Software Requirements Specification Template

CptS 322—Software Engineering

9 February 2005

The following annotated template shall be used to complete the Software Requirements Specification (SRS) assignment of WSU-TC CptS 322. The instructor must approve any modifications to the overall structure of this document.

Template Usage:

Text contained within angle brackets ('<', '>') shall be replaced by your project-specific information and/or details. For example, <Project Name> will be replaced with either 'Smart Home' or 'Sensor Network'.

Italicized text is included to briefly annotate the purpose of each section within this template. This text should not appear in the final version of your submitted SRS.

This cover page is not a part of the final template and should be removed before your SRS is submitted.

Acknowledgements:

Sections of this document are based upon the IEEE Guide to Software Requirements Specification (ANSI/IEEE Std. 830-1984). The SRS templates of Dr. Orest Pilskalns (WSU, Vancover) and Jack Hagemeister (WSU, Pullman) have also be used as guides in developing this template for the WSU-TC Spring 2005 CptS 322 course.

<Project Name>

Software Requirements Specification

<Version>

<Date>

<Your Name>

Lead Software Engineer

Prepared for

WSU-TC CptS 322—Software Engineering Principles I

Instructor: A. David McKinnon, Ph.D.

Spring 2005 in

1 REVISION HISTORY

Date	Description	Author	Comments
<date>	<Version 1>	<Your Name>	<First Revision>

2 DOCUMENT APPROVAL

The following Software Requirements Specification has been accepted and approved by the following:

Signature	Printed Name	Title	Date
	<Your Name>	Lead Software Eng.	
	A. David McKinnon	Instructor, CptS 322	

Table of Contents

3 1. INTRODUCTION

THIS SOFTWARE REQUIREMENTS SPECIFICATION (SRS) DOCUMENT IS CRAFTED TO PROVIDE A COMPREHENSIVE BLUEPRINT FOR THE DEVELOPMENT OF "PICKUP AT EASE," AN AUTOMATED COURIER SERVICE PLATFORM. IT ENCOMPASSES A DETAILED ENUMERATION OF THE SYSTEM'S FUNCTIONALITIES, THE INTERACTIONS BETWEEN THE SYSTEM AND ITS USERS, PERFORMANCE REQUIREMENTS, AND OTHER ESSENTIAL SPECIFICATIONS. THE SRS IS STRUCTURED TO ENSURE COMPLETENESS AND CLARITY, EQUIPPING SOFTWARE ENGINEERS WITH THE NECESSARY INFORMATION TO DESIGN AND IMPLEMENT THE SOFTWARE PRODUCT EFFECTIVELY. IT IS A GUIDING DOCUMENT THAT ALIGNS THE VISION OF THE STAKEHOLDERS WITH THE TECHNICAL EXECUTION BY THE DEVELOPMENT TEAM.

3.1 1.1 PURPOSE

The primary purpose of this SRS is to articulate the specific requirements and expectations for "Pickup AT Ease," outlining the software's intended capabilities, performance criteria, and design constraints. This document serves several audiences:

Software Engineers: Who will rely on the SRS for the detailed information necessary to architect, design, and implement the platform.

Project Managers: Who will use the SRS to plan project schedules, milestones, and resource allocation.

Quality Assurance Teams: Who will reference the SRS to develop test plans and validation strategies to ensure the software meets all stated requirements.

Business Analysts and Product Owners: Who will ensure that the software fulfills business needs and user demands as envisioned.

Stakeholders and Investors: Who will review the SRS to understand the product's intended functionality and assess its alignment with business objectives.

This document is intended to be a comprehensive and living artifact that evolves as the project progresses, ensuring that the final software product is aligned with the outlined specifications and meets the quality and functionality expected by the users and stakeholders.

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3.2 1.2 SCOPE

This subsection outlines the boundaries and the extent of the "Pickup AT Ease" software application, detailing its capabilities, limitations, and intended use.

Software Product Name: The primary product to be developed is named "Pickup AT Ease". It is an integrated software platform designed to automate and streamline courier service processes.

Capabilities and Limitations:

Capabilities:

"Pickup AT Ease" will provide a comprehensive suite of tools for:

User registration and authentication.

Parcel scheduling and pickup automation.

Real-time tracking of parcels for users and service providers.

AI-driven route optimization for efficient parcel delivery.

Secure payment processing with support for multiple payment methods.

Reporting and analytics tools for users and administrators.

It will offer a user-friendly interface accessible via web and mobile applications.

Limitations:

The system will not support warehouse management or international shipping logistics.

"Pickup AT Ease" is not designed to replace full-scale enterprise logistics solutions.

The platform will not provide offline functionality and will require an internet connection for all operations.

Application of the Software:

Benefits: The application aims to enhance the efficiency of courier services, reduce human error, decrease operational costs, and improve customer satisfaction through timely deliveries and transparent communication.

Objectives and Goals:

To reduce the parcel scheduling and processing time from hours to minutes.

To ensure that users can define and customize their delivery schedules with real-time parameter adjustments.

To provide businesses with detailed analytics on delivery performance, customer engagement, and operational efficiency.

Consistency with Higher-Level Specifications:

This SRS is consistent with the high-level strategic goals outlined in the System Requirement Specification, aligning with the company's mission to innovate the courier service industry through technology.

"Pickup AT Ease" is envisioned to be a market leader in local courier service solutions, offering scalable, secure, and eco-friendly options that align with modern consumer expectations and the digital transformation of logistics services.

3.3 1.3 Definitions, Acronyms, and Abbreviations

This subsection delineates the definitions of terms, acronyms, and abbreviations used throughout the Software Requirements Specification (SRS) document to ensure a clear and common understanding among all project stakeholders and team members. For a comprehensive glossary, refer to Appendix C in the SRS.

API (Application Programming Interface): A set of protocols and tools for building software applications, specifying how software components should interact.

CRUD (Create, Read, Update, Delete): The four basic functions of persistent storage in software development.

DBMS (Database Management System): Software that uses a standard method of cataloging, retrieving, and running queries on data.

ETA (Estimated Time of Arrival): The estimated time when a vehicle, person, or shipment is expected to arrive at a certain place.

GPS (Global Positioning System): A satellite-based navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth.

GUI (Graphical User Interface): A user interface that allows users to interact with electronic devices through graphical icons and visual indicators.

HTTPS (Hypertext Transfer Protocol Secure): An internet communication protocol that protects the integrity and confidentiality of data between the user's computer and the site.

JSON (JavaScript Object Notation): A lightweight data-interchange format that is easy for humans to read and write, and easy for machines to parse and generate.

MVP (Minimum Viable Product): A product with just enough features to satisfy early customers and provide feedback for future product development.

REST (Representational State Transfer): An architectural style for providing standards between computer systems on the web, making it easier for systems to communicate with each other.

SaaS (Software as a Service): A software licensing and delivery model in which software is licensed on a subscription basis and is centrally hosted.

SLA (Service Level Agreement): A commitment between a service provider and a client that outlines the service standards the provider is obligated to meet.

UI/UX (User Interface/User Experience): UI refers to the graphical layout of an application. UX refers to the experience a user has as they interact with every aspect of a company's products and services.

UML (Unified Modeling Language): A standardized modeling language enabling developers to specify, visualize, construct, and document artifacts of software systems.

For further reference and a complete list of all terms, acronyms, and abbreviations, please consult Appendix C attached at the end of this SRS document.

3.4 1.4 REFERENCES

This subsection of the Software Requirements Specification (SRS) provides a catalog of all the documents, standards, and resources that have been referenced in the preparation of the SRS for the "Pickup AT Ease" application. This collection aids in establishing a cohesive understanding of the project's background and the rationale behind requirement choices.

Pickup AT Ease Business Plan

Title: "Pickup AT Ease - Business and Strategic Plan"

Report Number: PAE-BP-2023-01

Date: January 15, 2023

Publishing Organization: Pickup AT Ease Inc.

Source: Internal Document Repository (Available upon request)

Market Analysis Report

Title: "2023 Courier and Delivery Services Industry - Market Analysis"

Report Number: PAE-MAR-2023-04

Date: April 10, 2023

Publishing Organization: Market Insights Consulting

Source: Available for purchase at Market Insights Consulting Reports

API Documentation

Title: "Google Maps API for Delivery Routing"

Date: Accessed on February 20, 2023

Publishing Organization: Google LLC

Source: Google Maps Platform Documentation

Data Protection and Privacy Laws

Title: "Comprehensive Guide to Data Protection and Privacy Laws"

Date: 2022 Edition

Publishing Organization: International Data Protection Association

Source: IDPA Publications

Technical Standards and Protocols

Title: "ISO/IEC 27001 - Information Security Management"

Date: 2013 (with amendments in 2022)

Publishing Organization: International Organization for Standardization

Source: ISO Standards Catalogue

System Requirements Specification Template

Title: "IEEE Recommended Practice for Software Requirements Specifications"

Report Number: IEEE Std 830-1998

Date: 1998

Publishing Organization: Institute of Electrical and Electronics Engineers

Source: IEEE Xplore Digital Library

Each document listed is instrumental to the development of the SRS and serves as foundational material guiding the project's trajectory. These references are maintained and managed by the project's documentation team and are available for review to all project stakeholders upon request or via the specified sources.

3.5 1.5 Overview

The SRS document for the "Pickup AT Ease" platform is meticulously organized into distinct sections, each serving a specific purpose in the overall documentation of the software's requirements.

