GREEN BUDDY PROJECT REPORT

INTRODUCTION

AIMS AND OBJECTIVES OF THE PROJECT

Green Buddy is designed to be an all-in-one platform for home gardeners and plant enthusiasts. The primary objective is to assist users in making informed decisions regarding their gardening activities. The platform achieves this by integrating various services, such as detailed plant information, care guides, YouTube video recommendations, weather forecasts, and nearby gardening shops.

The project focuses on delivering a user-friendly experience where both guest and registered users can access relevant gardening resources. Guest users can explore basic plant information, while registered users gain access to more advanced features, including weather alerts, detailed plant care guides, and personalized suggestions based on weather conditions.

ROADMAP OF THE PROJECT REPORT

This report will guide readers through the project development journey:

1. **Background:** Explores the problem it aims to solve, and the specific challenges faced by home gardeners.
2. **Specifications and Design:** Outlines the functional and nonfunctional requirements, along with the system architecture and design decisions.
3. **Implementation and Execution:** Details the development process, team roles, tools and technologies used, and the challenges encountered. It also highlights the agile practices adopted throughout the project.
4. **Testing and Evaluation:** Describes the testing strategy, including unit testing, and user testing, along with key findings and system limitations.
5. **Conclusion**: Summarizes the key insights and takeaways from the project.

BACKGROUND

CHALLENGES FACED BY GARDENERS

Home gardening can be a rewarding yet challenging endeavor.
Common issues faced by gardeners include:

- ➔ **Lack of proper knowledge about plants**: New Gardeners don't have proper knowledge and information about plants. Attempting to start a garden without proper knowledge can lead to issues, which in turn can make the person feel incomplete and lose interest.
- ➔ **Limited Access to Quality Garden Shops:** For gardeners, it is important to get good quality gardening supplies and advice on plants at local shops. Due to lack of time and finding a good quality shop with proper ratings, an address where they can buy plants and other related items is challenging for gardeners.

➔ **Adapting to Weather:** Gardeners frequently face challenges in adjusting to rapidly changing weather conditions. Without accurate weather information, they may experience difficulties in planting, which can harm their plants and disrupt their care routines.

These challenges often result in suboptimal plant growth and failed gardening projects.

SOLUTIONS

Green Buddy addresses these problems by providing an integrated platform that offers comprehensive information and tools:

- ★ **Plant Information:** When Green Buddy users enter the name of a plant, they receive detailed information about it.
- ★ **Plant Care:** Detailed care guides offering advice on watering, sunlighting, and pruning are available to help gardeners keep their plants healthy.
- ★ **Weather Forecasts:** Fetches and processes current-day and upcoming 5-day weather forecasts for user-specified locations, helping users make informed decisions. Also, accurate weather forecasts help users plan gardening activities based on local conditions, such as avoiding planting during harsh weather.
- ★ **Nearby Gardening Shops:** The platform helps users locate garden shops, offering relevant details like ratings, opening hours, and contact information to plan their visit effectively.
- ★ **Visual Learning:** Top-rated YouTube video suggestions provide users with easy-to-follow tutorials and best practices for plant care.
- ★ **Plant Tracking:** Users can add specific plants to their profile, including species information and other relevant details, allowing them to keep track of their plants and manage their care effectively.

SPECIFICATIONS AND DESIGN

FUNCTIONAL REQUIREMENTS

The key functional requirements of the Green Buddy platform include:

