

Sri Lanka Institute of Information Technology



Information technology project - IT2080

Garbage Management System

Batch ID:02.01

Group ID: ITP24_B2_W03

Progress Evolution Report

Group Members

	Name with initials	Registration Number
1.	Fonseka W D C	IT22341518
2.	Ganepola G A S S	IT22321022
3.	Chandrasekara N K D R	IT22052988
4.	Aluvihare W B W M R K	IT22304506
5.	Shehara I G D S	IT22338334
6.	Samarasinghe R T	IT22032942
7.	Rashmika S E S	IT22584854
8.	Wijesuriya M W A D	IT22369574

User Stories Completed

Customer Management System (IT22338334)

- As a new user, I want to register into the system, so that I can easily get the services.
- As a new user, I want to create a profile by entering the login credentials, so that I can ensure about my account details properly.
- As a user, I want to be able to update, delete or sign out from profile details, so that I can ensure my information is accurate and reflects my preferences.
- As a user, I want to change my profile image, so that I can customize my profile image by entering user generated files.
- As a customer, I want to get some information about the system, so that I can read the information from the about us page of the system.
- As a customer, I want to get some services, so that I can search for the services from the system.
- As a customer, I want to get the number of times that I have logged into the system, so that I can get the idea about how many times that I spend with this system.

Staff Management System (IT22321022)

- As a staff manager, I want to view requests so that I can assign a specific number of staff.
- As a staff manager, I want to edit the status of the requests so that I can organize future tasks
- As a staff manager, I want to register new staff members so that I can assign them to different tasks
- As a staff manager, I want to edit the details of the staff members so that I can see all the details of the staff.
- As a staff manager, I want to record the leave information so that I can make decisions about salaries.
- As a staff manager, I want to record OT hours so that I can include it to the salary report

Vehicle Management System (IT22369574)

- As a vehicle manager, I want to view requests so that I can assign vehicles for specific tasks.
- As a vehicle manager, I want to edit the status of the requests so that I can organize future tasks.
- As a vehicle manager, I want to register vehicles so that I can assign to different tasks.
- As a vehicle manager, I want to edit the profile of the registered vehicles so that I can see all the vehicle details.
- As a vehicle manager. I want to check the condition of the vehicle so that I can maintain it in good condition.
- As a vehicle manager, I want to request the maintenance cost so that I can service the vehicle.
- As a vehicle manager, I want to view maintenance summary so that I can generate a maintenance report.

Finance Management System (IT22052998)

- As a finance manager, I want to search for and view payment requests from the vehicle management department so that I can check the balance and approve them.
- As a finance manager, I want to search and view payment requests from the staff management department so that I can check the balance and approve
- As a finance manager, I want to see the debit and credit balances of the product management department so that I can update the income statement.
- If the financial request is rejected, then the finance manager will create a reject report and send it to the relevant management
- As a finance manager, I want to manage the income and expenses report so that I can generate and update the profit or loss statement daily and monthly

Product Management System (IT22584854)

- As an inventory manager, I want to view the order list so that I can see what products are ordered by the customers.
- As an inventory manager, I want to update the order status so that I can inform the customers about the progress of their orders.
- As an inventory manager, I want to generate reports based on the daily income so that I can analyze the sales performance and trends.
- As an inventory manager, I want to add new products to the inventory so that I can offer more variety and options to the customers.
- As an inventory manager, I want to edit product details so that I can correct any errors or update any changes in the product information.
- As an inventory manager, I want to remove products from the system so that I can avoid selling products that are out of stock or discontinued.

Research & Development Management System (IT22304506)

- As the Research Manager, I want to be able to mark research projects as completed, so that they are ready for customer viewing.
- As a user, I want to access a library of available research, so that I can browse and select relevant resources.
- As the Research Manager, I want to create new research projects, ensuring that all necessary details are captured.
- As the Research Manager, I want the ability to remove outdated or irrelevant research from the library, maintaining its relevance and accuracy.
- As a user, I expect the integration of research about products into the shopping cart, allowing me to make informed purchasing decisions.
- As a user, when I press the "Buy" button for a product with associated research, I expect a detailed report to be generated for that product.
- As a user, after reviewing the detailed report, I want to be redirected to the payment page for checkout, facilitating a seamless purchasing process.
- As a user, I want to be able to search for researches and products easily, ensuring that I can find the desired information efficiently.

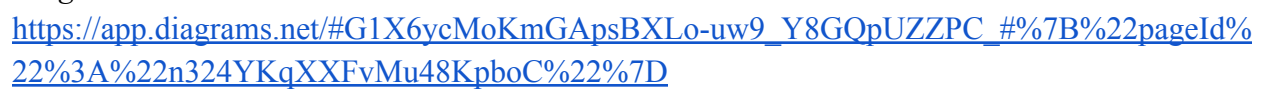
Route Management System (IT22032942)

- As a route manager, I want to be able to create and edit collection routes based on the distribution of garbage bins in the area.
- As a route manager, I want to view my assigned route for the day, including the sequence of bins to collect from and the estimated time for each stop.
- As a route manager, I want to receive notifications about upcoming garbage collection schedules and any changes to the route due to holidays or special events.
- As a route manager, I want to optimize collection routes to minimize travel time and fuel consumption while ensuring that all bins are serviced efficiently.
- As a route optimizer, I want to analyze historical route data and performance metrics to identify opportunities for route optimization and efficiency improvements.

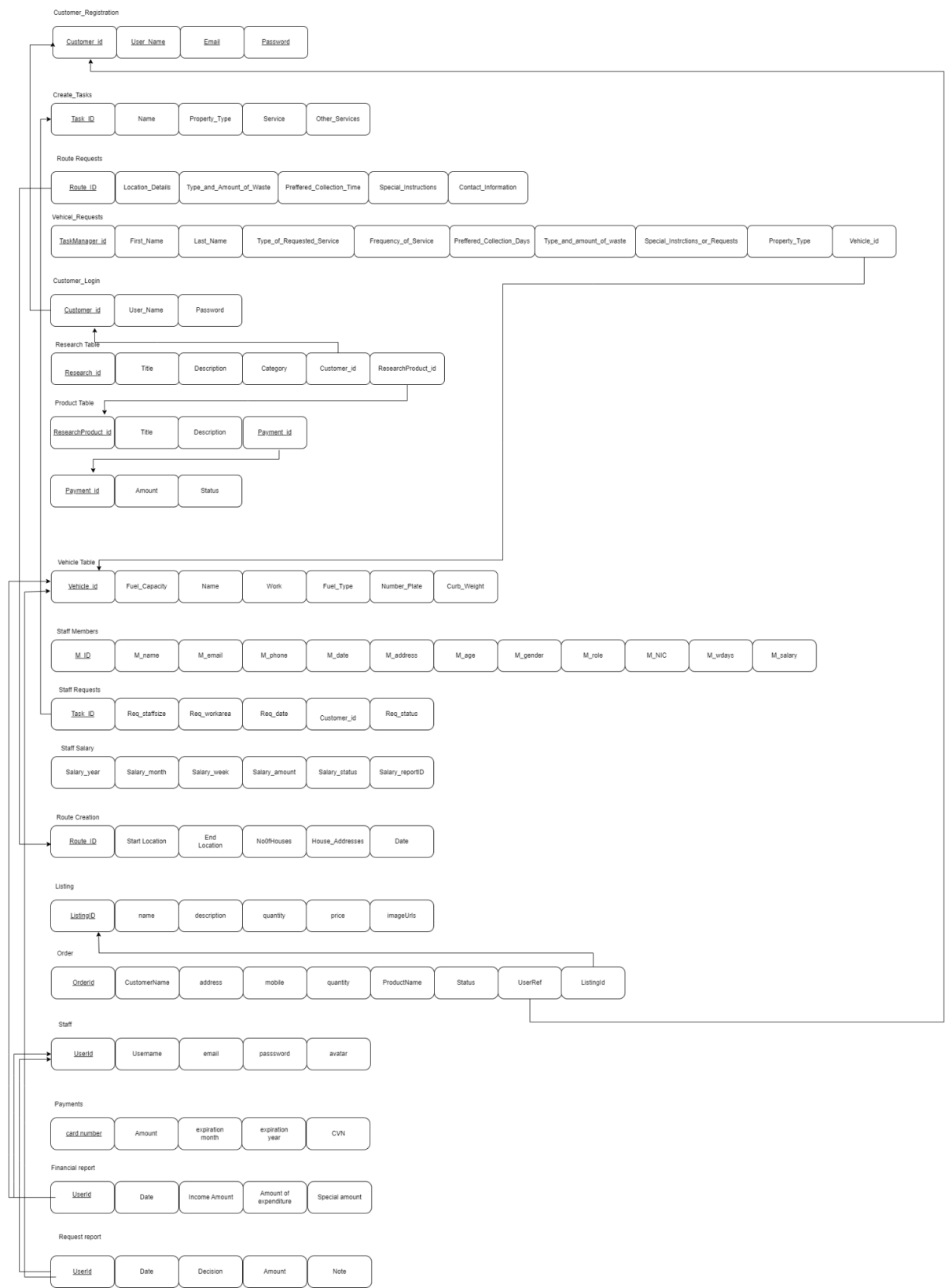
Task Management System (IT22341518)

