

**Harabhara – Gamified Sustainability Platform
A project Report**

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In partial fulfilment for the requirements of the project

**BACHELOR OF TECHNOLOGY IN COMPUTER SCIENCE
AND ENGINEERING**



DEPARTMENT OF COMPUTER SCIENCE AND

ENGINEERING SRM UNIVERSITY-AP

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ANDHRA

PRADESH,INDIA

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CERTIFICATE

This is to certify that the project work entitled “ **Harabhara – Gamified Sustainability Platform**” is a Bonafide record of project work carried out by the following students:

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from the **Department of Computer Science and Engineering, SRM University-AP**. The students conducted this project work under my supervision during the period **August 2025 to December 2025**. It is further certified that, to the best of my knowledge, this project has not previously formed the basis for the award of any degree or any similar title to this or any other candidate.

This is also to certify that the project work represents the **teamwork** of the candidates.

Station: Mangalagiri

Date: 09/12/2025

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1. Introduction

Climate change, pollution, and resource depletion are some of the defining challenges of our time. While awareness has grown significantly, sustaining eco-friendly habits remains difficult for individuals due to lack of motivation, lack of rewards, and no immediate sense of impact.

Harabhara emerges as an innovative solution to bridge this gap. It is a gamified sustainability platform built using Next.js that transforms everyday eco-friendly behaviour into an engaging, rewarding, and visually interactive experience.

Harabhara empowers users to take meaningful environmental actions through:

- Gamified quests and challenges,
- Daily eco-actions,
- Scan-to-earn recyclable detection,
- Green Credits (Gbits) as digital rewards,
- Leaderboards,
- Impact visualization dashboards,
- Reward redemption systems, and
- A playful game layer that motivates consistent participation.

Unlike traditional sustainability apps, Harabhara combines behavioural psychology, gamification, and modern web technologies to encourage long-term environmental commitment. Every interaction — whether it is recycling a plastic bottle, participating in an eco-challenge, or reducing waste — becomes part of a larger, meaningful journey toward creating a greener planet.

1.2 About the Project

Harabhara is designed using Next.js, a powerful full-stack React framework. This choice enables the platform to deliver fast performance, smooth navigation, dynamic rendering, and integrated backend functionality through API Routes.

Harabhara Focuses on Three Core Values:

1. Engagement

Users remain actively engaged through quests, streaks, levels, badges, and Gbit rewards.

2. Education

Users learn about the real environmental impact of their actions through charts, stats, and analytics.

3. Empowerment

Harabhara encourages users to build sustainable habits in a fun and rewarding manner.

The platform is optimized across devices, ensuring accessibility for users on mobile, tablet, or desktop. It creates a beautiful balance between gaming, sustainability, and technology.

1.2 Project Overview

Harabhara is a comprehensive eco-engagement system that motivates users to adopt environmentally responsible habits. It leverages interactive UI, gamified mechanisms, and data-driven insights to foster a community of conscious, active users.

Using Harabhara, users can:

- Complete eco-quests,
- Earn Gbits for verified sustainable actions,
- Scan product labels to validate recyclability,
- Unlock achievements,
- Track progress through intuitive graphs,
- Compete on leaderboards,
- And redeem Gbits for rewards.

This project demonstrates how Next.js can be leveraged to create a scalable, responsive, and immersive sustainability-focused application.

2. SCENARIO-BASED INTRODUCTION

2.1 A Real-World Scenario

Imagine you are a student committed to living more sustainably, but keeping track of eco-actions often becomes overwhelming. That's where Harabhara steps in.

You open the Harabhara app in the morning. A refreshing dashboard displays your Gbits, streak status, weekly actions, and current leaderboard position. Today's suggested quest challenges you to "Avoid Plastic for 24 Hours".

You begin the day by segregating your household waste. With a single tap, you log this eco-action. Instantly, your Gbits increase, your streak extends, and you unlock a new badge.

Later, you pick up a packaged item at the store. You open the Scan Page in Harabhara and scan its label. The system identifies whether the material is recyclable and rewards you accordingly. This small moment brings a sense of accomplishment.

In the evening, you check your impact analytics:

- Water saved,
- Plastic reduced,
- Emissions lowered.

A graph visualizes your weekly contribution, reminding you that your small actions matter.

