

COMP3019J - Introduction to Web Application Development

**Sustainable Development Volunteer Service
Website Project Design Document _Group 9**

Instructor: Dr. Aidan Murphy

Honghao Liu 23219672

Haoming Xi 23219607

Yanxiang Ao 23219615

1. Overview

This project aims to build a volunteer service platform centered on "Sustainability", promoting collaboration among students, social organizations, and administrators to advance the sustainable development of public welfare activities.

The website provides different functions and permissions for three types of users: Participants (Students), Organizations, Admins.

Core Objectives:

- i. Encourage students to participate in sustainability-focused volunteer activities.
- ii. Provide organizations with a platform to publish and manage projects.
- iii. Ensure authenticity and integrity of projects through an admin review system.
- iv. Digitally record and certify the volunteer service hours.

2. Objectives

- i. Provide a digital volunteer service platform focused on sustainability.
- ii. Implement a multi-user login system with different access permissions.
- iii. Support project publishing, registration, and management functions.
- iv. Record and certify students' volunteer service hours.
- v. Ensure data security and access control.
- vi. Deliver a clean, modern, and user-friendly web interface.

3. Functional Design & UI Prototype

3.1 Home Page

The screenshot shows the homepage of the Sustainable Volunteer Platform. At the top, there's a navigation bar with a logo, 'Sustainable Volunteer Platform', 'Login', and 'Sign Up' buttons. The main header reads 'Building a Better Future, Starting with Volunteering' with a subtitle 'Connecting volunteers with organizations to practice sustainable development'. Below this are two buttons: 'Join Now' and 'Learn More'. The central part of the page features four large stats boxes: '+ 500+ Projects', '10,000+ Volunteers', '50,000+ Volunteer Hours', and '200+ Partner Organizations'. Underneath these is a section titled 'Featured Projects' with a sub-instruction 'Join us to make a difference through action'. It lists four projects with details like category (Environmental, Education, etc.), rating (e.g., 4.8, 4.5, 4.9, 4.7), and registration numbers. Each project has a 'View Details' button. A 'View More Projects' button is at the bottom. Below the projects is a section titled 'Our Core Values' with three items: 'Sustainability' (green circle with plus sign), 'Community Impact' (blue circle with heart), and 'Collaboration' (purple circle with people icon). Each value has a brief description. The footer is dark with the platform name and a copyright notice.

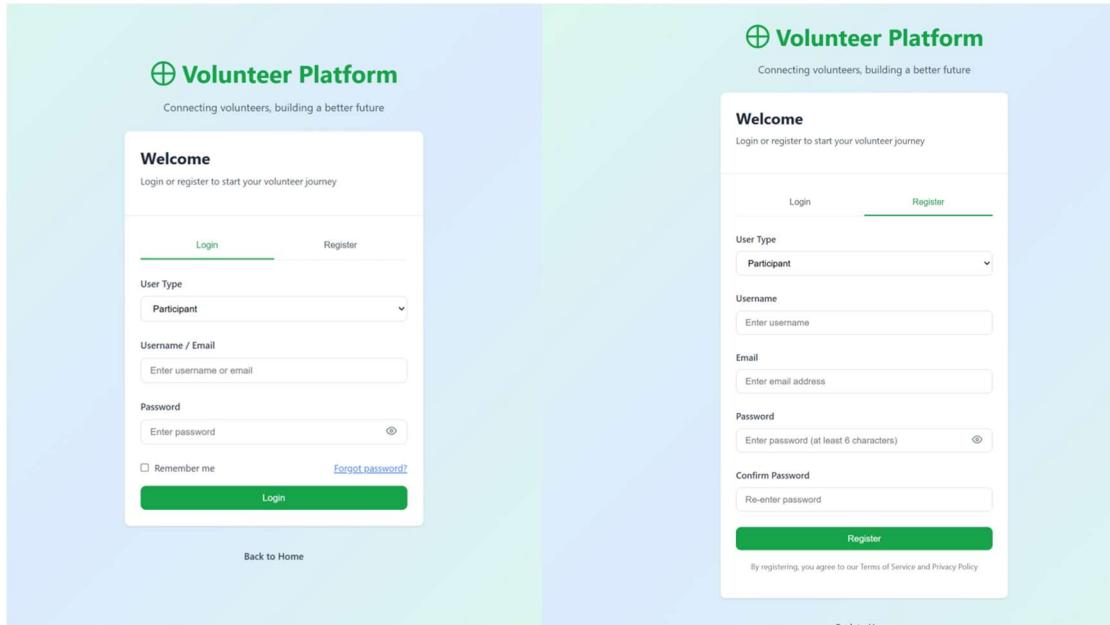
3.1.1 Home Page Functional Design

- i. Browse project summaries but cannot register or comment.
- ii. Encouraged to sign up to gain full access.

