Project Planning – EcoSphare: Gamified Sustainability App

1. Project Objective

The EcoSphare App aims to promote positive environmental behaviors among youth by transforming daily eco-friendly habits into a fun and competitive gamified experience. Users earn points and badges by completing simple environmental challenges — such as reducing plastic use or walking instead of driving. As they progress, their virtual tree grows, motivating continuous engagement and sustainable behavior.

2. Project Goals

• Increase environmental awareness among youth.

• Encourage adopting eco-friendly habits through gamification.

• Build an online community of environmentally active young users.

3. Project Timeline

Phase	Task	Duration	Expected Output
1	Requirements & Stakeholder Analysis	1 week	User Analysis Document
2	UI/UX Design	1.5 weeks	Figma Prototype
3	Database Design	1 week	ERD Diagram
4	App Frontend Development	2 weeks	Functional App Prototype
5	Gamification System Development	2 weeks	Points & Badges System
6	Daily Content Integration	1 week	Dynamic Content Added
7	Testing & Debugging	1 week	Bug-free App Version
8	Deployment & Feedback Collection	0.5 week	Initial Released Version

4. Team Roles

Role	Responsibilities
Project Leader	Manage tasks, timelines, and coordination.
Mobile Developer	Develop the mobile app using Kotlin .
UI/UX Designer	Design interactive and user-friendly interfaces.
Backend Developer	Handle database, authentication, and gamification logic.
Content Creator	Create daily Eco Tips & motivational content.
Tester	Conduct functionality and usability testing.

Note: For individual projects, the student performs all roles sequentially.

5. Tools & Technologies

Category	Tools
Frontend (UI)	Kotlin (Android Studio)
Backend	Firebase (Authentication + Firestore)
Design	Figma
Project Management	Trello or Notion
Version Control	GitHub
Notifications	Firebase Cloud Messaging
Gamification Logic	Firebase Functions or Local Database

6. Deliverables

☑ Project Planning Document

☑ Stakeholder Analysis Document

☑ Database Design (ERD Diagram)

☑ UI/UX Prototype (Figma Link)

☑ Source Code of the App

☑ Final Report (Documentation PDF)

7. Key Features

- Daily Challenges: Interactive eco-friendly tasks.

- Gamification System: Points, badges, and a growing virtual tree.

- Leaderboard: Compete with other users.

- Daily Eco Tips: Inspiring quotes and sustainability advice.

- User Profile: Displays achievements and badges.

8. Target Audience

- Youth aged 15–30 years.

- Students in schools and universities.

- Individuals interested in sustainability and environmental awareness.

9. Future Enhancements

- Group challenges with friends.

- Reward conversion through eco-partnerships.

- Smart and personalized notifications.

- Localized eco-challenges using GPS features.

Stakeholder Analysis – EcoSystem App

A. Internal Stakeholders

Stakeholder	Role / Responsibility	Interest / Expectation	Influence on Project
Development Team (Developers)	Develop the app, implement features, and design system architecture	Efficient, maintainable app that meets project goals	High – determines the quality of the final product
Design Team (UI/UX Designers)	Design user interfaces and overall user experience	Visually appealing and user-friendly design	Medium–High – affects usability and engagement
Project Leader / Academic Supervisor	Monitor progress, review deliverables	High-quality project delivered on time	High – provides guidance and final approval
QA / Testing Team	Test and validate the app to ensure stability	Stable, bug-free application	Medium – impacts the end-user experience

B. External Stakeholders

Stakeholder	Role / Responsibility	Interest / Expectation	Influence on Project
End Users	Use the app and participate in challenges	Enjoyable experience, motivation for eco-friendly habits, simple interface	High – app success depends on user satisfaction
Environmental Organizations / Initiatives	Support the initiative and provide content or challenges	Raise environmental awareness and positive social impact	Medium – adds credibility and content value
Users' Families and Friends	Join group or social challenges	Fun participation and shared eco-friendly habits	Low–Medium – supports engagement and motivation
Eco-Friendly Advertising Partners	Provide and display eco-focused ads	Reach an environmentally conscious audience	Low–Medium – potential revenue source for the app
Google Play Store	Host and review the app	Safe and policy-compliant app	High – approval required for publication

C. Interest vs Influence Matrix

Stakeholder	Interest	Influence	Strategy
Development Team	High	High	Direct management and daily coordination
End Users	High	High	Continuous feedback collection and engagement
Academic Supervisor	Medium	High	Regular progress updates and quality reviews
Environmental Organizations	Medium	Medium	Collaborate to enrich app content
Advertising Partners	Medium	Low	Periodic updates about environmental campaigns
Families and Friends	Low	Low	Encourage social interaction and community challenges

D. Key Points

1. The end user is the core focus; their satisfaction determines the app's success.
2. The internal team is responsible for product quality and user experience.
3. Collaboration with environmental entities increases credibility and engagement.
4. Eco-friendly advertising can provide sustainable revenue without harming the user experience.
5. Progression between challenges and levels must be carefully balanced to maintain motivation.