This immersive cycle of **action** → **reward** → **insight** → **motivation** is the foundation of Harabhara.

2.2 Use Case Scenarios

Scenario	Description	Solution Provided by Harabhara
Tracking eco-friendly habits	Users want to record waste-segregation, recycling, etc.	One-click Eco-Action Logging
Staying consistent	Users struggle with routine	Streaks, badges, and daily actions
Learning sustainability	Users want actionable eco-tips	Educational quests with real-world benefits
Recycling confusion	Users don't know if products are recyclable	Scan-to-Earn item identification
Staying motivated	Users lose interest quickly	Gbits, level-ups, and leaderboard ranking
Wanting rewards	Users expect tangible benefits	Reward Store + Gbit redemption
Understanding impact	Users want proof their actions matter	Dashboard with visual analytics

3. Problem Statement

The majority of sustainability-focused platforms face issues such as:

- No gamification to motivate users
- No reward mechanism
- Lack of visual impact metrics
- Complicated interfaces
- No community-driven engagement

As a result, individuals often lose interest in maintaining environmentally friendly habits because they cannot see any short-term benefits or sense of achievement.

Therefore, there is a need for a platform that:

- Makes sustainability enjoyable
- Rewards users for eco-friendly behaviours
- Offers analytics to visualize impact
- Provides structured activities
- Encourages consistency
- Engages users through gamification

Harabhara solves this with an end-to-end gamified sustainability ecosystem.

4. Target Audience

4.1 Primary Audience

- Eco-conscious youth and students
- Sustainability enthusiasts
- Individuals seeking a greener lifestyle
- People participating in zero-waste programs
- NGOs and environmental groups

4.2 Secondary Audience

- Recycling agencies
- Corporate CSR teams
- Brands promoting green initiatives
- Schools and colleges running eco-clubs

4.3 User Demographics

- **Age:** 12–60
- **Geography:** Global
- **Technical Skill:** Beginner to Intermediate
- **Devices:** All modern browsers supported

5. Project Goals and Objectives

5.1 Primary Goal

To design a digital platform that motivates environmentally sustainable actions through interactive gamification and reward mechanisms.

5.2 Specific Objectives

- Build an **intuitive UI** for eco-action tracking
- Implement **Gbit rewards** for tasks and verified actions
- Encourage participation through **quests and challenges**
- Provide meaningful insights using visual dashboards
- Enable **scan-based recyclable detection**
- Build a scalable **Next.js-based architecture**
- Promote long-term sustainability habits using playful design

6. Key Features

Below is a detailed, expanded feature list inspired by FitFlex's descriptive structure but fully tailored to Harabhara.

6.1 Core Features

Feature	Description	Technical Implementation
Eco-Action Logging	Users log daily green actions like recycling, using public transport, or saving water	Next.js pages + Context API for state management
Gamified Quests	Structured sustainability missions with difficulty levels	Dynamic rendering from db.json
Gbit Rewards System	Digital currency awarded for eco-actions	API route updates user Gbit count
Scan-to-Earn	Detect recyclable items by scanning labels	API-based item validation
Leaderboard	Ranks users based on Gbit accumulation	Server-side ranking
Dashboard Analytics	Graphs for impact: plastic reduced, emissions saved, water saved	Chart libraries + computed metrics
Rewards Store	Redeem Gbits for eco-friendly products or coupons	Reward redemption module
Game Layer	XP, levels, badges, streaks	Context-based user progression logic

6.2 Advanced Features

Advanced Feature	Description	Benefit
Streak Tracker	Daily activity streak encourages habit-building	Higher engagement & consistency
Achievement Badges	Special badges for milestones	Motivational boost
Impact Visualization	Converts Gbits into real environmental metrics	Educates users visually
Eco-Community Rankings	Compete with others globally	Adds social competition
Reward Points Ledger	Transaction history of earned/spent Gbits	Transparency

7. Prerequisites

To build Harabhara, the following tools and knowledge are essential:

