HORIZON CAMPUS

FACULTY & INTAKE	**Faculty of IT (NMC) – Intake 11**
COURSE MODULE	IT31023 - Systems Administration & Maintenance
NAME OF THE ASSIGNMENT	**Assignment 4 - CI/CD Pipeline Integration**
STUDENT NAME	U. D. S. Bandara
STUDENT INDEX NO	**ITBNM-2211-0112**

Contents

Task Tracker – Final Project Overview

🔗 GitHub Repository: https://github.com/SubodhaB/task-tracker

🔗 Live Demo (GitHub Pages): https://subodhab.github.io/task-tracker

Overview

The Task Tracker Micro SaaS is a lightweight, browser-based application that allows users to manage personal tasks with key features like filtering, prioritization, due dates, download daily, weekly or monthly tasks report (PDF), data backup/restore, and browser notifications. It is built with HTML, CSS, and JavaScript and deployed using GitHub Pages with CI/CD integration. This document presents a complete and honest account of the project's lifecycle from planning to deployment following advanced DevOps and software development practices.

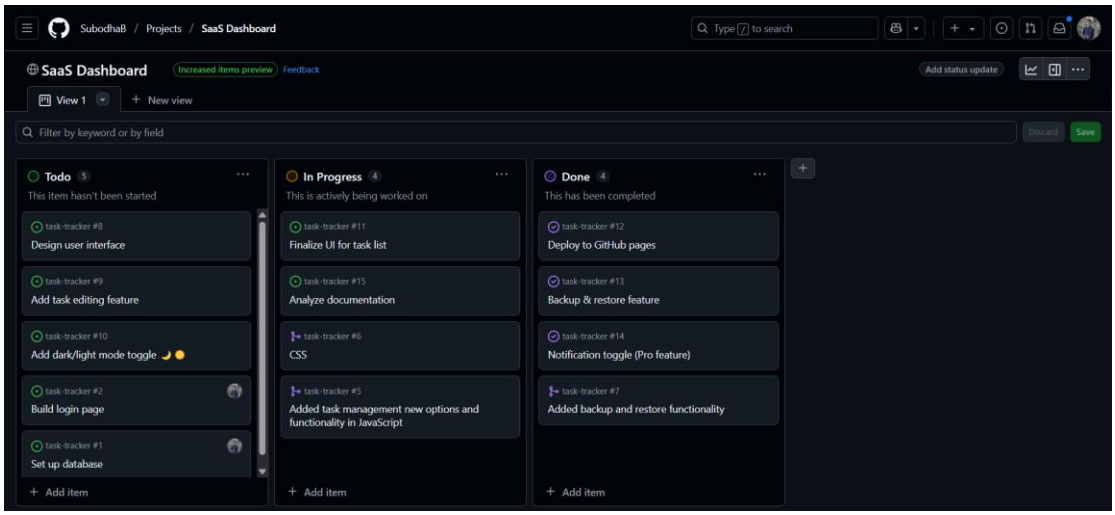
Phase 1 – Strategic Planning & Market Research

While the scope of the project did not include in-depth external market research, the planning phase focused on understanding the common pain points in task management apps. The app was designed around key user personas (e.g., students and professionals) requiring simplicity, portability, and data retention through local backups. No backend or login system was used, making the app lightweight and focused on the core user journey.

Phase 2 – Development Environment & Workflow

A GitHub repository was created and used for version control and collaboration. GitHub Projects was used for task planning. Branching and commit best practices were followed throughout development. The code was written using basic HTML, CSS, and JavaScript without external frameworks (like Bootstrap or Tailwind). All code was developed and tested locally before being pushed to the main branch.

Project Board of Task Tracker

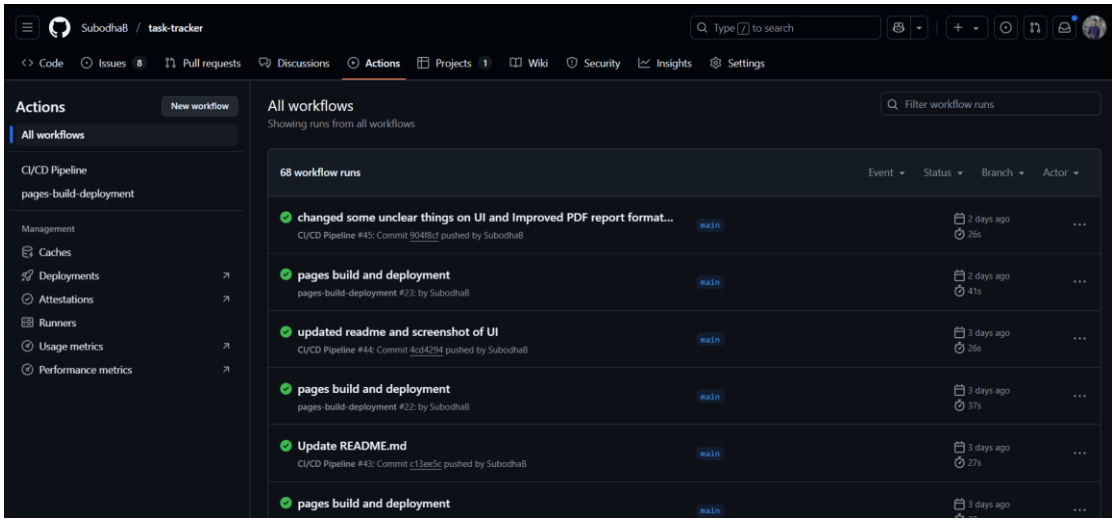


This is the project board was used for task planning.

