

Sri Lanka Institute of Information Technology



Online Landscape Planning And Maintenance Management System Information Technology Project (IT2080)

Project Proposal

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1. Background

Mr. Jagath Fernando is an experienced landscaper who has been working in the industry for +15 years and currently lives in Gampaha. He currently works as an independent landscaper who operates a small company on his own. He has experience of working on different landscaping projects in different areas of the country. He always tries to satisfy his customers by providing a better service. His services are delivered to customers on schedule but for the customers in a limited geographical area. Our client's vision is to serve the entire country with his colleagues to the best of their abilities. Despite his expertise, he understands that he and his fellow landscapers face different challenges.

2. Problems and Motivation

2.1 Problem Statement

Mr. Jagatha, an experienced and independent landscaper, faces several challenges in managing and expanding his landscaping services. He currently handles functions related to the customer projects manually. And he finds that all his competitors are using this manual approach. He understands that in this fast-paced market he needs a technologically advanced solution.

1. **Manual Data Management** – Project details, worker schedules, and supplier information are recorded on paper or spreadsheets, leading to errors, data loss, and difficulty in retrieval.
2. **Limited-Service Reach** – High transportation costs and lack of regional coordination prevent landscapers from expanding to other areas.
3. **Difficult Resource Sourcing** – Finding specific plants, materials, or equipment requires contacting multiple suppliers manually, wasting time and effort.
4. **Unreliable Workforce Recruitment** – Skilled workers are hired through personal networks or local ads, making recruitment slow and inconsistent.
5. **Inefficient Coordination** – Communication between landscapers, suppliers, and workers is scattered across phone calls and messages, causing delays.

6. **Costly and Limited Project Promotion** – Marketing is done via traditional advertisements, which require extra cost and have limited audience reach.

These challenges are also shared by many other landscapers in the industry and demand for landscape designs grows rapidly creating a need for a centralized technical solution.

2.2 Motivation

The motivation for developing the **Landscape Planning and Maintenance Management System** is to empower independent landscapers to work more efficiently, access resources and skilled workers easily, and grow their businesses beyond geographical limitations. By introducing a centralized online platform, the challenges that landscapers like Mr. Jagath face can be transformed into opportunities.

By implementing the proposed platform, the client and users will be able to,

1. **Centralized Project Management** - Store and manage all project details, client requirements, timelines, and progress updates in one place.
2. **Resource Integration** – Provide users to one online shop to purchase and rent items according to their needs
3. **Workforce Recruitment System** – Landscapers and workers can apply through the platform, making recruitment faster and more reliable.
4. **Automated Coordination** - Built-in communication tools to coordinate with suppliers, workers, and clients in real-time.
5. **Digital Marketing & Project Promotion** - Landscapers can publish and showcase their completed projects directly on the platform. And landscapers and workers can get automatic promotion to higher categories according to customer reviews.
6. **Multi-District Service Expansion** - The platform allows customers from different areas to get service from the system by requesting their nearest landscaper

The system will integrate multiple functions into one platform, eliminating the need for manual data handling and scattered communication.

3. Aim and Objectives

3.1 Aim

The aim of this project is to develop a centralized, web-based **Landscape Planning and Maintenance Management System** using MERN stack that enables client to efficiently manage projects, online shop, recruit skilled workers and landscapers, and promote their services through a single online platform, thereby reducing operational costs, improving coordination, and expanding their service reach beyond geographical limitations.

3.2 Objectives

1. **Landscape project management** – Provide a digital platform to request, track, and update all the landscaping project details in one place.
2. **Product and inventory management** – Insert products and updating them real time make an online shop that give access to customers unlimited products like machines, tools, fertilizers, interlocks and plants.
3. **Payment management and delivery tracking** – Customers can make their payments through an easy payment portal and track their order delivery until it arrives to their doorstep.
4. **User management and coordination** – The users have access to simple dashboards and they are managed and coordinated to better workflow by avoiding delays in the process.
5. **Notification & system alerts** – Automated notifications via WhatsApp and emails to notify customers and users about orders, service requests and project details.
6. **Expanded service reach** – Customers can access the system from anywhere and workers can easily access the system through their mobile phones even from their work sites.
7. **Ensure Data Accessibility & Security** – Store project, inventory, user and payment data securely with easy retrieval when needed.
8. **Reports and analytics** – System can generate reports about payments, orders, projects and inventories.
9. **Live customer support** – Customers can get support from live chat about system.

4. System Overview

4.1 Landscape Management

The Landscape Management module in the **Landscape Planning and Maintenance Management System** is designed to handle the complete service lifecycle, from the customer's initial request to project completion. The module integrates appointment scheduling, quotation management, blueprint handling, project tracking, and real-time communication in one platform. Customers can request services, make appointments and view project progress using this module. And, landscapers can share the project details and real time progression with customers. Customers and landscapers are always connected through whatsapp.

This module allows transparency between the landscaper and the customer. Also, it eliminates the need for manual tracking, reduces delays caused by fragmented communication, and provides a structured workflow that improves efficiency and customer satisfaction.