- When a customer submits a request, I as the task handler could allocate assignments to the staff, vehicle, and route categories in order to meet the customer's objective.
- In order to confirm the information provided by the staff, vehicle, and route, I, as the task handler, can review the information that they have submitted.
- I can assign certain vehicles and workers by seeing the requests given by waste management as a task handler.

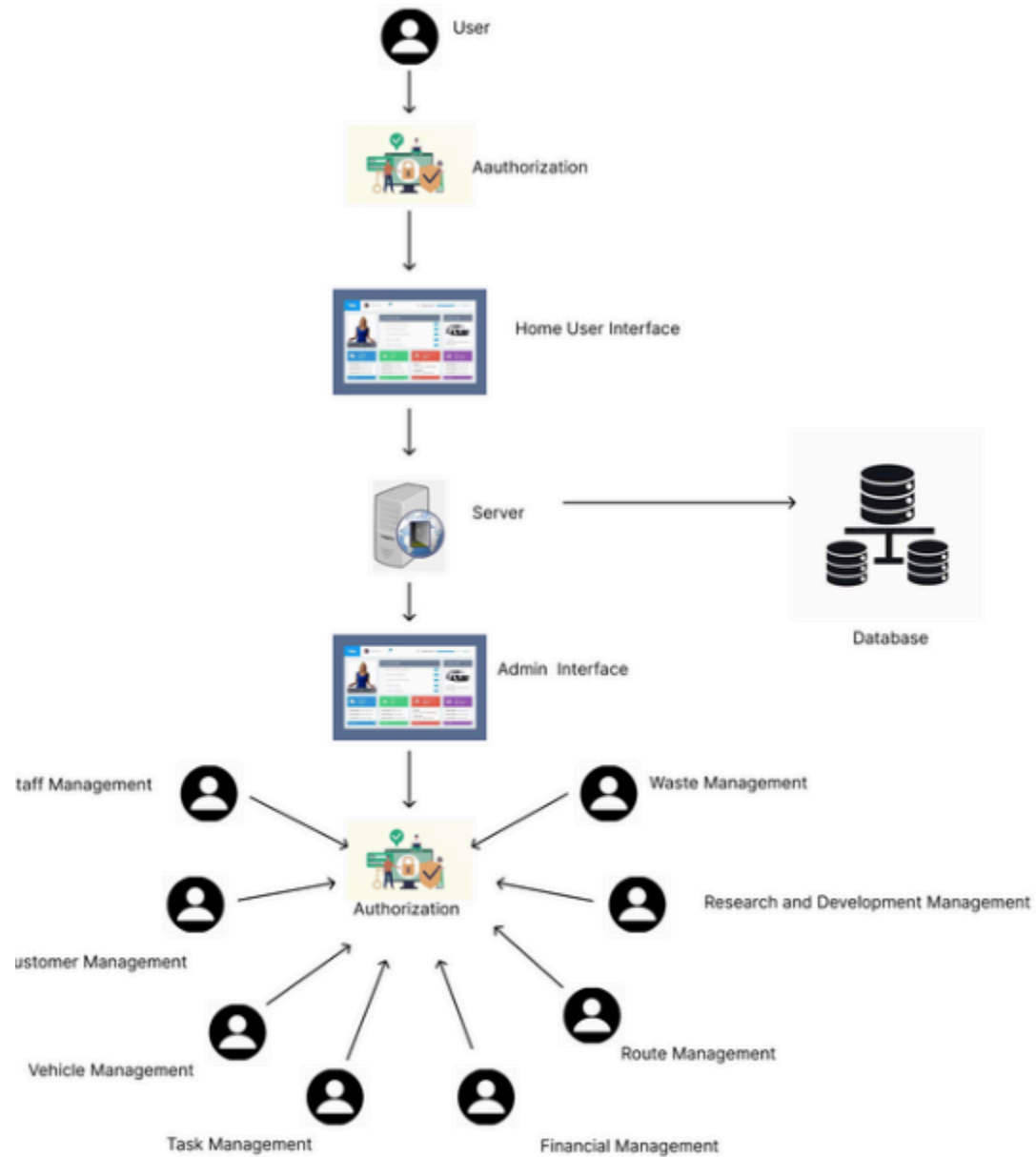
Diagram Link



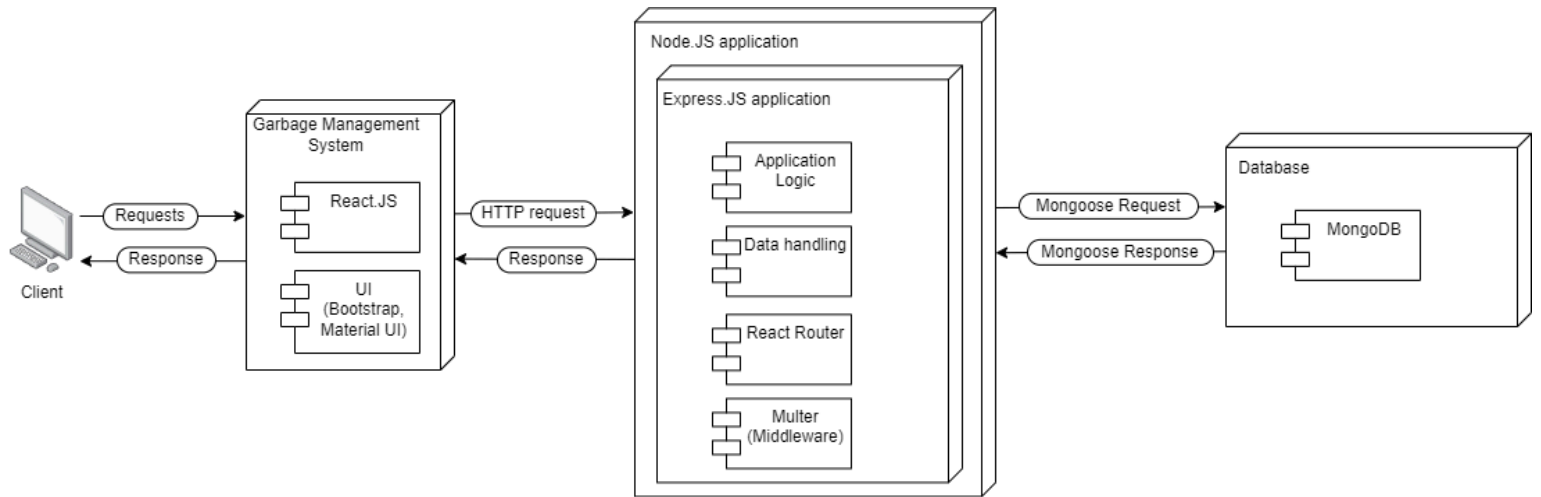
Normalized Schema



High Level System Diagram



Network Design



Test Case Design

Customer Management(IT22338334)

Test Case: Test user authentication

Test ID	Test Inputs	Comments	Actual Output
Test 01	User Name: hasini Password:123	Enter username and password that has not yet being registered	User not found!
Test 02	User Name: deshan Email: deshan@gmail.com Password:1234	Registered properly in the signup page and redirect in to the signin page after the registering	User registered successfully !
Test 03	User Name: deshan Email: deshan Password: 12345	User registered with incorrect email address	Please include an '@' in the email address.'des han' is missing an '@'
Test 04	User Name: deshanM Email: deshan@gmail.com Password: 123456	User registered with a unique username but not unique with the email address.	Error from the function
Test 05	User Name: deshan madawa Email: deshanmadawa@gmail.com Password: 1234	User registered with a unique username and the email address but not unique with the password	User registered successfully !

Test 06	User Name: deshan madawa12 Email: deshanmadawa34@gmail.com Password: 12345	User update the username,password and the email after registering successfully.	User is updated Successfully !
Test 07	Changed the profile image by adding image	Generate user files and upload images only.	Image Successfully uploaded!
Test 08	Changed the profile image by adding videos or files	Upload the video or file into the profile image	No Items match your search

Staff Management (IT22321022)

Test Case: Test Staff members registration

Test ID	Test Inputs	Comments	Actual Output
Test 01	Name: Hasini Email: Phone No: Date: Address; Age: Gender: Role: NIC: Working days per month:	Email,Phone No,Date,Address,Age,Gender,Role,NIC, Working days per month can not be empty	Registration Unsuccessful!!
Test 02	Name: Hasini Email: Hasini Phone No:0111 Date:2023/02/02 Address;65 new road Age:23 Gender: Female Role: Cleaner NIC:199878827265 Working days per month: 21 days	Please include an '@' in the email address.'Hasini' is missing an '@'	Registration Unsuccessful!!

Test 03	Name: Hasith Email: hasini@gmail.com Phone No:0112211w Date:2024/03/10 Address;56 new road Age:34 Gender: male Role: driver NIC:20016756728 Working days per month: 7days	Phone number can not include letters	Registration Unsuccessful!!
Test 04	Name: john Email: john@gmail.com Phone No:07718181191 Date:2023/09/18 Address;67 new road Age:24 Gender: male Role: supervisor NIC:20022232112334 Working days per month: 7days	Date should be today or within week	Registration Unsuccessful!!
