SRS-003

SOFTWARE REQUIREMENT SPECIFICATION

Library Information System

client:

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Revision List

Revision	Descriptioon
A	
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1. Introduction

1.1 Purpose of Writing the Document

This document outlines the use case scenarios for a software system designed to enhance the user experience within a virtual library environment. The software is aimed at providing a seamless and efficient platform for users, administrators, and members to interact with library resources, engage in educational activities, and manage various aspects of the library ecosystem. The purpose of this document is to detail specific use cases, their primary and alternative flows, as well as pre- and post-conditions.

1.2 Scope of Problem

The software whose requirements are specified in this document is a comprehensive Library Management System (LMS). This SRS outlines the software requirements for the entire Library Management System, encompassing various modules and functionalities that collectively contribute to an efficient and user-friendly virtual library environment. The system is designed to cater to the needs of multiple user roles, including actors such as students, lecturers, and administrators.

1.3 Definitions and Terms

User Roles:

User: Individuals engaging with the virtual library system.
Administrator: Responsible for system management.
System Modules:
Library Management System (LMS): Comprehensive software for cataloging, circulation, user management, and reporting within the virtual library.

Use Case Terminology:

Primary Flow: Main sequence of steps in a scenario.
Alternative Flow: Deviation to address specific conditions.
Pre-conditions: Necessary conditions before executing a use case.
Post-conditions: Desirable outcomes following successful use case execution.

1.4 References

https://openlibrary.telkomuniversity.ac.id/
https://chromewebstore.google.com/detail/google-dictionary-by-goog/mgijmajocgfcbeboacabfgobmjgjcoja
https://www.oxfordlearnersdictionaries.com/definition/english
https://languages.oup.com/google-dictionary-en/

2. General Description of the Software

2.1 Statement of Software Objectives

The library information system application software is a product that is being developed to help users to give the information of the books that available in the library. The software will provide a accessible and easy to use the library information, information of the books, and give the information of where the books are available to borrow.

2.2 Software Benefits / Functions

The Library Information System provide an easy to use platform for users to see the information of the books that the users want to borrow in advance through a superhuman AI network. This advanced technology ensures a safe and secure experience for both previewing the information of the books and when borrowing the books from the library. Of course, this application makes it easier for users when users want to borrow books and see information about the books they want to borrow and the availability of books in the library.

2.3 User Characteristics

1. Student : use the application to find the specific book that they want to borrow, return the book on time, and searching the library information.
2. Lecturer : use the application to find the specific book that they want to borrow, return the book on time, and searching the library information.
3. Guest : use the application to find the specific book and searching for the library information.
4. Administrator and Library Staff : responsible to validate the registration data that the student and the lecturer send to the system, input the information of the latest book that arrive in the library, update the status of the book, and accepting the student and the lecturer that want to join the membership.

2.4 Software / System Limitations

1. Hardware Limitation : The system's functionality ay be limited by the hardware infrastructure that owned by the admin. For example, memory and storage capacity.
2. Specific Technologies, Tools, and Database : The library information system may have predefined technologies, tools, and database that developers must use. Relates to the selection of programming languages, development frameworks, and database systems.
3. Parallel Operation : The system must need to handle multiple parallel operations, such as previewing information of the books and the library, borrowing books, returning books, joining memberships, accessing mini games, and updating the status of the books.
4. Security Considerations : Access Control, data encryption, and protection against the unauthorized access.