Key functions in Landscape Management

1. Customers can request landscape services
 - A customer can directly request a landscape service and a appointment from a landscaper by paying.
 - Landscapers can accept or reject the service requests they get from the customers.
2. Customers can request blueprints
 - Customers have an option to request a blueprints of their projects by paying.
 - Then landscaper provides the blueprints to the customer.
3. Customers can see their projects' progress.
 - While the project progress landscaper can update their projects' progressions through the system.
 - Which customer can see through his dashboard.
 - Landscaper can make changes to those posts from time to time to update the customers on time.

4. Communication between landscaper and customer

- Every time landscapers make updates customer receives a whatsapp message regarding it.
- It updates the customer on time and if they want, they continue their conversation through it.
- Also the system's notification bar provides important notifications for both customers and landscapers.

Functional Requirements:

- **Create:**

Add project progression, blueprints, service requests, and appointments.

Customers can request services and make appointments. Landscapers can add project progression status.

Landscapers can generate a report about current project and also about old projects.

- **Read:**

Access project progression, blueprints, service requests and appointments.

Customers can view the project progression from their dashboard. Landscapers can view customer appointments and service requests.

- **Update:**

Revise/Accept service requests, update project progressions, update blueprints, accept/revise appointments.

Service requests and appointments can be accept or reject by landscaper and project progression also can update.

- **Delete:**

Reject and delete service requests, delete blueprints, deleting incorrect or outdated project updates.

Customers can delete service requests. Landscapers can delete uploaded blueprints and incorrect or outdated project updates.

Non-Functional Requirements:

- Performance: Design upload and sharing operations should be completed efficiently, within a few seconds.
- Usability: Landscapers should easily navigate between service requests, design uploads, and inventory requests.
- Security: Landscape designs and customer-related documents must only be accessible to authorized users.
- Auditability: All actions such as accepting service requests or uploading plans must be logged for accountability.
- Responsiveness: The system should provide real-time notifications when new customer requests are received (Alert message).

Technical Requirements:

- Database
- Integration
- Security

4.2 Customer Management

Landscape Planning and Maintenance Management System's Customer Management module is made to make it easier for landscaping service providers to keep track of service history, manage client information, and communicate with clients consistently. It makes it possible for employees to keep and retrieve vital client information, including names, contact information, location, service preferences, and past interactions.

Maintaining individualized service, creating enduring client relationships, and cutting down on administrative burdens are all made possible by this module. The system facilitates effective scheduling, focused promotions, and customized service delivery by centralizing consumer data.

Also we introduce loyalty customer who is an old customer who has special benefits. Through proactive communication, service status monitoring, and real-time updates, the system raises customer satisfaction. Coordination and effective management of all client-related tasks are ensured via integration with other modules, such as job scheduling and billing.

Functional Requirements:

- **Create:**

We can add new customer details like name, contact info, and service preferences after the registered to the system customer can request the maintenance the service . They can select how this customer found us and if through an old customer, register new customers by entering their name and registration number.

Customer report generation and maintenance service report generation.

- **Read:**

We can view and search for customer info, like their service history and job status. Employee can see the maintenance request of the customer. If you are connected through an old customer, check to see if the old customer details are correct.

- **Update:**

If anything changes, like a phone number or address Employee can accept and update the maintenance service status.

The old customers who introduced us the new customer get 3% off from their next service.

- **Delete:** We can remove old or duplicate records. Employee can delete the unwanted maintenance service records. Also customer can delete their accounts.

Non-Functional Requirements:

- **Usability:** The system should offer a clean and user friendly interface for tasks like booking appointments, making payments, and viewing landscaper ratings.
- **Performance:** Pages such as service requests and item purchasing should load quickly.
- **Availability:** The platform should be available 24/7, especially for key functions like payment and service tracking.
- **Security:** Customer data, including login credentials and payment information, should be securely encrypted (Hash algorithms).
- **Reliability:** All transactions and booking confirmations must be processed correctly and notify users through a safe communication platform on time.

Technical Requirements:

- Access Control
- Data Quality

4.3 Inventory Management

Inventory management system in **landscape planning and maintenance management system** enables to handle the seamless organization, facilitate customer purchases and rentals, tracking orders, and distribution of materials essential for landscaping and garden maintenance. This system is to ensure efficient management of landscaping resources, reduce operational delays caused by material unavailability, and provide a structured marketplace for both service providers and customers. It supports internal operations for landscapers and also serves as a digital storefront for customers to browse and purchase available items independently of service requests.

Key Functions in the Inventory Management

1.Customer Purchases and Rentals

- Customers can directly purchase available inventory items.
- Machinery and large-scale equipment are made available for rental, rather than direct purchase, due to their nature and cost.

2.Rental Duration and Extensions

- During the rental process, the Inventory Manager assigns a specific rental duration to the customer.
- If needed, customers can request a time extension, which may incur additional charges.
- Extensions are only allowed with Inventory Manager approval.
- If the item is not returned within the allowed time, a penalty is automatically applied to the customer's account.

3.Order Management and Fulfillment

- Once an order is placed (either purchase or rental), the Inventory Manager:
 - Prepares and verifies the order
 - Confirms item availability

- Informs the customer
 - After the verified payment assigns the order to the Delivery Management system
- This ensures a streamlined and traceable order fulfillment process.