Software Requirements

- Node.js
- Next.js
- Tailwind CSS
- Git

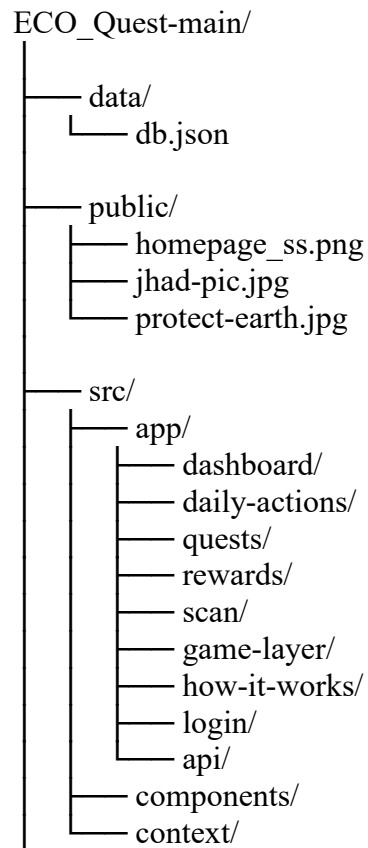
Knowledge Requirements

- React and Component Architecture
- Next.js File-Based Routing
- API Development
- JSON-based local database structure
- Responsive UI Design

8. Required Libraries & Packages

Package	Version	Purpose
next	Latest	Core framework
react	Latest	Component rendering
tailwindcss	3.x	Responsive UI styling
axios/fetch	—	API communication
chart libraries	—	Graphical analytics
zustand/context	—	State management
json storage	—	Quests, rewards, user data

9. Project Structure



10. Project Workflow

Step-by-step Flow

1. User opens Harabhara
2. Dashboard loads user Gbits and impact stats
3. User selects an eco-action or quest
4. API validates and updates data
5. Gbits increase, levels update
6. Leaderboard ranking recalculates
7. Dashboard visuals update in real-time

11. Component Implementations (Expanded)

11.1 Dashboard Component

- Displays total Gbits
- Shows completed quests
- Visual charts for weekly eco-actions
- Fetches user stats via API routes

11.2 Daily Actions Component

- Pre-defined daily tasks (e.g., saving electricity)
- Increment Gbits upon completion

11.3 Quests Module

- Long-term sustainability challenges
- Each quest gives XP and Gbits
- Listed using db.json

11.4 Scan Module

- Unique feature for recyclability detection
- Simulates scanning using API logic
- Rewards Gbits for valid recyclable items

11.5 Rewards Component

- Displays redeemable items
- Deducts Gbits upon redemption
- Updates user's Gbit ledger