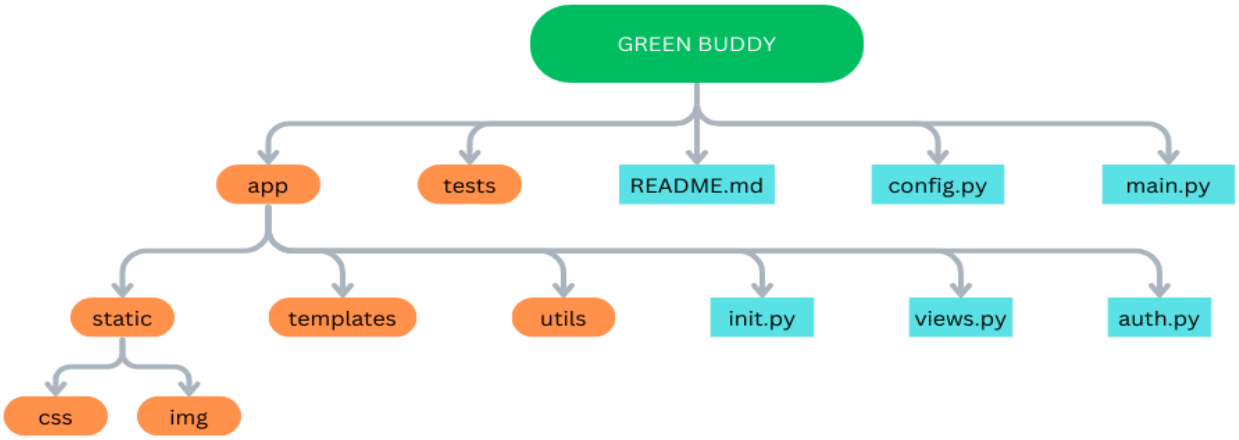
- ○ **User Authentication:** Allows users to access specific features based on their account type (Registered / Guest).
- ○ **Weather Forecast and Alerts:** Retrieves and processes current-day and 5-day weather forecasts, providing users with temperature, humidity, and weather conditions.
- ○ **Plant Information and Care Guidance:** Delivers detailed plant information and care tips based on user input(plant name).
- ○ **YouTube Video Suggestions:** Offers curated video recommendations on plant care.
- ○ **Garden Shop Locator:** Helps users discover nearby garden shops with detailed information like shop name, address, opening hours along with ratings to give users the flexibility to choose a shop based on their location.
- ○ **Plant Suggestions Based on Weather:** Suggests plants suitable for the current weather conditions.

NON-FUNCTIONAL REQUIREMENTS

- **Performance:** The platform should load plant information and weather data promptly.
- **Scalability:** The architecture should support the addition of new features (like a plant growth tracker) without requiring major system overhauls.
- **Security:** User data, especially login credentials, should be securely encrypted.
- **User Experience:** The platform should offer an intuitive interface, ensuring a smooth experience for both guest and registered users. Information should be presented in a clear and organized manner.
- **Maintainability:** The codebase should be modular, allowing for easy updates and bug fixes. Proper documentation should be maintained for future enhancements.

DESIGN CONSIDERATION AND ARCHITECTURE

Green Buddy is built using a modular architecture that separates front-end, back-end, and data management components:



- **API Integrations:** Data is retrieved from multiple sources, including OpenWeatherMap, Near by Garden shops, Plant API, and Youtube API
- **Key design elements:**
  - Visual Styling: A consistent and visually appealing layout with a fixed background image, choice of good contrast colors, use of legible font, having headings wherever necessary to assist the user.
  - Clear navigation paths for easy access to different features.

IMPLEMENTATION AND EXECUTION

DEVELOPMENT APPROACH AND TEAM MEMBER ROLES

Green Buddy was developed using an agile methodology, characterized by iterative development and continuous improvement.

Team members: Ashwini Ravikumar, Aparna Mishra, Akhila Kukkadala

ASHWINI RAVIKUMAR -

GENERAL	DESIGN	FRONT END	BACK END
Actively involved in brainstorming sessions - proposed ideas on the main project topic and other features;	Designed the logo and favicon for the project	User Authentication (Signup & Login pages)	YouTube recommendations feature under plant care
Created the directory structure that is to be followed to ensure the files are well-organized.	Created the front-end pages that served as the foundation for the app's UI framework	Homepage	Plant collections
Worked on the final product by merging the codes of all members and restructured the HTML (had to combine two files for each feature into one) and CSS parts to ensure all pages had the same theme.	Designed the Project architecture diagram and directory structure diagram	Dashboard (Plant collections)	Fixed error handling in weather page (for wrong location input).
Worked on testing for the main app, YouTube feature and Plant collections feature and merging all test files	Designed Project Presentation and contributed to adding essential inputs	Plant care page	
Also contributed to the Project report and ReadMe files by reviewing and adding inputs for the features I was responsible for, proposing ideas on how to represent info with Gantt charts and images			
Created requirements.txt			