Section 1: General Description

This section provides a macro view of the "Pickup AT Ease" system, detailing how the application fits within the larger ecosystem of courier services. Key elements include:

System Interface: How the application interacts with external systems, such as GPS for tracking and payment gateways for financial transactions.

User Demographics: A demographic analysis of the potential user base, such as individual customers, retailers, and e-commerce platforms.

Constraints: Overarching constraints like technological, legal, regulatory, and operational limits that the system must adhere to.

Assumptions and Dependencies: Fundamental assumptions made during the planning phase and dependencies on external factors or services.

Section 2: Specific Requirements

This critical section delineates all the software requirements in detail, divided into functional and non-functional categories. It includes:

Functional Requirements: Clear and concise descriptions of each functionality the software will provide, such as user account management, parcel booking, and delivery tracking.

Non-functional Requirements: System-wide requirements such as performance metrics, security protocols, and usability standards that do not pertain directly to specific functionalities.

Analysis Models

In this section, various analysis models provide a visual representation of the system's workflows and data processes. It includes:

Sequence Diagrams: These illustrate the sequence of interactions between system components and users for key processes.

Data Flow Diagrams (DFDs): These diagrams map out the flow of data through the system, identifying where data is inputted, how it's processed, and where it's stored.

Change Management Process:

This section outlines the protocol for handling changes to the SRS document, ensuring that the system remains in alignment with evolving business needs and technological advancements. It includes:

Change Request Process: The procedure for stakeholders to submit requests for changes in the software requirements.

Evaluation and Approval: The method for assessing the impact of proposed changes and the process for approving or rejecting these changes.

Appendices:

Supplementary materials that provide additional context and support for the SRS are found here. It includes:

Glossary: Definitions of technical terms, acronyms, and abbreviations used throughout the document to ensure clarity and prevent misunderstandings.

Reference Documents: A list of all the documents referenced throughout the SRS, providing a trail for validation and further research.

Supporting Information: Any additional diagrams, user surveys, market research findings, or technical specifications that support the requirements and decisions made in the SRS.

Each section of the SRS is crafted to ensure that all participants, from developers to business analysts, have the information they need to understand, design, and build the "Pickup AT Ease" software solution effectively. The document is intended to be comprehensive yet flexible, able to accommodate new insights as the project progresses from concept to deployment.

4 2. General Description

This section of the Software Requirements Specification (SRS) is dedicated to providing an overarching view of the "Pickup AT Ease" platform. It outlines the general factors that influence the product and its requirements, setting the stage for a deeper understanding of the specific technical specifications detailed later in the document. It is important to note that while this section does not enumerate specific requirements, it offers context that clarifies why certain requirements exist and how they fit into the broader scope of the project.

The general factors affecting the product and its requirements include:

4.1 2.1 Product Perspective

"Pickup AT Ease" will be integrated within the existing digital ecosystem of courier services, interfacing with both users' and couriers' existing tools and platforms. It will complement current technologies in use, offering enhancements such as improved automation, better user experience, and advanced analytics. This perspective frames the product as a key component in the modernization of courier services.

4.2 2.2 User Characteristics

The intended user base includes individual customers seeking convenient parcel delivery services and businesses of all sizes that require reliable courier options. The system is designed with a diverse user demographic in mind, ensuring accessibility, ease of use, and a minimal learning curve.

4.3 2.3 Operating environment

"Pickup AT Ease" will operate in a competitive and fast-paced environment where timely deliveries and customer satisfaction are paramount. It will function across

various platforms, including web and mobile devices, ensuring a consistent and responsive experience in different operating environments.

4.4 2.4 Design and Implementation Constraints

The platform will be developed with a focus on scalability, security, and compliance with industry standards and regulations. Constraints include adherence to data protection laws, integration capabilities with existing technologies, and the need for a responsive and intuitive design.

4.5 2.5 Assumptions and Dependencies

Several assumptions underpin the development of "Pickup AT Ease." These include the availability of a stable internet connection for users, the reliability of GPS technology for tracking services, and the continued growth of e-commerce, which will drive demand for courier services. Dependencies may include third-party services, such as payment gateways and cloud infrastructure providers.

By understanding these general factors, stakeholders and the development team can appreciate the nuances of the project's requirements. This understanding ensures that when specific requirements are discussed, they are considered within the correct context, leading to a more effective design and a product that meets the needs of its users and the goals of the business.

5 3. Specific Requirements

This will be the largest and most important section of the SRS. The customer requirements will be embodied within Section 2, but this section will give the D-requirements that are used to guide the project's software design, implementation, and testing.

Each requirement in this section should be:

- *Correct*
- *Traceable (both forward and backward to prior/future artifacts)*
- *Unambiguous*
- *Verifiable (i.e., testable)*
- *Prioritized (with respect to importance and/or stability)*
- *Complete*
- *Consistent*
- *Uniquely identifiable (usually via numbering like 3.4.5.6)*

Attention should be paid to the carefuly organize the requirements presented in this section so that they may easily accessed and understood. Furthermore, this SRS is not the software design document, therefore one should avoid the tendency to over-constrain (and therefore design) the software project within this SRS.

5.1 3.1 External Interface Requirements

5.1.1 3.1.1 User Interfaces

5.1.2 3.1.2 Hardware Interfaces

5.1.3 3.1.3 Software Interfaces

5.1.4 3.1.4 Communications Interfaces

5.2 3.2 Functional Requirements

This section describes specific features of the software project. If desired, some requirements may be specified in the use-case format and listed in the Use Cases Section.

5.2.1 3.2.1 <Functional Requirement or Feature #1>

3.2.1.1 Introduction

3.2.1.2 Inputs

3.2.1.3 Processing

3.2.1.4 Outputs

3.2.1.5 Error Handling

5.2.2 3.2.2 <Functional Requirement or Feature #2>

…

5.3 3.3 USE CASES

5.3.1 3.3.1 Use Case #1

5.3.2 3.3.2 Use Case #2

…

5.4 3.4 CLASSES / OBJECTS

5.4.1 3.4.1 <Class / Object #1>

3.4.1.1 Attributes

3.4.1.2 Functions

<Reference to functional requirements and/or use cases>

5.4.2 3.4.2 <Class / Object #2>

…

5.5 3.5 NON-FUNCTIONAL REQUIREMENTS

Non-functional requirements may exist for the following attributes. Often these requirements must be achieved at a system-wide level rather than at a unit level. State the requirements in the following sections in measurable terms (e.g., 95% of transaction shall be processed in less than a second, system downtime may not exceed 1 minute per day, > 30 day MTBF value, etc).

5.5.1 3.5.1 Performance

5.5.2 3.5.2 Reliability

5.5.3 3.5.3 Availability

5.5.4 3.5.4 Security

5.5.5 3.5.5 Maintainability

5.5.6 3.5.6 Portability

5.6 3.6 INVERSE REQUIREMENTS

*State any *useful* inverse requirements.*

5.7 3.7 Design Constraints

Specify design constrains imposed by other standards, company policies, hardware limitation, etc. that will impact this software project.

5.8 3.8 Logical Database Requirements

Will a database be used? If so, what logical requirements exist for data formats, storage capabilities, data retention, data integrity, etc.

5.9 3.9 Other Requirements

Catchall section for any additional requirements.

6 4. Analysis Models

List all analysis models used in developing specific requirements previously given in this SRS. Each model should include an introduction and a narrative description. Furthermore, each model should be traceable the SRS's requirements.

6.1 4.1 Sequence Diagrams

6.2 4.3 Data Flow Diagrams (DFD)

6.3 4.2 State-Transition Diagrams (STD)

7 5. Change Management Process

The Change Management Process for the "Pickup AT Ease" SRS is designed to ensure that the document remains an accurate reflection of the project requirements throughout the software development lifecycle. As the project evolves, changes may become necessary due to shifts in market demands, technological advancements, regulatory updates, or stakeholder feedback. This section outlines the structured approach for managing and incorporating such changes into the SRS.

5.1 Change Request Submission

Eligibility: Any project stakeholder, including team members, product owners, clients, or users, may identify the need for a change in the SRS.

Process: To propose a change, the requester must submit a Change Request Form through the designated project management tool. The form must detail the nature of the change, the rationale behind it, the sections of the SRS affected, and any potential impacts on other project areas.

5.2 Change Assessment

Initial Review: The project manager conducts an initial review to determine the change's validity and necessity before forwarding it to the Change Control Board (CCB).

Change Control Board (CCB): Comprising representatives from development, quality assurance, product management, and, if necessary, stakeholders, the CCB meets regularly to evaluate proposed changes.

Impact Analysis: For changes passing the initial review, a comprehensive impact analysis is performed to assess the implications on project scope, timelines, costs, and risks.

5.3 Change Approval or Rejection

Decision Criteria: Decisions are based on the impact analysis, the change's alignment with project objectives, and the value it adds to the end-users.

Approval Process: If the CCB approves the change, it will be ranked based on priority and urgency. The project manager will then schedule the change for implementation.

Rejection: If rejected, the requester will be informed of the decision with an explanation. Rejected changes may be revised and resubmitted if new information or conditions arise.

5.4 Implementation of Approved Changes

Documentation: Approved changes are documented, including the expected outcomes and any alterations to project plans.

Communication: The project manager is responsible for communicating changes to all impacted parties, ensuring that the development team and stakeholders are aware of the updated requirements.