3. Detailed Description of Software

3.1 Requirement Descriptions

3.1.1 *Functional Requirements*

No.	Requirement ID	Feature	Description
1.	ADM-01	Book input	This function is used by the admin to input new books into the system
2.	ADM-02	Data validation	This function is used by the admin to validate the data of new members into the system
3.	USER-01	User registration	The function is used by the user to register their information to create a new membership
4.	USER-02	login	This function is used by the user to login to their membership with the appropriate login credentials that they previously selected
5.	USER-03	Book preview	This function is used by the user to preview a brief excerpt of the book and its content
6.	USER-04	Book borrowing	This function is used by the user to borrow a book
7.	USER-05	Change credential	The user can change credential
8.	ADM-03	Change Book Status	The admin can change the status of a book
9.	ADM-04	View Book Record	The admin can know the loan record of the book
10.	USER-08	View Member History	The member able to know their loan record
11.	USER-09	Book Availability	The user can know which book is able to be borrowed
12.	ADM-10	Book Approval	The admin can decide if a book is able to be borrowed
13.	USER-10	Forgot Password	The user can reset their password by clicking “forgot my password” button

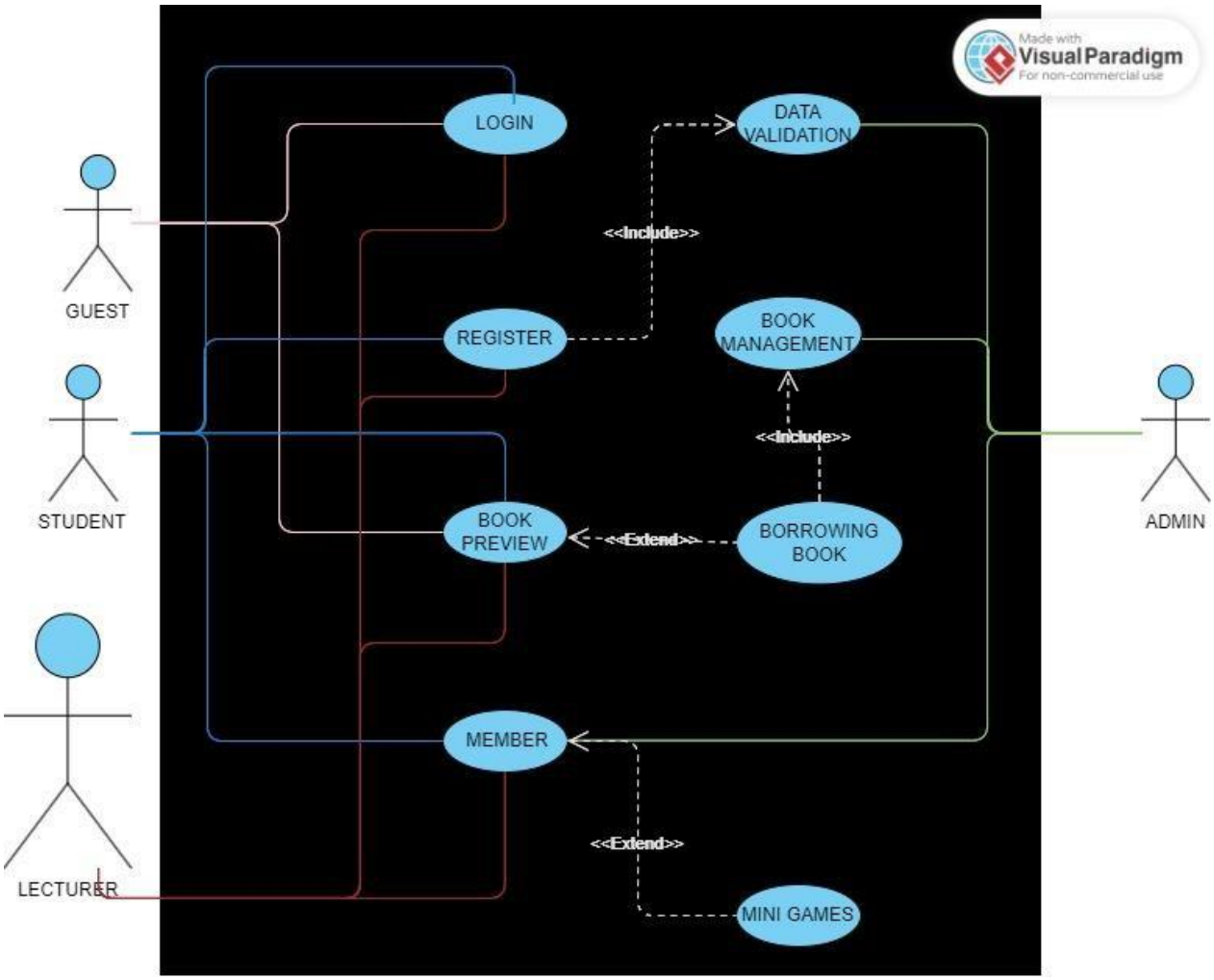
3.1.2 *Non-Functional Requirements*

No.	Quality	Requirement ID	Description
1.	Credentials security	NFR-01	This function safeguards against unauthorized logins from unfamiliar sources by employing a two-factor authentication approach
2.	System responsiveness	NFR-02	This function is designed to allow users to navigate the website without experiencing substantial delays
3.	Mini-games	NFR-03	This function is used by the user to engage in simple mini-games, earning points and rewards in the process
4.	Login Performance	NFR-04	The login process shall be completed within 5 seconds

5.	Login security	NFR-05	The login process shall be secure and protect user credentials from unauthorized access
6.	Sign in security	NFR-06	Sign in process shall be secure and protect user data from unauthorized access
7.	Book borrowing	NFR-07	The user can borrow books up to 3 books
8.	Registration Confirmation	NFR-08	User can get a confirmation via email less than 5 minutes
9.	Loading time	NFR-09	The website doesn't need a highspeed internet to be accessed
10.	Registration process	NFR-10	The system can load the applicant (that want to be a member) data less than 2 minutes
11.	Book Recommendation	NFR-11	The system can recommend some books based on the user records