Phase 3 – CI/CD & Quality Assurance

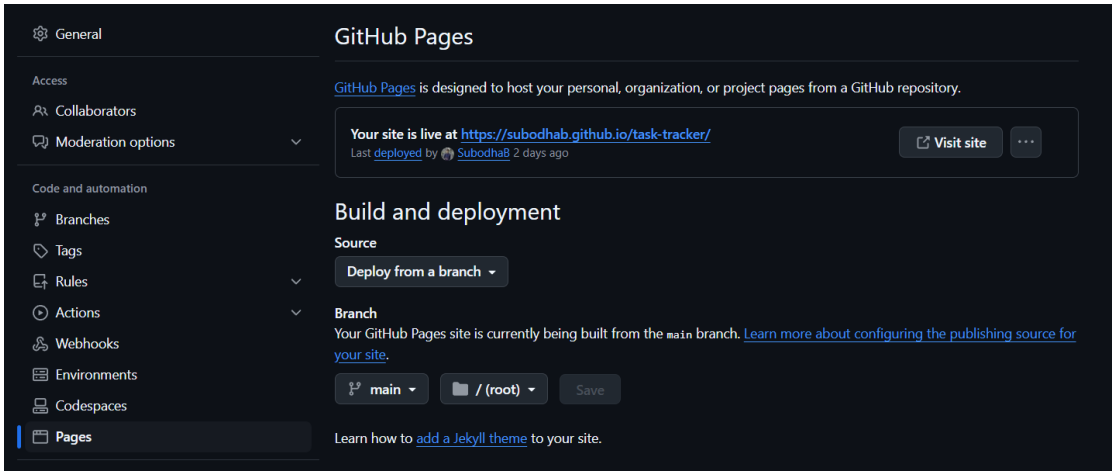
A CI/CD workflow was configured using GitHub Actions. The pipeline ensures linting and build success before deployment. GitHub Pages was used to host the project. All features were tested manually on multiple browsers to ensure compatibility. Console logs were used for runtime observability. LocalStorage was used for persistence, and browser notifications were scheduled with validation.

All workflows



CI/CD Pipeline & pages build deployment

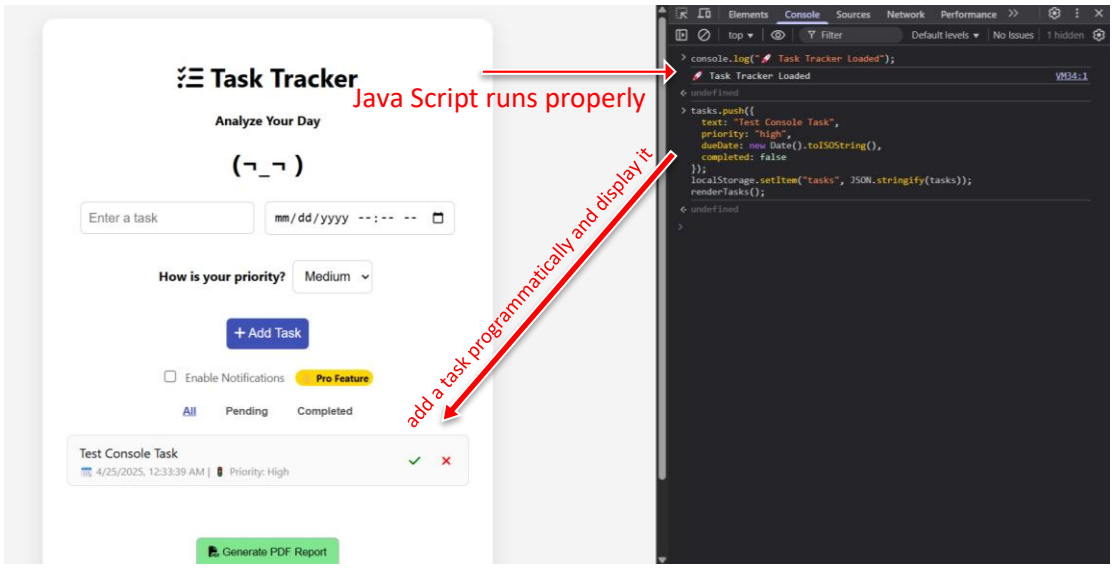
GitHub Deployment



GitHub Pages was used to host the project

How We Tested

Throughout the development of the Task Tracker project, rigorous local testing was conducted to ensure each feature worked smoothly and reliably. The application was tested manually in multiple modern web browsers (Chrome, Firefox, and Edge) by opening the index.html file directly. We validated all key user interactions including task creation, priority selection, deadline setting, filtering (All, Pending, Completed), task completion toggling, deletion, localStorage persistence, backup/restore from JSON, PDF report generation, and browser notifications. Console logs (console.log) were used extensively to trace events and debug logic during development.



