مبادرة الكليات التطبيقية
The Applied Colleges Initiative

BLOOD DONATION MANAGEMENT SYSTEM IN MADINAH

WEB PROJECT (1)

FWD291

Blood donations

Supervisor: Dr.Hala Hameed

Presented by:

Rehamlbrahim

SID #4451964

Lana Al-Juhani

SID #4450984

Atheer Al-Harbi.

SID #4451855

Abeer Al-Anazi.

SID #4453204

Tuqaal-Nakhli

SID #4553366

Academic Year 1445 AH

Acknowledgement

The success and results of this project have required a tremendous amount of guidance, and fortunately, we have achieved that throughout our project.

All that we did was, firstly, by the grace of Allah Almighty for His bounty to complete the project, without his blessings, we would not be able to do anything. Then, we like to express our special thanks and gratitude to our supervisor, **Dr. Hala Hameed**, who helped us and directed us throughout the period of work on this project then.

At the end, the support and help from people around us we think it is necessary to thank them, we thank our professors and colleagues who have been supportive of us throughout the project.

Abstract

The service aims to enable community members to donate blood to give it to those in need.

Each whole blood donation could save three lives. Donated blood also contributes to meeting many medical needs, such as cases of people who have lost amounts of blood due to physical injuries, an organ transplant, or any major surgery, in addition to people who are unable to produce a sufficient amount of blood due to illness or undergoing treatment.

Donating blood helps reduce the level of iron in the blood because no one suffers from heart disease and clogged arteries. Studies have shown that those who donate their blood at least once a year are less likely to suffer from.

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Chapter 1: Introduction

1.1 Introduction

Blood donation: A simple medical procedure contributes to saving lives. So a person donates his blood voluntarily, and the blood is taken from a healthy person and preserved, then preserved so that it can be used to treat another person's conditions in emergencies that require a blood transfusion, or for people who are potential patients for long-term .

1.2 Problem Definition

Millions of people need blood transfusions annually. Some may need blood while undergoing surgery. Others rely on it after being in an accident or suffering from a disease that requires obtaining some blood components. Donating blood allows for all of this. There is no substitute for human blood. Therefore, all blood transfusions use blood from donors.

What are the reasons for blood transfusion?

A blood transfusion is necessary if you lose blood due to bleeding, serious injury, or during surgery. But some people may need blood transfusions to treat certain conditions and disorders, including:

Anemia Blood transfusion Anemia is one of the most prominent causes of blood transfusion, and it occurs when a person's blood does not contain a sufficient amount of red blood cells.

Hemophilia is a bleeding disorder in which the blood is unable to clot.

* Cancer.

* Sickle cell disease is a group of red blood cell disorders that change their shape.

* Kidney disease.

* Liver diseases.

Problems accessing donors

1-With an increase in the need for blood donors, hospitals are facing a lot of difficulties in finding them.

2-the lack of awareness in society about the necessity of donating

3-Lack of link between donor and recipient in

Case of emergency

4-If the patient needs an emergency operation, do not wait for a donor to arrive

5-Lack of rare blood types.

1.3 Project Objectives

This project will contribute to solving the problem of blood shortage and will have a significant positive impact on society. As we are the students behind our project, our objectives are focused and deliberate, aimed at directly confronting the challenge of blood shortages. Our goals are:

1. To enhance the visibility of blood supplies, making it easier to track and manage available stocks in real-time across hospitals and blood banks.

2. To increase donor engagement by simplifying the donation process with a user-friendly interface and notifications for when urgent blood donations are needed.

3. To facilitate efficient matching between donors and recipients, ensuring those in need receive blood in a timely manner.

4. To raise community awareness about the importance of donating blood, fostering a culture of regular donation through educational campaigns.

5. To ensure the security and privacy of all our users' data, adhering to the highest standards of data protection.

6. To continuously adapt and respond to our region's needs, evaluating the effectiveness of our application and making necessary adjustments.

By achieving these goals, we aim to make a significant, positive impact on our society, addressing the urgent issue of blood shortages and enhancing community health and wellbeing.

1.4 Project Scope

The scope of our blood donation management system project is to develop a web-based platform that allows efficient management of blood donation activities between donors, recipients, and administrators.