3.1.2 Home Page Introduction

A sustainability-themed homepage (green tone), showcasing the mission, registration options, and project statistics. Includes "Join Now" and "Learn More" buttons, plus featured projects encouraging volunteer engagement.

3.2 Login / Register Pages



3.2.1 Login / Register Pages Functional Design

- i. Three user types: Participant / Organization / Admin.
- ii. All users can log in, edit personal information, or delete their accounts.
- iii. Passwords are encrypted (e.g., using BCrypt).

3.2.2 Login / Register Pages Introduction

- i. **Login Page:** Users choose their role (Participant / Organization / Admin) and log in via username/email and password.
- ii. **Register Page:** New users select a role and enter username, email, and password to create an account. The interface is clean and intuitive.

3.3 Participant Dashboard

The screenshot displays the 'Personal Dashboard' for a user named 'Volunteer 123'. The sidebar on the left includes links for Profile (highlighted in green), Available Projects, My Registrations, and Hour Records. The main content area features a summary section with 'Total Hours' (68h), 'Points' (1360), 'Completed' (12), and 'Upcoming' (3) projects. Below this is a 'My Badges' section showing five achievements: 'Rising Star' (yellow box, completed), 'Eco Pioneer' (green box, completed), 'Compassion Ambassador' (white box, locked), 'Public Welfare Expert' (white box, locked), and 'Team Leader' (white box, locked). A 'Recommended Projects' section follows, listing 'Beach Cleanup Action' (Blue Ocean Protection) and 'Community Book Donation' (Book Community Foundation), each with a 'Register Now' button.

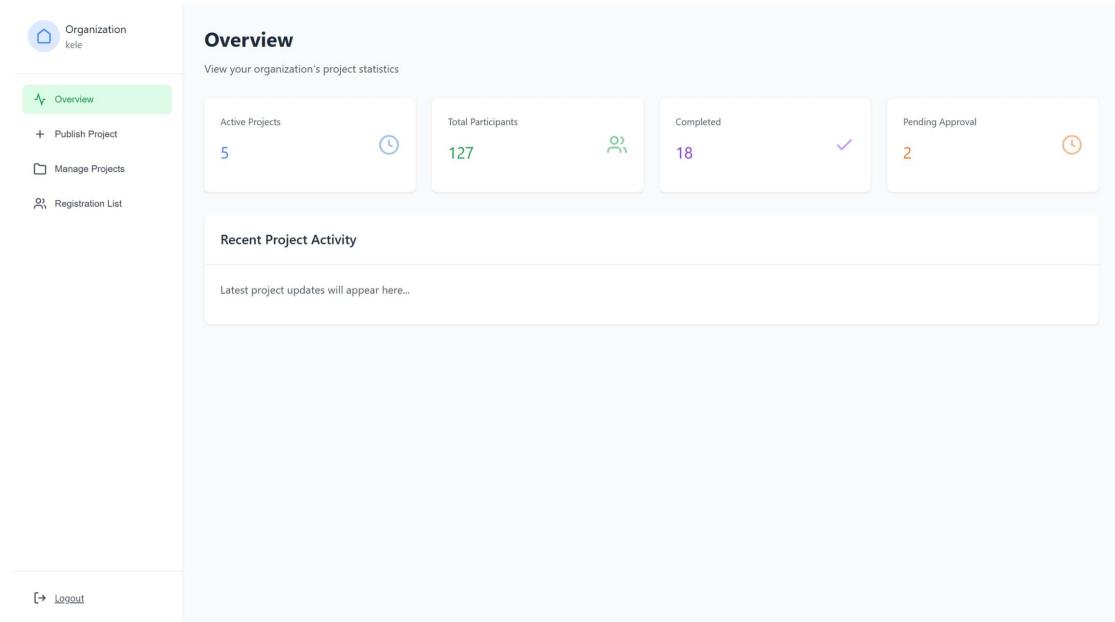
3.3.1 Participant Dashboard Functional Design

- i. Browse and register for volunteer projects.
- ii. View project details (content, time, requirements).
- iii. Check personal volunteer hours.
- iv. Withdraw from unstarted projects.