4.Support for Landscaping Service Requirements

- When a customer requests landscaping services, the assigned Landscaper may require specific materials or equipment.
- The landscaper submits a quotation listing the needed items to the Inventory Manager.
- Upon approval, the Inventory Manager prepares the order using a unique Order ID, which is used for tracking the request throughout the process.

5.System Integration and Interactions

The Inventory Management module interacts directly with other system components:

- Landscape Management Module: For material provisioning related to landscaping projects.
- Delivery Management Module: For managing the dispatch and delivery of orders to customers.

This integration ensures effective coordination, reduces delays, and maintains accurate tracking across the platform.

Functional Requirements

Create:

Inventory manager add items with item name, category, price under categories such as plants, Fertilizers, Landscaping equipment, interlock materials (tiles, stones, bricks) and rental machinery.

Generating reports about inventory stocks, customer orders.

Read:

Displays the inventory item details in the customer's dashboard (as Shop)

Allows landscapers to browse and request items for their approved landscaping or maintenance jobs.

Update:

Update item details, update rented period for special customer requests.

automatically update stock levels

Delete:

Delete items from the inventory database, Delete over dated orders.

Delete items that are currently booked, rented, or under processing

Non-Functional Requirements

- Accuracy - Inventory stock levels must be maintained and updated in real-time based on usage and deliveries.
- Audit Trail - All actions, including assignments and deliveries of items, should be logged for transparency and tracking.
- Performance - Updates and stock check-ins/outs should process quickly to support field operations.
- Security - Only authorized personnel should be able to view or modify inventory records.

Technical Requirements

- Database
- Performance
- Integration Requirements

4.4 User Management and System Coordination

The System Coordination Module of the Landscaper Web Application is made to streamline and consolidate the administration of job assignments, service appointments, users, and operational duties. Authorizing user registrations, allocating landscaping chores, verifying payments, controlling system settings, producing reports, and monitoring notifications are some of the main duties that fall under the purview of the coordinator and administrator.

Employee & Landscaper Rating and Grading System

The system allows customers to rate both employees and landscapers after completing a job or project. Ratings are collected on a 1–5 star scale with optional comments. The platform automatically calculates the average score for each individual and assigns a performance grade (A, B, or C) based on the score.

1. Employee Rating & Grading System

Our system lets customers rate employees after completing a landscaping service. Ratings are given through a star system (1–5 stars) along with optional comments. The platform automatically calculates the employee's average score and assigns a performance grade (A, B, or C) based on that score.

- Customer Feedback: Ratings consider service quality, communication, and professionalism.
- Automated Analysis: The system processes ratings from multiple jobs to determine a final score.

❖ Grade Assignment:

- Grade A: 4.5–5.0 stars (Excellent performance)
- Grade B: 3.5–4.4 stars (Good performance)
- Grade C: Below 3.5 stars (Needs improvement)
- Display: Grades are visible in employee profiles and the admin dashboard.

2. Landscaper Rating & Grading System

Customers can also rate landscapers after the completion of a project. The system collects these ratings and automatically calculates an average score to determine the landscaper's grade (A, B, or C).

- Customer Feedback: Ratings focus on creativity, execution quality, and overall satisfaction.
- Automated Analysis: Average ratings from all completed projects are calculated.

❖ Grade Assignment:

- Grade A: 4.5–5.0 stars (Excellent quality & design skills)
- Grade B: 3.5–4.4 stars (Good quality)
- Grade C: Below 3.5 stars (Needs improvement)
- Display: Grades appear in landscaper profiles and search results for easy customer selection.
- Benefits: Helps customers choose skilled landscapers, motivates high-quality work, and assists admins in promotion and hiring decisions.

Functional Requirements

• Create:

Coordinators can create job schedules, service categories, and assign jobs to landscapers.

Coordinator can also create hiring records and design application forms for potential employees and landscapers to apply through the system interface. They can also configure system-level settings.

• Read:

The system allows viewing of job applications.

Coordinator can access reports and audit logs of all administrative action.

- **Update:**

Coordinators can review and approve applications from employees and landscapers.

- **Delete:**

Coordinators can remove cancelled jobs, inactive users, and outdated records.

Admins can delete incorrect or unnecessary applications and system data.

Non-Functional Requirements

- **Security:** Admin access must be tightly controlled using role-based permissions to restrict sensitive actions like hiring and payment verification.
- **Auditability:** All administrative actions such as hiring, notifications, and report generation must be logged in the system.
- **Reliability:** Actions like verifying payments and sending notifications must execute accurately without failure.
- **Report Generation:** The system should be able to generate detailed reports quickly, even when handling large datasets.

Technical Requirements

- Access Control
- Data Quality
- Database

4.5Payment Management

The payment handling component of our landscaping management system is designed to support secure, efficient, and flexible financial transactions between customers, landscapers, and the system. It streamlines the entire payment process across different service stages- starting from appointment confirmation to full landscape execution, ensuring both accountability and convenience for all parties involved.