SRS Update: The SRS document is updated to reflect the approved changes. The updated document is then redistributed, and the version history is amended to include a summary of the changes and the date of modification.

5.5 Roles and Responsibilities

Change Initiator: The individual or group proposing the change.

Project Manager: Oversees the change process and ensures the updated SRS is communicated to all stakeholders.

Change Control Board (CCB): Evaluates and approves/rejects change requests.

Development Team: Implements the approved changes into the project.

5.6 Tools and Tracking

Project Management Software: Used to track change requests, discussions, decisions, and implementation status.

Version Control System: Maintains a history of SRS versions, providing a clear audit trail of changes.

The structured Change Management Process outlined here ensures that the SRS for "Pickup AT Ease" remains a living document, adaptable to the project's evolving needs while maintaining a clear vision and direction. It mitigates risks associated with changes and ensures that all updates enhance the project's success and final product quality.

8 6. APPENDICES

Appendices may be used to provide additional (and hopefully helpful) information. If present, the SRS should explicitly state whether the information contained within an appendix is to be considered as a part of the SRS's overall set of requirements.

Example Appendices could include (initial) conceptual documents for the software project, marketing materials, minutes of meetings with the customer(s), etc.

8.1 A.1 APPENDIX 1

8.2 A.2 APPENDIX 2

Project Identification

Project:	Pickup AT Ease
Prepared By:	Uzma Khan
Document Version:	1.0
Published Date:	28.09.2023

Contributors

The following individuals contributed to this document.

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This document is distributed to all the following people.

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ADEDOLAPO BALOGUN	
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UZMA KHAN	

Referenced Documents

This document refers to the following materials

Version number	Title	Author	Date	Source / Location

Revision History

Version Number	Revision Date	Summary of Changes	Modified by
1.0	29.09.2023	First list of requirements	Bulat Khungureev

[Note: It is recommended that drafts be numbered 0.1 to 0.9, and that the first approved version be numbered 1.0. Thereafter, new version numbers will depend upon changes: 1.01, 1.1, etc for minor updates, 2.0, 3.0 etc for major changes.]

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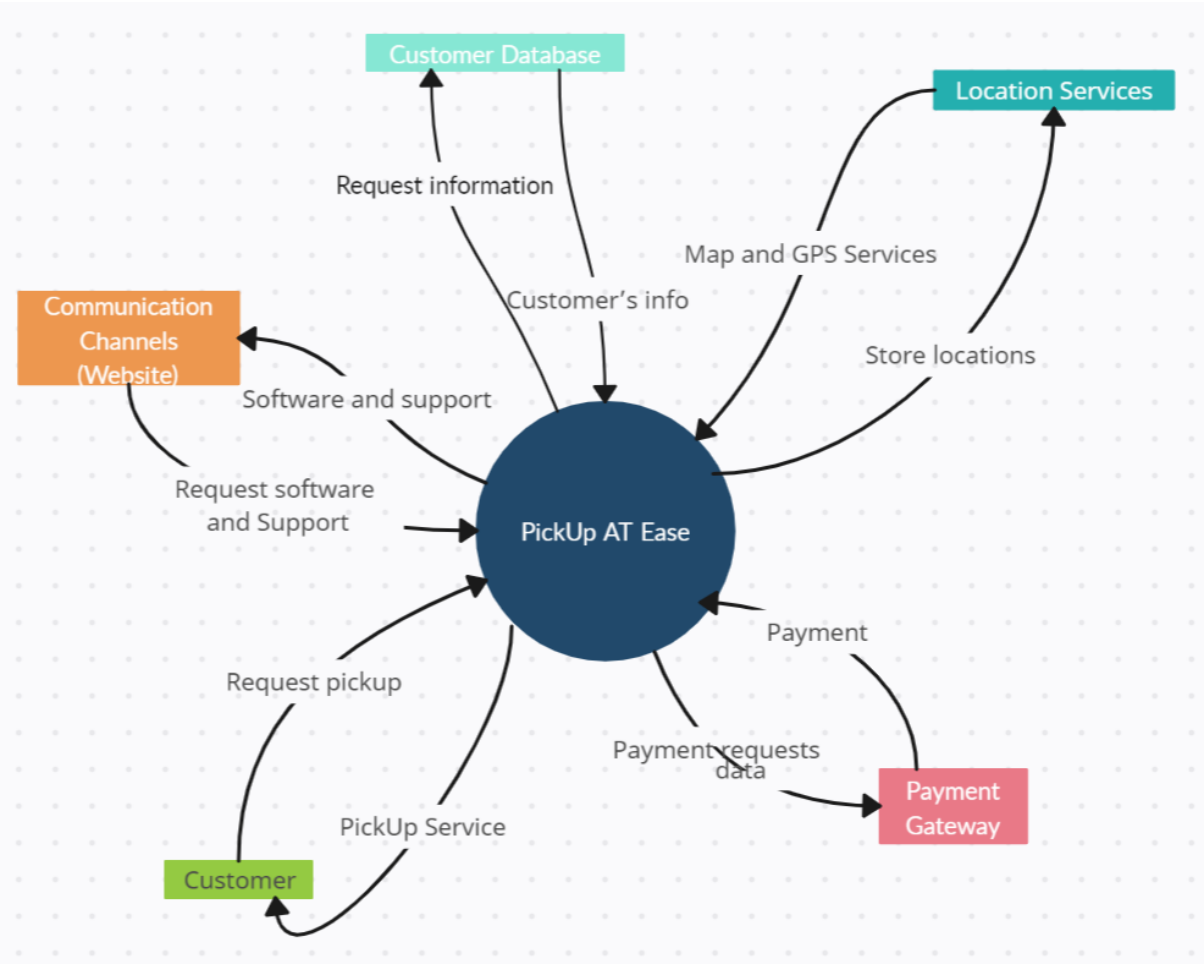
1. Business Context Diagram



Requirement Scope Area	Description
Project Scope and Boundaries	Encompasses all functional and non-functional project requirements, serving as a comprehensive checklist and defining project boundaries.

External Entity	Description
Users	Users encompass both customers and recipients who interact with the Pickup AT Ease platform.
External Courier Services	These are third-party courier service providers that may be integrated into Pickup AT Eass.They serve as specialized delivery partners, helping extend the platform's capabilities to handle complex or specific shipping requirements.
Interaction with Users	Users engage with the platform for various tasks, making them a crucial part of the system. Their interactions with the platform drive its usage and require seamless user experiences for successful engagement.
Integration with External Services	Pickup AT Ease has the capability to interact with external courier services.This integration enhances the platform's versatility, allowing it to handle a wide range of delivery needs effectively and efficiently.

Information Flows	Description
User Interactions with the Platform	Users engage with the Pickup AT Ease platform for various purposes, including registration, scheduling parcel pickups, and tracking parcels.This flow represents the essential interactions of users with the system, highlighting their inputs and actions that drive the platform's functionality.
Platform Interaction with External Courier Services	When specialized or unique delivery requirements arise, Pickup AT Ease can interact with external courier services for specific deliveries.This flow reflects the platform's flexibility and collaborative nature, allowing it to seamlessly integrate with external partners to meet diverse delivery needs.
Real-time Parcel Tracking and Notifications	The system provides real-time parcel tracking information and sends automated notifications at significant tracking milestones, such as pickup, en route, and delivery.This flow ensures that users and recipients have up-to-date information on their parcels, enhancing transparency and communication.
Payment Processing and Invoicing	Users have the option to securely add and manage payment methods within the platform. Payment processing is handled in compliance with industry-standard security protocols, and invoices and payment receipts are accessible via the platform.This flow streamlines the financial aspect of the service, making it convenient and secure for users while ensuring proper documentation and compliance.

2. Requirements Scope Statements

HLR#	Description	Priority (H, M, L)
HLR01	**User Registration and Authentication**: ● Users must be able to register with Pickup AT Ease using valid email addresses ● User registration should include password creation and account verification ● Users should have the option to log in securely using their registered credentials	**M**
HLR02	**Parcel Scheduling and Pickup:** ● Users should be able to schedule parcel pickups via the web platform or mobile app ● Pickup requests should include parcel details, pickup location, and preferred pickup time slots ● Users should receive confirmation notifications upon successful scheduling	**H**
HLR03	**Real-time Tracking and Notification:** ● Users and recipients must have access to real-time parcel tracking information ● Automated notifications should be sent at key parcel tracking milestones, such as pickup, en route, and delivery ● Notifications should be accessible via email, SMS, and in-app notifications	**H**
HLR04	**Automated Route Optimization:** ● Pickup AT Ease should employ AI-driven route optimization algorithms to determine the most efficient delivery routes ● Route optimization should consider factors such as traffic conditions and delivery time windows ● The system should adapt routes dynamically in response to changing conditions	**H**

HLR05	**Secure Payment Processing:** ● Users must have the option to securely add and manage payment methods within the platform ● Payment processing should comply with industry-standard security protocols ● Invoices and payment receipts should be accessible to users via the platform	**H**
HLR06	**System Scalability:** ● The system should be scalable to accommodate increased user registrations and parcel volumes ● Scalability should be achieved without compromising system performance	**L**
HLR07	**Data Security:** ● User data, including personal and payment information, must be encrypted and stored securely ● The system should comply with relevant data protection regulations	**H**
HLR08	**Performance Benchmarks:** ● The platform should maintain responsiveness, with minimal loading times and downtime. ● Response times for tracking and notification updates should be near real-time.	**H**
HLR09	**Sustainability and Environmental Impact:** ● Pickup AT Ease is committed to minimizing its environmental impact by using electric vehicles for deliveries and sustainable packaging materials. ● Real-time environmental impact reporting should be available to users.	**H**
HLR10	**Regulatory Compliance:** ● The system must adhere to all relevant regulations, including safety, data protection, and environmental standards.	**H**
HLR11	**Marketing and Branding:** ● The platform's branding and marketing efforts should emphasize technology, sustainability, and an exceptional customer experience as unique selling points.	**L**

3. High Level Business Requirements Sign-Off

The undersigned acknowledge their agreement with the contents of Version 1.0 of the High-Level *Requirements document for PickUp AT Ease.*

Following approval of this document, requirements changes will be governed by the project's change management process, including impact analysis and appropriate reviews and approvals, under the general control of the Project Plan and according to company policy. Approved Change Request Documents, if present, will be attached to this Requirements Document as updates.