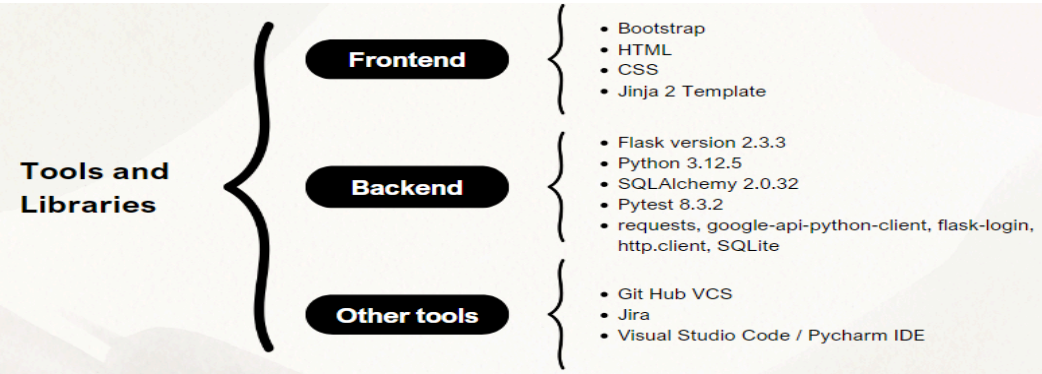
APARNA MISHRA -

GENERAL	FRONTEND	BACKEND	PROJECT FILES / REPORT
Participated in brainstorming sessions, contributed to ideas on features and to improve the Green Buddy platform's functionality and user experience	Designed Front-end UI for Weather & shops API features before code merging to ensure smoother integration with the base UI	Weather API Feature	Prepared README file
Created GitHub repository , added collaborators to ensured everyone working on their respective branch	Created frontend UI for Google Maps API for Garden Shops	Google Maps embed API & Google Geo coding API	Prepared Project Assignment
Took on the role of Scrum Master, handling task assignments, updating tickets, and keeping the team's progress aligned with project goals		Debugged and fixed issues encountered during API integration	Contributed to the project documentation, & presentation slides by reviewing content & providing essential inputs.
Worked on debugging the errors on some features(APIs)		Conducted testing for the Weather and Garden Shops features	
		Fixed and resolved errors in both the weather and Shops API (for wrong location input including error handling on html page for shops API)	

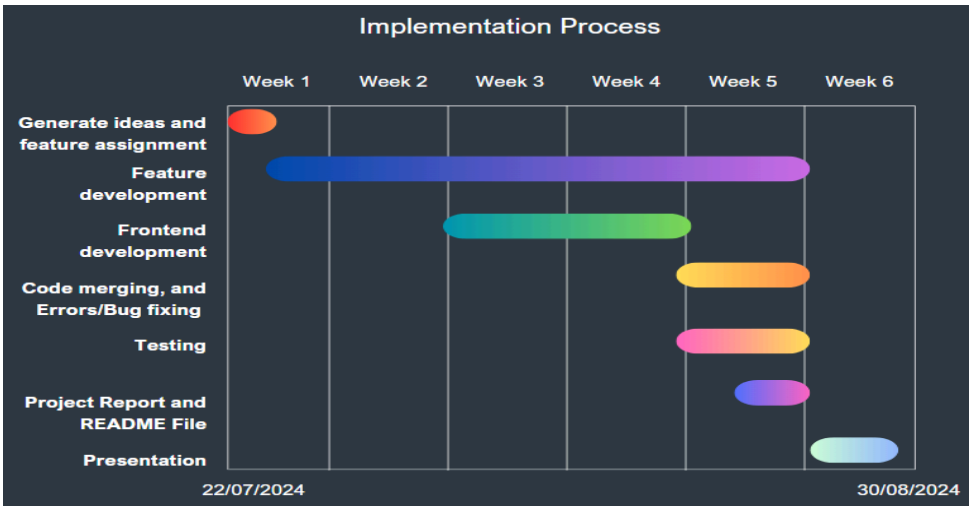
AKHILA KUKKADALA -

GENERAL	FRONTEND	BACKEND	PROJECT FILES / REPORT
Participated in brainstorming sessions, actively involved in giving ideas on features	Homepage for Plant information API feature	Plant information API feature	Prepared Project Report
Took on the role of Scrum Master for two sprints, handling task assignments, updating tickets, and keeping the team's progress aligned with project goals (Jira)	Created frontend UI for Plant information feature	Plant care API feature.	Worked on the project presentation
Contributed in Project Assignment		Fixed / resolved errors in Plant information feature(for entering invalid plant name)	Contributed to the README file by reviewing content and providing essential inputs.
		Worked on fixing the error in plant care feature(for entering invalid/wrong plant name)	
		Worked on testing for Plant information feature	