11.6 Game Layer

- Levels, XP bars, badges, achievements
- Increases user engagement

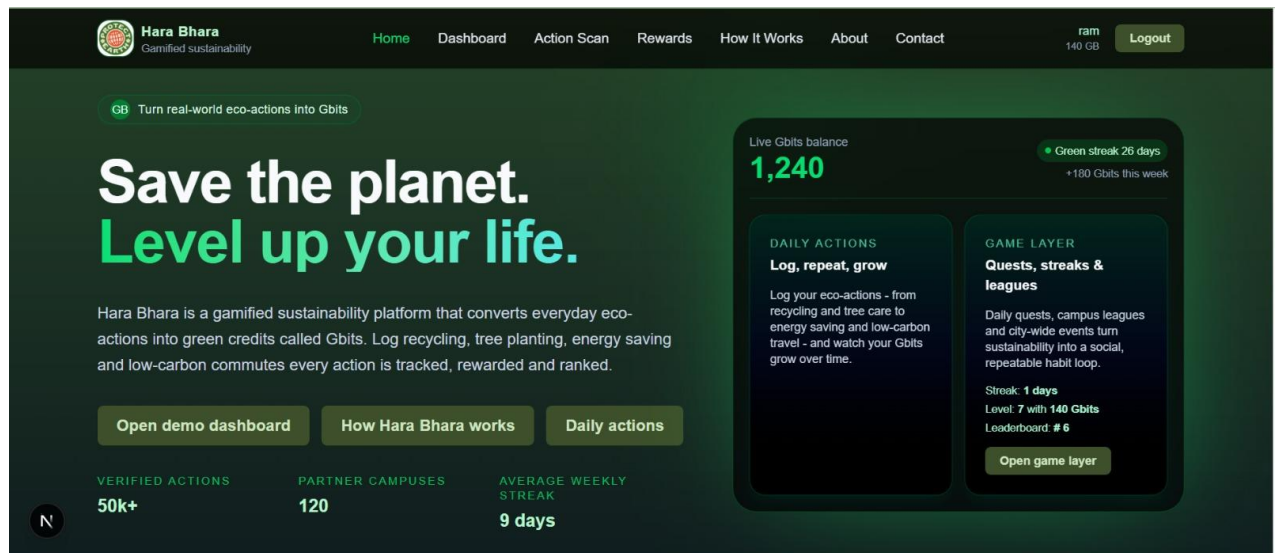
12. Running the Application

- npm install
- npm run dev

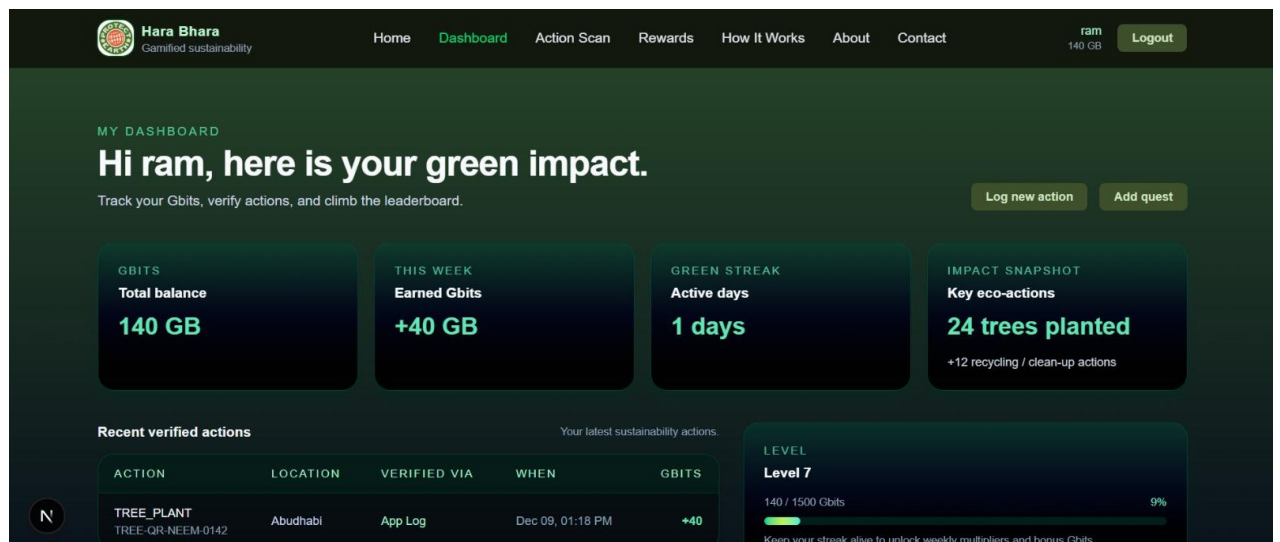
Next.js handles both frontend and backend operations.

13. Screenshots

13.1 Home Page – Sustainability Overview Screen



13.2 Dashboard – Green Impact Summary



13.3 Action Scan Page – Log and Verify Eco-Action

Hara Bhara
Gamified sustainability

Home Dashboard **Action Scan** Rewards How It Works About Contact

ram 140 GB Logout

Simulate logging a new eco-action.

Enter a short reference and action type to see how Hara Bhara would estimate Gbits for a single sustainability action.

Action reference or note
For example: "Hostel A recycling", "Neem tree planting", "Cycle commute to office".

TREE-QR-NEEM-0142

Action type

Tree planting

Upload evidence photo
Snap a quick pic of the action (tree you planted, clean-up pile, bike odometer).

Choose File No file...hosen

Share Strava activity link
Paste a Strava "Share Activity" URL—perfect for runs, rides, or walks contributing to your impact.

https://www.strava.com/activities

This page sends a POST request to /api/scan.

Verify action

RESULT
Verification output
Submit the form to verify your action and earn Gbits instantly.

Hara Bhara
Gamified sustainability

Home How It Works About Contact

Login Join the beta

Welcome back

Sign in to track your green impact

Email

you@example.com

Password

Enter your password

Login

New here? [Create an account](#)

13.4 Rewards Hub – Redeem Gbits for Vouchers and Products

Hara Bhara
Gamified sustainability

Home Dashboard Action Scan **Rewards** How It Works About Contact

ram 140 GB Logout

REWARDS HUB

Redeem your Gbits for products, vouchers and experiences.