Name	Project Role and Functional Area	Date Signed
BULAT	Software Development	29/09/2023
ADEDOLAPO	IT Infrastructure Management	29/09/2023
UZMA	Security and Compliance	29/09/2023

** Note: physical signatures are not required. Email approvals are acceptable and should be appended to project documents.*

COMP 3059 – Capstone Project I

Software Requirements Analysis and Design Assignment

This assignment is an overview to gather the software needs with requirements analysis and help to proceed with the design.

The requirements analysis helps to break down functional and non-functional requirements to a basic design view to provide a clear system development process framework. It involves various entities, including business, stakeholders and technology requirements.

The design is the activity following requirements specification and before programming. Software design usually involves problem solving and planning a software solution.

To work on this assignment you could use the references and a sample template given below. The sample template can be customised to suit the nature of your project.

Reference Readings/Example:
http://www.uacg.bg/filebank/acadstaff/userfiles/publ_bg_397_SDP_activities_and_steps.pdf

www.cse.msu.edu/~chengb/RE-491/Papers/SRSExample-webapp.doc

Reference template:
www.tricity.wsu.edu/~mckinnon/cpts322/cpts322-srs-v1.doc

1.0 Introduction

1.1 Purpose

The purpose of this document is to present a detailed description of the PickUp AT Ease System. It will explain the purpose and features of the system, the interfaces of the system, what the system will do, the constraints under which it must operate and how the system will react to external stimuli. This document is intended for both the stakeholders and the developers of the system and will be proposed to the PickUp AT Ease Company for its approval.

1.2 Scope

This software system will be a package pickup and tracking system for a local PickUp AT Ease Company. This system is designed to maximize the user's ability to organize, arrange and keep track of their packages by providing tools to assist in automating the pickup and tracking processes, which would otherwise have to be performed manually. By maximizing the user's time efficiency and convenience, the system will meet the user's needs while remaining easy to understand and use.

More specifically, this system is designed to allow a user to manage and communicate with the company to arrange their package pickups, track the status of their packages and facilitate an easy and straightforward pickup process. The software will facilitate communication between the users, the company, and any third parties involved via Email, Text Messages, or In-App Notifications. Preformatted reply forms are used in every stage of the packaging process to provide a uniform tracking process; the location of these forms is configurable via the application's maintenance options. The system also contains a relational database containing a list of Users, Packages, and Pickup Locations.

2.0 System Overview

The System Overview section introduces the system context and design.

2.1 Project Perspective

The PickUp AT Ease system is a new self-contained system that aims to serve users who cannot receive packages at their homes or offices. It fits into the wider context of the modern trend towards increased ecommerce and the resulting surge in parcel deliveries.

2.2 System Context

The Pickup AT Ease system plays a pivotal role in enhancing the customer's package reception experience by ensuring that parcels are readily available for pickup at their convenience. It directly addresses the problem of missed or inconvenient delivery times and the potential for package theft at unattended locations.

2.3 General Constraints

General constraints include the need for robust server capacity and internet connectivity to handle potentially high traffic volume on the website. Additionally, the security of the system should be high standard for user data protection. The system also needs to operate in legal compliance with all jurisdictions it operates in, in terms of data collection and storage, logistics, and consumer protection.

2.4 Assumptions and Dependencies

It is assumed that users have access to the internet to avail the services of the proposed system. The success of the system is dependent on the effective collaboration with various delivery companies for smooth operations. Furthermore, it is dependent on a reliable and efficient courier network to ensure parcels are safely stored and readily available for pickup. Lastly, the system's success is hugely dependent on user trust, which can be achieved through securing user data and maintaining a high level of service reliability and customer support.

3.0 Functional Requirements

These requirements describe the basic functionality provided by the PickUp AT Ease system and detail specific tasks users can perform.

3.0.1 User Registration

- Introduction: This functionality allows a new user to create an account in PickUp AT Ease system.
- Inputs: The new user provides personal details including name, email, and contact number, and creates a password.
- Processing: The system validates the inputs and creates an account for the new user.
- Outputs: The new user gets an acknowledgement of successful registration, and can now login using the registered details.

3.0.2 Package Tracking

- Introduction: Registered users can track the status of their packages.
- Inputs: The user inputs the unique Package ID.
- Processing: The system verifies the Package ID and fetches the package status from the database.
- Outputs: The package status is displayed to the user.

3.0.3 Scheduling a Pickup

- Introduction: Allows users to schedule a pickup for their package.

- Inputs: User provides the preferred pickup location and time.
- Processing: The system schedules the pickup based on the user's preference and availability.
- Outputs: Confirmation of scheduled pickup is provided to the user.

3.0.4 Pickup Location Selection

- Introduction: The user can choose their preferred pickup location.
- Inputs: The user inputs their postcode or city.
- Processing: The system displays available pickup locations based on entered postcode or city.
- Outputs: User is able to select their preferred pickup location

3.0.5 Customer Support/Feedback

- Introduction: This functionality allows users to raise requests, and complaints or provide feedback.
- Inputs: User provides details about their issue or feedback.
- Processing: The system acknowledges the received input and forwards it to the concerned department.
- Outputs: Confirmation of received requests or feedback is provided to the user.

3.1 Use Cases

3.1.1 Use Case #1 *User Registration*

-Actor: New User
-Preconditions: The user is on the PickUp AT Ease website.
-Postconditions: The user is registered and can log into the system.
-Scenario:
1. User navigates to the registration page.
2. User enters personal details and creates a password.
3. System validates the inputs and creates an account.
4. System sends an acknowledgment to the user about successful registration.

3.1.2 Use Case #2 Package Tracking

-Actor: Registered User
-Preconditions: The user is logged into the system.
-Postconditions: The user gets the updated status of their package.
-Scenario:
1. User navigates to the tracking page.

2. User enters the unique Package ID.

3. System verifies the Package ID and fetches the package status from the database.

4. System displays the package status to the user.

3.1.3 Use Case #3 Scheduling a Pickup

-Actor: Registered User

-Preconditions: The user is logged into the system and has a package ready for pickup.

-Postconditions: A pickup for the user's package has been scheduled.

-Scenario:

1. User navigates to the scheduling page.
2. User enters their preferred pickup location and time.
3. System validates the inputs and schedules the pickup.
4. System provides a confirmation of scheduled pickup to the user.

3.1.4 Use Case #4 Pickup Location Selection

-Actor: Registered User

-Preconditions: The user is logged into the system and needs to select a pickup location.

-Postconditions: The user has selected their preferred pickup location.

-Scenario:

1. User inputs their postcode or city.
2. System displays available pickup locations based on the provided postcode or city.
3. User selects their preferred pickup location.

3.1.5 Use Case #5 Customer Support/Feedback

-Actor: Registered User

-Preconditions: The user is logged into the system and needs to raise a request, make a complaint or give feedback.

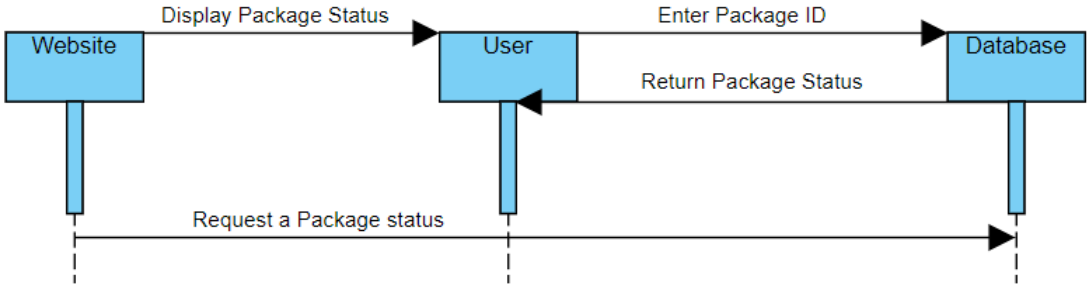
-Postconditions: The system has received the user's request, complaint, or feedback.

