTIVE

To create a Python bot to pull bank information & display your current balance on the screen.

EDUCATION

West Chester University, West Chester, PA
Bachelor of Science, Computer Science (August 2020 – present; graduation May 2024)

- GPA: 3.3

WORK EXPERIENCE

West Chester, Pa
1. Google – Open-source with Norman Nanley

Flight Tracker, to track the most precious location of flight travel from a point A to point B

CODING COURSEWORK

Software Engineering - Focused on more advanced topics in object-oriented programming, including project design, planning, and testing.
Data Structures and algorithms – Using object-oriented languages to explore data abstraction, recursion, lists, stacks, queues, linked lists, trees, hashing, and evaluating algorithm efficiency.
Computer Science I, II, III – Java OOP programming

TECHNICAL SKILLS

Coding Languages: Java, Python, C++, HTML, CSS
Other: Linux, Mac, Windows
GitHub: https://github.com/ZHumphr