Test 05	Name: Hasini Email: Phone No: Date: Address; Age: Gender: Role: NIC:1998565444e Working days per month:	NIC can not include letters except 'v' or 'V'	Registration Unsuccessful!!

Test 06	Name: Hasini Email: hasini@gmail.com Phone No:011245561222111 Date:2024/03/09 Address; 45 new road Age:34 Gender: male Role:ccleaner NIC:19987383929382v Working days per month: 14days	Phone number can not exceed 10 digits	Registration Unsuccessful!!!
Test 07	Name: Hasini Email: hasini@gmail.com Phone No:0112567891 Date:2024/04/28 Address;56 new road Age:23 Gender: Female Role: cleaner NIC:96778628188v Working days per month:21 days		Registration successful!!!

Finance Management

Test Case : Create financial report

Test ID	Test Inputs	Comments	Actual Output
Test 01	Card Number: Valid 12-digit number Amount: Valid amount (e.g., 1000.50) Expiration Month: Valid month (e.g., 05) Expiration Year: Valid future year (e.g., 2025) CVN: Valid 3-digit number	Ensure all fields are filled correctly.	Form submission succeeds, and the console logs "Form submitted successfully".
Test 02	Card Number: Less than 12 digits or non-numeric Amount: Valid amount Expiration Month: Valid month Expiration Year: Valid future year CVN: Valid CVN	Card number fails validation.	Error message displayed next to the Card Number field.
Test 03	Card Number: Valid 12-digit number Amount: Invalid amount format (e.g., text instead of number)	Amount format does not match the required format	Error message displayed next to the Amount field.

	Expiration Month: Valid month Expiration Year: Valid future year CVN: Valid CVN		
Test 04	Card Number: Valid 12-digit number Amount: Valid amount Expiration Month: Month in the past (e.g., 04 for April) Expiration Year: Current or past year CVN: Valid CVN	Expiration date is invalid due to being in the past.	Error message displayed next to the Expiration Month or Year field.
Test 05	Card Number: Valid 12-digit number Amount: Valid amount Expiration Month: Valid month Expiration Year: Valid future year CVN: Less than 3 digits or non-numeric	CVN format does not match the required format	Error message displayed next to the CVN field.

Vehicle Management (IT22369574)

Test case : Test Vehicle Registration

Test ID	Test Inputs	Comments	Actual Output
Test 01	Name: Side loader garbage truck VehicleID: Work: CurbWeight: FuelType: FuelCapacity:	VehicleID, Work, CurbWeight, FuelType, FuelCapacity can not be empty.	Registration unsuccessful!
Test 02	Name: Side loader garbage truck VehicleID: JK045 Work: Garbage Collection CurbWeight: thousand FuelType: FuelCapacity:	CurbWeight can not be a String it is an Integer number	
Test 03	Name: Side loader garbage truck VehicleID: JK045 Work: Garbage Collection CurbWeight: 1000 FuelType: Petrol FuelCapacity: Two Thousand	FuelCapacity can not be a String it is an Integer number	
Test 04	Name: Side loader garbage truck VehicleID: JK045 Work: Garbage Collection CurbWeight: 1000 FuelType: Petrol FuelCapacity: 2000		Registration successful!