-Scenario:

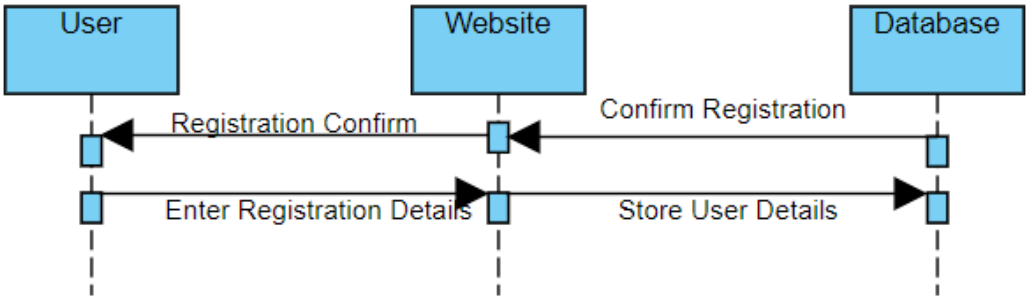
1. User navigates to the support/feedback page.
2. User inputs details about their issue or feedback.
3. System acknowledges the received input and forwards it to the concerned department.
4. System provides a confirmation of received request or feedback to the user.

3.3 Data Modelling and Analysis

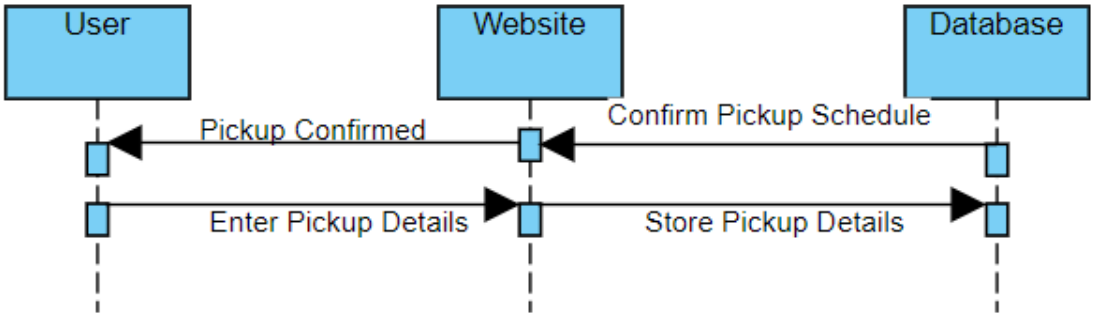
- Sequence Diagrams:
  Package Tracking:



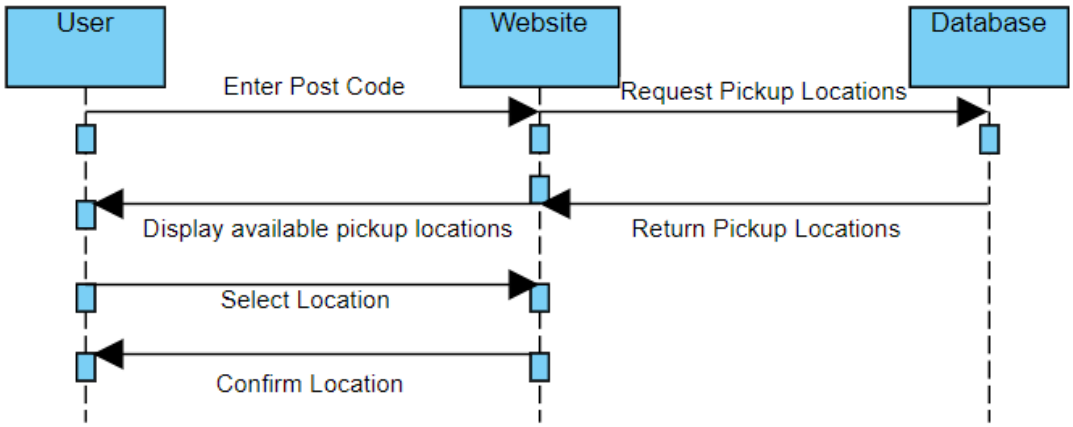
User Registration:



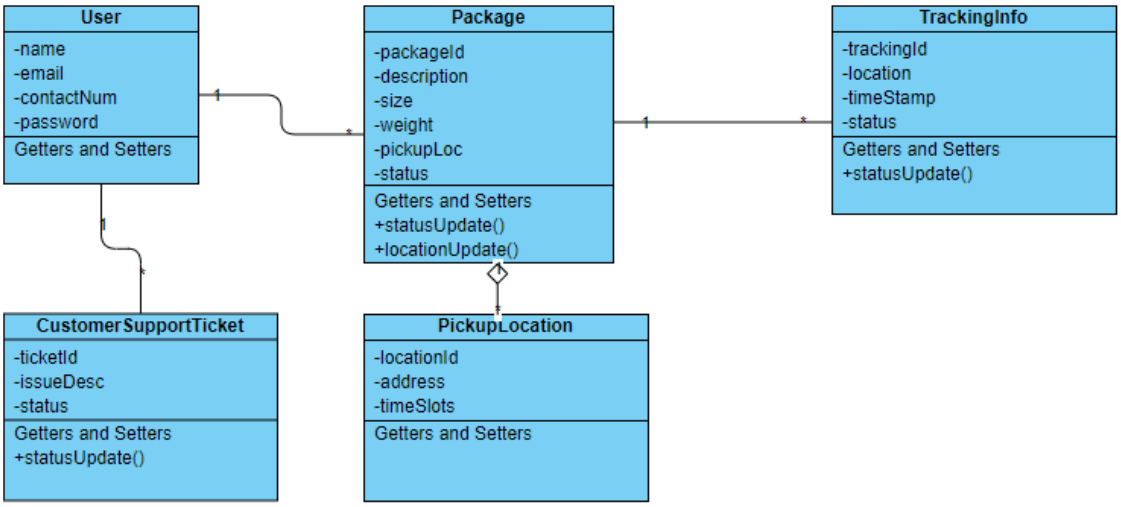
Pickup Scheduling:



Select Pickup Location:



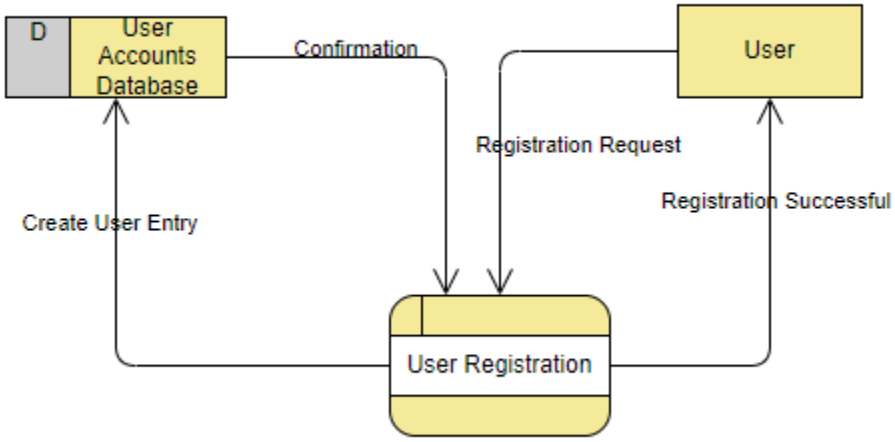
- UML Class Diagram:



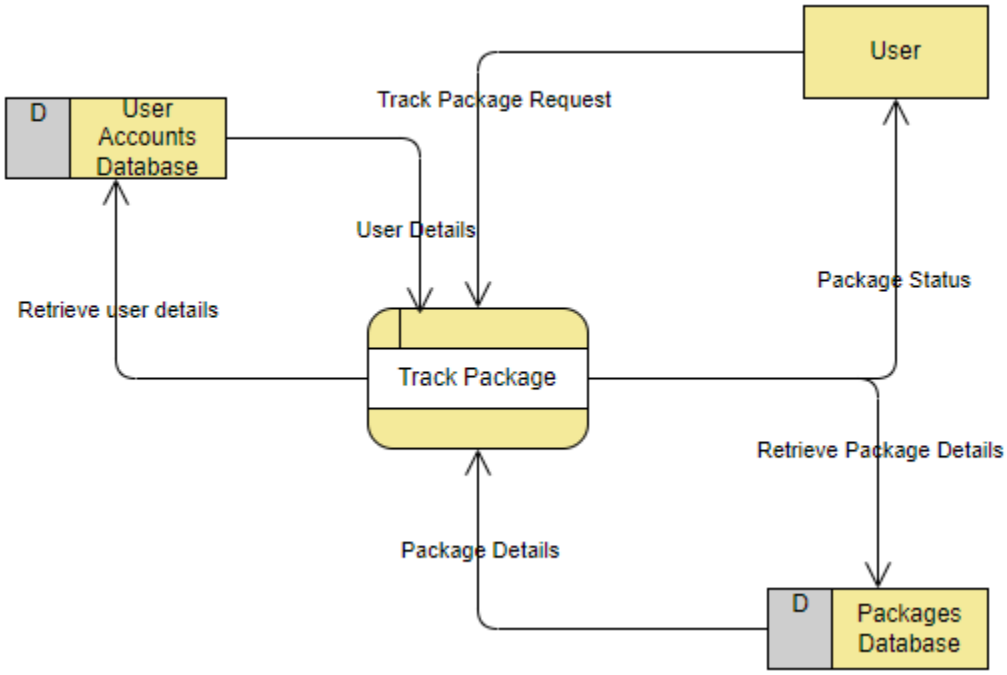
3.4 Process Modelling

Data Flow Diagram:

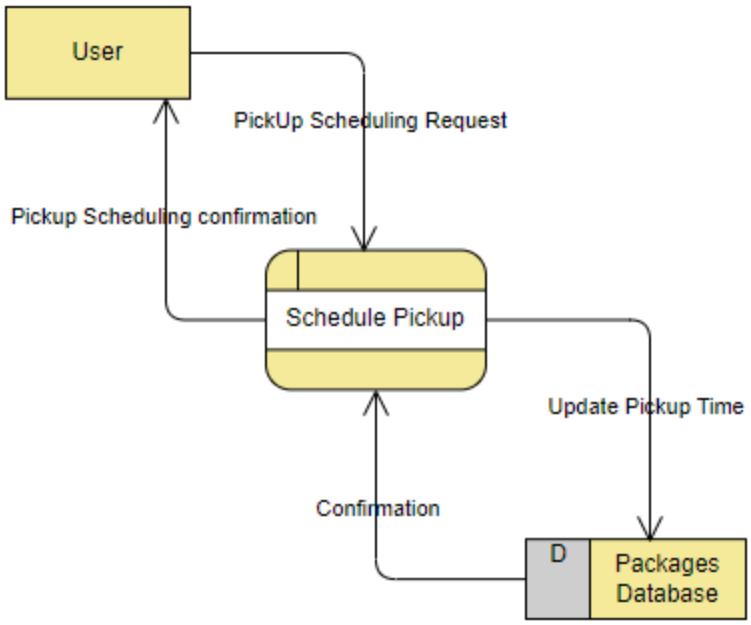
User Registration:



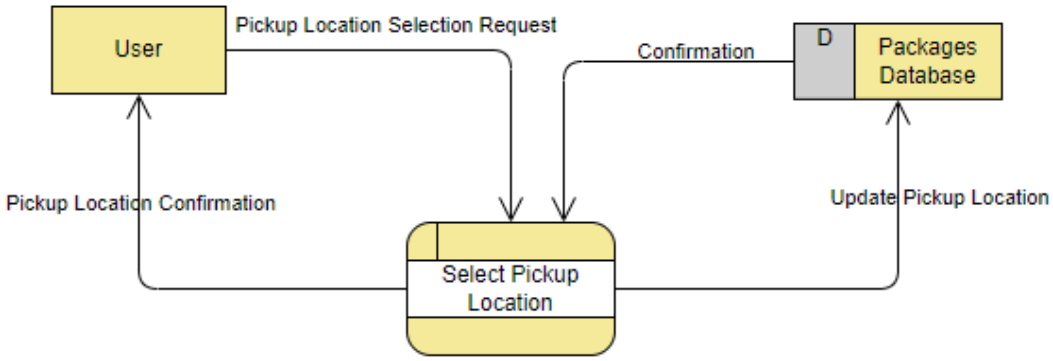
Track Package:



PickUp Scheduling:



Select Pickup Location:



4.0 Non-Functional Requirements

4.1 Performance

- The system should be capable of supporting up to 1000 users simultaneously.
- Package tracking information for the user should display in less than 2 seconds after entering the tracking ID.
- 95% of transactions (scheduling a pick-up, tracking a package) should be processed in less than a second.

4.2 Reliability

- The system should have a reliability of 99.9%, i.e., it should be functional 99.9% of the time.
- Data reliability should be ensured through regular backups of essential data.

4.3 Availability

- The system should be available to users 24/7.
- The planned system downtime may not exceed 5 minutes per month for maintenance.

4.4 Security

- The system must adhere to data protection legislation. All user data must be stored securely with encryption.
- Unauthorized access to the system should be prevented. Any unauthorized intrusion attempt should be logged and reported.
- Passwords should be hashed and not stored as plain text.

4.5 Maintainability

- The system's software components should be modular to allow for easy modification, addition, or removal of features.
- All functionalities of the system should be extensively documented to enable easy understanding and maintenance.

4.6 Portability

- The website should be easily accessible and offer a consistent user experience across different browsers and platforms (Windows, macOS, Linux).
- The website should be responsive and compatible with mobile devices.

5.0 Logical Database Requirements

5.1 Database Structure

- The database should include tables for Users, Packages, Tracking Information, Pickup Locations, and Customer Support Tickets.

5.2 Data Formats

- Users Table: Fields like UserID (Primary Key), Name, Email, Password (hashed), Contact Number.
- Packages Table: Fields include PackageID (Primary Key), UserID (Foreign Key), Description, Size, Weight, Pickup Location, Status.
- Tracking Information Table: Fields include TrackingID (Primary Key), PackageID (Foreign Key), Location, TimeStamp, Status.
- Pickup Locations Table: Fields have LocationID (Primary Key), Address, AvailableTime Slots.
- Customer Support Tickets Table: Fields include TicketID (Primary Key), UserID (Foreign Key), Issue Description, Status.

5.3 Storage Capabilities

- The database system should be capable of storing and efficiently retrieving a large number of records. It should also have measures in place to ensure data redundancy and support scalability.

5.4 Data Retention

- The system should maintain records for a considerable period allowing users access to historical data (such as previous package pick-ups and tracking details). This could be around 3 years as per standard industry practices or as legally required.

5.5 Data Integrity

- The system should ensure data integrity, such that there are no discrepancies in data across the system. This can be enforced by using unique primary keys and related foreign keys to establish relationships between various tables and prevent duplicate, missing or inaccurate data.

5.6 Data Backup and Recovery

- Regular, automated backups should be conducted to ensure data can be recovered in case of unexpected data loss.

5.7 Data privacy and Security

- User data protection is crucial and should be ensured through encryption. No data should be revealed, either purposefully or accidentally, to unauthorized individuals or services.

6.0 Approval

The signatures below indicate their approval of the contents of this document.

Project Role	Name	Signature	Date
IT Infrastructure Management	Adedolapo Balogun		11/05/2023
Software Development	Bulat Khungureev		11/05/2023
Security and Compliance	Uzma Khan		11/05/2023

PRODUCT BACKLOG

Project Objectives:

The primary objective of Pickup AT Ease is to disrupt and redefine the courier service industry by introducing a cutting-edge, automated platform. This platform aims to deliver efficient, eco-conscious parcel pickup and delivery services that cater to the evolving needs of individuals and businesses.

Core Features:

User Registration and Authentication:
A robust user registration system with email verification ensures secure account creation.
Two-factor authentication (2FA) enhances account security, instilling user confidence.

Parcel Scheduling and Pickup:
An intuitive and user-friendly interface empowers customers to schedule parcel pickups effortlessly.
Customers can provide comprehensive parcel details, specify pickup locations, and choose preferred pickup time slots.

Real-time Parcel Tracking and Notification:
Real-time parcel tracking is at the core of the user experience, allowing users and recipients to monitor deliveries from pickup to drop-off.
Automated notifications provide timely updates at crucial delivery milestones, including parcel pickup, en route status, and successful delivery.

AI-Driven Route Optimization:
The system leverages state-of-the-art AI algorithms to optimize delivery routes dynamically.
Factors such as real-time traffic conditions, delivery time windows, and historical data contribute to efficient routing.

Secure Payment Processing:
Pickup AT Ease ensures secure payment processing within the platform, enabling users to add and manage payment methods confidently.
Stringent encryption protocols and adherence to industry-standard payment security measures guarantee safe transactions.

Integration with External Courier Services:
Seamlessly integrating with external courier services streamlines coordination and enhances flexibility for specialized deliveries.
Tracking and communication with external partners are facilitated to ensure a seamless experience for users.

Regulatory Compliance:
Pickup AT Ease strictly complies with all relevant regulations, including safety, data protection, and environmental standards.
Compliance features are deeply embedded within the system to ensure legal adherence.

Sustainability and Environmental Impact:
Prioritizing environmental responsibility, the platform adopts eco-friendly practices.
Electric vehicles are employed for deliveries, and sustainable packaging materials are utilized, accompanied by real-time environmental impact reporting for user transparency.

User-Centric Features:
The user-centric design places an emphasis on providing an intuitive and user-friendly interface.
Round-the-clock customer support services are available to cater to user inquiries and concerns, further enhancing the overall user experience.

Architecture and Technology Stack:

Front-end: The front-end of the platform is constructed using cutting-edge web development technologies, ensuring responsiveness and compatibility across web and mobile devices.

Back-end: A robust back-end system manages critical functions such as user registration, authentication, parcel scheduling, real-time tracking, and secure payment processing. It also orchestrates integration with external courier services.

Database: Secure and scalable data storage is facilitated through a well-structured database system, ensuring efficient retrieval and management of parcel and user information.

AI Algorithms: Advanced AI algorithms power the dynamic route optimization system, continuously analyzing variables such as traffic conditions and delivery data to propose the most optimal routes.

Security: The platform incorporates a multi-layered security approach encompassing encryption, firewall protection, and intrusion detection systems to fortify data security and protect transactions.

Challenges and Mitigation Strategies:
Data Security: To mitigate data security risks, the project will undergo regular security audits and penetration testing to identify and address vulnerabilities proactively.

Regulatory Compliance: The project will establish a dedicated compliance team to ensure ongoing adherence to a dynamic regulatory landscape, thereby mitigating compliance-related challenges.

Environmental Impact: A rigorous environmental impact reduction strategy will be implemented, with constant monitoring and reporting to track progress and ensure alignment with sustainability goals.

User Feedback: The project will actively engage users through feedback mechanisms, including surveys and user suggestions, to drive continuous improvements in the user experience.

Technological Advancements: To stay ahead in terms of technology, the project will commit to ongoing research and development efforts, ensuring that the platform remains at the forefront of innovation.

Project Summary

This document is intended to provide a summary understanding of the high-level vision of your project goals.

