



An Undergraduate Internship/Project on Recycle Website

By

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Science in Computer Science

Department of Computer Science & Engineering
Independent University, Bangladesh

Attestation

Recyrkle Website has been completed by me solely. I learned front-end work using platforms -bootstrap/html/css/js and back-end work using framework -PHP, MySQL. I used some templates from the bootstrap documentation directly from their website, and I followed online tutorials for better customization and guidance. All decisions were made jointly with the stakeholders.

Signature

Date

Ahmed Seeam Nurullah

Name

Acknowledgement

First and Foremost I would like to thank ALmighty Allah for granting me this opportunity.

I would like to thank Mr.Sharaf Rahman, Co-Founder/Director, of Recyrcle for giving me the opportunity to do an internship within the organization.

I would like to thank Ms.Leticia Suarez, Director, of Development,Recyrcle for giving me the constant assistance and advice as my external supervisor.

I'd like to express my gratitude to MD. Asif Bin Khaled, Internal Supervisor, Lecturer, Department of Computer Science Engineering, Independent University of Bangladesh, for his constant assistance and advice.

I am incredibly grateful to my department staff members and friends who helped me complete this internship.

Letter of Transmittal

May 19, 2022

Subject: Submission of internship report on Recycle Ltd.

Dear Sir,

As a student of Independent University, Bangladesh, I have prepared my internship report on “Recycle Website.” I have tried my level best to follow your guidelines in every aspect of the planning of this report. I have also collected what I believe to be the most critical information to make this report specific and accurate. I am honestly thankful for your guidance during this draft of the report. I hope you will appreciate my effort. I have done the study in a complete form, and I have tried my best to conduct this professionally. It could indeed have been better if there were no limitations. I hope you will assess my report considering the limits of the study.

Yours sincerely,

Ahmed Seeam Nurullah ID: 1620641

Evaluation Committee

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Signature

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Name

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Supervisor

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Signature

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Name

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Internal Examiner

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Name

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External Examiner

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Name

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Convener

Abstract

Recyrkle is a UK-based Startup that works on the circular economy. Their primary product is recycling plastic waste into 3D filaments. In addition, Recyrkle emphasizes research to innovate new ways to re-use the waste we produce. I joined recycle as an intern developer. At first, the task I was given was to maintain and update their current website built using the WIX platform. The recyrkle team was facing issues due to the constraints of the WIX platform. The immediate plan was to create a new website that was completely customizable. I learned front-end and backend. I have done the development myself with frequent output from stakeholders.

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Chapter 1

Introduction

1.1 Overview/Background of the Work

A website is becoming more and more necessary for any company in this era of digitalization and automation. The project I am assigned to by my supervisor Ms. Leticia Suarez at Recycle, is a website for a circular economy-based products manufacturing company. I will work solo to build this project. The website will provide all the necessary information about the company to its users in the About Us section, covering its Mission and Visions, core practices, locations, and such. There will also be a contact form if the users want to contact the company.

1.2 Objectives

The goal of the project is to fortify its online presence to compete against competitors. It will also provide customers with a convenient medium to connect via the web platform. Customers can directly contact Recycle for queries and learn more about their research with the website. In addition, the website will be responsive to access through a computer or mobile device.

1.3 Scopes

During the development of this project some of the features that will be available for the users are mentioned below:

- Homepage
- About Us
- Contact Us

Chapter 2

Literature Review

2.1 Relationship with Undergraduate Studies

As an aspiring computer Scientist, being a developer is one of my aspirations. All the courses I have completed have helped immensely in understanding the technicalities. In addition, knowledge gained from courses like software engineering, database management, and System Analysis and Design has been helpful.

