Sharing Garden

- Group member:
  - 2050633 卢嘉霖
  - 2053711 楚杰
- Instructor: Ping Sun

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1. Project Background

The sharing garden project is an initiative that aims to respond to the national call for energy conservation and emission reduction, by building a green and low-carbon campus. It actively promotes the development of a scientific, low-carbon, and efficient resource allocation model, to adapt to the development situation of higher education, and to promote the construction of an ecological civilization. The main action of this project is to transform the idle and abandoned land on campus into a sharing garden, which is designed and constructed by all students. This project aims to achieve the goal of participatory landscape design, and students can earn credits and rewards, such as potted plants, by participating. We will build a web-based application, which includes a sharing garden construction toolkit and a sharing garden community.

2. Main Goals

1. Through this sharing garden project, we aim to master the ability to design a system, as this is the main goal of our Systems Analysis and Design course.
2. This project is of great significance to society as sustainable development has become a common goal for all countries worldwide. By building a green and low-carbon campus, we not only contribute to the cause of environmental protection, but also cultivate people's sense of responsibility towards sustainable development through public participation and collective maintenance. This helps promote the construction of an ecological civilization and spread the concept of energy conservation and emission reduction.
3. High-quality design is crucial for the successful development of the project. In this project, our aim is to create a shared garden that is both low-carbon and aesthetically pleasing, as well as based on public participation and collective maintenance. Good design can make the entire project more attractive and user-friendly, and reflect the professionalism and quality of the project.

3. Main Functions and Characteristics

3.1 Functions Overviews

1. Integration: This project can integrate data from different sources, such as user information, garden system information, management systems, and activity schedules. The data can be analyzed, processed, and displayed efficiently.
2. Cross-Platform Deployment: This system supports cross-platform deployment, allowing users to easily access it from multiple platforms, including web, mobile web, and WeChat mini-programs.
3. User Functionality: Users can view the sharing garden, check-in for work, and participate in other activities.
4. Administrator Functionality: Administrators can manage users, the community, prize distribution, and perform other administrative functions.
5. Garden Management: The Garden Management module allows administrators to manage the garden, including its layout, plants, and maintenance requirements. This module also grants certain permissions to ordinary users.
6. Communication: The system includes a communication module that allows users to communicate with each other and share ideas.

3.2 Characteristics Overviews

1. Object-Oriented Programming: This project used Object-Oriented Programming for the systems analysis, design, and programming implementation. This ensured the project was structured efficiently and effectively.
2. User-Friendly Interface: The interface of the sharing garden system is designed to be aesthetically pleasing and user-friendly; this ensures that students can quickly learn how to use it.
3. Customized Garden Design: The system allows users to design their sharing gardens; this feature is both educational and enjoyable for students.
4. Interactive Experience: The project provides students with an interactive experience through various activities, discussions, and competitions.
5. Personalized Incentives: The sharing garden system offers personalized incentives to students, which encourages participation.

4. Expected Users and Key Usability Goals

1. College Students: This project mainly targets college students, who will use the sharing garden system as regular users. Their role is to take part in garden-related activities, update their garden status, and communicate with other users.
2. Administrators: Administrators are responsible for managing the sharing garden system. Their role includes managing user accounts, organizing activities, and ensuring the smooth operation of the system.
3. University Staff: University staff can use the sharing garden system to accomplish their own work regarding the garden. They can report any issues or maintenance work that needs to be done, and can also provide guidance or advice to students.
4. Eco-Lovers: Eco-lovers who care about the environment and sustainable development can use the sharing garden system as a platform to share their opinions and ideas.
5. Local Communities: Local communities may also use the sharing garden system to exchange information and knowledge about gardening and environmental protection.

5. Analysis of Existing Similar Products

Project name	User professional level	User age range	Scope of focus	Format
Our Toolkit	Strong (students)	Youth (college students)	Campus micro-updates	Web-based + WeChat Mini Program (Big Data + Community Operations)
Community Shared Tool Box	Weak (public)	All Ages	Basic community living purposes	Physical Tools
SEEDs's Gardening Toolkit	Weak (public)	Adults	Community gardening	Manuals and institutional assistance
Beijing Urban Quadrant's "Community Planning Toolkit"	Strong (professional planners)	Adults	Community planning	WeChat Mini Program (includes large amounts of data and automatic analysis technology)