Company Name	Pickup AT Ease	
Company Address	181 Bayview Av, Cityville, Canada	
Company Website	www.pickupatease.com	
Telephone	+1 (123) 456-7890	
Contact	Bulat Khungureev	
Title	Manager	
Email	bulat.khungureev@pickupatease.com	
Telephone	+1 (123) 456-7831	
Project Title	"Pickup AT Ease" - Revolutionizing Parcel Services with Innovative Automation	
Project Description	**About the company:** Pickup AT Ease Inc. is a forward-thinking technology startup headquartered in Canada. Our mission is to redefine the courier service industry by introducing a fully automated platform that focuses on user convenience. **About the project:** "Pickup AT Ease" represents the epitome of our vision for the future of courier services. Through advanced technology, comprehensive online strategies, and a strong commitment to sustainability, we aim to set new industry standards, offering an automated platform that caters to the dynamic needs of today's users.	
Problem/ Opportunity Assessment *	*Please describe current state problem/opportunity that describes the nature and extent of the problem (factual, quantified, concise), or that outlines a chance for advancement or progress.*	
	1.	**Problem**: The traditional courier industry relies heavily on manual processes, leading to inefficiencies, delays, and errors in parcel management. **Opportunity**: We recognize the potential for automation in courier operations. Our goal is to create a fully automated platform that minimizes human errors and optimizes resource usage, resulting in cost savings and consistent service quality.
	2.	**Problem**: Conventional courier services often lack comprehensive online platforms, hindering users from conveniently scheduling pickups and tracking deliveries. **Opportunity**: We aim to establish a robust online presence with a user-friendly website and a feature-rich mobile app. Users can schedule pickups, track parcels, and make payments seamlessly, setting new industry standards for convenience and accessibility.
	3.	**Problem**: Manual route planning consumes time, leading to suboptimal delivery routes and longer delivery times. **Opportunity**: Our solution involves the implementation of advanced automated route optimization algorithms driven by AI. These algorithms continuously analyze traffic data, delivery priorities, and vehicle capacity, ensuring efficient and speedy parcel deliveries.
	4.	**Problem**: Traditional courier services often lack proactive communication with customers, leading to dissatisfaction due to uncertainty about parcel whereabouts.

		Opportunity: We propose utilizing automated communication tools for real-time notifications. Users will receive updates on parcel status through SMS, email, or mobile app notifications, enhancing user satisfaction with transparent delivery processes.
	5.	**Problem**: Payment processing in the courier industry can be cumbersome, leading to delays and security concerns. **Opportunity**: We are committed to developing a secure, automated payment processing system that seamlessly integrates with leading payment gateways, ensuring swift and secure transactions, and ultimately improving the user experience.
	6.	**Problem**: Customer support in the courier industry can be limited to business hours, leaving users without assistance during off-hours. **Opportunity**: We plan to implement an AI-powered chatbot for 24/7 customer support. This chatbot will handle routine queries, provide real-time parcel tracking information, and escalate complex issues to human agents when necessary, offering round-the-clock assistance to users.
Desired Project Outcomes/ Requirements*	*Define how this project shall address a business need, e.g. the business problem or opportunity described above; describe what the beneficiary must be able to do / receive from the solution*	
	1.	**Advanced Online Courier Platform**: Develop a pioneering web-based platform and mobile application with user-friendly features, including parcel scheduling, real-time tracking, and chatbot support.
	2.	**AI-Driven Route Optimization**: Implement advanced AI-driven route optimization algorithms to streamline deliveries, reduce operational costs, and enhance delivery speed.
	3.	**Eco-friendly Delivery Options**: Introduce automated eco-friendly delivery choices, including electric vehicle fleets, sustainable packaging options, and real-time environmental impact reporting.
	4.	**Comprehensive Online Payment System**: Establish a secure, automated payment processing system integrated with leading payment gateways, ensuring swift and secure transactions.
	5.	**Continuous Customer Support**: Implement an AI-powered chatbot for 24/7 customer support, enhancing user experience and satisfaction.
	6.	**Innovative Communication**: Utilize automated notifications to keep users informed about parcel status and delivery updates in real time.
	Define the boundaries of work that you expect to receive from the students effort (vs. internal effort)	

Key Deliverables to be produced by students*	1.	**Fully Functional Platform**: Deliver a feature-rich web-based platform and mobile application with a user-friendly interface, including parcel scheduling, real-time tracking, and chatbot support.
	2.	**AI-Driven Route Optimization**: Develop AI-powered algorithms for route optimization, reducing delivery times and operational costs.
	3.	**Eco-friendly Delivery Solutions**: Implement eco-friendly delivery options and real-time environmental impact reporting to cater to environmentally conscious users.
	4.	**Online Payment Gateway**: Create a secure, automated payment processing system integrated with leading payment gateways.
	5.	**AI-Powered Chatbot**: Build an AI-powered chatbot capable of providing 24/7 customer support, handling inquiries, and escalating complex issues when necessary.
Desired Start Date	September 09, 2023	
Desired End Date	April 30, 2024	
Attachments	*List attachments that support project description*	
	1.	Comprehensive Market Research and Analysis Report
	2.	Detailed Project Requirements Document

* Please add fields as required

PICKUP AT EASE

PickUp Service

Project Vision Document

Version 1.0

28.09.2023

Revision History

Revision	Date	Author	Reviewed By	Summary of Changes
1.0	29.09.2023	Adedolapo Balogun	Bulat Khungureev	General information

Document Approval List

Version	Approved By	Signature	Date
1.0	Uzma Khan	Uzma Khan	29.09.2023

Document Distribution List

Version	Name of the Receiver/Group	Date
1.0	ANJANA SHAH (PROF)	29-09-2023
1.0	UZMA KHAN	29-09-2023
1.0	ADEDOLAPO BALOGUN	29-09-2023
1.0	BULAT KHUNGUREEV	29-09-2023

Table of Contents

1 Introduction

The purpose of this project vision document is to provide a clear and comprehensive overview of the Pickup AT Ease project, version 1.0. It serves as a guiding document for all stakeholders involved in the development, outlining the project's objectives, scope, and key considerations.

1.1 Purpose

The document must clearly communicate the overarching goals of the project, emphasizing the importance of automation, innovation, and user-centricity in redefining the courier service industry.

1.2 Scope

The scope of this project vision document is to provide a comprehensive overview of the Pickup AT Ease project, version 1.0. It outlines the project's objectives, key functionalities, and areas that are either included or excluded from the project scope.

1.2.1 In Scope

The scope of the project vision must explicitly define the major components and functionalities that are considered within the scope of Pickup AT Ease, version 1.0. This should include a detailed breakdown of what the project aims to deliver.

1.2.2 Out of Scope

The document must also clearly state what is explicitly out of scope for this version of the project. This includes any features, functionalities, or areas that will not be addressed in the current phase of development.

1.3 Definitions, Acronyms, and Abbreviations

The project vision document must provide a section that lists and defines any industry-specific terms, acronyms, or abbreviations used within the document. This is to ensure that all stakeholders have a common understanding of terminology.

1.4 References

The document should include a references section that lists any external documents, standards, or resources that are relevant to the project vision. This is to provide stakeholders with additional context and sources of information related to the project.

These introduction requirements ensure that the project vision document serves its purpose effectively by clearly outlining the project's purpose, scope, and providing necessary definitions and references for stakeholders to understand the context of Pickup AT Ease, version 1.0.

Reference File Name	Version	Description
Comprehensive Market Research and Analysis Report	1.2	Market research and analysis report providing insights into the courier service Industry
Detailed Project Requirements Document	2.0	Detailed project requirements document outlining functional and non-functional requirements for Pickup AT Ease development.
Courier Service Industry Regulations	1.0	A reference to industry regulations, including safety, data protection, and environmental standards, which the project must adhere to.
Sustainability Guidelines	1.1	Guidelines for sustainable practices, including the use of electric vehicles and sustainable packaging materials

2 Positioning

2.1 Business Opportunity

The business opportunity addressed by the Pickup AT Ease project is to revolutionize the courier service industry through advanced automation and innovation. By introducing an automated platform that focuses on user convenience, Pickup AT Ease aims to redefine the courier service experience, meet the dynamic needs of today's users, and set new industry standards.

2.2 Problem Statement

The Problem of	The traditional courier industry relies heavily on manual processes, leading to inefficiencies, delays, and errors in parcel management.
affects	Stakeholders affected by this problem include courier service providers, users, and recipients of parcels.
the impact of which is	The impact of this problem is increased operational costs, delayed deliveries, and decreased user satisfaction.
a successful solution would be	A successful solution would result in cost savings, efficient parcel management, and a consistent, user-friendly experience for all stakeholders.

Table 1 Problem Statement

2.3 Product Position Statement

For	For users who require courier services.
Who	Who seek a modern, convenient, and efficient way to send and receive parcels.
The Pickup AT Ease is a	The Pickup AT Ease is an innovative automated courier service platform.
That	That offers a seamless and user-friendly parcel scheduling, tracking, and delivery experience.
Unlike	Unlike traditional courier services that rely on manual processes and lack comprehensive online platforms.

Our product	Our product provides advanced automation, real-time tracking, eco-friendly delivery options, and 24/7 customer support, setting it apart as a modern, sustainable, and customer-centric courier solution.