The key in-scope elements include:

- Donor and recipient registration and profiles

- Search and matching of donors to recipients

- Appointment booking for donations

- Donation history and inventory management

- Admin dashboard for management and reporting

Out of scope are elements such as integration with external hospital systems, complex

Medical records or testing data, mobile applications, advanced analytics and business

Intelligence. The initial release will focus on core donation functionality for a single

Organization. Additional features may be considered in future enhancements based on Requirements.

The project aims to provide a basic but full-functioning system within the defined

Boundaries. Feedback from initial users will help evaluate expanding scope as needed. Regular Scope reviews will maintain focus on key objectives and deliverables.

1.5 Project Timeline

This section outlines the d timeline for our web-based blood donation platform project. As the student development team, we expect to complete the project within 6 months According to the following timeline:

- The first involve concluding our background research and finalizing system requirements based on user needs analysis. By the end of this phase, we aim to have our project proposal and design documents ready for review.

- In the second month, we will focus on developing the core application architecture and building out the front-end interface. Basic functionality for user registration and profile management is targeted for completion.

- By the third month, more complexd inventory management and appointment scheduling are planned to be integrated. This will allow, implementation of the backend website an continue.-functional requirements around performance, security and accessibility will also be addressed.

- Prior to the fifth month, an external audit of the system will be conducted. Based on feedback, remaining bugs will be fixed and improvements added.

- The final month is reserved for documentation, deployment, and presentation of the project.

- Post-deployment support and further optimization may continue beyond the Scheduled timeline as well.

We aim to meet all projected deadlines to ensure a quality product is delivered on time To benefit blood donors and recipients in need.
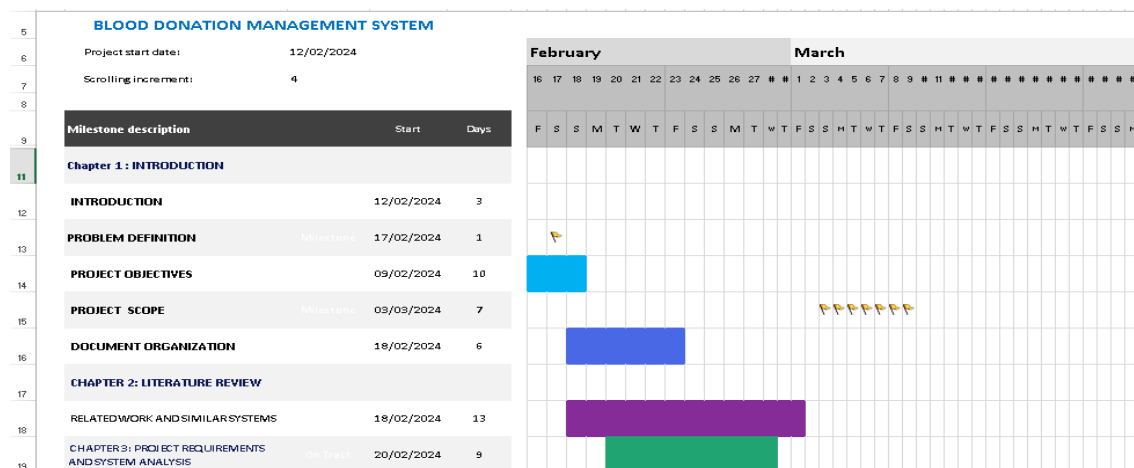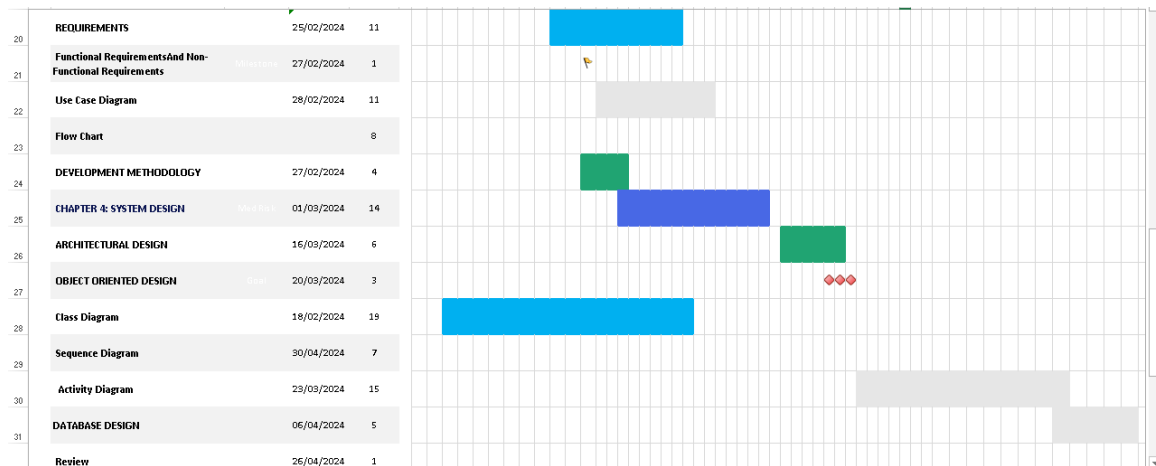