12.	Book Recommendation (2)	NFR-12	The system can recommend some books based on the user data
13.	User Interface	NFR-13	The system has a user-friendly UI
14.	View Member History	NFR-14	The member able to know their loan record anytime
15	System Scalability	NFR-15	The system support many concurrent users without having performance issues

3.2 Analysis Modeling

3.2.1 *Usecase Diagram*



3.2.1.1 Usecase Scenario #1 <Login>

i. Pre-Condition : The system already have the user data
ii. Use Case Description
    a. Primary Flow:
        - Actor input the username and password
        - The system verify the data with the stored data
        - The system display that the actor has successfully signed in
    b. Alternative Flow:
iii. Post-Condition : The actor have successfully login

3.2.1.2 Usecase Scenario #2 <Register>

i. Pre-Condition : The system has no data of the actor
ii. Use Case Description
    a. Primary Flow:
        - The system ask for the actor username
        - The system ask for the actor password
        - The system ask for the actor password again for verification
        - The system verifies the first inputted password and the second inputted password
        -
    b. Alternative Flow:
iii. Post-Condition : The system successfully store the actor data

3.2.1.3 Usecase Scenario #3 <Book Preview>

i. Pre-Condition : The actor choose a book they want to preview
ii. Use Case Description
    a. Primary Flow:
        - The system show the book list
        - The actor choose the book
        - The system display the information of the book
    b. Alternative Flow:
        - The actor search the book that they want to preview
        - The system display the information of the book
iii. Post-Condition : The system has display the information of the book they choose

3.2.1.4 Usecase Scenario #4 <Join Member>

i. Pre-Condition : The actor is a student or a lecturer
ii. Use Case Description
    a. Primary Flow:
        - The actor choose to join the membership
        - The actor data is validated by the admin
    b. Alternative Flow:
iii. Post-Condition : The actor has successfully joined the membership

3.2.1.5 Usecase Scenario #5 <Mini Games>

i. Pre-Condition : A member choose to play mini game
ii. Use Case Description
    a. Primary Flow:
        - The system display the question of the mini games
        - The actor input the answer
        - The system display that the answer is incorrect or correct
        - The system display how many questions that the actor correctly answer
    b. Alternative Flow:
iii. Post-Condition : The system output the score of the member