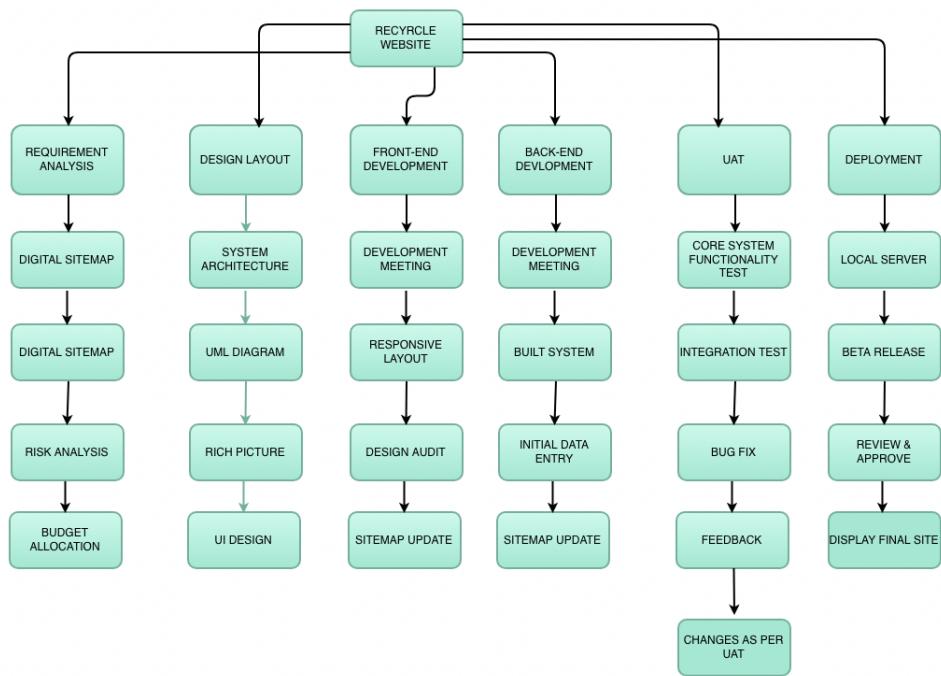
2.2 Related works

Ocean Clean Up is a company that focuses on circular economy-based products such as recycled products. Their audience/visitors are the same as Recycle. The Ocean Clean Up frequently collaborates with Recycle on different projects. I have mentioned the collaborations on the website.

Chapter 3

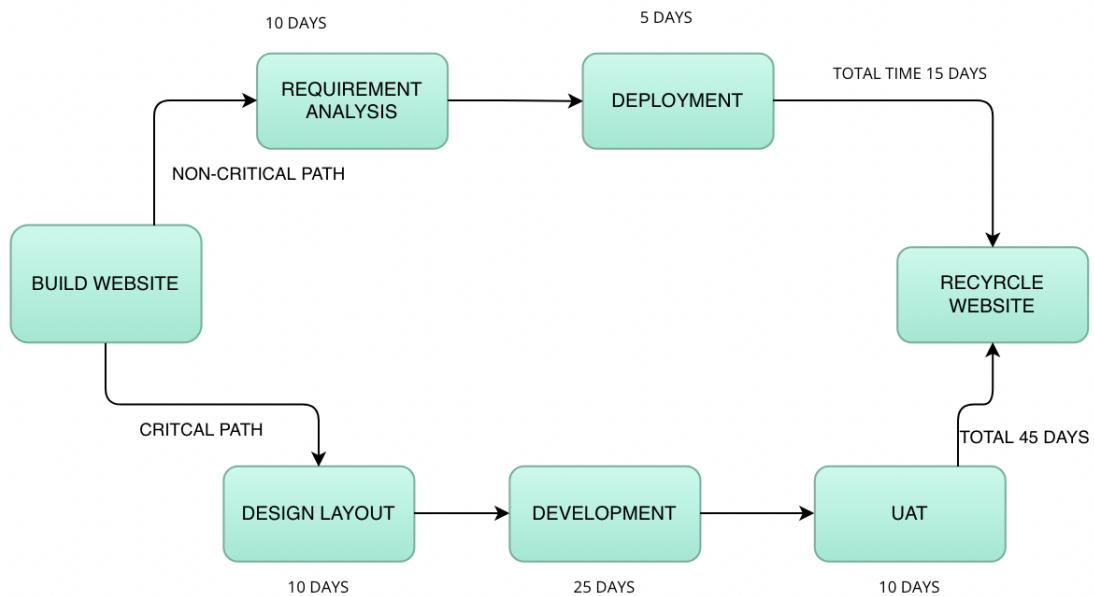
Project Management & Financing

3.1 Work Breakdown Structure



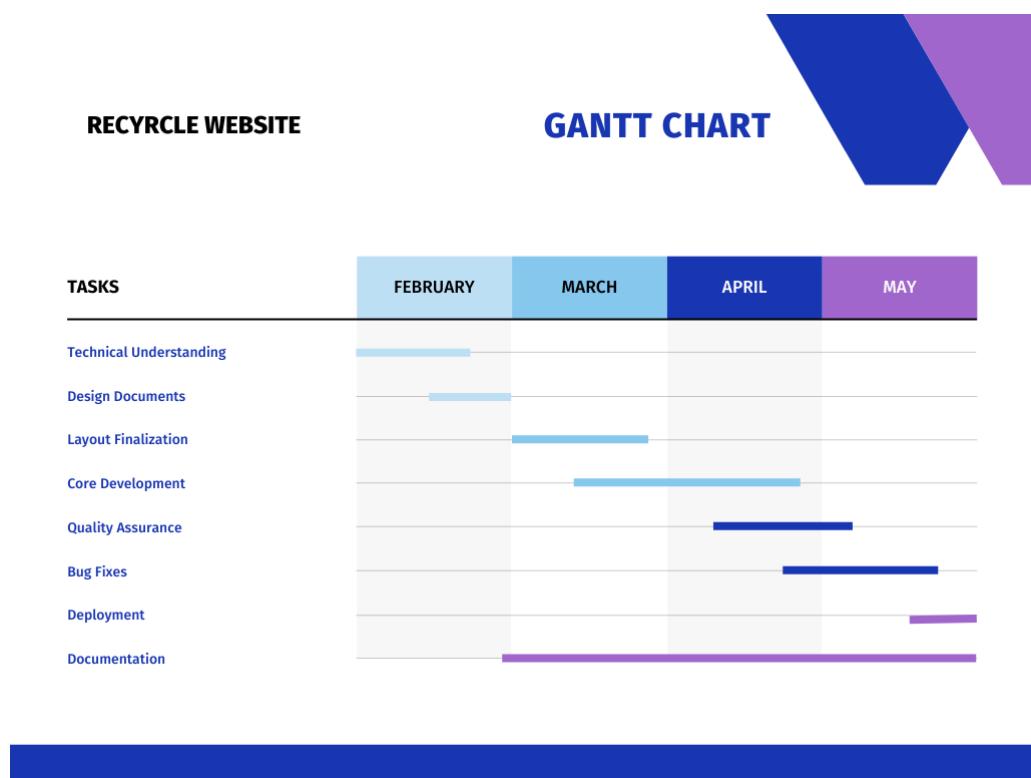
3.2 Process/Activity wise Time Distribution