Figure 1-1 Project Timeline

#	Task	Date	Duration
20	REQUIREMENTS	25/02/2024	11
21	Functional RequirementsAnd Non-Functional Requirements	27/02/2024	1
22	Use Case Diagram	28/02/2024	11
23	Flow Chart		8
24	DEVELOPMENT METHODOLOGY	27/02/2024	4
25	CHAPTER 4: SYSTEM DESIGN	01/03/2024	14
26	ARCHITECTURAL DESIGN	16/03/2024	6
27	OBJECT ORIENTED DESIGN	20/03/2024	3
28	Class Diagram	18/02/2024	19
29	Sequence Diagram	30/04/2024	7
30	Activity Diagram	23/03/2024	15
31	DATABASE DESIGN	06/04/2024	5
	Review	26/04/2024	1

1.6 Document Organization

We have organized our project documentation in the following manner:

- Chapter 1 provides an overview of the project, beginning with the introduction which Outlines the background and purpose of the initiative. The problem definition clarifies the gaps We seek to address. Project objectives, scope and timeline are also presented to establish goals and boundaries.

- In Chapter 2, we summarizes our literature review process covering existing donation Systems, pain points faced by donors and recipients, as well as regulatory standards that must be considered. This helped inform our understanding of user needs and technical requirements.

- Chapter 3 dives into specific system requirements in terms of essential features and quality attributes. The proposed system design is also exhibited through entity relationship diagrams, database schemas, wireframes, and usage flows. Our selection of the waterfall development model is justified.

- Future chapters will describe the implementation process in detail. This includes frontend and backend development, integration of key components, customization of open source modules utilized. Testing strategies used to ensure quality and reliability will also beexplained.

- The final chapter concludes the document with a discussion on overall insights gained.

Future enhancements and possibilities are highlighted. Appendices include supplementary

Material like system documentation, developer guides and source code as applicable.

We believe this organized structure provides a comprehensive depiction of our project to all concerned stakeholders.

Chapter 2: Literature Review

2.1 Introduction

This section introduces the literature review and background study chapter, outlining its purpose and scope. It sets the stage for exploring existing research, theories, and knowledge relevant to the project's subject matter.

2.2 Related work and Similar Systems

- **Wateen application:**

Figure 2-1 Wateen application

About the project:

The Wateen application is the official application for blood donation in Saudi Arabia, and it is one of the qualitative initiatives launched in cooperation with the Ministry of Health. This application seeks to reduce the communication gap between donors and blood banks so that the blood donation process becomes easier, while it includes a database of more than (800) thousand. Blood donor nationwide.

Objectives:

It aims to increase awareness about the importance of voluntary blood donation, and to work towards complete sufficiency, through voluntary donation within blood banks in the Kingdom. The initiative also aims to spread awareness of the importance of blood

donation within society, facilitate blood donation procedures through the (Wateen) application, fill the needs of blood banks within the Kingdom, and hold periodic donation campaigns, in addition to improving the donor experience on a continuous and permanent basis.

lhsan platform:

Figure 2-2 lhsan platform

About Ihsan:

Ihsan is a Saudi national platform for charitable work that works to develop advanced technical solutions and invest in data and artificial intelligence with the aim of maximizing the impact and sustainability of charitable and development projects and services, through effective partnerships between the government, private and non-profit sectors.

Goals:

1- PA Empowering the non-profit and development sector and expanding its imct.

2- Promoting the values of national belonging and humanitarian work among members of society.

3- Integration with various government agencies and maximizing benefit from them.

4- Activating the role of social responsibility in the private sector.