3.3.2 Participant Dashboard Introduction

Displays volunteer data and achievements: total hours, points, completed and upcoming projects, and earned badges (e.g., Rising Star, Eco Pioneer). Sidebar provides quick access to available projects, registration history, and service records.

3.4 Organization Dashboard



3.4.1 Organization Dashboard Functional Design

- i. Create and publish volunteer projects.
- ii. Set project theme, content, time, and minimum participants.
- iii. Manage registration lists.
- iv. Track project progress and participant engagement.

3.4.2 Organization Dashboard Introduction

Shows organizational project statistics: active projects, participants, completed and pending projects. Allows publishing new projects, managing existing ones, and viewing registration lists.

3.5 Admin Panel

The screenshot shows the 'Project Review' section of the Admin Panel. On the left, a sidebar menu includes 'Administrator System Admin', 'Project Review' (which is highlighted in green), 'Hours Review', 'User Management', and 'System Settings'. The main content area is titled 'Project Review' and describes 'Review volunteer projects submitted by organizations'. A specific project, 'Rural Teaching Support Activity', is listed as 'Pending Review' by 'Hope Light Education Foundation' on 'Submitted 2025-11-02'. The project details show 'Activity Date: 2025-11-28', 'Expected Participants: 20 people', and 'Sustainability Rating: 4.2/5.0'. The project description states: 'This project aims to provide quality educational resources to rural children through teaching support activities, helping them broaden their horizons and cultivate learning interests. The activity will last one week, with volunteers teaching Chinese, Math, English and organizing extracurricular activities.' At the bottom of the project card are three buttons: 'Approve' (green), 'Reject' (red), and 'View Details'.

3.5.1 Admin Panel Functional Design

- i. Review and approve organization projects for sustainability alignment
- ii. Verify attendance and project completion records
- iii. Award service hours and points
- iv. Manage all user accounts and database security

3.5.2 Admin Panel Introduction

The Project Review Page lets admins review organization-submitted projects. It displays project title, organization, date, participants, sustainability rating, and description, with options to approve, reject, or view details.

3.6 Project Details Page

The screenshot shows a project details page for the "Community Waste Sorting Campaign". At the top, there are tabs for "Environmental" and "Registered". The title "Community Waste Sorting Campaign" is displayed with a green "Verified" badge. Below the title, there's a brief description: "This activity aims to raise community residents' environmental awareness and promote waste sorting knowledge. Volunteers will help residents understand the importance and correct methods of waste sorting through distributing brochures, on-site explanations, and interactive games. The activity will cover multiple communities, contributing to building a beautiful home." To the right, there's a registration section showing "Registered 15/20" and a "Register Now" button.

Project Details

Description
This activity aims to raise community residents' environmental awareness and promote waste sorting knowledge. Volunteers will help residents understand the importance and correct methods of waste sorting through distributing brochures, on-site explanations, and interactive games. The activity will cover multiple communities, contributing to building a beautiful home.

Requirements
Love environmental protection, have good communication skills, and be able to participate in the entire activity

Comments & Discussion
Participants and organizations can communicate here

Feel free to leave any questions here...

Send Comment

Comments:

Emma Wilson Participant 2025-11-01 10:30
Very meaningful activity, looking forward to participating! Do I need to bring my own promotional materials?

Organization Reply:
The organization will provide brochures and other materials. Just arrive on time.

Michael Chen Participant 2025-11-02 15:20
Participated in similar activities before, learned a lot. How long will this activity last?

Organization Reply:
The activity is expected to last 4 hours, from 9:00 AM to 1:00 PM.

Organization Info

Green Earth Environmental
Dedicated to environmental advocacy and practice, has conducted over 100 environmental activities.
[View More Projects](#)

Sustainability Rating

★★★★★ 4.8
This project aligns with the UN Sustainable Development Goals (SDGs), having positive impacts on environmental protection and social development.

- Environmental Impact: ★★★★
- Social Value: ★★★★
- Educational Significance: ★★★★

3.6.1 Project Details Page Functional Design

- Organizations can publish projects and students can register to participate.
- Supports project management and communication.
- Participants and organizations can comment and exchange feedback.

3.6.2 Project Details Page Introduction

The page shows project details (description, time, location, points, participants, and organization info), along with a sustainability rating, registration button, and discussion area for communication.