Critical Path Method



3.3 Gantt Chart

Gantt Chart



3.4 Process wise Resource Allocation

- Project Manager : 1

3.5. ACTIVITY WISE RESOURCE ALLOCATION & FINANCING

- Designer: 1
- Front and Back-end Developer : 1
- QA : 1

3.5 Activity wise Resource Allocation

ACTIVITY WISE RESOURCE ALLOCATION		
TASK	DAYS	WORK PERCENTAGE
Requirement Analysis	10	10%
Design Layout	10	25%
Development	25	50%
UAT	10	10%
Deployment	5	05%
Total	60	100%

3.6 Estimated Costing

ESTIMATED COSTING	
WORK DISTRIBUTION	COST(BDT)
User Experience & Interface	20,000
Web Module & Functionality	20,000
Web Hosting & Maintenance	80,000
TOTAL	140,000

Chapter 4

Methodology

The Agile software development technique is a straightforward and efficient methods for integrating a business need into software solutions. Agile software development methodologies involve continuous planning, learning, improvement, team participation, evolutionary development, and early delivery. It promotes an adaptability scope of change. The basic principles of Agile methodology are:

- Satisfy the consumer by delivering functional software
- Accept change, especially if it is introduced late in the development process.
- Continue to build functional software in small increments and on a regular basis.
- Encourage customers and analysts to collaborate on a regular basis.
- Adopt agility while paying close attention to mindful development.