TOOLS AND LIBRARIES



IMPLEMENTATION PROCESS



CHALLENGES

- **Balancing API Calls:** A major concern was controlling the frequency of API requests without exceeding rate limits, along with selecting the most suitable APIs for our needs.
- **Front-End Development:** Since some team members lacked prior knowledge of front-end development, they had to learn and implement the necessary skills as they progressed.
- **Integrating Code from Different Features:** Merging everyone's code was challenging due to errors and inconsistencies, and the styling required restructuring.
- **Testing and Solving the errors:** We are not familiar with API testing, so we need to learn it from scratch and implement it. Also, handling errors that occur when wrong input is provided was a challenge.

AGILE DEVELOPMENT

- **Iterative Development:** We adopted an iterative development approach by dividing the project into distinct features, with each team member focusing on their own assigned feature. Regular sprint planning and daily standups helped us track progress, address challenges, and refine our work based on feedback. Jira was used to manage tasks and monitor sprint outcomes, ensuring alignment with project goals.
- **Code Reviews:** Before merging code into the main branch, team members conducted code reviews to ensure quality, consistency, and adherence to best practices. This helped catch bugs and maintain a clean codebase.
- **Continuous Refactoring:** As we progressed through the sprints, the codebase was continuously refactored to improve performance, remove redundancy, and enhance readability. This was particularly important as new features were integrated and the project became more complex.

TESTING AND EVALUATION

TESTING STRATEGY

The Green Buddy platform underwent comprehensive testing to ensure reliability and usability:

- **Unit Testing:** Focused on individual components, such as API integrations and data processing, to identify and resolve issues early in development. Each developer is responsible for writing and running unit tests for their features to ensure individual components are correct.
- **Pytest:** Pytest, a widely-used testing framework for Python, was employed to automate the tests, verify the correctness of code, and maintain code quality throughout the development process. We used Pytest because it has a simple syntax, is easy to set up, and provides powerful features such as fixtures, and parameterized testing.
- **User Testing:** Conducted with potential users to gather feedback on usability, design, and feature accessibility.

FUNCTIONAL AND USER TESTING

- **Testing Results:** Confirmed the correct functioning of core features, including data retrieval and user authentication.
- **User Testing Feedback:** Users appreciated the clear navigation paths and intuitive layout

SYSTEM LIMITATIONS

Despite its success, the system has some limitations:

- **Dependency on External APIs:** The platform relies heavily on third-party APIs, making it vulnerable to outages or changes in service terms. And also Plant API displays limited information.

EVALUATION AND FUTURE ENHANCEMENT

While the platform delivers on its core features, there are opportunities for improvement. Additional features can be integrated into the Green Buddy platform including:

- **Plant Growth Tracker:** An interactive feature that allows users to track and monitor the growth of their plants over time.
- **Information Request Feature:** If users cannot find specific plant-related information, they can submit a request for that information, indicating their needs (e.g., “We want details on this specific plant”).
- **To-Do list:** Users can add and manage their daily list to keep track of their gardening-related tasks
- Option to add images in the Plant collections feature.
- **Reminders:** Implement reminders for tasks like watering, pruning, and fertilizing based on the specific needs of each plant (can be set by the user).
- **Own API**: Create our own API and databases to avoid third-party APIs

CONCLUSION

Green Buddy successfully delivers a unified platform for home gardeners by integrating essential services into one accessible system. It provides easy access to plant information, care guides, weather forecasts, and nearby garden shop locators, all through a user-friendly interface. Both guest and registered users can quickly find resources, while personalized recommendations and YouTube video suggestions support gardeners in making informed decisions. The project met its objectives by addressing common gardening challenges and utilizing agile methodologies to overcome hurdles in API integration and interface design. Future enhancements could include a plant growth tracker and personalized recommendations based on user behavior, further enriching the gardening experience.