This functionality allows customers to make various types of payments, including appointment fees, blueprint design charges, and full or partial landscape payments. It also handles item purchases, such as fertilizers or tools. Through integration with the stripe payment gateway, all transactions are processed securely and validated in real-time.

Customers are provided with flexible options such as full payment, half payment, and balance payment methods. The system automatically updates payment statuses and triggers notifications to relevant users (customer, landscaper) through integrated communication tools like Twilio. In addition, receipts are generated in PDF format for transparency and future references.

Payment Gateway plays a vital role in maintaining a smooth workflow, ensuring services are initiated only after confirmed payments, and eliminating manual errors in billing and communication.

Functional requirements:

- **Create:**
 - Allow customers to initiate and make various payments (appointment, blueprint, landscape, item purchase)
 - Generate digital receipts for each transaction using PDF generation tools.
 - Generate payment reports.
- **Read:**
 - Display payment summary, history, status, and receipt download options or customers.
- **Update:**
 - Update payment status after successful transaction validation.
 - Enable admin to confirm payment manually if auto validation fails.

- **Delete:**
Allow authorized personnel to cancel or revoke invalid/failed payments from the system.

Non-Functional Requirements:

- **Speed:** Payment processing must occur within 2–3 seconds.
- **Security:** All transactions must be encrypted via secure protocols (SSL, JWT).
- **Compatibility:** Compatible across mobile and web platforms.
- **Reliability:** System must validate payments accurately and notify all related roles promptly.

Technical Requirements:

- **Access Control:** Only authorized users (customers and admins) can perform payment-related actions.
- **Payment Gateway Integration:** Stripe is used for secure online payments.
- **Notification Service:** Twilio is used for SMS and WhatsApp payment notifications.
- **PDF Receipt Generation:** pdfkit is used to generate downloadable receipts after each transaction.
- **Real-Time Validation:** Payments are linked to order IDs and confirmed via backend verification.

4.5.1 Delivery Management

Delivery management system designed to ensure smooth, secure, and professional handling of inventory deliveries in the landscaping service. It allows admins to assign deliveries to company-hired drivers using available vehicles, manage real-time status updates, and handle unexpected events like accidents. This improves logistics coordination, enhances customer satisfaction, and ensure business continuity through backup assignments and proper logging of events.

Functional Requirements

- **Create:**

Add new delivery vehicles, register drivers, Create delivery assignments, log accident reports.
Generate delivery reports

- **Read:**

View delivery schedules and assigned drivers/vehicles. Track vehicle availability, accident history, maintenance status. Access driver profiles, including delivery history and incident logs. View reports of delayed or rerouted deliveries.

- **Update:**

Update delivery status manually. Modify vehicle status manually. Edit driver information, update accidents report or assign follow-up actions.

- **Delete:**

Remove old or decommissioned vehicles from the system. Delete cancelled deliveries or reassigned tasks. Archive accident reports after resolution or audits.

Non-functional Requirements

- Reliability – system must support real-time updates without data loss.
- Scalability – ability to manage many deliveries, drivers, and vehicles.
- Security – secure role-based access.
- Usability - intuitive dashboard for quick status views and updates.
- Maintainability – easily add or remove drivers/vehicles with minimal technical effort.
- Transparency - Logs and reports for deliveries and incidents are accessible to admins.

6.Methodology

Tools and Technologies

Programming IDE	Visual studio
Source-Code editor	Visual studio code
Programming Language	MERN stack
Front End Development	React.js
Server-Side Web Application Framework and Application Programming Interface (back end)	Node.js / Express.js
Database Management System	Mongo dB
UX/UI Designing	Figma

In our Information Technology Project, we adopted a modular and agile-based development approach to ensure collaboration, efficiency, and quality across all phases of the project. The system was divided in to clearly defined functional segments including User Management, Landscape Service Management, Inventory Control, Payment Processing, and Customer Interactions. Each team member was assigned ownership of a specific segment, enabling parallel and independent development while maintaining consistency and seamless integration through GitHub.

To plan, document, and coordinate the development process, we employed a suite of industry-standard tools. Figma was used to designed user interface wireframes that ensure modern and intuitive user experience. To develop clear visual models, we utilized Draw.io for creating use case diagrams, flowcharts, and StarUML for more advanced UML diagrams like data flow diagrams. These tools supported effective communication of system behavior and structure during the design phase.

For project management, Jira served as our central platform to manage tasks, track issues, and maintain an agile workflow through sprint planning and real-time updates. Our documentation,

reports and presentations were created using Microsoft Word and PowerPoint, highlighting the productivity benefits of Microsoft Office Suite. All documents were collectively compiled and formatted by team members in shared environment to ensure consistency.

To model and manage our system's data, we will use MongoDB Cloud as our primary database platform. For visualizing and organizing database schema, tools like Hackolade and Draw.io were utilized. Our system design supports real-time data access and scalability across modules. We will develop our system using MERN stack, comprising MongoDB, Express.js, React.js, and Node.js. The React framework was chosen for frontend development due its reusable components and support for building highly interactive, single-page applications. On the server side, Node.js with Express.js allow us to build scalable and fast backend services. Our development will be primarily done using Visual Studio Code, with Postman used for testing API endpoints.