4. Technical Details

Module	Technology Stack / Tools
Frontend	HTML5 + CSS3 + JavaScript
Backend	Python Flask
Database	SQLite
Security	Password encryption + User access control
Deployment	Local development + GitHub repository
Version Control	GitLab / GitHub
Prototype Design	Figma for UI + Color scheme design

5. Project Structure

Project Structure

```
/  
├── app.py          # App factory, registers blueprints, seeds admin  
├── config.py       # Configuration (secret key, DB URI, etc.)  
├── models.py        # SQLAlchemy models and db instance  
├── routes.py        # All Flask routes (Blueprint 'main')  
├── forms.py         # Minimal form parsers for login/register  
├── requirements.txt # Python dependencies  
└── README.md       # Project documentation  
instance/  
├── volunteer.db    # SQLite database (auto-created)  
templates/  
├── index.html      # Home page  
├── login.html       # Login/Register page  
├── participant_dashboard.html  
├── organization_dashboard.html  
├── admin_panel.html  
├── project_detail.html  
└── volunteer_record.html  
static/              # Static files  
├── css/  
│   └── style.css    # Main stylesheet  
└── js/  
    ├── home.js  
    ├── auth.js  
    └── participant.js
```

This is a typical Flask Web Application structured using the MVC (Model-View-Controller) pattern, including:

- i. Backend logic (app.py, routes.py, models.py, forms.py).
- ii. Frontend templates (templates/).
- iii. Static assets (static/).
- iv. Database (instance/volunteer.db).

Core functions include:

- i. User registration/login for multiple roles.
- ii. Project creation and registration.
- iii. Volunteer record management.
- iv. Admin dashboard.
- v. Clear frontend-backend separation for maintainability.

6. Database Models

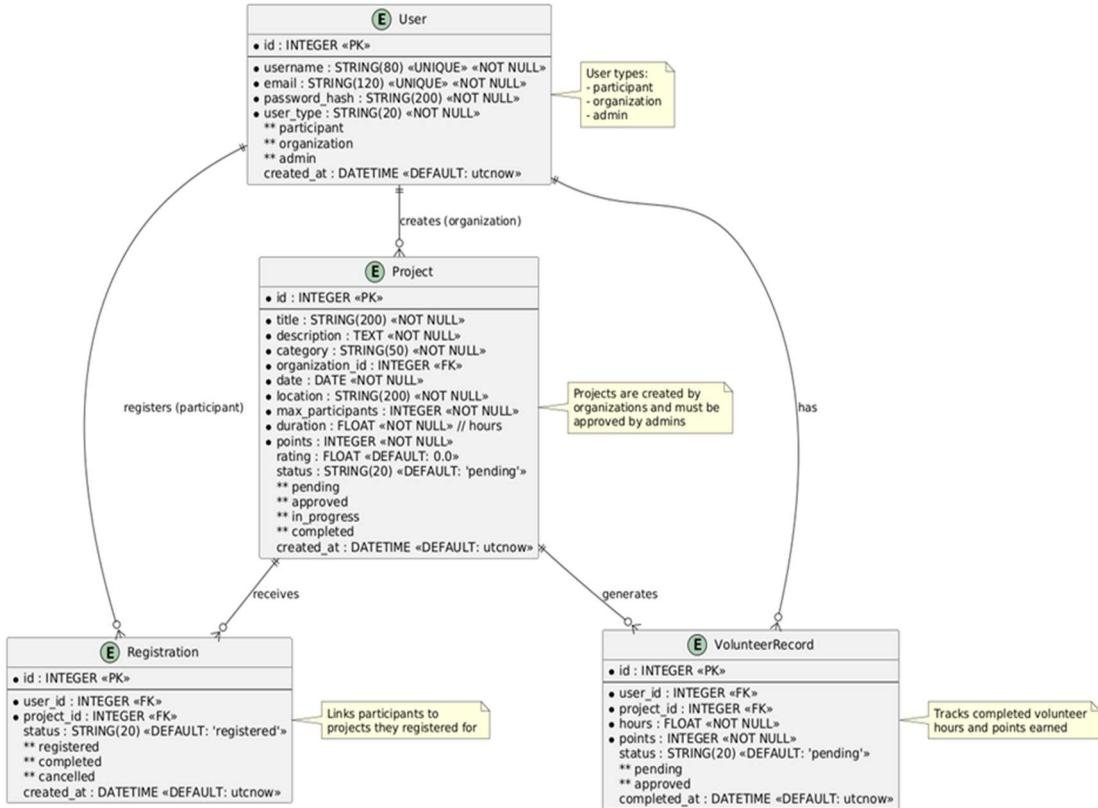
User: Stores user accounts (participants, organizations, admins)

Project: Volunteer project information

Registration: Project registrations by participants

VolunteerRecord: Certified volunteer hours and points

6.1 Database Schema Diagram



Four main tables: **User**, **Project**, **Registration**, and **VolunteerRecord**.