3.2.1.6 Usecase Scenario #6 <Borrowing Book>

i. Pre-Condition : The actor want to borrow a book
ii. Use Case Description
    a. Primary Flow:
        - The system show the book list
        - The actor chooses the book they want to borrow
        - The actor request the book to borrow
        - The admin approve / deny the request from the actor
    b. Alternative Flow:
        - The actor search the book they want to borrow
        - The actor request the book to borrow
        - The admin approve / deny the request from the actor
iii. Post-Condition : The actor has successfully borrow the book

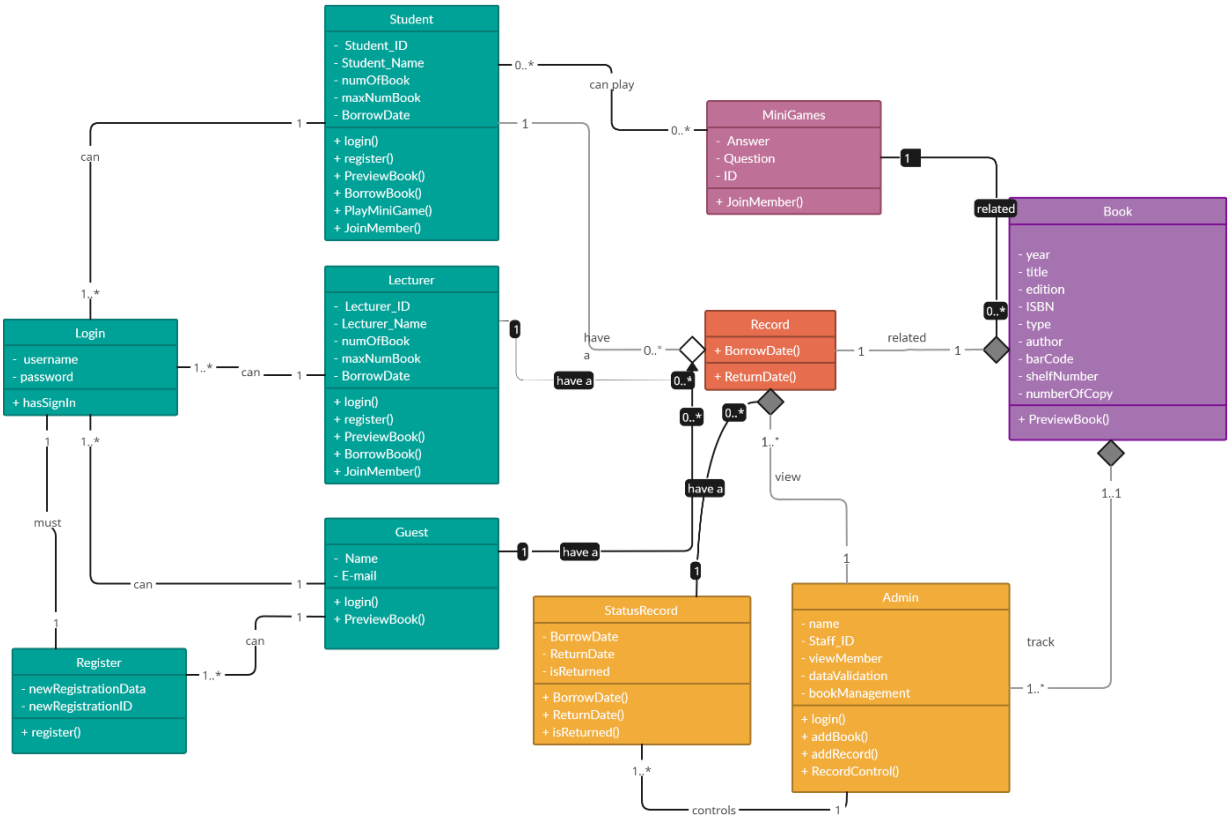
3.2.1.7 Usecase Scenario #7 <Book Management>

i. Pre-Condition : The system display a database of the books
ii. Use Case Description
    a. Primary Flow:
        - The system display the book status
        - The admin can manage the accessibility of the book
        - The system receive the admin enquiry
    b. Alternative Flow:
        - The admin want to add a book
        - The admin input the book information
        - The system insert the book into the database
iii. Post-Condition : The admin successfully updated a book status