Test the Task Tracker via Console

We also tested across different screen sizes to ensure the layout remained responsive and clean. Each time a new feature was implemented, we committed the changes to a separate Git branch (e.g., feature/pdf-report, feature/notification), pushed them to GitHub, and reviewed the GitHub Actions CI/CD deployment log to confirm successful automated deployment to GitHub Pages. This combination of real-time browser testing and continuous integration validated the stability and quality of the final app.

Phase 4 – Production Deployment & Documentation

The project was deployed on GitHub Pages through GitHub Actions. Backup and restore options were added using the Blob API. Disaster recovery is enabled through downloadable JSON backups. Notifications are optional and labeled as "Pro Feature" for future monetization or gated access. Documentation includes TDD, PRD, Runbook, C4 diagrams, and a wiki.

C4 Diagram Overview

The **C4 Model** helps describe the architecture of software systems at multiple levels of detail. For the Task Tracker application, here's how the four layers apply:

Context Diagram:

The Task Tracker is a client-side web application used by individual users to manage daily tasks. Users interact with it through a browser. There's no backend server; all data is stored locally using localStorage.

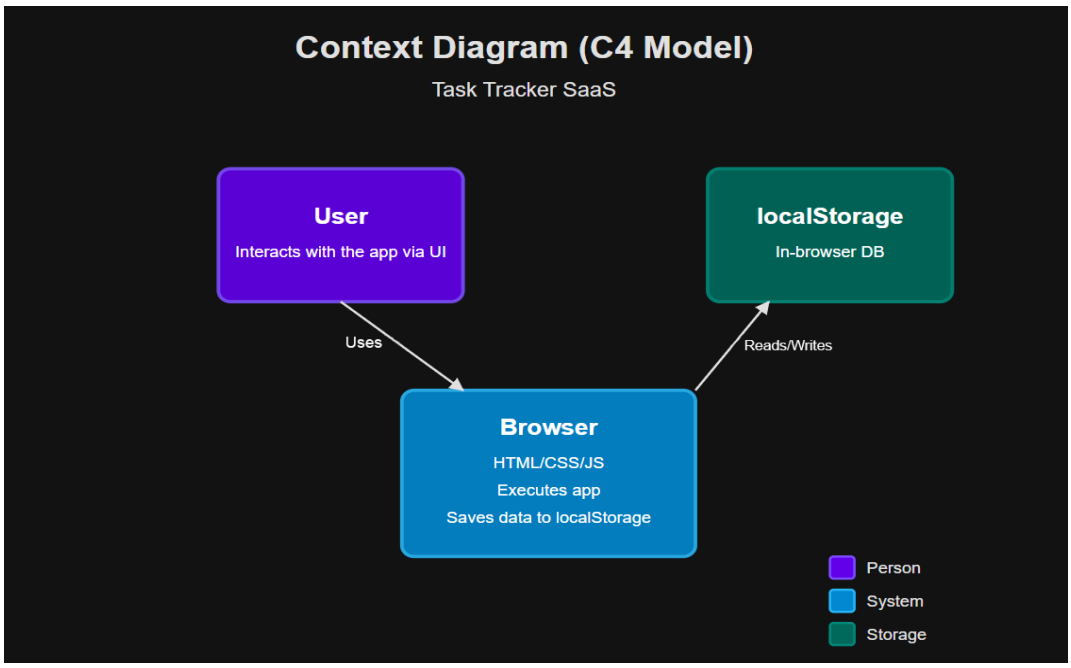


Figure 1.1 – Image of Context Diagram

Container Diagram:

The application runs entirely in the user's browser. It consists of three main containers:

- ✓ index.html (UI & Structure)
- ✓ style.css (Design & Responsiveness)
- ✓ script.js (Functionality, Logic, Storage, Notifications, PDF generation)