To handle secure payments and communication, we integrated:

- Stripe for processing appointment, blueprint, and landscape payments securely.
- Twilio to send real-time SMS and WhatsApp notifications to users regarding payment confirmations and service updates.
- pdfkit for generating downloadable PDF receipts ad reports for user transactions.

In addition, we used HTML5, CSS3, and JavaScript for structuring and styling web content, ensuring a responsive and user-friendly design. To enhance data communication and presentation, we used Jason to transfer and render structured information across components. Our development approach emphasized clarity, efficiency, and iterative improvement. As part of our software engineering practices, we used:

- Git and GitHub for version control and collaboration.
- Agile methodology, enabling continuous refinement of features baed on team and stakeholder feedback.

By combining these modern tools and practices, we ensured our landscaping system was secure, maintainable, user-friendly, and aligned with the expectations of both users and project evaluators.

Requirements engineering methods

- User interviews and observations: We will identify user needs by interviewing stakeholders such as customers, landscapers, and coordinators.
- Use case modeling: Created comprehensive use case scenarios and use case diagrams for all actors to specify how various roles interact.
- Process observation: Manual workflows in landscaping operations will be studied to identify pain points and automation opportunities.

Design Methods

- Unified Modeling Language (UML): UML diagrams such as activity diagrams, sequence diagrams, and class diagrams will be used to model system interactions, logic flow, and component behaviors.
- Wireframes: Wireframes will be designed using Figma to design clean interfaces for each user role.

Development Tools and Technologies

1. Front-End Development

- Used React.js to build a dynamic and responsive single-page application (SPA).
- Designed interfaces using HTML5 and CSS3 for structure and style.
- Used JSON to exchange and structure data across components.

2. Back-End Development

- Developed server side using Node.js, and event-driven JavaScript runtime.
- Used Express.js as the backend framework to handle routing, middleware, and APIs.
- Programmed both frontend and backend in JavaScript as part of the MERN stack.

3. Database Management System

- Implemented MongoDB Cloud as the NoSQL database for flexible data modeling.

- Stored complex data such as customer details, service requests, inventory, and payments.
- Ensured scalability and compatibility with MERN stack.

4. Version Control

- Used Git for local version control and branching.
- Used GitHub as the collaborative platform for repository hosting, pull requests, and issue tracking.
- Enabled smooth teamwork with continuous integration and conflict resolution.

5. Development Environment

- Used Visual Studio Code (VS Code) as the main IDE for both frontend and backend coding.
- Leveraged features like Git integration, debugging tools, and extensions for React and Node.
- Used Postman for testing and validating backend APIs.

6. Cloud Hosting and Deployment

- Selected AWS EC2 and Google Cloud as hosting options for production deployment.

Testing Methods

- Functionality testing to ensure each module works as expected.
- Usability testing to verify user-friendly interfaces.
- Web UI testing for design consistency and responsiveness.
- Performance testing for load handling.
- Security testing to validate role-based access and encrypted payments.

Integration Methods

- We will follow an iterative integration process, incorporating:

- Presentation-level integration of React components.
- Data integration via restful APIs between frontend and backend.
- Payment and communication API integrations with third-party tools (Stripe, Twilio).

Alternatives and Justifications

- We chose Node.js and Express.js over framework like Django for better compatibility with React and real-time performance in handling API requests.
- For design, we selected Figma and Drwa.io over Adobe XD due to ease of use, collaboration features, and team familiarity.
- Agile methodology was selected for its iterative nature, allowing us to refine features based on user and stakeholder feedback.

Work breakdown structure

	Student ID & Name with initials	Brief description of the function
01	S.A.H.K. Samarakoon	<p><u>Landscape management</u></p> <p>This handles the full-service cycle, from customer requests project completion. It combines appointment scheduling, quotations, blueprint handling, and project tracking in one place. Customers can request services and monitor progress, while landscapers can share updates in real-time. This improves transparency, reduces delays, and eliminates manual tracking, ensuring smoother communication and higher customer satisfaction.</p>

		<p>Create: customer can request services and make appointments.</p> <p>Landscapers can add blueprints and update project progress.</p> <p>Read: Customers can see their project progress on the dashboard.</p> <p>Landscapers can view service requests and appointments.</p> <p>Update: Landscapers can accept or revise service requests and appointments.</p> <p>Project progress and blueprints can be updated.</p> <p>Delete: customers can cancel service requests.</p> <p>Landscapers can delete outdated project updates or blueprints.</p>
02	R.M.M.K. Jayawardhena	<p><u>Inventory management</u></p> <p>Inventory management helps organize, track, and distribute landscaping materials like tools, fertilizers, and plants. It ensures that landscapers have timely access to necessary items, minimizing delays in operations. Customers can also browse and purchase available products through the system, making it both an internal resource manager and an online storefront for landscaping needs.</p>