Route Management

Test case : Create the unique routes

Test ID	Test inputs	Comments	Actual Output
Test 01	Number:RN01 StartLocation:Kaduwela endLocation:Malabe noOfHouses:4 house Addresses:"Wickrama",Kaduwela,Colombo. "piyasa",Kaduwela,Colombo. date:2022.04.23	In Number first two letters need to be capital english letters.	Registration unsuccessful!
Test 02	Number:RN01 StartLocation:Kaduwela endLocation:Malabe noOfHouses:4 house Addresses:"Wickrama",Kaduwela,Colombo. "piyasa",Kaduwela,Colombo. date:2022.04.23	In Start location first letter must be a capital english letter.	Registration unsuccessful!
Test 03	Number:RN01 StartLocation:Kaduwela endLocation:Malabe noOfHouses:4 house Addresses:"Wickrama",Kaduwela,Colombo. "piyasa",Kaduwela,Colombo. date:2022.04.23	In End location fist letter must be a capital english letter.	Registration unsuccessful!
Test 04	Number:RN01	In No of	Registration

	StartLocation:Kaduwela endLocation:Malabe noOfHouses:4 house Addresses:"Wickrama",Kaduwela,Colombo. "piyasa",Kaduwela,Colombo. date:2022.04.23	houses maximum limit is 40 and minimum limit is 10	unsuccessful!
Test 05	Number:RN01 StartLocation:Kaduwela endLocation:Malabe noOfHouses:4 house Addresses:"Wickrama",Kaduwela,Colombo. "piyasa",Kaduwela,Colombo. date:2022.04.23	In date, can only select the days after today cant select the days before the today.	Registration unsuccessful!

R & D Management

Test case : Test Research Publication

Test ID	Test Inputs	Expected Outputs	Actual Outputs	Result	Comenet
1	Valid input data for all fields including image uploads	Form submission successful, no error messages	As expected	Pass	All inputs are valid, form submitted successfully
2	Missing required fields	Error message displayed for missing fields	As expected	Pass	Validation for checkboxes works properly
3	Selecting no checkboxes for waste reduction practices	Error message displayed prompting to select at least one checkbox	As expected	Pass	Validation for checkboxes works properly
4	Selecting a category from the dropdown	No error message displayed for category selection	As expected	Pass	Category selection validation works
5	Selecting "IS THIS RESEARCH ABOUT A PRODUCT?" checkbox without	Error message displayed prompting to fill both price and importance	As expected	Pass	Validation for product fields works

	filling price and importance	fields			
6	Uploading more than 6 images	Error message displayed for maximum photo limit exceeded	As expected	Pass	Max photo limit validation works
7	Uploading no images	Error message displayed for at least one photo required	As expected	Pass	Min photo limit validation works
8	Submitting the form with valid inputs and images	Form submission successful with no error messages	As expected	Pass	Overall form validation works

Product Management(IT22584854)

Test Id	Description	Pre-Condition	Steps	Expected Results	Pass/Fail
1	Verify that Inventory manager add product to inventory successfully.	· User has access to the create listing functionality.	1. Login to the system as an Inventory manager. 2. Add product details and create a listing.	Product details store in the database and show successful message The product visible on the customer product page.	Pass

2	Verify Inventory Manager can edit existing product information successfully.	<ul style="list-style-type: none"> · An existing product in the inventory system. · Inventory manager account with access to edit product listings exists. 	<ol style="list-style-type: none"> 1. Login to the system using the inventory manager account credentials. 2. Navigate to the product management section of the system. 3. select the existing product to be edited. 4. Edit specific product details (e.g., update product description, adjust price) and submit. 	<p>The system successfully updates the product information in the database.</p> <p>The updated product information is reflected on the product page when accessed.</p>	Pass
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Innovative Parts of the projects

Customer Management System (IT22338334)

- Created the user ID unique by installing the jsonwebtoken. So we cannot see the user's unique id when opening it with github.
- Created the cookie(user_token). So that no other servers can access this cookie.
- Users can sign up from the google.
- Storage(firebase) - can Store and retrieve user-generated files like images, audio and video without server-side code.

Research and Development Management System (IT22304506)

- Dynamic Research Product Marketplace with real-time search, filtering, and image carousel navigation.
- Shopping cart feature for streamlined purchase process and improved user engagement.
- Provision of downloadable purchase reports in CSV format for transparency and accountability.
- Responsive and accessible design for optimal viewing across various devices and assistive technologies.

Staff Management System (IT22321022)

- The system ability to calculate staff salaries based on leave and OT information.
- Utilizing data analytics to generate insights from staff leave, overtime, and task allocation data enables informed decision-making about salaries.
- Enabling real-time task requests ensures timely response to operational needs. Task managers can submit requests soon as they arise, and staff members can promptly acknowledge and act on them
- Enabling real-time task requests ensures timely response to operational needs.

Product Management System (IT22584854)

- Inventory manager can print shipping labels instantly.

Finance Management System (IT22052988)

- The system ability to payment funds for the relevant departments like vehicle management and staff management.
- The system ability to download payment approved or reject reports.
- Update and maintain financial report

Vehicle Management System (IT22369574)

- Integrate features to chec the condition of vehicles.
- Create a dashboard to view all requests , vehicle statuses, maintenance summaries and other relevant information at a glance easily.

- Provide a mechanism to request maintenance costs for servicing vehicles involve generating cost estimates.

Commercialization

Step into a world where waste becomes wealth and garbage management becomes a profitable venture. Our municipality's commercialization initiative is not just about collecting trash; it's about unlocking the hidden value within it. Through meticulous planning and strategic implementation, we've devised a multifaceted approach to monetizing waste management.

Firstly, we've meticulously structured our pricing system to ensure fairness and flexibility. Whether you're a small business or a large corporation, our pricing tiers cater to your specific needs and waste volume. With transparent pricing models, you'll always know exactly what you're paying for, fostering trust and confidence in our services.

But it doesn't stop there. Our marketing team has launched dynamic campaigns to spread the word about our commercialized garbage management services. Through captivating

advertisements and community outreach events, we're engaging with businesses and residents alike, showcasing the benefits of our innovative approach.

Behind the scenes, our billing and payment system ensures seamless transactions, making it easy for our commercial clients to manage their accounts. From invoicing to payment processing, we've streamlined the entire process, leaving no room for confusion or delays.

As we embark on this journey, we're committed to continuous improvement. Regular monitoring and evaluation allow us to fine-tune our strategies, optimizing efficiency and maximizing returns. By staying agile and responsive to feedback, we're shaping the future of waste management one step at a time.

Join us in this exciting venture as we transform garbage into gold and pave the way for a more sustainable future. Together, let's turn trash into treasure and build thriving communities that prioritize environmental stewardship and economic prosperity.

Staff Management System (IT22321022)

Introduction

In the Garbage Management System, staff Management can add new staff members and remove existing ones. Once added, they are assigned specific tasks based on their experience and skills. This function organizes and calculates all the salaries of the staff by considering their working hours, days and OT hours. And the final paysheet is sent to the finance management for the approval of payments.

Module:

- Staff Management System for Garbage Management System's workers

Completion Level Of Features:

- Create Registration page for register new staff members
- Create the validation for the registration page
- Create the data retrieve page
- Create the update and delete staff member details
- Create the search part for staff members
- Create the staff requests view page

Works not yet complete:

- Create salary report generation page
- Create the staff requests report generation page

Completion Level Percentage: 82% level

SQL Queries Used:

Create Staff Member:

```
INSERT INTO staff_members (mname, memail, mphone, mdate, maddress, mage, mgender, mrole, mnic, mwdays, msalary)
VALUES (?, ?, ?, ?, ?, ?, ?, ?, ?, ?, ?);
```

Update a Staff Member:

```
UPDATE staff_members
SET mname = ?, memail = ?, mphone = ?, mdate = ?, maddress = ?, mage = ?, mgender = ?, mrole = ?, mnic = ?, mwdays = ?, msalary = ?
```

WHERE id = ?;

Delete a Staff Member:

DELETE FROM staff_members WHERE id = ?;

Get All Staff Members:

SELECT * FROM staff_members;

Get Staff Member ID:

SELECT * FROM staff_members WHERE id = ?;

Algorithms:

- Algorithm for filtering staff members by name
- Algorithm for filtering task manager requests by job role
- Algorithm for downloading monthly salary report
- Algorithm for downloading staff requests report

pseudocode representation

```
// Staff Member Details
displayStaffMemberDetails()
if (StaffManagerWantsToEditDetails()):
    editStaffMemberDetails()
if (saveChanges()):
    saveChangesToDatabase()
else:
    discardChanges()

// Profile Deletion
if (StaffManagerWantsToDeleteProfile()):
```

```

        confirmDeletion()
    if (confirmDeletion()):
        deleteProfile()
    else:
        cancelDeletion()

// Searching
sendSearch()
if (StaffManagerWantsToSearchStaffMembers()):
    searchStaffMembers()
if (saveChanges()):
    saveChangesToDatabase()
else:
    discardChanges()

// details of staff members
if (StaffManagerWantsToGetDetails()):
    confirmGetDetails()
if (confirmGetDetails()):
    readProfilePage()
else:
    redirectAllStaffMembersPage()

```

Finance Management System- IT22052988

Module:

- Finance Management System for Garbage Management System

Completion Level Of Features:

- Create Finance home page
- Create payment page
- Create financial report page for update and download reports.
- Create financial request page

Works not yet complete:

- Navigate to payment page when confirm the product
- Resend approved funds reports to relevant departments

SQL Queries Used:

- `SELECT * FROM FinancialReports;`
- `INSERT INTO Payments (Card_Number, Amount, Expiration_Month, Expiration_Year, CVN)
VALUES ('123456789012', 100.50, '04', '2024', '123');`
- `DELETE FROM Requests WHERE id = 1;`
- `UPDATE Requests`
- `SET date = '2024-04-27', decision = 'reject', amount = 200.00, note = 'Rejected due to
insufficient funds'`
- `WHERE id = 1;`
- `INSERT INTO Requests (date, decision, amount, note)`
- `VALUES ('2024-04-27', 'accept', 100.00, 'Approved request');`

Algorithms:

- Define initial state using useState hooks for searchTerm.
- Define teamMembers array containing objects with name, id, and contact properties.
- Render components, forms, input fields, and data based on state and user interactions.
- Initialize state variables for form data (formData) and errors.

pseudocode representations

Start

Initialize Financial Management Subsystem

Interface: Administrator

Navigate to Financial Management Page

Display Financial Management Menu

Options:

1. View Financial Transactions
2. Validate Client Payments
3. Generate Financial Reports
4. Exit

View Financial Transactions

Display list of financial transactions

Include transaction details:

- Transaction ID
- Transaction Type (e.g., Salary, Expense, Payment)
- Amount
- Date/Time

Validate Client Payments

Display list of pending client payments

Validate each payment:

- Verify payment details
- Mark payment as valid and accounted for

Generate Financial Reports

Select criteria for report generation:

- Date Range
- Transaction Types
- Financial Categories (e.g., Salaries, Expenses, Payments)

Generate and display detailed financial report based on selected criteria

Exit Interface

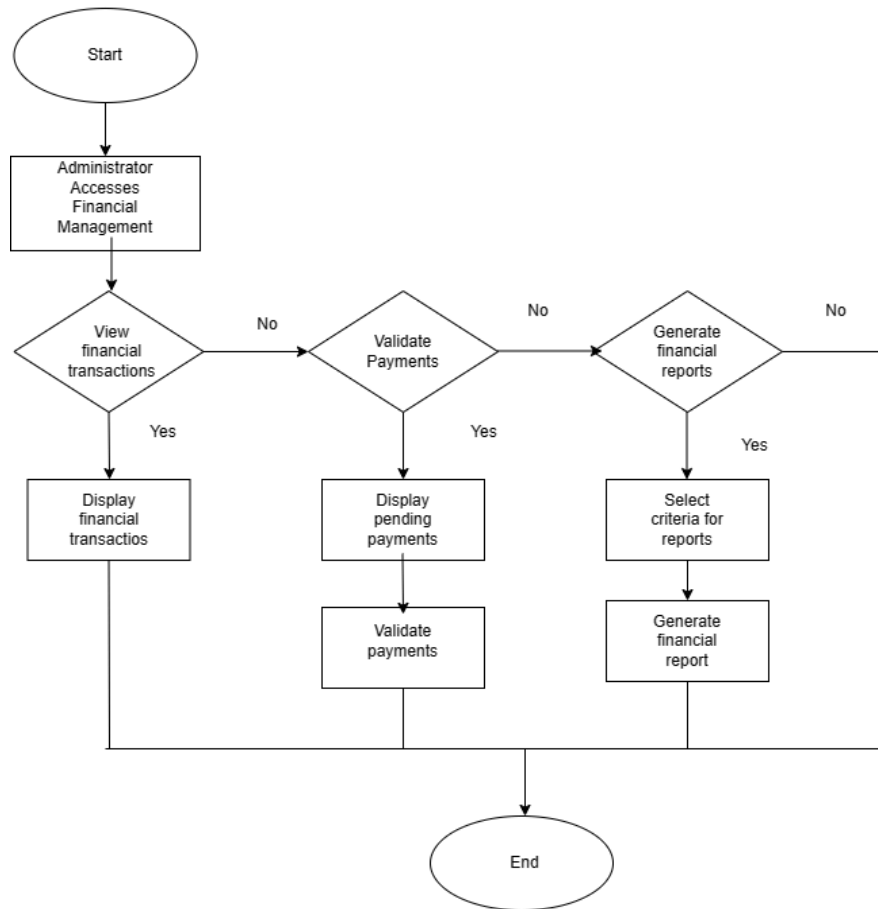
End program execution

End Interface

End

Flow Chart:

Finance Management System



Research and Development Management System- IT22304506

Module:

- Research and Development Management System for Garbage Management System

Introduction

The Research & Development Management system is a comprehensive platform designed to facilitate efficient management and interaction within a research environment. It offers a range of functions aimed at enhancing the publication, viewing, and feedback processes for research articles. The system allows the research team to publish articles across various areas of study, ranging from technological innovation to behavioral studies. Customers can access and provide feedback on published research, contributing to a dynamic and collaborative research community. Integrating research and development (R&D) within garbage management systems

is imperative for fostering innovation, optimizing processes, and addressing pressing environmental concerns. Through R&D, novel solutions and technologies can be developed to enhance waste collection, sorting, recycling, and disposal methods, ultimately leading to more efficient and sustainable practices. Moreover, research efforts contribute to identifying and mitigating environmental impacts, ensuring public health and safety, informing policy decisions, and promoting resource recovery and community engagement. By continuously advancing R&D initiatives within garbage management, societies can adapt to changing conditions, reduce environmental footprint, and move towards a more circular and sustainable approach to waste management

Completion Level Of Features:

- Create Research page
- Create the validation in the Create Research page
- Create Delete Research page
- Create the validation in the Delete Research page
- Create update research page
- Create the validation in the Update Research page
- Create user header
- Create the user footer
- Create the Research product selling page
- Create the Generate report when the product selling

Works not yet complete:

- Navigate to payment page when confirm the product

SQL Queries Used:

- `SELECT * FROM research_products;`
- `INSERT INTO cart_items (user_id, research_id, quantity) VALUES (?, ?, ?);`
- `DELETE FROM cart_items WHERE cart_item_id = ?;`
- `SELECT * FROM research_list;`
- `DELETE FROM research_list WHERE research_id = ?;`
- `UPDATE research_list`
`SET`

```

title = ?,
name = ?,
address = ?,
description = ?,
date = ?,
category = ?,
composting = ?,
reducing = ?,
donating = ?,
    energy = ?,
reuse = ?,
other = ?,
imgUrls = ?,
price = ?,
isProduct = ?,
importance = ?
WHERE
    research_id = ?;