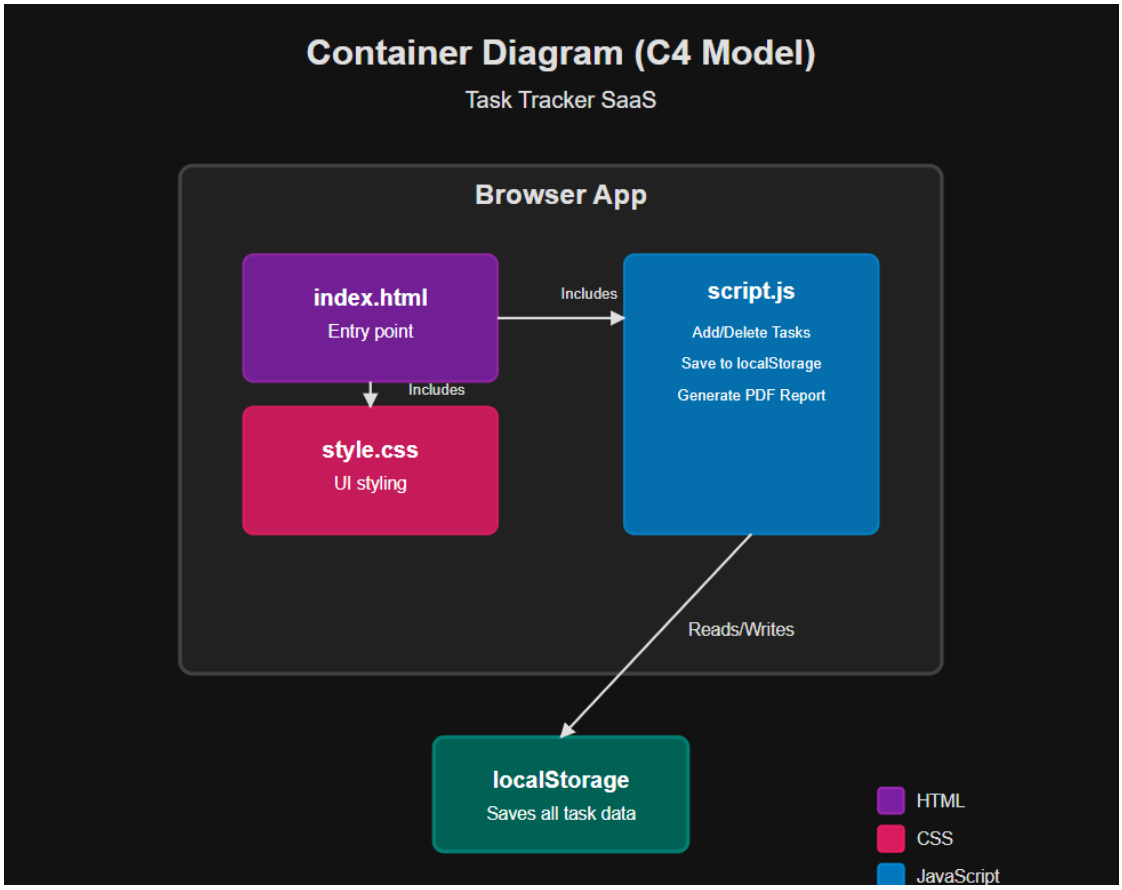


Figure 1.2 – Image of Container Diagram

Component Diagram:

The script.js file is modularly organized into components such as:

- ✓ Task Management (add/delete/filter/complete)
- ✓ Backup & Restore
- ✓ PDF Report Generator
- ✓ Notification System
- ✓ Data Persistence with localStorage

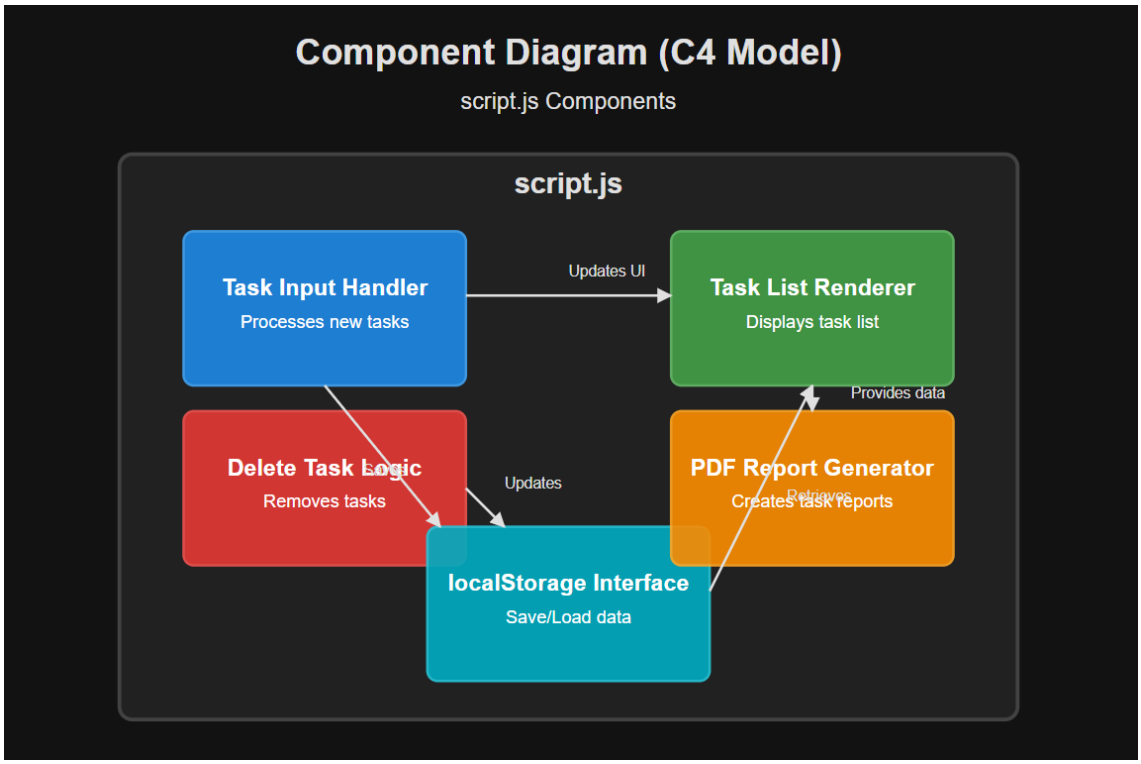


Figure 1.3 – Image of Component Diagram

Code:

As it's a single-page app (SPA) written in vanilla JS, each function in script.js acts as a code-level component handling a specific operation (e.g., saveTasks(), generatePDF(), scheduleNotifications()).

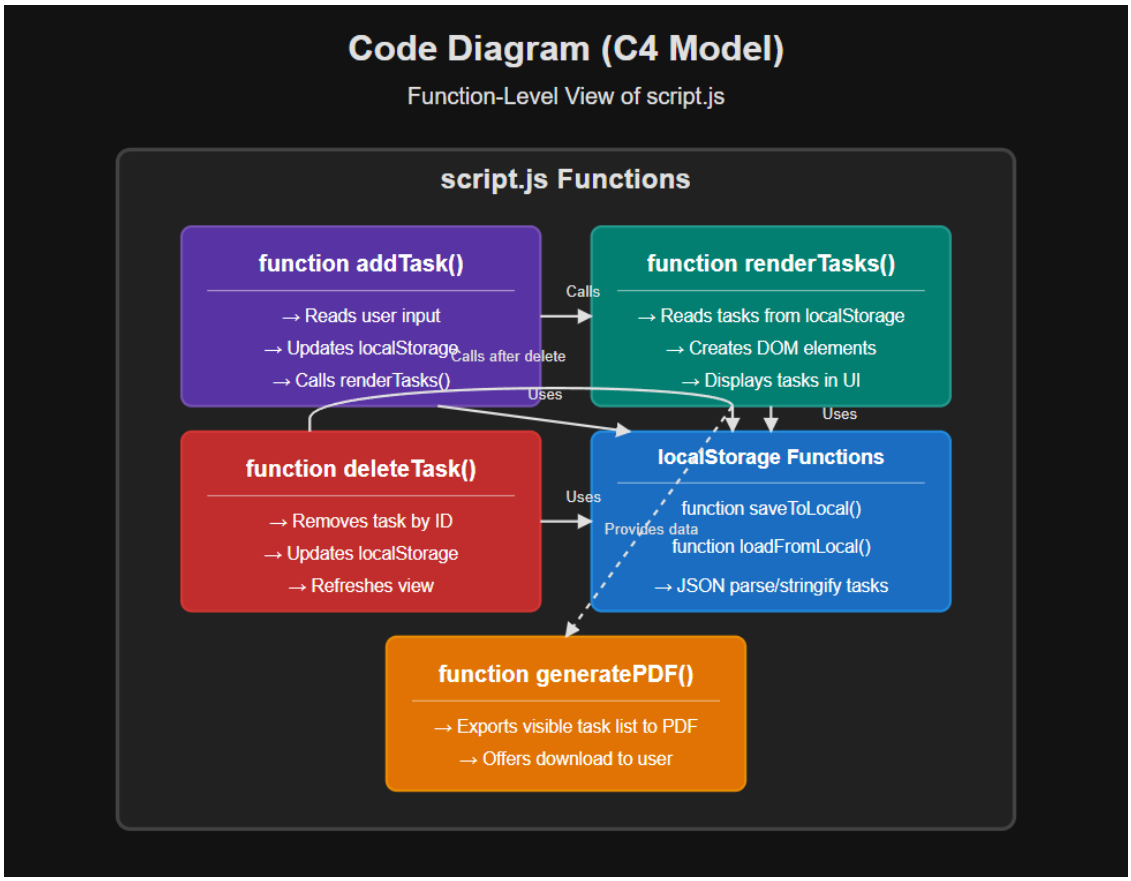


Figure 1.4 – Image of Code Diagram

Key Features

Feature	Description
Task Management	Add, delete, and mark tasks as completed
Priority Levels	High, Medium, Low labels shown with each task
Due Date Support	Select a deadline for each task with calendar input
Filters	Show All / Pending / Completed tasks
PDF Report Generation	Export all tasks to a well-formatted PDF document
Notifications (Pro)	Alert user 5 minutes before due tasks (with permission)
Backup/Restore	JSON-based export/import for safe offline storage
CI/CD Pipeline	Auto-deploy via GitHub Actions to GitHub Pages