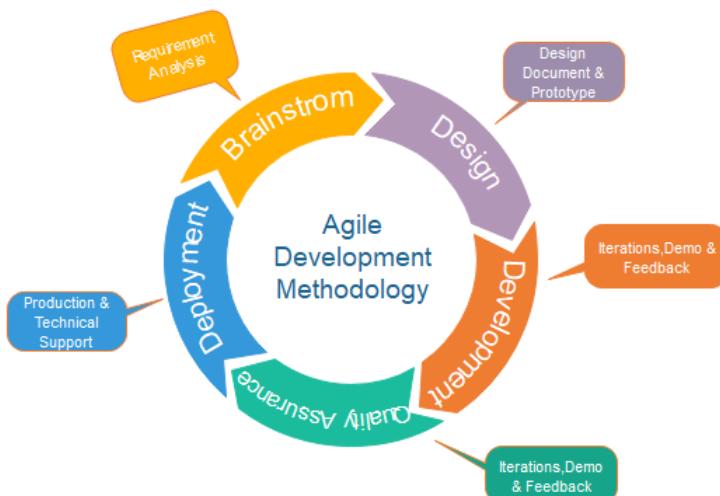


Fig. Agile Model

Chapter 5

Body of the Project

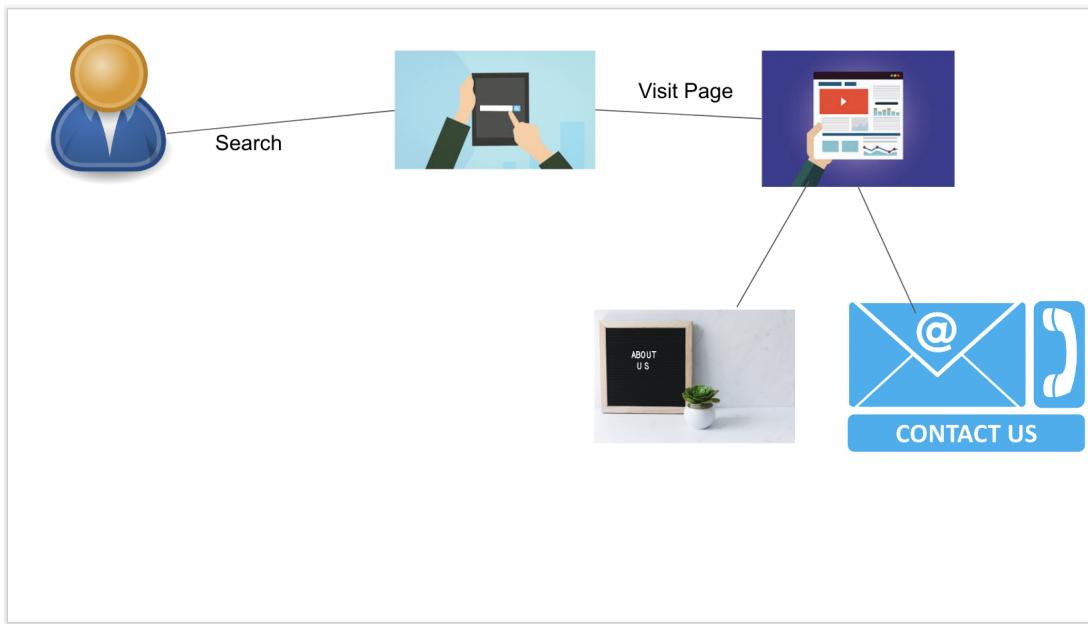
5.1 Work Description

A website is becoming more and more necessary for any company in this era of digitalization and automation. The project I am assigned to by my supervisor Ms. Leticia Suarez at Recrycycle, is a website for a circular economy-based products manufacturing company. I will work solo to build this project. The website will provide all the necessary information about the company to its users in the About Us section, covering its Mission and Visions, core practices, locations, and such. There will also be a contact form if the users want to contact the company.

5.2 Requirement Analysis

- User Should be able to have a hassle free experience
- User Should be able to navigate easily
- User Should be able to fill up the contact Form
- Pages should be responsive

Rich Picture



Functional and Non-Functional Requirements

Functional Requirements

- Responsiveness
- User Friendly Interface
- Contact Form
- Responsive Navigation

Non-Functional Requirements

- Responsiveness
- User Friendly Interface
- Contact Form
- Responsive Navigation
- Technical Feasibility
- Economic Feasibility
- Legal Feasibility
- Operational Feasibility
- Schedule Feasibility

5.3 System Analysis

5.3.1 Six Element Analysis

Process	Human	Non-Computing Hardware	Computing Hardware	Software	Database	Network
Manage Forms	Admin	N/A	Computer	Web Browser	MySQL	WAN/LAN
Submit Forms	User	N/A	Computer/Mobile	Web Browser	MySQL	WAN/LAN
CRUD Operations	Admin	N/A	Computer	Web Browser	MySQL	WAN/LAN
View	User	N/A	Computer	Web Browser	MySQL	WAN/LAN

5.3.2 Feasibility Analysis

- Technical Feasibility: Recycle is a startup organization that is focused on circular economy. They have the required talents to bring the project's vision to reality. In addition, this project is technically possible since all of the necessary hardware, software, and other technical requirements are on hand.
- Economic Feasibility: This analysis is carried out to determine the cost and benefit of the project. A detailed cost proposal for website development was generated, including all cost breakdowns. This expense is then weighed against whether the website would be financially beneficial to the company. More digital presence means more revenue.
- Legal Feasibility: Before beginning this project, all legal constraints, such as data protection legislation, social media rules, and government restrictions, were assessed to guarantee that it does not meet any legal constraints in the future.
- Operational Feasibility: Because of last year's pandemic and the current economic situation, the website is very plausible, as more and more users are getting digitally active. Also, the project plan satisfies all of the project completion standards.
- Schedule Feasibility: This is the most critical assessment for project success. We predict the length of time it will take to finish a project in scheduling feasibility which in this case is 80 working days and some room for flexibility. The project will complete on time as the given milestones are being accomplished on schedule.

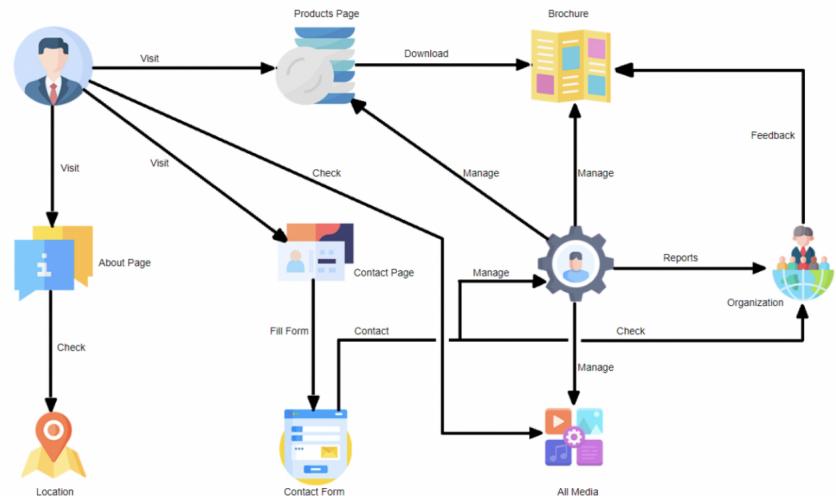
5.3.3 Problem Solution Analysis

The previous was built on the WIX platform, which is a drag and drop website builder with limited functionalities and customization. Recyrcle Ltd. has been dealing with issues such as adding new functionalities and complete customization. As they don't have a dedicated development team they opted for Wix. I have built a fully customizable website from the ground up using bootstrap/HTML/CSS/js.