```

Algorithms:

- Algorithm for Filtering Researches by Title or Category
- Algorithm for Updating Research Details.
- Algorithm for Downloading Purchase Report.

pseudocode representations

- Fetching Research Data:

```

Procedure fetchResearches():
    Call API endpoint to fetch research data
    If response is successful:
        Parse JSON data
        Initialize researches array with parsed data
        Set loading state to false
    Else:
        Set error message
        Set loading state to false

```

- Handling Search Input Change:

Procedure handleSearchInputChange(event):

Update search input state with event target value

- Adding Research to Cart:

Procedure addToCart(research):

Append research to cart items array

- Downloading Purchase Report

Procedure handleDownloadReport():

Convert purchase details to CSV format

Create a Blob with CSV data

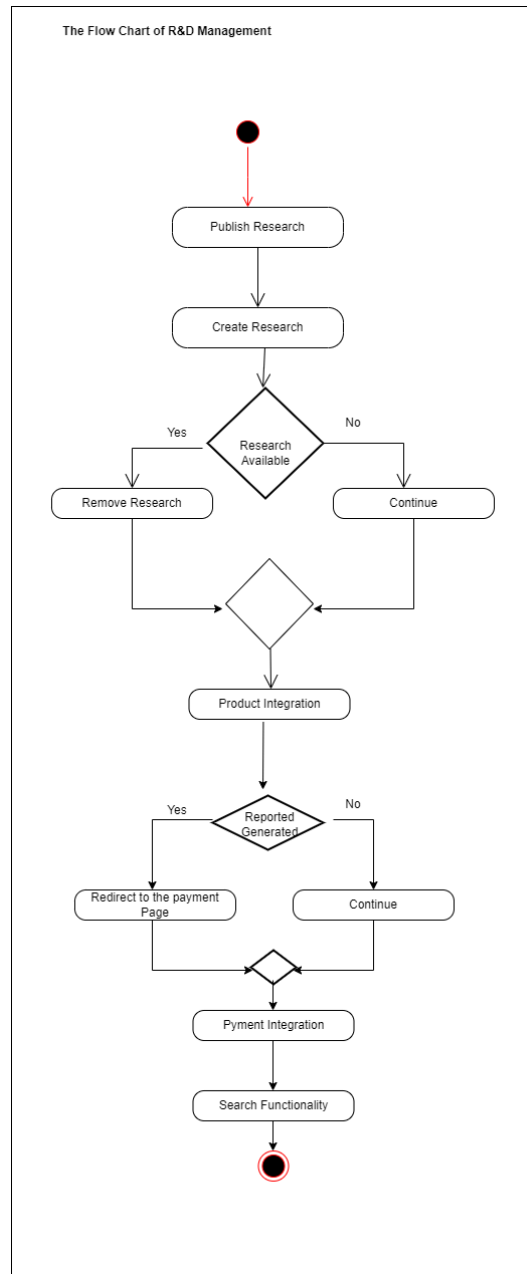
Create a URL for Blob object

Create a link element with download attribute

Append link to document body and trigger download

Remove link element and revoke URL

Flow Chart:



Customer Management System (IT22338334)

Introduction:

For those using our services, the Customer Management System in our Garbage Management Web Application is made to simplify and improve their experiences. This function includes a range of functional criteria designed to provide an easy to use experience for administrators and customers alike. On the site, users may quickly register and fill out the necessary information for a customized experience. Customers can efficiently get the services and buy products through the system. Customers can pay for their buying services and products through the system. And also customer can search products and services through the search bar. And registered users can update, delete their personal information through their profile. In our all-inclusive garbage management solution, the Customer Management System is an essential element that promotes customer involvement, satisfaction, and effective service delivery.

Module:

- Customer Management System

Completion Level Of Features:

- Create signin page
- Create the validation in the signin page
- Create signup page
- Create the validation in the signup page
- Create profile page
- Create update,delete the profile
- Create signout from the profile page
- Create Home Page
- Create About page
- Create user header

Works not yet complete:

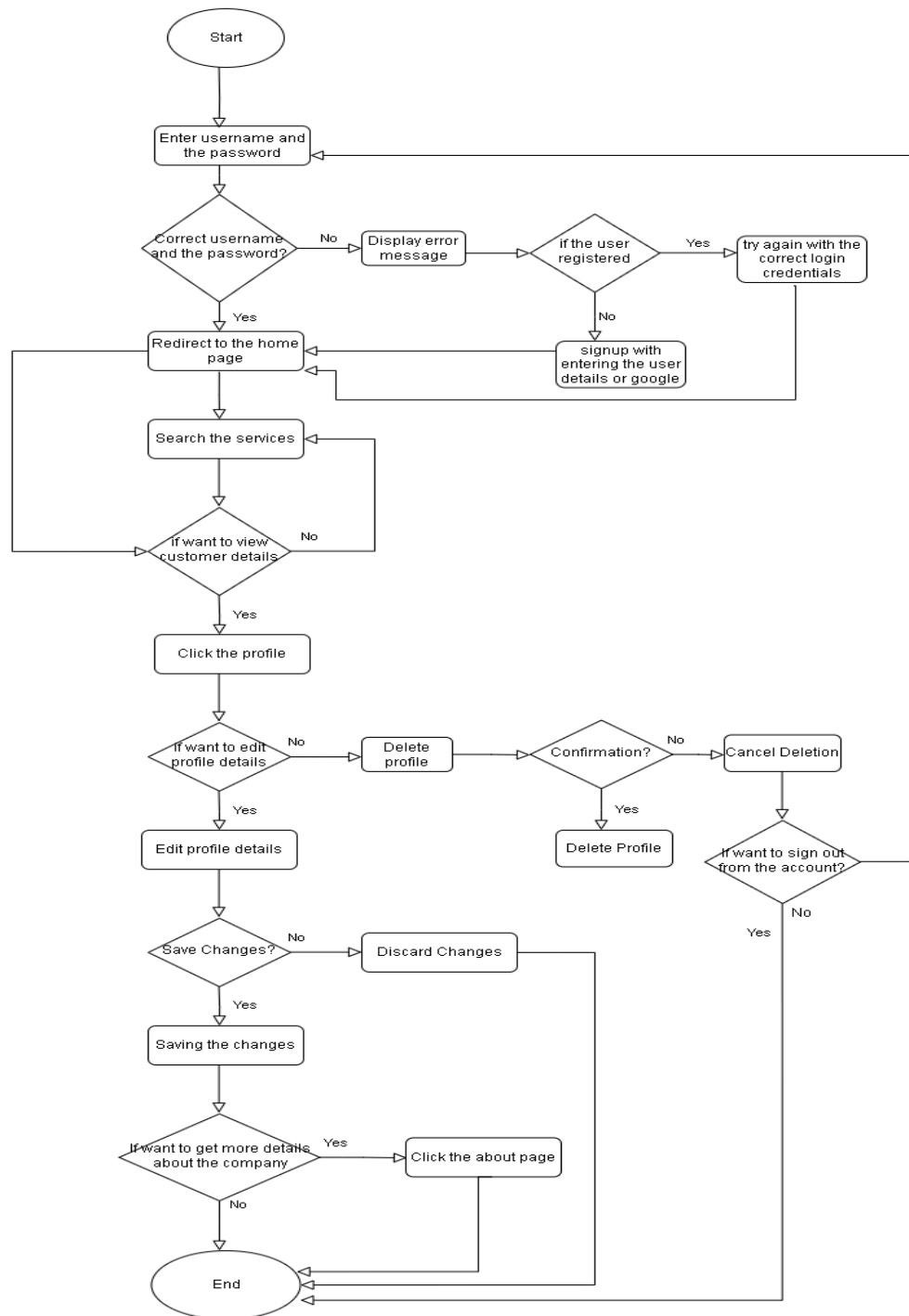
- Change the background color in the home page
- Create the services page to be search from the search bar
- Create generate report