Main Folder Structure

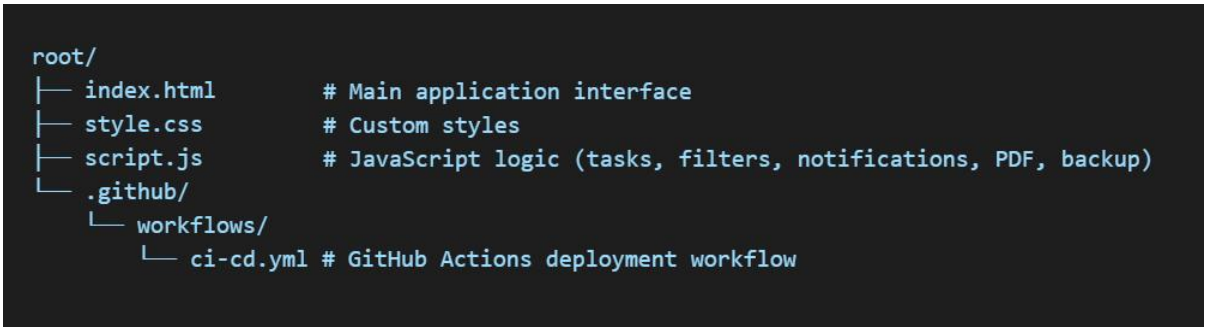


Figure 2 – Image of Main folder Structure

Visual Documentation

Main Interface: Task List, Filters, and Action Buttons

The main interface of the Task Tracker is designed to be simple and user-friendly. It includes:

- A **task list** where all created tasks are displayed.
- **Filter buttons** (All, Pending, Completed) allowing users to quickly sort and view tasks based on their status.
- **Action buttons** for each task to:

  ☑ Mark the task as completed.

  ❌ Delete the task from the list.

- An intuitive layout that ensures users can interact with their tasks effortlessly, all styled with modern custom CSS.

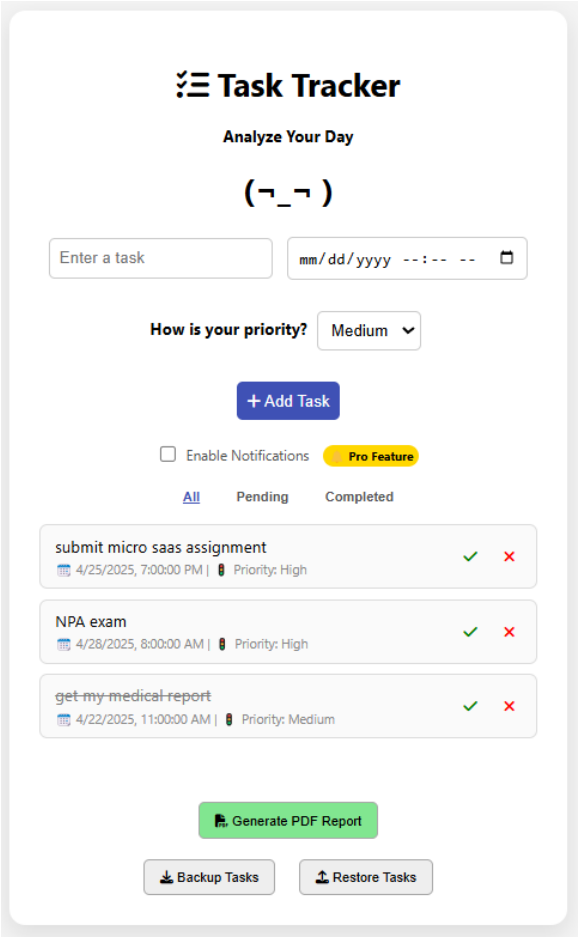


Figure 3.1 - Main interface showing the task list, filters, and action buttons

Task Form: Add Tasks with Priority & Due Date

While the form is not a pop-up modal, it behaves like one by staying focused and centered on the interface. This form includes:

- A text input to enter the task name.
- A dropdown selector to choose priority (Low, Medium, High).
- A datetime picker to set the task's due date and time.
- A submit button that adds the task to the list and saves it to local storage.

It ensures task creation is quick and organized, and priority + due date are reflected in the generated report and notifications.