Table 2 Product Position Statement

3 Stakeholder and User Descriptions

This section aims to provide a clear understanding of the individuals or entities (stakeholders and users) involved in the project. It also outlines their roles and responsibilities, as well as the key problems they perceive to be addressed by the proposed solution. It's important to note that while this section provides background information about stakeholders and users, their specific requests or requirements are captured in a separate stakeholder requests artifact or detailed requirements document.

3.1 Stakeholder Summary

In this subsection, you'll create a summary list of key stakeholders involved in the project. Stakeholders can be individuals, organizations, or entities with an interest in the project's outcome. Each stakeholder should be described in terms of what they represent concerning the project and their role throughout the project's lifecycle.

Stakeholder Name	Represents	Role
Customers	These are the end-users of our Pickup AT Ease platform. They are the heart of our business and drive demand for our services.	Their role involves scheduling parcel pickups, tracking deliveries, providing feedback, and making payments. Essentially, they're the ones who will benefit the most from our platform's ease and efficiency.
Pickup AT Ease Management	Our leadership and decision-makers who guide the company's strategic direction.	They provide critical insights, allocate resources, and ensure that our project aligns perfectly with our company's broader goals. Their role is pivotal in making this project a success.
Courier Service Providers	Government agencies overseeing courier and transportation regulations.	They set and enforce industry standards, ensuring our operations comply with safety, data protection, and environmental regulations. Their oversight is vital for our compliance and reputation.

Stakeholder Name	Represents	Role
IT and Development Team	Our internal development team at Pickup AT Ease Inc.	They are responsible for developing, maintaining, and continuously improving the technical aspects of our platform. Without them, our technological innovation wouldn't be possible.
Regulatory Authorities	Government agencies overseeing courier and transportation regulations	Set and enforce industry standards, ensuring compliance with safety, data protection, and environmental regulations.

Table 3 Stakeholder Summary

3.2 User Summary

The Pickup AT Ease platform caters to a variety of users, each with specific roles and responsibilities. Here's a summary of identified users:

User Name	Description	Responsibilities	Stakeholer
Customers	These are our end-users who want a modern, convenient, and efficient way to send and receive parcels.	They schedule parcel pickups, track deliveries, provide feedback, and make payments. They are the ones directly benefiting from our system's user-friendliness..	They are directly represented as their interests align perfectly with ours.
Pickup AT Ease Staff	These are our internal employees responsible for the day-to-day operations of our platform.	They manage and optimize the platform, monitor customer support, and ensure data security. Their work ensures the platform runs smoothly.	They represent the interests of Pickup AT Ease Management.
Courier Partners	These are the external courier service providers we collaborate with.	They coordinate parcel pickups and deliveries, ensuring timely and reliable services. Their performance directly impacts our reputation.	They are part of the interests of Courier Service Providers.

User Name	Description	Responsibilities	Stakeholer
IT Development Team	Our internal development team responsible for our platform's technical aspects.	They develop and maintain the platform, ensuring its functionality and efficiency. Their work is the backbone of our technical innovation.	They are directly aligned with the interests of the IT and Development Team.
Regulators	Government agencies ensuring industry compliance	Set and enforce industry regulations - Monitor safety and data protection - Environmental oversight	Regulatory Authorities

Table 4 User Summary

4 Stakeholder Requirements

In this section, we categorize and list the requirements from the perspective of business stakeholders and potential system users. These requirements help us understand what our stakeholders expect from the project.

ID	Requirement	Stakeholder
SR1	Customers should be able to register with Pickup AT Ease using valid email addresses.	Customers
SR2	Pickup requests should include parcel details, pickup location, and preferred pickup time slots.	Customers
SR3	Real-time parcel tracking information should be accessible to users and recipients.	Customers, Pickup AT Ease Staff
SR4	The system should employ AI-driven route optimization algorithms to determine efficient delivery routes.	Pickup AT Ease Management
SR5	Users must have the option to securely add and manage payment methods within the platform.	Customers, Pickup AT Ease Staff
SR6	Pickup AT Ease should integrate seamlessly with external courier services for specialized deliveries.	Courier Partners
SR7	The system must adhere to all relevant regulations, including safety, data protection, and environmental standards.	Regulators
SR8	Pickup AT Ease should minimize its environmental impact by using electric vehicles for deliveries and sustainable packaging materials.	Environmental Experts

Table 5 Stakeholder Requirements

5 System Features

In this section, we list and briefly describe the high-level system features that are essential to deliver benefits to users without delving into specific design details.

ID	Feature	Stakeholder Requirement ID
SF1	User Registration and Authentication	SR1
SF2	Parcel Scheduling and Pickup	SR2
SF3	Real-time Parcel Tracking and Notification	SR3
SF4	AI-Driven Route Optimization	SR4
SF5	Secure Payment Processing	SR5

ID	Feature	Stakeholder Requirement ID
SF6	Integration with External Courier Services	SR6
SF7	Regulatory Compliance	SR7
SF8	Sustainability and Environmental Impact	SR8

Table 6 System Features

5.1.1 Feature Descriptions:

- **SF1 User Registration and Authentication:** This feature enables users to register with Pickup AT Ease using valid email addresses, ensuring a secure and personalized experience.

- **SF2 Parcel Scheduling and Pickup:** Users can schedule parcel pickups, providing parcel details, pickup locations, and preferred pickup time slots.

- **SF3 Real-time Parcel Tracking and Notification:** The system provides real-time parcel tracking information and sends automated notifications at key milestones, such as pickup, en route, and delivery.

- **SF4 AI-Driven Route Optimization:** Pickup AT Ease employs AI-driven route optimization algorithms to determine the most efficient delivery routes, considering factors like traffic conditions and delivery time windows.

- **SF5 Secure Payment Processing:** Users can securely add and manage payment methods within the platform, ensuring swift and secure transactions.

- **SF6 Integration with External Courier Services:** The system integrates seamlessly with external courier services for specialized deliveries, facilitating coordination and tracking.

- **SF7 Regulatory Compliance:** Pickup AT Ease adheres to all relevant regulations, including safety, data protection, and environmental standards, ensuring legal compliance.

- **SF8 Sustainability and Environmental Impact:** The platform minimizes its environmental impact by using electric vehicles for deliveries and sustainable packaging materials, with real-time environmental impact reporting.

These high-level system features are essential for meeting the project's objectives and delivering benefits to stakeholders while avoiding specific design details.

6 Assumptions

To guide our efforts effectively, we've identified key assumptions underpinning the business context of Pickup AT Ease:

- **User Adoption**: We assume that customers and users will readily adopt the Pickup AT Ease platform and its features, leading to increased usage and success.
- **Regulatory Compliance**: It is assumed that all relevant regulations related to safety, data protection, and environmental standards can be met without major obstacles or legal issues.
- **Technology Readiness**: We assume that the required technology, such as AI-driven route optimization algorithms and secure payment processing systems, can be implemented effectively within the project timeline.
- **Environmental Impact**: It is assumed that the use of electric vehicles for deliveries and sustainable packaging options will significantly reduce the project's environmental impact as intended.
- **Customer Support Effectiveness**: We assume that the AI-powered chatbot for 24/7 customer support will effectively handle routine queries and provide satisfactory assistance to users.
- **Integration with External Partners**: It is assumed that the integration with external courier services for specialized deliveries will proceed smoothly and without significant technical challenges.
- **Sustainability Metrics**: We assume that real-time environmental impact reporting will accurately measure and report the project's sustainability efforts.
- **Scalability**: It is assumed that the system's scalability to accommodate increased user registrations and parcel volumes can be achieved without compromising performance.

- **Market Acceptance**: We assume that the innovative and eco-friendly aspects of Pickup AT Ease will be well-received by the market and will attract a significant user base.
- **Market Competition**: It is assumed that competitors in the courier service industry will not introduce similar innovations that could significantly impact our project's success.

These assumptions serve as a basis for planning and decision-making but should be periodically reviewed and validated throughout the project to ensure their accuracy and relevance.

7 Constraints

- **Regulatory Constraints**: The project must adhere to various regulations related to the courier service industry, including safety, data protection, and environmental standards, which may impose limitations on certain aspects of the project.
- **Budget Constraints**: The project's budget is limited, and financial constraints may affect the scope of the project and the resources available for its execution.
- **Timeline Constraints**: The project has a specific timeline from September 09, 2023, to April 30, 2024. Meeting project milestones and deadlines is crucial, and any delays may impact the project's success.
- **Technology Constraints**: The availability and compatibility of technology required for AI-driven route optimization, secure payment processing, and real-time tracking may pose constraints on the project.
- **Resource Constraints**: The availability of skilled personnel, including developers, data analysts, and customer support agents, may be limited and could impact the project's execution.
- **Environmental Constraints**: While the project aims to reduce its environmental impact, there may be constraints related to the availability of electric vehicles, sustainable packaging materials, and the feasibility of implementing eco-friendly practices.
- **Competitive Constraints**: The project operates in a competitive courier service industry, and actions by competitors may introduce constraints or opportunities that need to be monitored and addressed.
- **Integration Constraints**: Integrating the Pickup AT Ease platform with external courier services may involve technical challenges and dependencies on the capabilities and willingness of external partners.
- **Market Acceptance Constraints**: The project's success depends on the acceptance and adoption of its innovative and eco-friendly features by the market, which may be influenced by external factors.

- **Security and Privacy Constraints**: Ensuring the security and privacy of user data and payment information is essential, and any breach could have severe consequences for the project.

These constraints should be carefully considered and managed throughout the project to minimize their impact and ensure successful project delivery.