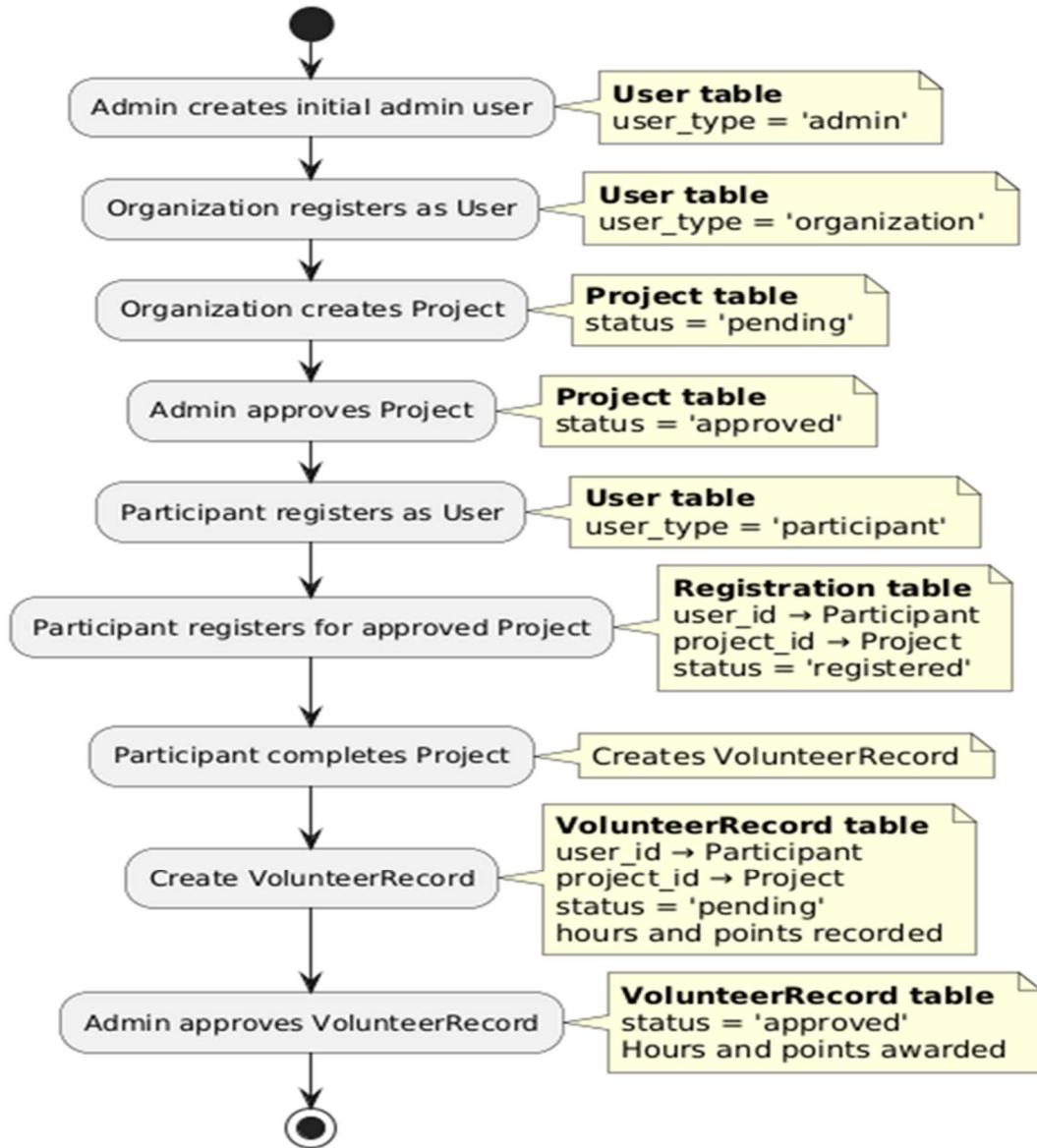
- i. **User** stores all accounts with unique credentials.
- ii. **Project** contains activity details and links to the organization that created it.
- iii. **Registration** connects participants and projects, tracking their status.
- iv. **VolunteerRecord** logs completed work, hours, and points.