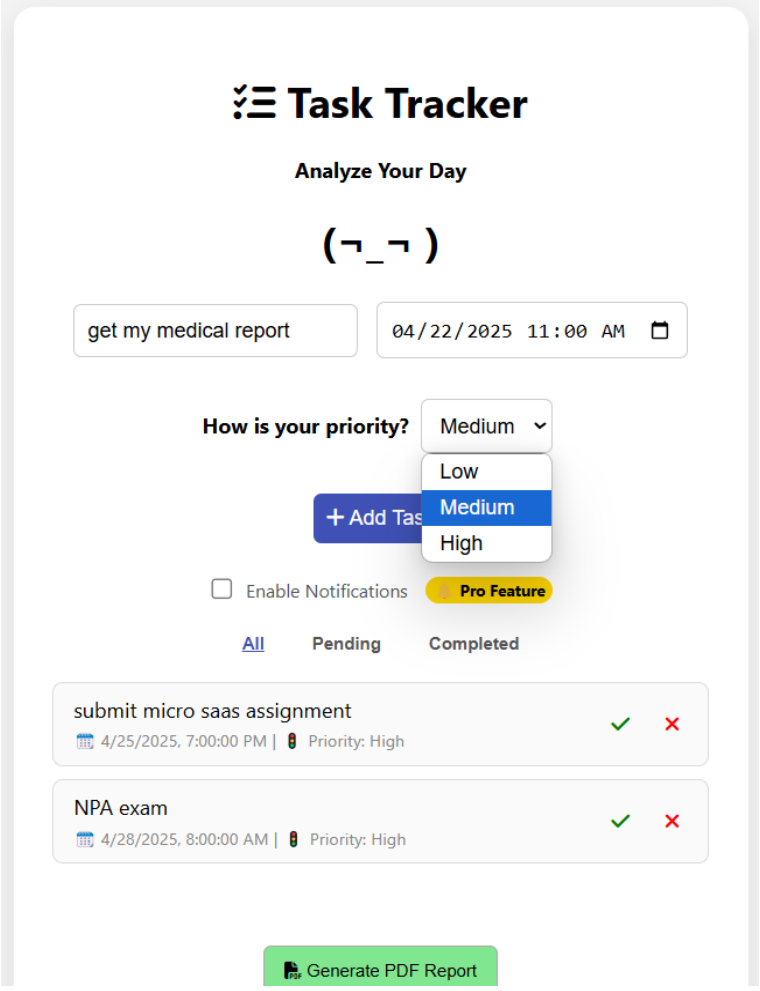


Figure 3.2 - Form for adding new tasks with priority and due date options

Daily Task Report – PDF Export Functionality

A dedicated button labeled “Generate PDF Report” allows users to export all tasks into a downloadable PDF file. The exported PDF includes:

- The task name
- Its priority level
- Due date and time (if set)
- Completion status (Completed / Pending)

This feature is especially useful for reviewing daily productivity or printing physical task records.

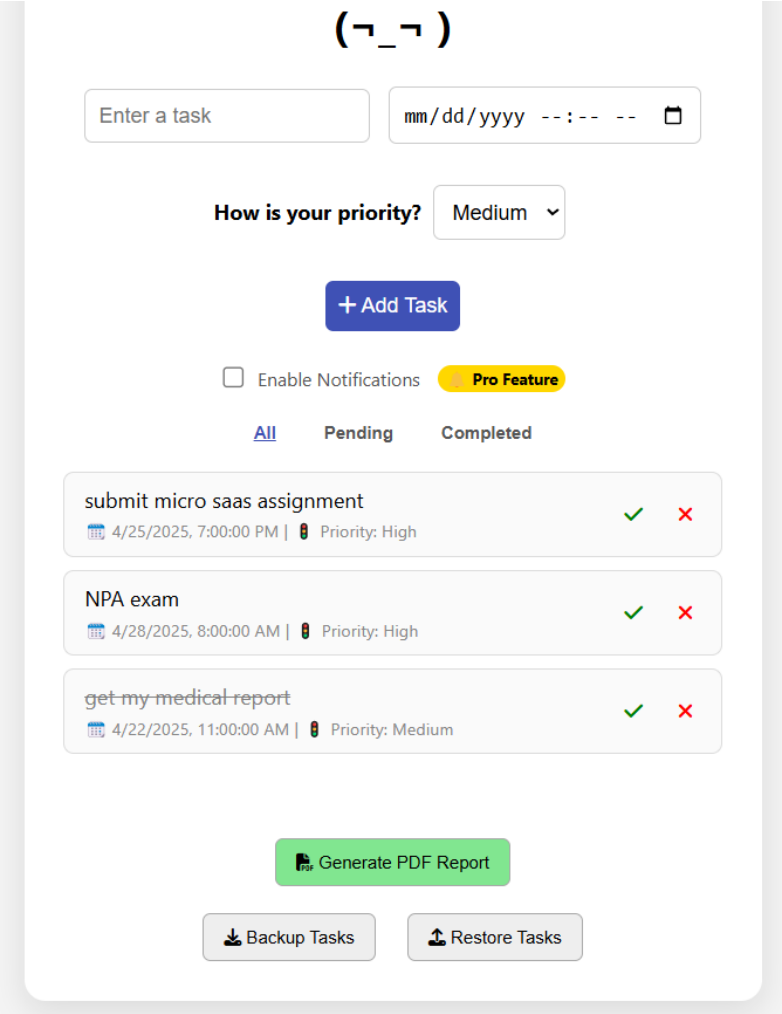


Figure 3.3 - The daily task report PDF export functionality

Browser Notifications for Task Reminders (Pro Feature)

This optional Pro Feature sends real-time browser notifications for upcoming tasks. How it works:

- If enabled by the user via a toggle switch
- Notifications are scheduled 5 minutes before a task's due time
- The browser will show an alert:
  " ⏰ Task Reminder: Your task 'XYZ' is due soon!"

It helps users stay on track and never miss an important deadline.