3.2.1.8 Usecase Scenario #2 <Data Validation>

i. Pre-Condition : The actor input the registration data
ii. Use Case Description
    a. Primary Flow:
        - The system received the new data from registration
        - The admin verify the data
        - The admin accept the registration data
    b. Alternative Flow:
iii. Post-Condition : The successfully added the new member

3.2.2 *Class Diagram*



3.2.2.1 *Class Diagram Description*

Class ID	Class Name	Attribute (visibility)	Method / Operation
001	Student	-Student_ID : int -Student_Name : string -numOfBook : int -maxNumBook : int -BorrowDate : date	+login(), +register(), +PreviewBook(), +BorrowBook(), +PlayMiniGame(), +JoinMember()
002	Lecturer	-Lecturer_ID : int - Lecturer_Name : string -numOfBook : int -maxNumBook : int -BorrowDate : date	+login() +register() +PreviewBook() +BorrowBook() +PlayMiniGame() +JoinMember()
003	Book	-year : int -title : string	+ PreviewBook()

		-edition : string -ISBN : int -type : string -author : string -barCode : int	
004	Guest	-Name : string -E-mail : string	login(), PreviewBook()
005	Admin	-name : string -Staff_ID : int -viewMemer : string -dataValidation : boolean -bookManagement : string	+login() +addBook() +addRecord() +RecordControl()
006	StatusRecord	-BorrowDate : date -ReturnDate : date -isReturned : string	+BorrowDate() +ReturnDate() +isReeturned()
007	Register	-newRegistrationData : string -newRegistrationID : int	+register()
008	Login	-username : string -password : string	+hasSignIn()
009	MiniGames	-Answer : string -Question : string -ID : int	+JoinMember()

For each class: identify all operations (referring to class responsibilities) and attributes including their visibility

1. Student
   - Attributes
     a. Student_ID : int
        Visibility : public
        Description : ID of the student

     b. Student_Name : string
        Visibility : public
        Description : Full name of the student

     c. numOfBook : int
        Visibility : pulic
        Description : Number of book that the student borrow

     d. maxNumBook : int
        Visibility : public
        Description :Number of maximal book that can borrow

     e. BorrowDate : date
        Visibility : public
        Description : The date that the sudent borrow the book

- Operation
    a. login(username, password : string) : void
       Visibility : public
       Description : The Information of the book, if wanted to be borrowed

    b. register(username, password, validPass : string) : void
       Visibility : public
       Description : Register a new user with the provided username, password, and validation password

    c. PreviewBook(title)
       Visibility : public
       Description : Display the selected book

    d. BorrowBook(title)
       Visibility : public
       Description : Show the borrowing book

    e. PlayMiniGame(book)
       Visibility : public
       Description : Allow user to play the mini games

    f. JoinMember(user)
       Visibility : public
       Description : Allow user to join the membership

2. Lecturer
    - Attributes
        a. Lecturer_ID: integer
           Visiblity: Private
           Description: Numbers associated with a certain lecturer

        b. Lecturer_Name: string
           Visibility: Private
           Description: Name of the lecturer

        c. numOfBook: integer
           Visibility: Private
           Description: Number of book borrowed by the lecturer

        d. maxNumOfBook: integer
           Visibility: Private
           Description: Maximum number of book that can be borrowed by the lecturer

        e. BorrowDate: date
           Visibility: Private
           Description: The date when a certain book is borrowed by the lecturer