Algorithms:

- User sessions
- Search services Algorithm

Flow Chart:

Customer Management System



Pseudo Code:

Start

// Login

input username, password

if (validate(username, password)):

 displayCustomerDetails()

else: displayErrorMessage()

End

// Customer Details

displayCustomerDetails()

if (customerWantsToEditDetails()):

 editCustomerDetails()

if (saveChanges()):

 saveChangesToDatabase()

else:

 discardChanges()

// Profile Deletion

if (customerWantsToDeleteProfile()):

 confirmDeletion()

if (confirmDeletion()):

 deleteProfile()

else:

 cancelDeletion()

// Searching

sendSearch()

if (customerWantsToSearchServices()):

 searchServices()

if (saveChanges()):

 saveChangesToDatabase()

else:

 discardChanges()

// details of company

if (customerWantsToGetDetails()):

 confirmGetDetails()

if (confirmGetDetails()):

 readAboutPage()

```
else:  
    redirectHomePage()
```

```
End
```

SQL Queries Used:

- Search Services
"select * from user_db.member where id = '"+search+"'"
- Insert a new member
String sql = "INSERT INTO user_db.member(USerID,UName, Email , Password)
values(?, ?, ?, ?, ?, ?, ?)";
- Update a user
String sql="update user_db.member set UserID = '"+UserID+"',UName =
"'+UName+'",Email = '"+Email +"', " + "Password = '"+Password +"' where id =
"'+search+"'"
- Delete an account
String sql="delete from user_db.member where id = '"+search+" "';

Database Queries Used:

```
import mongoose from "mongoose";  
  
const userSchema = new mongoose.Schema({  
  username:{  
    type:String,  
    required: true,  
    unique: true,  
  },  
  email:{  
    type:String,  
    required: true,  
    unique: true,  
  },  
  password:{  
    type:String,  
    required: true,  
  },  
},
```

```
    avatar: {
      type: String,
      default:
"https://cdn.pixabay.com/photo/2015/10/05/22/37/blank-profile-picture-973460_960_720.png"

    },

  },
  { timestamps: true }
);

const User = mongoose.model('User', userSchema);

export default User;
```

Introduction:

A vehicle management system efficiently handles tasks like registering new vehicles , assigning them to specific duties, updating , deleting, and more. It maintains a list of vehicles available for various tasks, and the user-friendly interface ensures effortless administration without any hassle.

Module:

- Vehicle Management System for Garbage Management System

Completion Levels of Features:

- Create a new vehicle registration page
- Create a page to display all vehicles
- Create a page to update and delete vehicles
- Create an auto generate vehicle maintenance summary report
- Create validation for vehicle registration page

Works not yet:

- Create a page to request maintenance costs.
- Create a page for vehicle condition checking.
- Create vehicle request view page

Algorithms :

- Maintenance summary generating algorithm
- Maintenance cost estimate algorithm
- Vehicle conditions checking algorithm
- Filtering vehicle by there task algorithm
- Request status editing algorithm

SQL Queries Used:

- Insert a vehicle ⇒

INSERT INTO Vehicles (VehicleID, Name, VehicleNum, Work, CurbWeight, FuelType, FuelCapacity)

- Select all details of a vehicle ⇒

SELECT*

FROM Vehicle

- Delete a vehicle ⇒

DELETE FROM Vehicles

WHERE VehicleID = ?

- Update a vehicle details ⇒

UPDATE Vehicles

SET

Name = ?

VehicleNum = ?

Work = ?

CurbWeight = ?

FuelType = ?

FuelCapacity = ?

WHERE

VehicleID = ?

Route Management System

Introduction

The route management system plays a crucial role in optimizing and streamlining the process of garbage collection within a community or municipality. In the context of a garbage management website, the route management system serves as the backbone for coordinating and managing the collection routes undertaken by waste management crews.

Efficient route management is essential for ensuring timely and effective garbage collection, minimizing operational costs, reducing environmental impact, and enhancing overall service quality. By leveraging technology and data-driven approaches, garbage management websites can revolutionize how routes are planned, monitored, and executed.

Key features of a route management system in a garbage management website may include route planning and optimization, real-time tracking and monitoring of collection vehicles, crew assignment and scheduling, automated notifications and alerts, as well as performance analytics and reporting capabilities.

In this era of digital transformation, the integration of route management systems into garbage management websites empowers stakeholders, including waste management authorities, collection crews, and residents, to collaborate more effectively, improve operational efficiency, and contribute to a cleaner and healthier environment.

Overall, the route management system serves as a vital component of modern garbage management solutions, driving efficiency, sustainability, and innovation in waste collection processes. Through continuous improvement and adaptation to evolving needs, garbage management websites equipped with robust route management capabilities can play a pivotal role in creating cleaner, healthier, and more livable communities.

Feature Completion

- work completed
- Backend API endpoint for searching
- create the frontend interface for creating the routes,read the routes,updating the route and delete a route.
- create the database for route details

Tasks Yet to Be Completed

- Create a report to analyze the monthly report of routes.
- Need to develop the UI designs

Database Queries

```
const garbageRouteSchema = mongoose.Schema(
  {
    number : {
      type :Number,
      required: true,
    },
    startLocation :{
      type :String,
      required:true
    },
    endLocation :{
      type :String,
      required:true
    },
    noOfHouses :{
      type :Number,
      required:true
    },
    houseAddresses :{
      type: String,
      required:true
    },
    date :{
      type:Date,
      required:true
    }
  },{
    timestamps: true,
  }
);
```

Pseudocodes

Start

Initialize Route Management System

Interface: Route Manager

Manage Route Details

Display Route Details Menu

Options:

1. Add New Route
2. Edit Existing Route
3. Delete Route
4. View Route Schedule
5. Generate Route Report
6. Exit

Add New Route

Prompt user for route details:

- Route Name
- Start Location
- End Location
- Collection Frequency
- Vehicle Type(s)
- Assigned Staff Members

Edit Existing Route

Display list of existing routes

Select route to edit

Update route details as needed:

- Route Name
- Start Location
- End Location
- Collection Frequency
- Vehicle Type(s)
- Assigned Staff Members

Delete Route

Display list of existing routes

Select route to delete

Confirm deletion

View Route Schedule

Display schedule for selected route

Include details such as:

- Collection Days/Times
- Assigned Vehicles
- Assigned Staff

Generate Route Report

Select criteria for report generation:

- Date Range
- Route Type (e.g., residential, commercial)
- Vehicle Usage

Generate and display route report based on selected criteria

Exit Interface

End program execution

End Interface

End

- **Module : Task Manage System**

Introduction

The task management system considers the customer's purpose, and according to that, the system will prepare the customer's request by logging the job for a specific number of staff members, relevant vehicles, and the relevant area. For that, it is needed to send requests to relevant management systems by requesting necessary resources. Definitely, the main role of this system is preparing the customer's request and coordinating with other relevant systems. The main purpose of this system is to provide efficient and perfect service to the customer and keep the whole system active by communicating with other sub-systems. As well as the system has ability to create new tasks once the customer request is received via the customer management system as a new job logging , update the task's status from time to time, and delete the task from the system database once it's completed.