Inspired by the StepSetGo store flow, Hara Bhara lets you swap hard-earned Gbits for curated drops—from daily flash deals to limited edition impact bundles. Claims reset every evening so there is always something fresh to chase.

WALLET
140 GB

WEEKLY GAIN
+40

CLAIMS DONE
0

Featured rewards Inventory refresh · 6:00 PM daily

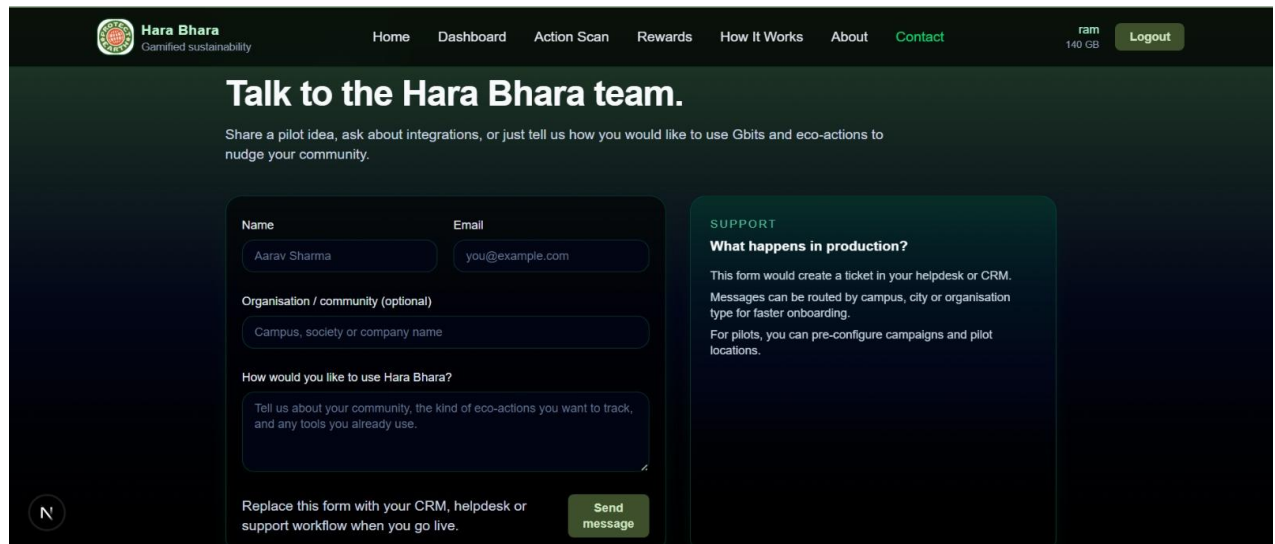
VOUCHER · EARTHPUSE
Carbon-neutral commute kit
Transit pass + bike share credits for a greener trip to work.
LIVE NOW
Insufficient Gbits