		<p>Create: Add items (Fertilizers, Landscaping equipment, interlock materials and rental machinery)</p> <p>Can also set rental time, price and late return penalties for machinery.</p> <p>Read: Customers can view items in the shop. Landscapers can browse and request items for their jobs.</p> <p>Update: item details and rental periods can be updated.</p> <p>Stock levels are automatically updated when items are used or returned.</p> <p>Delete: Remove old or unavailable items from the inventory.</p> <p>Delete orders that are outdated or under processing.</p>
03	Loshana A	<p><u>User Management and System Coordination</u></p> <p>This component manages users, service assignments, and system-wide coordination. It allows the coordinator admin to register users, assign jobs, verify payments, generate reports, and monitor service notifications. By centralizing control, it streamlines operations and maintains smooth communication between different roles in the system. This part</p>

		<p>also include the rating system and categorizing the employees and landscapers according to their customer ratings.</p> <p>Create: Admins can create job schedules, service types, and assign work to landscapers. They can also create hiring forms and set up system settings.</p> <p>Read: Admins can view job applications, reports, and activity logs.</p> <p>Update: Admins can approve or reject job applications from employees and landscapers.</p> <p>Delete: Remove cancelled jobs, inactive users, and outdated or incorrect applications.</p>
04	H.M.I.S Rathnathilaka	<p><u>Payment Management</u></p> <p>Supports secure and flexible transactions between customers and landscapers. All payments (appointment, blueprints, full or partial project fees, item purchases) are processed securely and confirmed in real-time. System also sends__instant updates. This ensures services only begin after verified payments, reducing errors and improving financial tracking.</p>

		<p>Create: Let customers make different types of payments and get a receipt.</p> <p>Read: Show payment details like status, history, and let customers download receipts.</p> <p>Update: Change payment status once the payment is confirmed; let system confirm it if needed.</p> <p>Delete: Let admins remove or cancel failed or invalid payments.</p> <p><u>Delivery Management</u></p> <p>The delivery management feature allows manual status updates for customer orders, which are displayed on their dashboard for tracking. It enhances transparency and coordination between inventory managers and customers.</p> <p>Create: Add new delivery vehicles, register drivers, create delivery assignments, log accident reports.</p> <p>Read: View delivery schedules, assigned drivers, vehicles, access driver profiles, view delivery history.</p> <p>Update: Update delivery status. Modify vehicle status manually. Edit driver and vehicle information</p>
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		<p>Delete: Remove old vehicles, Delete cancelled deliveries or reassigned tasks. Archive accident reports after resolution or audits.</p>
05	K.W.A.J. Lakmal	<p><u>Customer Management</u></p> <p>The customer management component helps landscaping provides manage client details, service history, and communication efficiently. It supports personalized services, improves scheduling, and boosts customer satisfaction through real-time updates and integration with billing and job scheduling.</p> <p>Create: Add new customers with basic details.</p> <p>Read: View and search customer profiles, including service history and feedbacks.</p> <p>Update: edit customer details when changes are requested.</p> <p>Delete: Remove inactive or duplicated customer records to keep the system clean and accurate.</p>

5.Literature Review

The landscape industry plays a crucial role in enhancing environmental aesthetics and functionality in both public and private spaces. However, traditional methods of managing landscape planning and maintenance services present significant limitations, particularly in terms of geographical reach, resource coordination, and workforce management. In this section, we critically evaluate two existing methods manual landscape operations and manual garden maintenance operation and highlight their limitations, which form the basis for the proposed solution.

01.Manual Landscape Management

In traditional landscaping processes, most operations including client communication, resource planning, project tracking, staff coordination, and hiring employees are conducted manually. Landscapers often manage projects within a limited geographical area, primarily due to high transportation costs, lack of remote coordination tools, and limited access to distributed labor and equipment. Moreover, sourcing specific plant types, hiring skilled workers, or renting necessary machinery are processes that often involve time-consuming manual efforts such as phone calls, travel, or third-party arrangements.

Advantages of Manual Methods:

- No dependency on technology or internet
- Simple and accessible for small-scale operations
- Low initial setup cost

Disadvantages:

- Limited scalability due to geographic constraints
- High logistical challenges in coordinating resources
- Difficulty in hiring and assigning workers on demand
- Lack of centralized access to plant varieties, tools, or machinery

- High advertising costs to promote landscaping services manually

This approach cause for often delays and operational inefficiencies. Also this method restricts landscape professionals from expanding their services.

02.Manual garden maintenance management

In this method, the **tracking, and execution of garden maintenance tasks** such as pruning, watering, fertilizing, weeding, lawn mowing, and pest control are managed **without the use of digital systems**. Communication is typically carried out face-to-face or through phone calls, and record-keeping is often done using notebooks or printed schedules. While this approach may work for individual gardeners within a small local area, it presents several critical limitations in terms of efficiency, coordination, and resource management.

Advantages:

- No Technical Knowledge Required
- Personal communication with clients can build trust

Disadvantages

- Communicating job details, scheduling work, and sourcing materials or workers must be done manually
- Hiring and tracking worker availability is challenging
- No Automated Scheduling or Reminders
- As the number of clients and projects grows, manual methods become unsustainable due to increased complexity and coordination needs.

Propose a system as a solution:

Given these limitations, there is a pressing need for a centralized, web-based system that streamlines landscape planning and maintenance services through automation, resource coordination, project publishing, and workforce hiring. The proposed Landscape Planning and Maintenance Management System directly addresses these gaps.