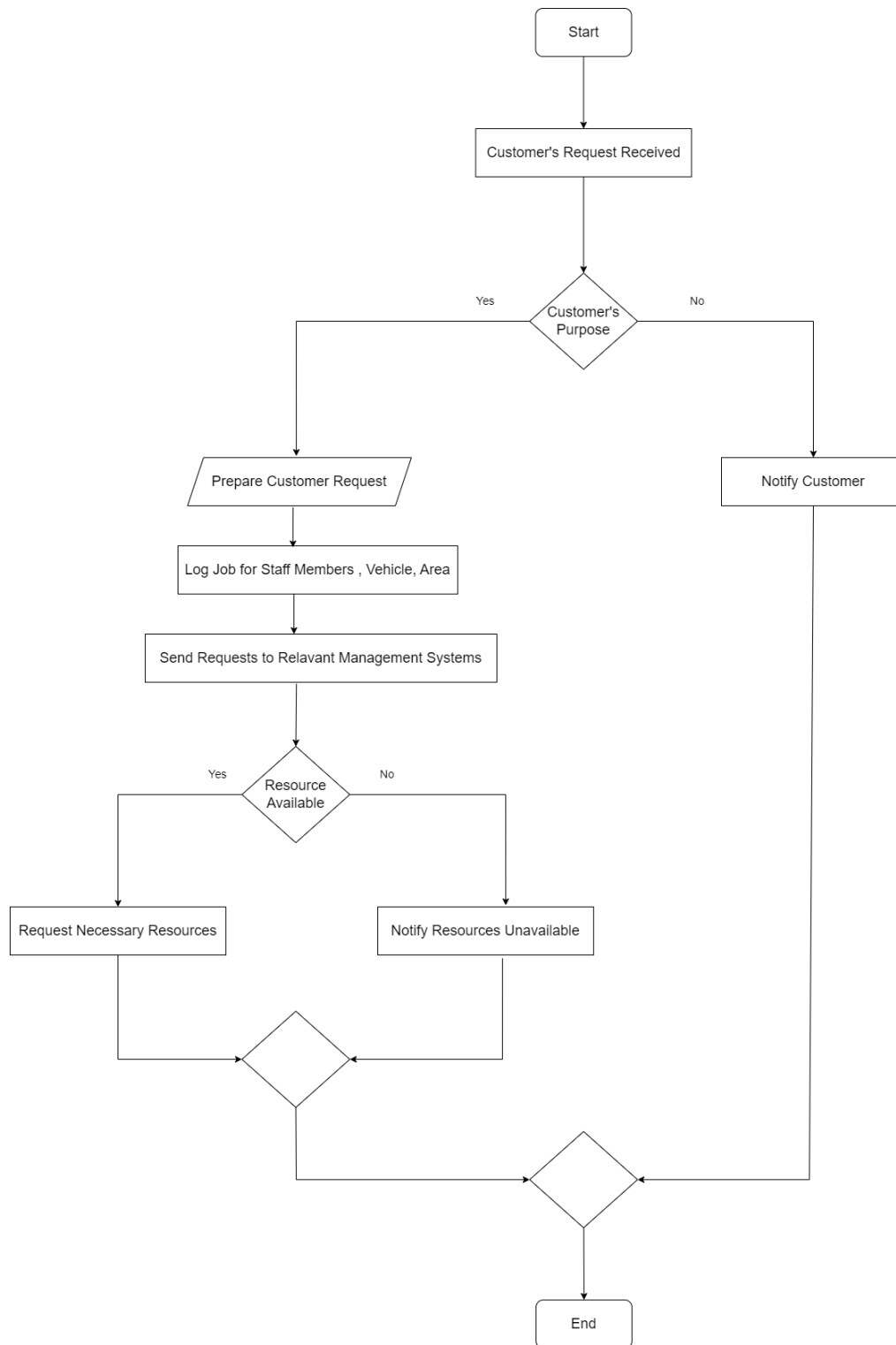
Feature of Completion

- Task Creation (100% completion rate)
- Update Task Status (100% completion rate)
- Delete Task (100% completion rate)
- Send Request for a vehicle (100% completion rate)
- Send request for the route (100% completion rate)

Tasks Yet to Be Completed

- Get customer requirements from the Customer Management System.
- Generate Report

Flow Chart



Pseudo Code

Start

Receive customer's request

If Customer's Purpose is known

Prepare customer's request

Log job for specified staff members, vehicles, and area

Send requests to relevant management systems for necessary resources

If Resources are available

Request necessary resources

Else

Notify resource unavailability

End If

Create new task based on customer request

While Task is not completed

Update task status periodically

If Task is completed

Delete task from system database

End If

End While

Else

Notify customer about missing purpose

End If

End

Introduction

The product managing subsystem is a main source of income of the garbage management system. All the sales-related tasks are handled through this subsystem. The uniqueness of our garbage management system is not only recycling garbage but also manufacturing and selling products. There are so many products selling on the garbage management system. Such as bins for indoor and outdoor needs, compost fertilizer, recycled paper etc.

When orders are placed by the customers (users), the inventory manager can see the order list when the inventory manager navigates to his relevant page. The inventory manager is the one who manages these orders and updates the order status whether the order is completed or not. Also, the inventory managers can generate reports of shipping labels

Inventory managers can add new products to the inventory and edit product details. And also can remove the product from the system when products are not selling anymore or out of stock.

Completion Level Of Features:

- Create a create listing page.
- Create a Product view page.
- Create an Edit listing function.
- Create a Delete listing function.
- Create an Order view page.

Works not yet complete:

- Create a search function for the Order page.
- Create a report generation for the Order page.

SQL Queries Used:

No queries are used.

Database:

MongoDB (Non-relational Database)

Algorithms:

- Algorithm for Filtering Orders by OrdreID

Pseudo code

Start

Initialize Product Management Subsystem

Interface: Inventory Manager

Navigate to Inventory Manager Page

Display Inventory Manager Menu

Options:

1. View Orders
2. Update Order Status
3. Generate Shipping Labels
4. Manage Products

Sub-options:

- a. Add New Product
 - b. Edit Product Details
 - c. Remove Product
5. Generate Reports
 6. Exit

View Orders

Display list of orders

Include order details:

- Order ID
- Customer Name
- Product(s) Ordered
- Order Status

Update Order Status

Select order to update

Set order status:

- Pending
- In Progress
- Completed
- Cancelled

Generate Shipping Labels

Select orders for label generation

Generate and print shipping labels for selected orders

Manage Products

Display product management menu

Options:

1. Add New Product
2. Edit Product Details
3. Remove Product
4. Exit

Add New Product

Prompt user for product details:

- Product Name
- Category
- Description
- Price
- Quantity

Edit Product Details

Display list of existing products

Select product to edit

Update product details as needed:

- Product Name
- Category
- Description
- Price
- Quantity

Remove Product

Display list of existing products

Select product to remove

Confirm removal

Generate Reports

Select criteria for report generation:

- Date Range
- Product Sales

- Inventory Levels

Generate and display report based on selected criteria

Exit Interface

End program execution

End Interface

End