5- Raising the level of reliability and transparency in charitable and development work.

Project importance:

Facilitating the donation process for those wishing to do good, through integration with other platforms, and informing them of the various donation areas available within the Kingdom of Saudi Arabia in one place.

2.3 Summary

The chapter concludes with a summary of key findings and insights gleaned from the literature review and background study.

Chapter 3: Project Requirements and System Analysis

2.4 Introduction

In this chapter, the proposed system is analyzed by a comprehensive discussion of feasibility study and functional and non-functional requirements. Further, it discusses the high-level architecture and the development methodology to be followed to achieve the project.

2.5 Requirements

This section summarizes the functional and non-functional requirements of the projects' deliverables. Depending on the nature of the requirements, they will be categorised in to two categories, functional and non-functional.

2.5.1 Functional Requirements

1. User Registration: Allow users to register as donors, recipients, or administrators.

2. Donor Search: Enable recipients to search for blood donors based on blood type, location, and availability.

3. Appointment Scheduling: Allow recipients to schedule appointments with donors for blood donations.

4. Donation History: Maintain a record of donors' donation history for tracking purposes.

5. Blood Inventory Management: Manage and update the inventory of available blood units, including expiration dates and quantities.

6. Notification System: Notify donors about upcoming appointments, urgent blood needs, or donation events.

7. Feedback Mechanism: Provide a way for recipients to provide feedback on their donation experience.

8. Administrator Dashboard: Allow administrators to manage user accounts, oversee donation activities, and generate reports.

2.5.2 Non-Functional Requirements

1. Usability: Ensure the website is user-friendly and accessible to all users, including those with disabilities.

2. Performance: Ensure the system can handle multiple concurrent users and maintain responsiveness during peak usage times.

3. Security: Implement measures to protect user data, including encryption of sensitive information and secure login mechanisms.

4. Reliability: Ensure the system is reliable and available 24/7, with minimal downtime for maintenance or upgrades.

5. Scalability: Design the system to accommodate growth in users and data without significant performance degradation.

6. Compatibility: Ensure compatibility with a range of web browsers and devices to reach a broad audience.

7. Regulatory Compliance: Ensure compliance with relevant regulations and standards for handling sensitive medical data and blood products.

8. Disaster Recovery: Implement backup and recovery procedures to mitigate the risk of data loss in case of system failure or disaster.

2.6 System Design

This section highlights the design of the proposed system by illustrating the application flow via flowchart and use case diagram.

2.6.1 Use Case Diagram

System Overview:
- System Name: Blood Donation Management System.
Purpose: To facilitate the management of blood donation activities, including - donor registration, blood request handling, and inventory management

Actors and Their Use Cases:
The diagram includes four main actors, each with specific interactions with the system:
1. Donor:
 - Register/Sign Up: Allows donors to create an account in the system.

- Log In: Enables donors to access their account.
- Update Profile: Donors can update their personal information.
- View Donation History: Donors can view their past donation activities.
- Find Donation Events: Enables donors to locate upcoming donatio events.
- Receive Notifications: Donors receive updates and reminders.
- Donate Blood: Functionality to record the donation process.
- Feedback: Donors can provide feedback about their experience.

2. Recipient:
- Request Blood: Recipients can request blood for their needs.
- Track Request: Allows tracking the status of their blood request.
- Receive Blood: Process through which recipients receive the requested blood.

3. Healthcare Professional:
- Verify Donors: Healthcare professionals can verify donor eligibility.
- Manage Blood Inventory: Includes functionalities for inventory tracking and management.
- Approve/Reject Requests: They have the authority to approve or reject blood requests.
- Coordinate Donations: Facilitate and coordinate the donation process between donors and recipients.