Database Design – EcoSystem Project

Project Name:
EcoSphere Mobile Application

1. Project Idea

The **EcoSphere** mobile app aims to promote environmental awareness through a series of challenges completed by users.
Each completed challenge grants points, allowing users to progress from one level to another.
These points can later be exchanged for rewards or badges as motivation.

2. Database Objective

The database is designed to:

1. Store user data.
2. Store environmental challenges and their categories.
3. Track each user's participation in challenges.
4. Calculate user points and determine their current level.
5. Support adding badges or rewards in the future.

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3. Main Entities

1. Users
2. Levels
3. Challenge Categories
4. Challenges
5. User Challenges
6. Points Transactions
7. *(Optional)* Badges and User Badges

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4. Tables Description

4.1 Users Table

Stores all basic user information.

Field	Type	Description
user_id	Integer (PK)	Unique user ID
full_name	Varchar(100)	User's full name
email	Varchar(100), Unique	Email address
password_hash	Varchar(255)	Encrypted password
current_points	Integer	Current total points
current_level_id	FK → Levels	Current level ID
created_at	DateTime	Account creation date

4.2 Levels Table

Defines the user levels based on the number of points.

Field	Type	Description
level_id	Integer (PK)	Level ID

level_name	Varchar(50)	Level name
min_points	Integer	Minimum required points for this level

4.3 Challenge Categories Table

Classifies challenges into categories.

Field	Type	Description
category_id	Integer (PK)	Category ID
category_name	Varchar(100)	Category name (e.g., Recycling, Energy Saving)

4.4 Challenges Table

Contains details of all available challenges.

Field	Type	Description
challenge_id	Integer (PK)	Challenge ID
title	Varchar(150)	Challenge title
description	Text	Challenge description
category_id	FK → ChallengeCategories	Linked category
points_reward	Integer	Points granted when completed
is_repeatable	Boolean	Whether the challenge can be repeated
start_at	DateTime	Challenge start time
end_at	DateTime	Challenge end time
difficulty	TinyInt	Difficulty level (1–5)

4.5 User Challenges Table

Links users with the challenges they participate in.

Field	Type	Description
user_challenge_id	Integer (PK)	Record ID
user_id	FK → Users	User ID
challenge_id	FK → Challenges	Challenge ID
status	Enum('pending','submitted','approved','rejected')	Challenge status
proof_url	Varchar(255)	URL for proof (photo/video)
approved_by	Integer	Admin or approver ID
approved_at	DateTime	Approval date
created_at	DateTime	Submission date

Tracks all point-related operations.

Field	Type	Description
transaction_id	Integer (PK)	Transaction ID
user_id	FK → Users	User ID
source_type	Enum('challenge','bonus','admin','daily')	Source of points
source_id	Integer	Source record ID
points	Integer	Number of points (positive or negative)
created_at	DateTime	Transaction timestamp

4.7 Badges Table (Optional)

Defines different badges that can be earned.

Field	Type	Description
badge_id	Integer (PK)	Badge ID
badge_name	Varchar(100)	Badge name
badge_description	Text	Description of the badge
min_points	Integer	Minimum points required to earn the badge

5. Table Relationships

Relationship	Type	Description
Users ↔ Levels	(1:N)	Each user belongs to one level
Users ↔ UserChallenges	(1:N)	One user can complete multiple challenges
Challenges ↔ UserChallenges	(1:N)	One challenge can be completed by multiple users
ChallengeCategories ↔ Challenges	(1:N)	Each category contains multiple challenges
Users ↔ PointsTransactions	(1:N)	Each user has multiple point transactions

6. ER Diagram Description

The database consists of a **Users** entity linked to **Levels** in a one-to-many relationship. Users are connected to **Challenges** through a linking entity (**UserChallenges**) that tracks

each challenge's status.
Each **Challenge** belongs to a **Category**, and all **PointsTransactions** are recorded to maintain an activity history.

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7. Firebase Implementation

This relational model is written for academic documentation purposes but will be implemented in **Firebase Firestore** using the following structure:

Collections:

- users
- levels
- challenges
- users/{userId}/userChallenges
- users/{userId}/transactions

UI/UX design

https://www.figma.com/design/Al0CBBEW0xlbHI6iXgMPAa/EcoSphere?node-id=0-1&p=f&t=fnM9Cz3UlEfOjAzg-0