- Geographic expansion is made feasible through distributed coordination of workers, machines, and plant suppliers.
- Landscapers can advertise their completed projects through the system without relying on costly third-party advertisements.
- A built-in vacancy module allows landscapers and customers to hire skilled workers based on location, availability, and qualifications.
- The system also maintains a central database of tools, plant varieties, rental equipment, and worker profiles, making the entire process transparent and efficient.

This solution not only overcomes the challenges of manual operations but also introduces modern scalability and visibility, empowering landscapers to manage projects across regions while optimizing time, cost, and resource usage.

7.Evaluation Method

To ensure that the Landscape Planning and Maintenance Management System operates as intended and meets user expectations, a comprehensive evaluation process will be conducted throughout the development and deployment lifecycle. This process covers technical accuracy, user satisfaction, performance under realistic conditions, and system adaptability.

1. Functional Evaluation

- This stage verifies whether the core features of the system perform as expected.
- Each function will be tested using real-world scenarios to ensure smooth and accurate operation from the user's perspective.

2. Performance & Usability Evaluation

- The system's response time, scalability, and ease of use will be analyzed.
- This includes:
 - **Performance Testing** - Simulating multiple users requesting services, uploading blueprints, or updating progress at the same time.
 - **Usability Testing** - Observing how easily customers and landscapers can navigate the interface, understand instructions, and complete common tasks.

3. Security & Compliance Evaluation

- This step ensures that user data is protected and system access is secure.
 - User authentication checks
 - Data validation and sanitization
 - Blueprint and file handling for secure uploads/downloads
 - Role-based access control to ensure only authorized users perform specific tasks

4. Stakeholder Feedback

- After testing key features, feedback will be collected from actual users including:

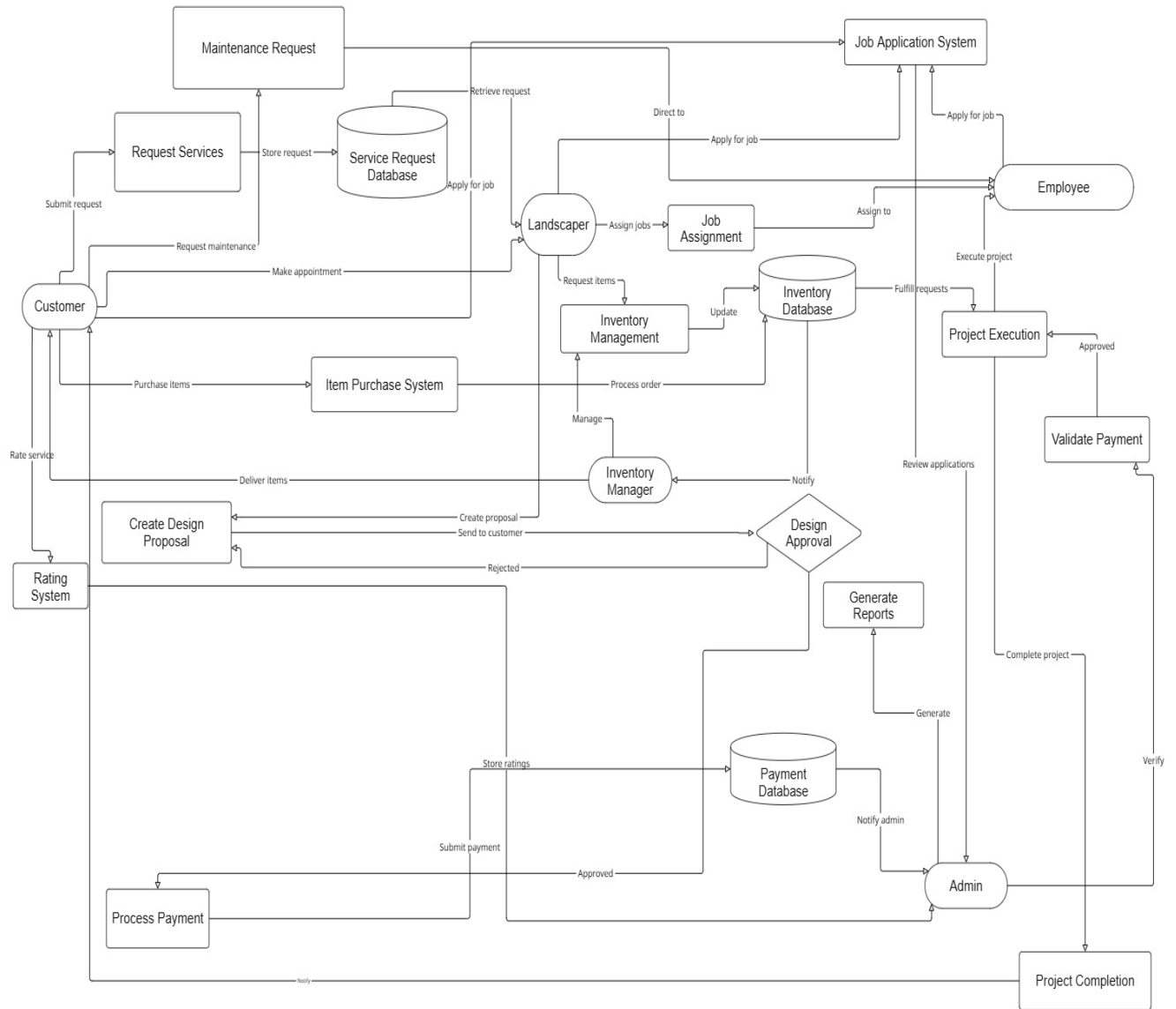
- **Customers:** How easy was it to book services and track progress?
- **Landscapers:** Was it easy to manage appointments and update projects?
- **Admins:** Could they manage users and monitor system activity effectively?