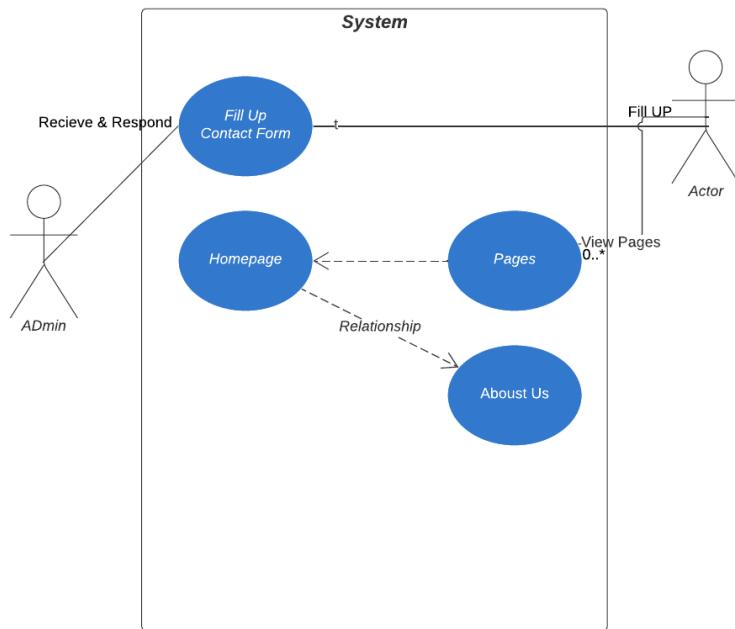
5.3.4 Effect and Constraints Analysis

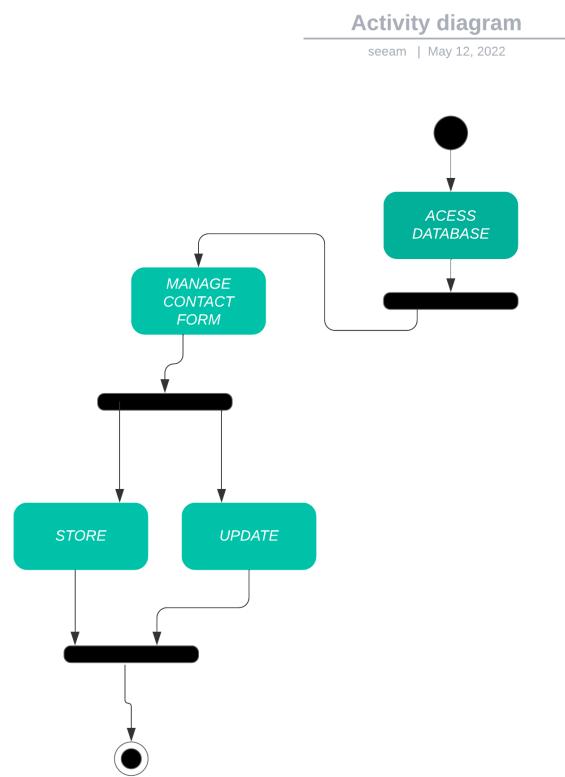
During any website development there are a handful of constraints that need to be kept in mind. For example, budget, deadline, unique design and features, etc. In this project, it was budget and design. When developing a website, considering the end-user in mind is the most important task. Each client is unique in their own way. Before we begin designing, we must do research and have a knowledge of our target audience. It takes almost 10 to 15 working days to finalize a design. The final design and the first mockup for this project looked like two different websites.

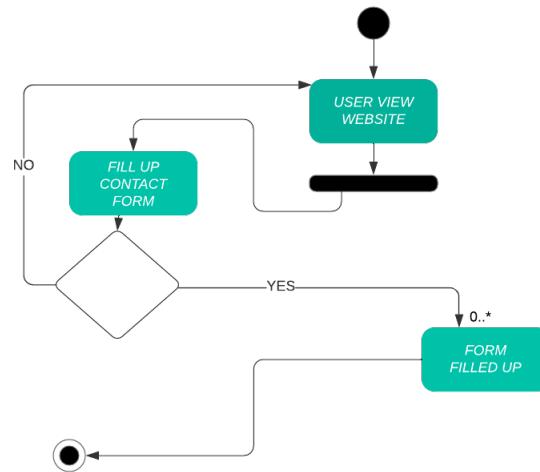
5.4 System Design



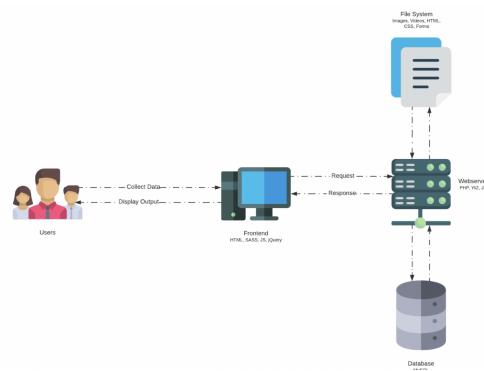
UML Diagrams







Architecture



5.5 Implementation

5.6 Testing

The following functionalities have been tested for this particular website:

- Mobile Responsiveness
- Contact Form
- All Buttons
- All Links

Input

CONTACT US

Name

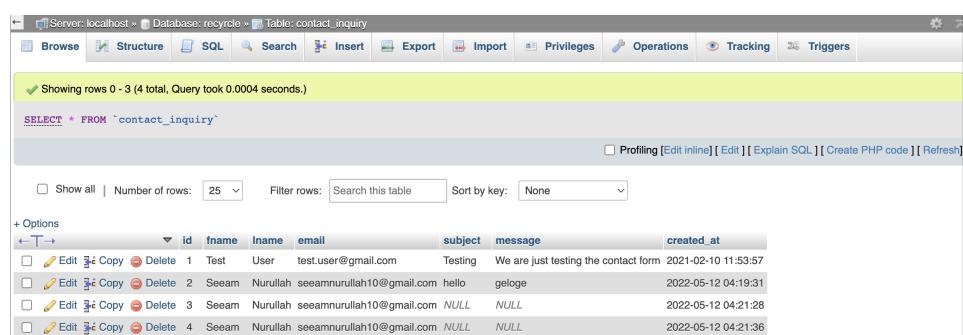
Email

Phone Number

Message



Output



The screenshot shows the MySQL Workbench interface with the following details:

- Server:** localhost
- Database:** recycle
- Table:** contact_inquiry
- Query:** SELECT * FROM `contact_inquiry`
- Results:** Showing rows 0 - 3 (4 total, Query took 0.0004 seconds.)

	Edit	Copy	Delete	ID	Fname	Iname	Email	Subject	Message	Created At
<input type="checkbox"/>	Edit	Copy	Delete	1	Test	User	test.user@gmail.com	Testing	We are just testing the contact form	2021-02-10 11:53:57
<input type="checkbox"/>	Edit	Copy	Delete	2	Seam	Nurullah	seeamnurullah10@gmail.com	hello	geloge	2022-05-12 04:19:31
<input type="checkbox"/>	Edit	Copy	Delete	3	Seam	Nurullah	seeamnurullah10@gmail.com	NULL	NULL	2022-05-12 04:21:28
<input type="checkbox"/>	Edit	Copy	Delete	4	Seam	Nurullah	seeamnurullah10@gmail.com	NULL	NULL	2022-05-12 04:21:36

Designing Test Cases

Test Results

All the features mentioned in functional requirements work.

CONTACT US

Name

Email

Phone Number

Message



Server: localhost -> Database: recycle -> Table: contact_inquiry

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Showing rows 0 - 3 (4 total, Query took 0.0004 seconds.)

SELECT * FROM `contact_inquiry`

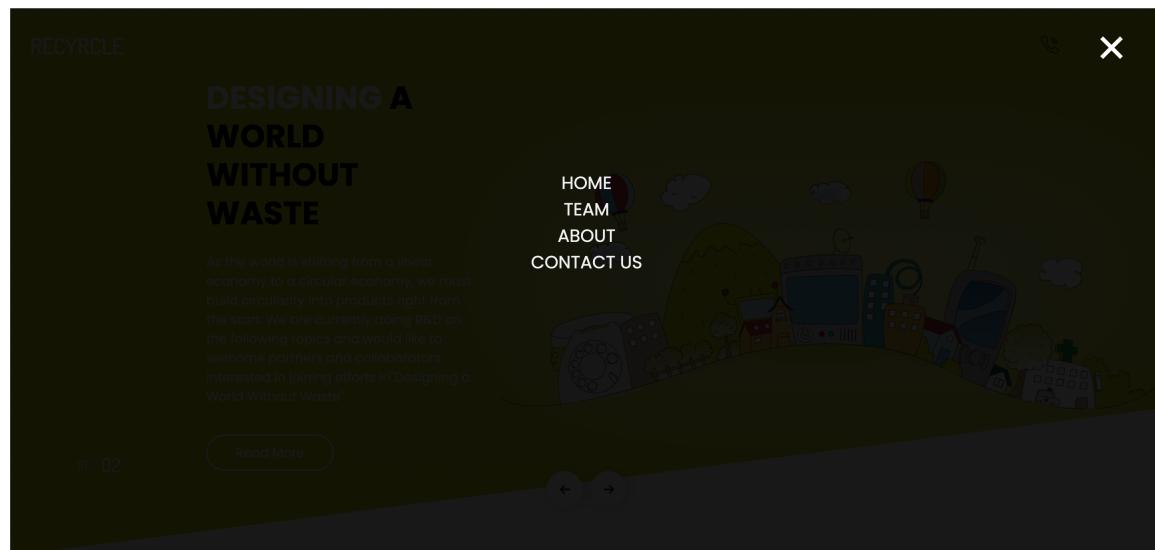
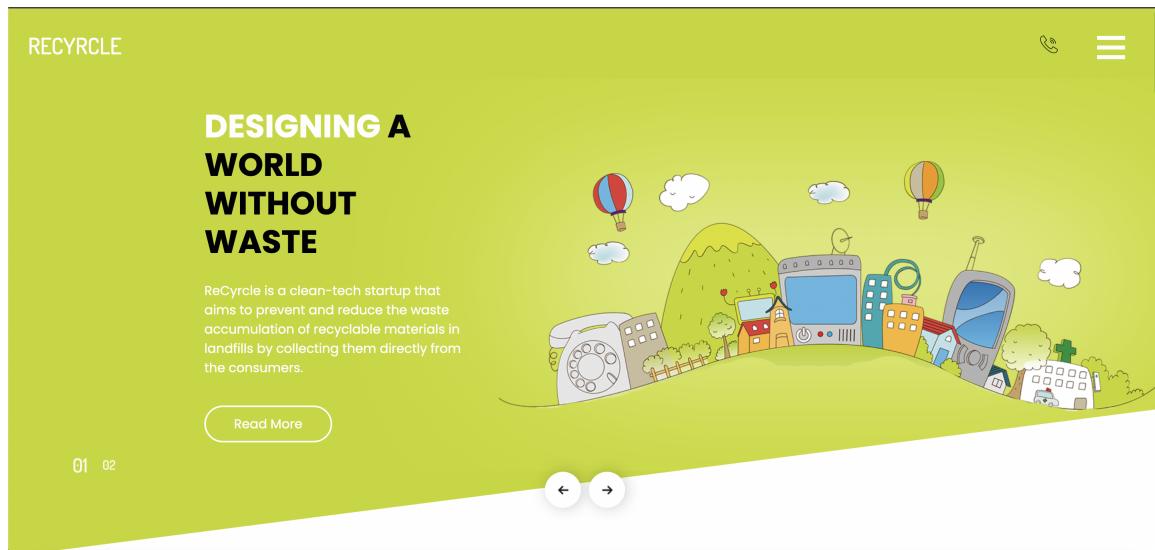
Show all | Number of rows: 25 | Filter rows: Search this table | Sort by key: None