    - Operations
        a. Login(username: String, password: String) boolean

           Visibility: Public

Description: Logs in the user with the provided username and password. Returns true if the login is successful, false otherwise.

b. Register(username: String, password: String): void
Visibility: Public
Description: Registers a new user with the provided information.

c. PreviewBook(book: string) void
Visibility: Public
Description: The information of the book, if wanted to be borrowed.

d. BorrowBook(book: string, BorrowDate: date) void
Visibility: Public
Description: The borrowed book and the date when it borrowed and should be returned.

e. PlayMiniGame(book: string) integer
Visibility: Public
Description: Mini-game where you can earn points and rewards in the process.

f. JoinMember(username: String) void
Visibility: Public
Description: Allows user to apply for membership of the library.

3. Book

- Attributes
  a. Year: Integer
  Visibility: Public
  Description: the Year that this book is published

  b. Title: String
  Visibility: Public
  Description: The Title of the Book

  c. Edition: String
  Visibility: Public
  Description: the Edition of the current book

  d. ISBN: Integer
  Visibility: Public
  Description: Unique identification number of the book

  e. Type: String
  Visibility: Public
  Description: The type of book that is selected

  f. Author: String
  Visibility: Public
  Description: The Author of the book

  Visibility: Public

g. barCode: Integer

Visibility: Public

Description: the barCode of the book, if want to be borrowed

- Operation
  a. PreviewBook(book : string) : void
     Visibility: Public
     Description: The Information of the book, if wanted to be borrowed

4. Guest
   - Attributes
     a. Name : string
        Visibility : public
        Description : full name of the guest

     b. E-mail : string
        Visibility : public
        Description : email address of the guest
   - Operation
     a. login(username, password : string) : void
        Visibility : public
        Description : Log in the user with provided username and password, return true if the data is correct, false otherwise

     b. PreviewBook(book : string) : void
        Visibility: Public
        Description: The Information of the book, if wanted to be borrowed
5. Admin
   - Attributes
     a. Name: string
        Visibility: Public
        Description: the name of the admin

     b. Staff_ID: int
        Visibility: Private
        Description: the ID of the staff

     c. ViewMember: string
        Visibility: Public
        Description: The Information of the library member

     d. DataValidation: boolean
        Visibility: Private
        Description: This works to validate the member's data

     e. BookManagement: string
        Visibility: Private
        Description: This work to manage the books
   - Operation
     a. Login(username: String, password: String) boolean
        Visibility: Public
        Description: Logs in the user with the provided username and password. Returns true if the login is successful, false otherwise.

     b. Addbook(book: string) void

Visibility: Private
Description: This works make the admin to able to add book into the database

c. AddRecord(book, member: string) void
Visibility: Private
Description: This works make the admin to able to add the log into the database

d. RecordControl (book, member: string) void
Visibility: Private
Description: This works make the admin to able to change the log in the database

3.3 System Environment Requirements

3.3.1 *Operating Environment*

The software is compatible with a variety of hardware, such as computers and smartphones, that are capable of running a web browser. As stated in the system requirements for the browser, the software can be operated on a Windows 10 computer with internet access, and on mobile devices with a minimum of Android 11 or iOS 15 (limited to versions still supported by the respective operating system manufacturers).

The software comprises the application/website, offering features like book previews, book lending, and user registration. The website interacts with a server/database system to fetch and update user and book information.

3.3.2 *Hardware Requirements*

a. Processor

- Logical charateristic: The software may specify a minimum required processor to run the website through the browser.
- Physical charateristics: The device should have enough performance to run the the website through the browser.

b. Main Memory

- Logical characteristics: The software may specify a minimum amount of main memory required for efficient operation through the web browser.
- Physical characteristics: The device should have enough main memory to support the apllication through the web browser and all of it functions.

c. Storage (Internal/External)

- Logical characteristics: The software through the web browser may specify a minimum amount of available storage required for efficient operation.
- Physical characteristic: The device should have enough available storage to contain the web browser, which then will be used to access the website.

d. Network Interface (Mobile Data/Wi-Fi/LAN)

- Logical characteristic: The website requires network connectivity, supporting mobile data, Wi-Fi, and LAN connections through the operating system and the hardware availability (Wi-Fi card or Ethernet).