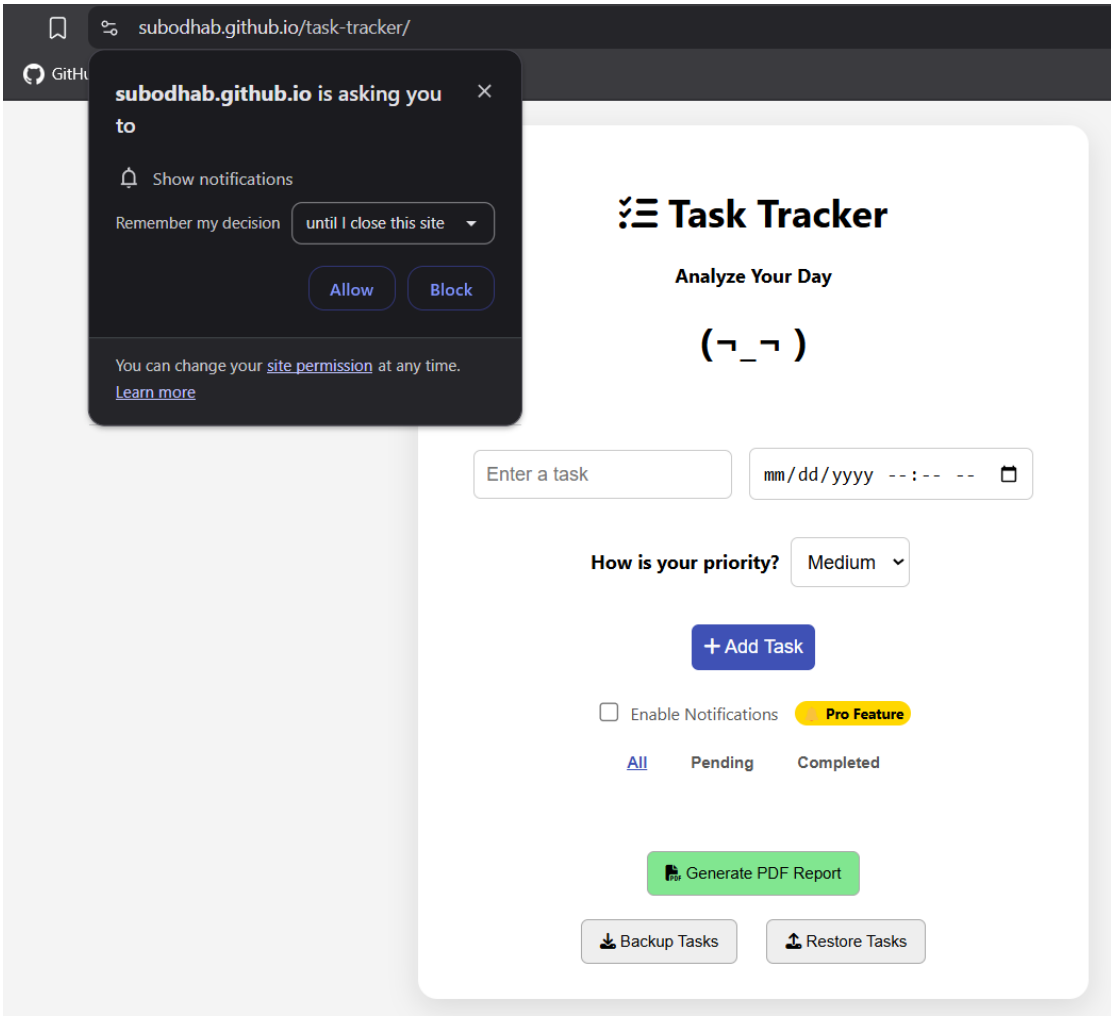


Figure 3.4 - Browser notification implementation for task reminders

Tech Stack

- HTML, CSS, JavaScript (Vanilla)
- jsPDF library for PDF report generation
- Git, GitHub, GitHub Pages, GitHub Actions
- No backend or database used

Future Improvements

- Implement task editing functionality
- Add dark mode theme support
- Use service workers for offline mode
- Migrate to IndexedDB or cloud backend (e.g., Firebase)
- Include user login and sync
- Enhanced PDF report customization options
- Integrate charts and analytics for task completion metrics

References

Topic	Source	Link
HTML/CSS/JavaScript	MDN Web Docs	developer.mozilla.org
Web Storage API (localStorage)	MDN	MDN localStorage
Storing & Retrieving JSON in localStorage	Web Dev Simplified	YouTube
Deploy to GitHub Pages with CI/CD	GitHub Pages Docs	pages.github.io
C4 Model Explained	c4model.com	c4model.com
Exporting HTML as PDF using jsPDF	CodeSource	codesource.io

Conclusion

This project demonstrates a complete, end-to-end SaaS workflow without relying on backend infrastructure. It emphasizes DevOps integration, simplicity in design, and clarity in documentation. A standout feature is the PDF report generation capability that allows users to download comprehensive daily task summaries. All objectives were met, and the application runs without errors or external dependencies.