FLASH DROPS
Queue up StepSetGo-style windows

Solar café voucher
Today · 5:00 PM
450 GB
30 slots

Metro ride credits
Tomorrow · 11:00 AM
300 GB
60 slots

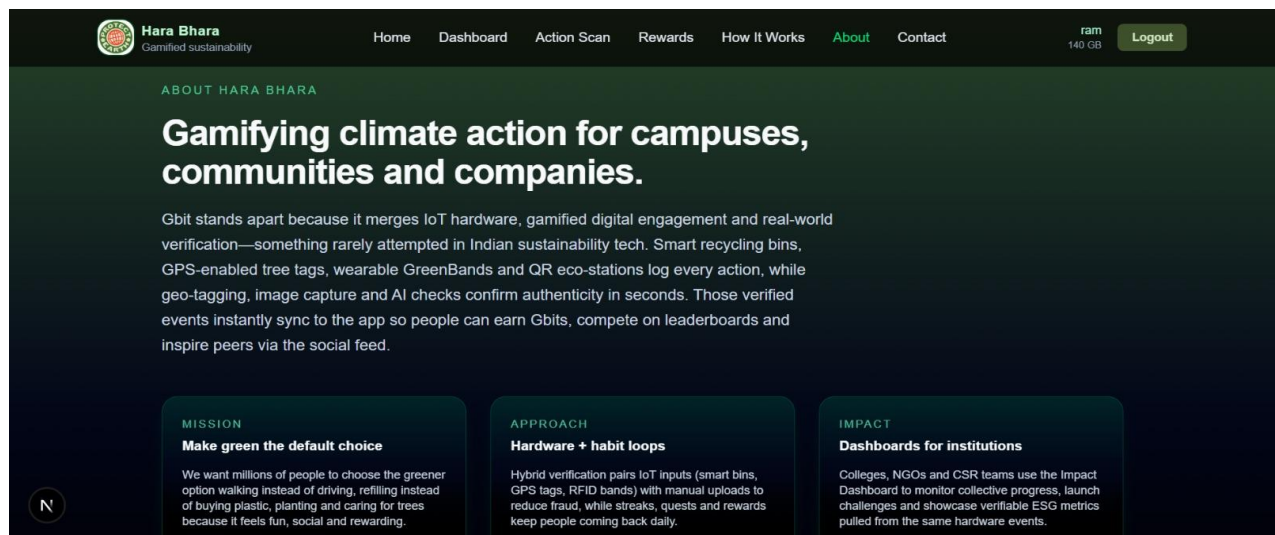
13.5 Contact Page – User Inquiry and Support Form



The screenshot shows the 'Contact' page of the Hara Bhara application. The header includes the Hara Bhara logo, navigation links (Home, Dashboard, Action Scan, Rewards, How It Works, About, Contact), and user information (ram, 140 GB, Logout). The main heading is 'Talk to the Hara Bhara team.' with a subtext: 'Share a pilot idea, ask about integrations, or just tell us how you would like to use Gbits and eco-actions to nudge your community.'

The contact form is divided into two columns. The left column contains input fields for 'Name' (Aarav Sharma), 'Email' (you@example.com), 'Organisation / community (optional)' (Campus, society or company name), and a text area for 'How would you like to use Hara Bhara?'. Below these is a note: 'Replace this form with your CRM, helpdesk or support workflow when you go live.' and a 'Send message' button. The right column is titled 'SUPPORT' and 'What happens in production?' with explanatory text about ticket creation and routing.

13.6 About Page – Platform Mission and Sustainability Approach



The screenshot shows the 'About' page of the Hara Bhara application. The header is identical to the contact page. The main heading is 'Gamifying climate action for campuses, communities and companies.' followed by a paragraph describing Gbit's technology and its impact.

The page is divided into three columns, each with a title and a description:

- MISSION: Make green the default choice**
We want millions of people to choose the greener option walking instead of driving, refilling instead of buying plastic, planting and caring for trees because it feels fun, social and rewarding.
- APPROACH: Hardware + habit loops**
Hybrid verification pairs IoT inputs (smart bins, GPS tags, RFID bands) with manual uploads to reduce fraud, while streaks, quests and rewards keep people coming back daily.
- IMPACT: Dashboards for institutions**
Colleges, NGOs and CSR teams use the Impact Dashboard to monitor collective progress, launch challenges and showcase verifiable ESG metrics pulled from the same hardware events.

14. Conclusion

Harabhara demonstrates how modern web technologies, gamification frameworks, and sustainability principles can converge into a single, impactful platform. It encourages users not only to adopt eco-friendly habits but to stay committed through a playful, reward-driven ecosystem.

This project highlights the capability of Next.js as a full-stack solution and showcases the importance of experience design in behavioural change.

15. Future Enhancements (Expanded)

- Full user authentication with JWT
- Integration with real-world recycling centres
- AI-powered object detection during scanning
- Blockchain-based verification of eco-actions
- Marketplace for sustainable brands
- Carbon footprint calculator
- Mobile application version (React Native)

16. References

- Next.js Documentation – <https://nextjs.org/docs>
- React Documentation – <https://react.dev>
- Tailwind CSS – <https://tailwindcss.com/docs>
- MDN Web Docs – <https://developer.mozilla.org>
- Axios Documentation – <https://axios-http.com/docs>
- Recharts Documentation – <https://recharts.org/en-US/>
- Environmental Sustainability Guidelines – <https://www.unep.org>