+ Options

	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	id	fname	lname	email	subject	message	created_at
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	1	Test	User	test.user@gmail.com	Testing	We are just testing the contact form	2021-02-10 11:53:57
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	2	Seeam	Nurullah	seeamnurullah10@gmail.com	hello	geloge	2022-05-12 04:19:31
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	3	Seeam	Nurullah	seeamnurullah10@gmail.com	NULL	NULL	2022-05-12 04:21:28
<input type="checkbox"/>	<input type="button" value="Edit"/>	<input type="button" value="Copy"/>	<input type="button" value="Delete"/>	4	Seeam	Nurullah	seeamnurullah10@gmail.com	NULL	NULL	2022-05-12 04:21:36

Chapter 6

Results & Analysis



ReCycle Limited
OUR PROJECTS



3D PRINTING WASTE COLLECTION

We collect 3D printing fails and empty filament spools from Brunel University Design Facilities to reprocess them into raw materials that can be reused



Food Waste Collection App

Biocycle is a student led organization based in Southampton that collect food waste from households. We co-developed a food collection app.



Circular Economy Business Series

The Circular Business Series is a collaborate project between JCI Greenwich and ReCycle to provide support and insight into adopting circular business models.

OUR TEAM



SHARAF RAHMAN
DIRECTOR
BUSINESS
DEVELOPMENT

Follow On



SAMREEN RAHMAN
DIRECTOR
STRATEGIC
PLANNING

Follow On



LOUIS LEVI COOPER
ENGINEER
MATERIAL
PROCESSING

Follow On



JOANNA POWER
ENGINEER
PRODUCT DESIGN
DEVELOPMENT

Follow On



CONTACT US

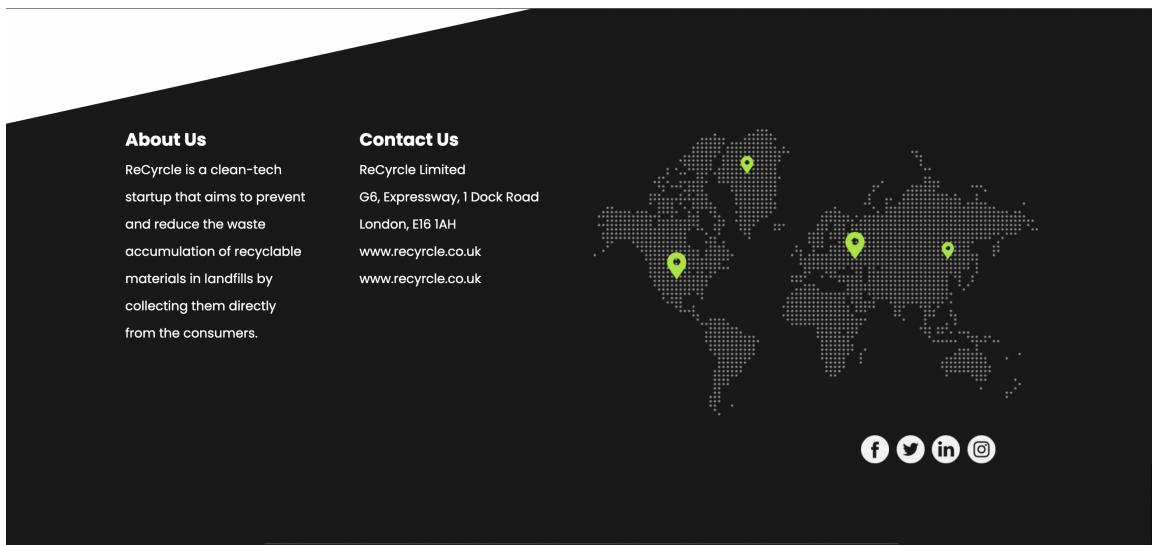
Name

Email

Phone Number

Message





ABOUT US

ReCycle is a clean-tech startup committed to solving the problem of packaging waste with a closed-loop recycling system. We want to prevent and reduce the waste accumulation of recyclable materials in landfill by collecting them directly from the consumers and change society's mindset towards waste.