Key Relationships:

- i. One organization can create many projects (1:N via organization_id).
- ii. One participant can register for many projects (1:N via Registration.user_id).
- iii. One project can have many registrations (1:N via Registration.project_id).
- iv. One participant can have many records (1:N via VolunteerRecord.user_id).
- v. One project can generate many records (1:N via VolunteerRecord.project_id).

6.2 Data Population Flow

6.2.1 Activity Diagram:



This activity diagram shows the workflow of how data flows through the system:

- i. **Initial Setup:** Admin creates the first account.
- ii. **Organization Registration:** Organizations sign up.
- iii. **Project Creation:** Organizations create projects (status = pending).
- iv. **Project Approval:** Admins approve projects.
- v. **Participant Registration:** Volunteers sign up.

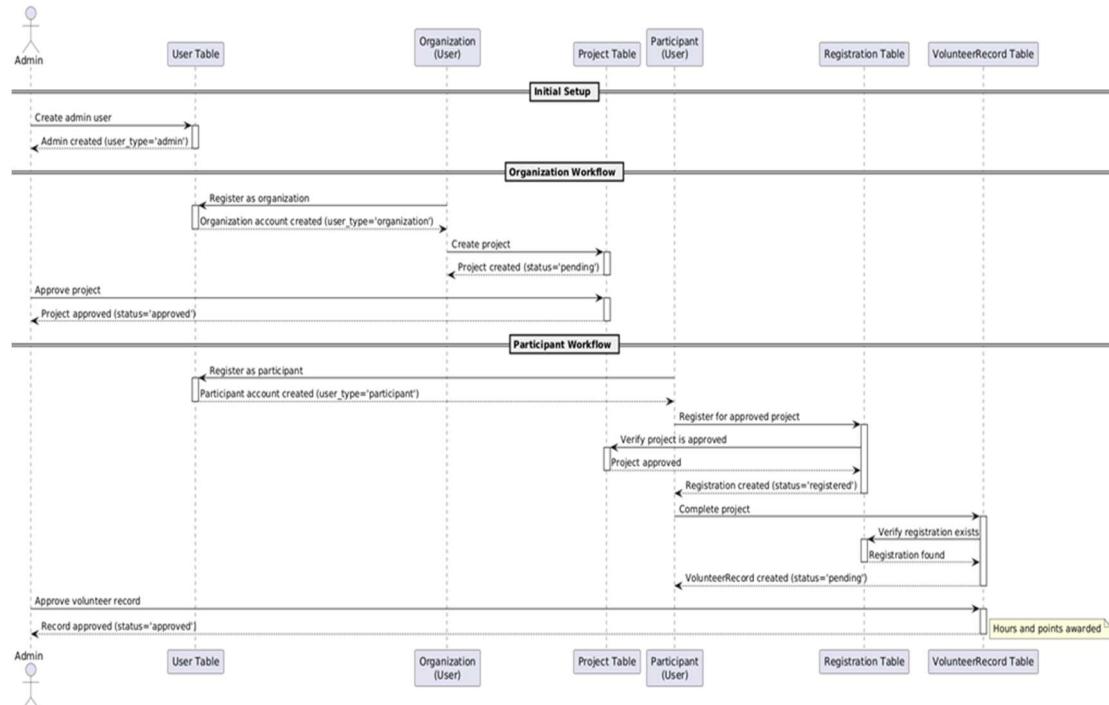
vi. Project Registration: Participants join approved projects.

vii. Project Completion: Volunteer records are created.

viii. Record Approval: Admins approve records and award hours and points.

The diagram illustrates the complete lifecycle from user registration to volunteer hour certification, showing how different user roles interact with the database at each stage.

6.2.2 Sequence Diagram:



This sequence diagram provides a detailed view of the interactions between system actors and database tables during the data population process:

i. Initial Setup: Admin creates the first user.

ii. Organization Workflow: Organizations register, create projects, and await approval.

iii. Participant Workflow: Illustrates how participants register, search for approved projects, create registration records, complete volunteer work, and finally receive approval for their volunteer hours.

The sequence diagram emphasizes the verification steps (e.g., checking if a project is approved before registration, verifying registration exists before creating volunteer records) and shows the communication flow between different system components. This helps understand the data integrity checks and approval workflows that ensure only valid data enters the system.

7. Conclusion

This project integrates technology and public welfare, building an online platform centered on university volunteer service and sustainable development. It enhances students' social responsibility and offers organizations efficient volunteer management tools - aligning with principles of sustainable development of UCD.