- Physical Characteristic: The device should have a working mobile data connection and Wi-Fi/LAN capabilities.

e. Camera

- Logical characteristics: The website may use the camera for a few purposes, such as registering verification and cross-checking face with the student identification card.
- Physical Characteristics: The device should have a camera with sufficient resolution and capabilities.

f. Input Devices

- Logical Characteristics: The website supports input from many devices such as touchscreen, mouse, touchpad, and keyboards.
- Physical characteristics: The device should have a capability to read input from many devices as stated before.

3.3.3 *Software Dependencies*

1. Software Components:
   a. Library Management App
      Purpose: Core applications for users to access the library from the web.
      Data in: user inputs such as login, register, book lending request, book preview request, and mini-games answer.
      Data out: request to the server in accordance with the user inputs.
   b. Server/Database
      Purpose: stores and manages data (user informations, book informations, mini-games answers)
      Data in: request to the server in accordance with the user inputs.
      Data out: information/authentification in accordance with the user inputs.
2. Implementation Constraints:
   Security Measures: Implement user authentication and authorization for app access.
   Data Integrity: Incorporate checksums or hash functions to guarantee data integrity during transmission from the server to the end-user devices. Also helps to keep the data consistent across all of them.
3. Data Sharing Mechanisms:
   Real-time Updates: Facilitate real-time updates between the website and the server for high priority data.
   Caching: Implement caching mechanisms to enhance data retrieval efficiency for low-priority data and to alleviate server load.

4. Appendix

Appendix A: List of Difficult Words

Administrator: an information technology professional who supports a multiuser computing environment and ensures continuous, optimal performance of IT services and support systems.

Application: a computer software package that performs a specific function directly for an end user or, in some cases, for another application.

Author: a person who writes books or the person who wrote a particular book.

Barcode: a machine-readable code in the form of numbers and a pattern of parallel lines of varying widths, printed on and identifying a product.

Credentials: a qualification, achievement, personal quality, or aspect of a person's background, typically when used to indicate that they are suitable for something.

Database: a structured set of data held in a computer, especially one that is accessible in various ways.

Device: a thing made for a particular purpose; an invention or contrivance, especially a mechanical or electrical one.

Display: make a prominent exhibition of (something) in a place where it can be easily seen.

Ethernet: a local-area network protocol featuring a bus topology and a 10 megabit per second data transfer rate.

Hardware: the machines and electronic parts in a computer or other electronic system

LAN: a system for communicating by computer within a large building or group of buildings (the abbreviation for ‘local area network’).

Log in:

Mobile: capable of moving or being moved readily.

Operation System: the software that supports a computer's basic functions, such as scheduling tasks, executing applications, and controlling peripherals.

Preview: an inspection or viewing of something before it is bought or becomes generally known and available.

Processor: a controller, the key component of a computing device that contains the circuitry necessary to interpret and execute electrical signals fed into the device.

Resources: a stock or supply of money, materials, staff, and other assets that can be drawn on by a person or organization in order to function effectively.

Seamless: smooth and continuous, with no apparent gaps or spaces between one part and the next.

Software: the programs used to direct the operation of a computer, as well as documentation giving instructions on how to use them.

SRS: a document that describes what the software will do and how it will be expected to perform.

Variety: a number of different types of things, especially ones in the same general category.

Verification: the process of establishing the truth, accuracy, or validity of something.

Virtual: almost or nearly as described, but not completely or according to strict definition.

Visibility: the state or fact of being visible.

Wi-Fi: a system for connecting to the internet or sending data over computer networks using radio waves instead of wires.