5. Final System Testing & Deployment Review

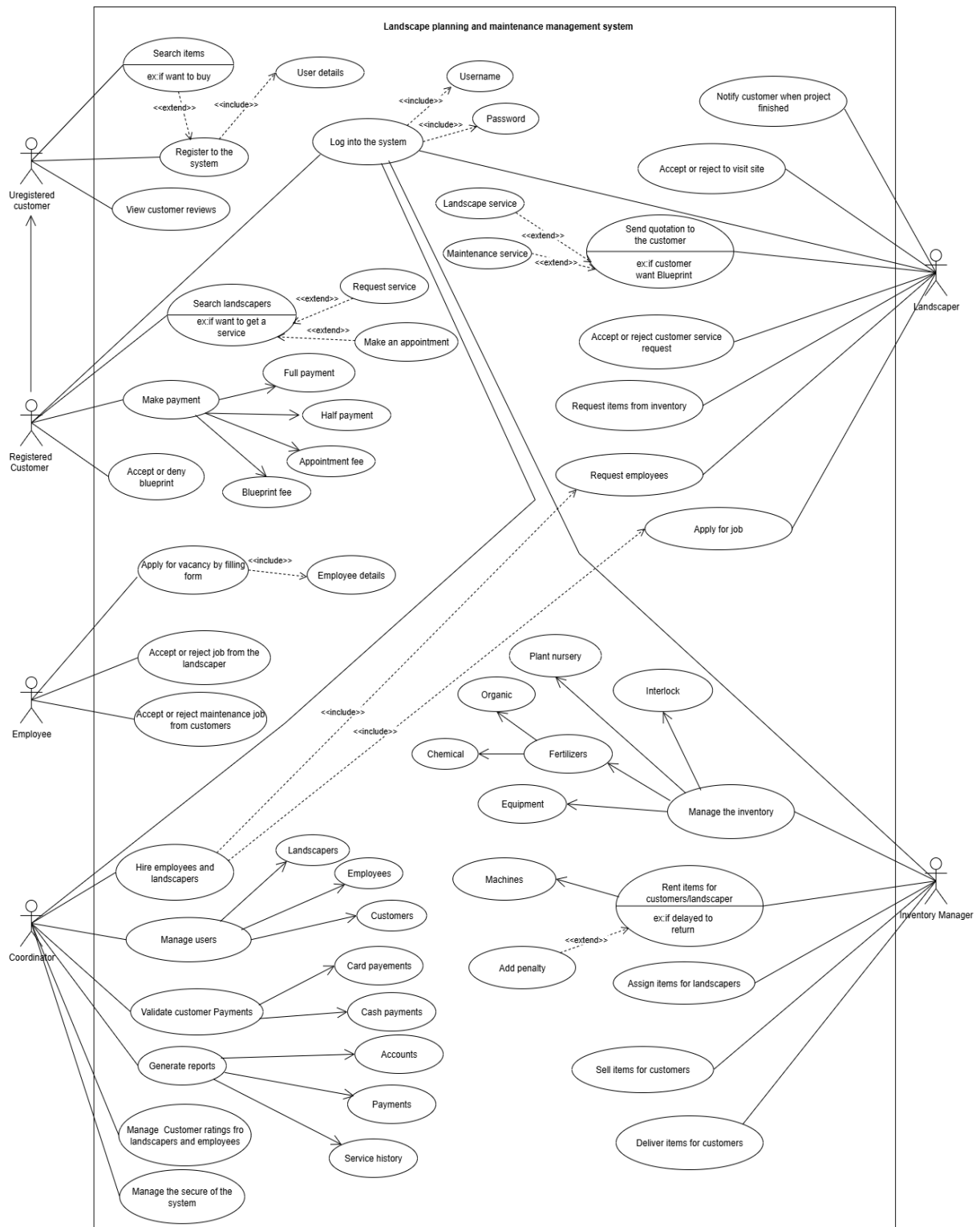
- Before final deployment, the system will go through:
 - **End-to-End Testing:** Running full workflows from appointment to project completion to ensure feature integration.
 - **Cross-Browser and Device Testing:** Verifying consistency across desktops, tablets, and mobile devices.
 - **Bug Fix Verification:** Ensuring all identified issues are resolved and tracked through tools like Trello or GitHub Issues.

8.Appendix

8.1System Diagram



8.2 Use Case Diagram



9. References

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