From our research we found that 55–65% of greenhouse gas emissions arise just from the handling of materials' production, transportation and disposal. A circular economy may significantly reduce 85–90% of the emissions. We recycle materials and process them into a usable and manufacturable form reducing the demand and need for virgin materials been extracted from the Earth's crust.

As the world is shifting from a linear economy to a circular economy, it is vital that we build circularity into products right from the start. We are currently doing R&D on the following topics and would like to welcome partners and collaborators interested in joining efforts in "Designing a World Without Waste".

COLLABORATIONS



SUPPORTING PARTNERS



Chapter 7

Project as Engineering Problem Analysis

I have set up a contact form which takes input and is stored in the database. I was originally working on an admin panel but I had some issues with implementation. For future development I will add an Admin Panel, Products Page and Cart Features to checkout products directly from website. Admin will be able to update products and add new products.

7.1 Sustainability of the Project/Work

Every system must emphasize sustainability to keep up with the race of modernization. It is a complex undertaking, but to exist in the long term and ensure that the system's purpose is fulfilled to the customers, sustainability plays a critical role. In the case of software and web development, systems are built to be sustainable so that they may be used continuously without causing difficulties for both the owners and the users. To ensure the long-term viability of my project, the website is built to be accessible independent of the user's machine's environment. The website we designed in a way so that it does not rely on the computer specifications, operating system, resolution, or internet speed of the user. The website will work on all desktops and devices using any browser. The website's long-term sustainability will also be ensured through frequent maintenance of the website, and its server, which the maintenance team collaborating will do with developers. The website's HTML, CSS, JS, and back-end code are optimized. The website works properly and is easily accessible by users regardless of the device's specification by minimizing repeated codes, all the CSS and JS codes that are utilized, and keeping suitable coding standards. In terms of style and layout, the website is meant to be user-friendly, focusing on the User Experience. Visitors with less computer experience will be able to access and navigate the website with ease. The media files, such

as photographs, videos, symbols, and logos, have been optimized to guarantee that the pages load quickly, allowing individuals with low-end devices and sluggish connections to visit the website.

7.2 Social and Environmental Effects and Analysis

This website has been designed and developed to maximize efficiency while utilizing fewer resources. I attempted to make the code and media material feasible to the greatest extent. As a result, the website is ad-free, there are fewer re-directions, and only essential plugins are utilized, contributing to overall optimization, resulting in less power consumption and energy savings.

7.3 Addressing Ethics and Ethical Issues

Ethical reasoning are a must in every kind of web or software development because the more technologically advanced our society becomes and also abide by some basic ethical principles and guidelines. Sensitive data is constantly shared on the internet via numerous systems. Thus the data must not be compromised. Data nowadays can be measured at a higher price than that of patrol.

- The website only collects necessary user information, such as a user's name, email address, and phone number.
- On the website, there is no discrimination or preference based on race, sexuality, gender, religious beliefs, color, language, political or other perspectives, national or social origin, property, birth, or any other status.
- The back-end server and database can only be accessible by the developer.

Chapter 8

Lesson Learned

8.1 Problems Faced During this Period

During my internship, I faced some communication issues while working remotely, and there was a time difference. I met some personal problems, which set me back quite a bit. The lead developer of Recycle quit after I started my internship, so I didn't have anyone from the technical side to guide me. I had to learn everything on my own. I faced issues with understanding the concepts of the back-end framework.

8.2 Solution of those Problems

I tried to be as responsive and available outside my regular hours due to the time difference. I tried to work to make progress during my leave for my sister's hospitalization. I learned everything online from YouTube and documentation.

Chapter 9

Future Work & Conclusion

9.1 Future Works

ReCyrkle Ltd. has a sister concern In-Use Ltd which focuses on sales on 3D Filaments. For future development, we are already working on a product oriented website where users can view products, ask for quotations and details. The idea is to make it like a product oriented website where users can order directly to their homes and offices. I intend to add full functionalities of CMS Panel.

9.2 Conclusion

Working as an intern with Recycle Limited was an incredible experience. I have learned how to work within tight deadlines and under pressure. On the other hand, my supervisors played an essential part in making my job easier by offering advice and suggestions. This internship has allowed me to learn more about the development environment and market. Thanks to Recycle, my teamwork capability, professional abilities, my communication skills, and, last but not least, my technical skills have all improved. I will undoubtedly learn and seek a career in this field. I would like to thank everyone who has made my stay as an intern so wonderful, boosted my self-confidence, and helped me prepare to step into my professional career.

Bibliography