6. Novelty and Enhancements

1. Participatory Landscape Design: Traditional landscape design is often tailored to the designer's preferences and may not reflect the true needs and wants of the users. Our project promotes participatory landscape design, which involves the students in the design process, allowing them to create a more personalized and sustainable sharing garden that meets their needs and desires.
2. sharing Garden Toolkit: We provide a comprehensive toolkit for building a sharing garden, including guides for selecting appropriate plant species, building green infrastructure, and adopting sustainable gardening practices. These tools enable students to not only design a beautiful garden, but also to construct and maintain it in an environmentally friendly and socially responsible way.
3. Web-based sharing Garden Community: Our web-based platform provides a space for sharing garden enthusiasts to share their experiences, exchange knowledge, and collaborate on new projects. This community creates a learning environment where users can connect with like-minded individuals and work collectively to promote sustainable living.
4. Educational Opportunities: Our project provides students with valuable educational opportunities that extend beyond the classroom. Students learn about sustainable living through hands-on experience in building and maintaining sharing gardens. This type of experiential learning is an effective way to promote environmental consciousness and encourage responsible citizenship.
5. Multi-disciplinary Collaboration: Our project encourages interdisciplinary collaboration between students, faculty, and community organizations. This creates a community of stakeholders who work together to build sustainable sharing gardens, which promotes a sense of ownership and shared responsibility for the environment.

7. Potential for Further Development

1. Expand the audience and increase social impact: In the future, we can expand the project to more people, such as different age groups of students, such as elementary and middle school students, or promote it to community residents, which can increase the social impact of the project.
2. Promote technological innovation and improve service quality: In the future, we can use more advanced technologies, such as artificial intelligence, cloud computing, etc., to improve the quality and convenience of our project services.
3. Expand the scope of services and provide more diverse content: In addition to the existing service content, we can expand more diverse service content in the project, such as providing health consultation, psychological support services, etc., to provide more comprehensive services for students and community residents.
4. Introduce innovative business models and promote sustainable development: Introducing innovative business models in the project, such as sharing economy-based models to promote project development, while paying attention to the sustainable development of the project, can make the project operate stably for a long time.

8. Project Challenges

1. User privacy: In the course of providing services, we need to collect user information, so in the process we must pay attention to user privacy and information security-related issues to avoid damage that may occur.
2. Early user numbers: In the early stages of the project, we may encounter an insufficient number of users, which will affect the coverage of the project, and it is necessary to continue to explore effective strategies to promote and attract new users.
3. Dynamic community construction: The creation of a vibrant community is a long-term process, and it is necessary to continuously provide a wealth of projects and content to maintain the community's vitality and attractiveness.
4. Stable operation and server support: Due to the continuous development and expansion of the project, it is necessary to ensure stable and secure operation of the project by investing more resources in server support and security equipment.
5. Business model: Exploring and introducing innovative business models is conducive to the sustainable development of the project, but it also requires us to maintain a balance between commercial interests and project sustainability.

9. Related Technologies

UML modeling

1. Use case diagrams are utilized to illustrate the system's capabilities and user requirements.
2. Class diagrams are used to represent the system's entities and their relationships.
3. Sequence diagrams and activity diagrams are used to depict the system's logic flows.

Database technology

1. MySQL database management system is used for data storage and management.
2. The database schema is designed based on the Entity-Relationship model.

Front-end development (including web and WeChat mini program)

1. React and Vue.js are utilized to develop the web front-end.
2. WeChat mini program development framework is used for developing the WeChat mini program front-end.

Front-end and Back-end Interaction

1. AJAX technology and JSON format are used for front-end and back-end data communication.
2. Node.js and Express.js are utilized for the back-end development, and RESTful API is implemented for front-end and back-end interaction.

10. Project Experience

Project management practices

1. The project manager regularly held team meetings to keep the team members informed of the project status and progress.
2. Agile project management methodologies were adopted to promote teamwork and flexibility.
3. Risk management and contingency plans were developed to mitigate potential risks throughout the project lifecycle.

Acquiring Technical Expertise

1. The project team regularly conducted technical research on the latest development trends and emerging technologies.
2. The team members participated in online courses and training sessions to improve their technical skills and knowledge.
3. The project team collaborated with technical experts and consultants to receive technical guidance and support when necessary.

Collaboration experience

1. The project team fostered a culture of openness and communication to encourage team members to actively share ideas and feedback.
2. The team utilized collaboration tools such as project management software, instant messaging platforms, and video conferencing to facilitate communication and collaboration.
3. The project team established clear roles and responsibilities for each team member, ensuring everyone had a clear understanding of their contributions to the project.