4. System Administrator:
- Manage Users: Administrators can manage user accounts and profiles.
- Update System: Responsible for system updates and maintenance.
Monitor and Respond to Feedback: Administrators monitor user feedback -
and respond accordingly
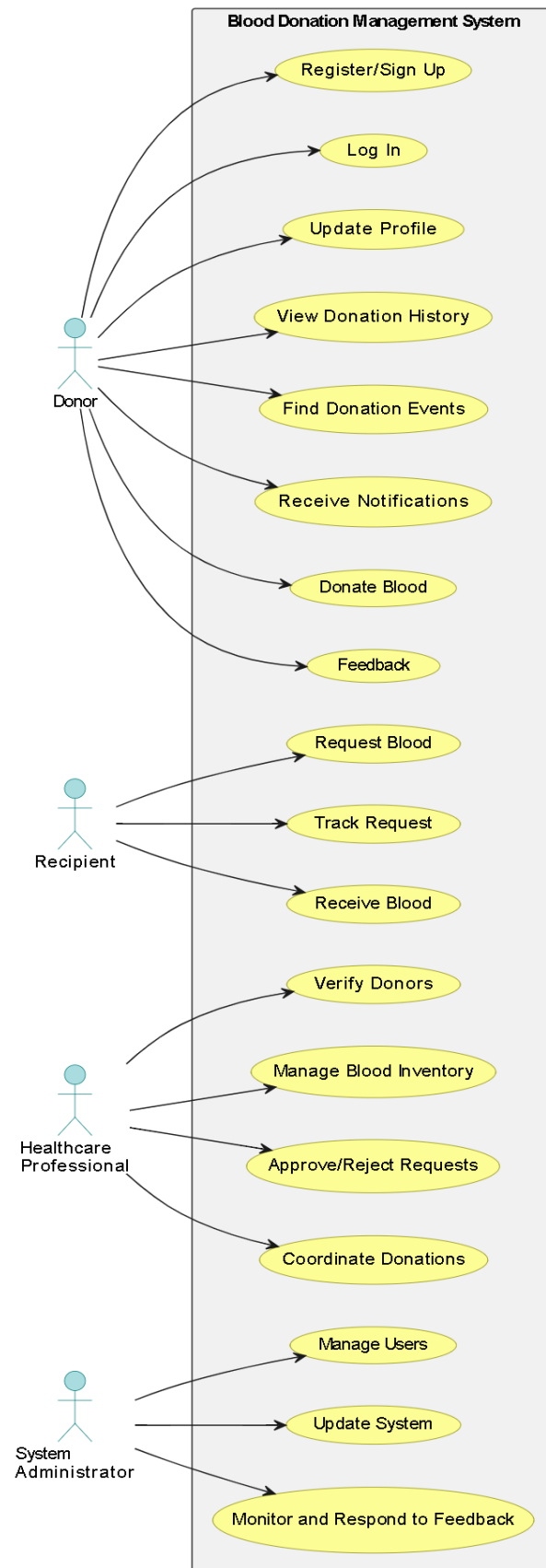
Figure 0-1 Use case Diagram

2.6.2 Flow Chart
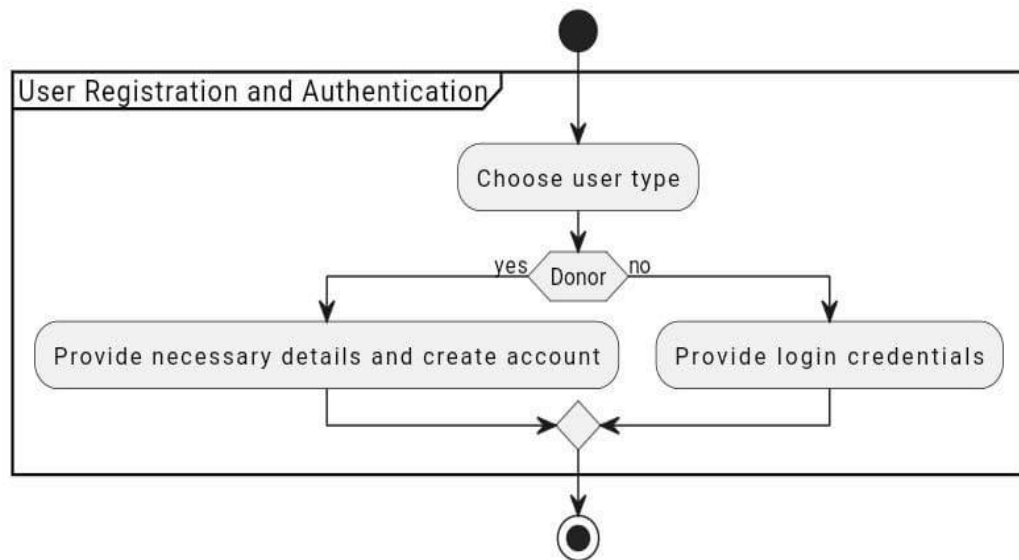
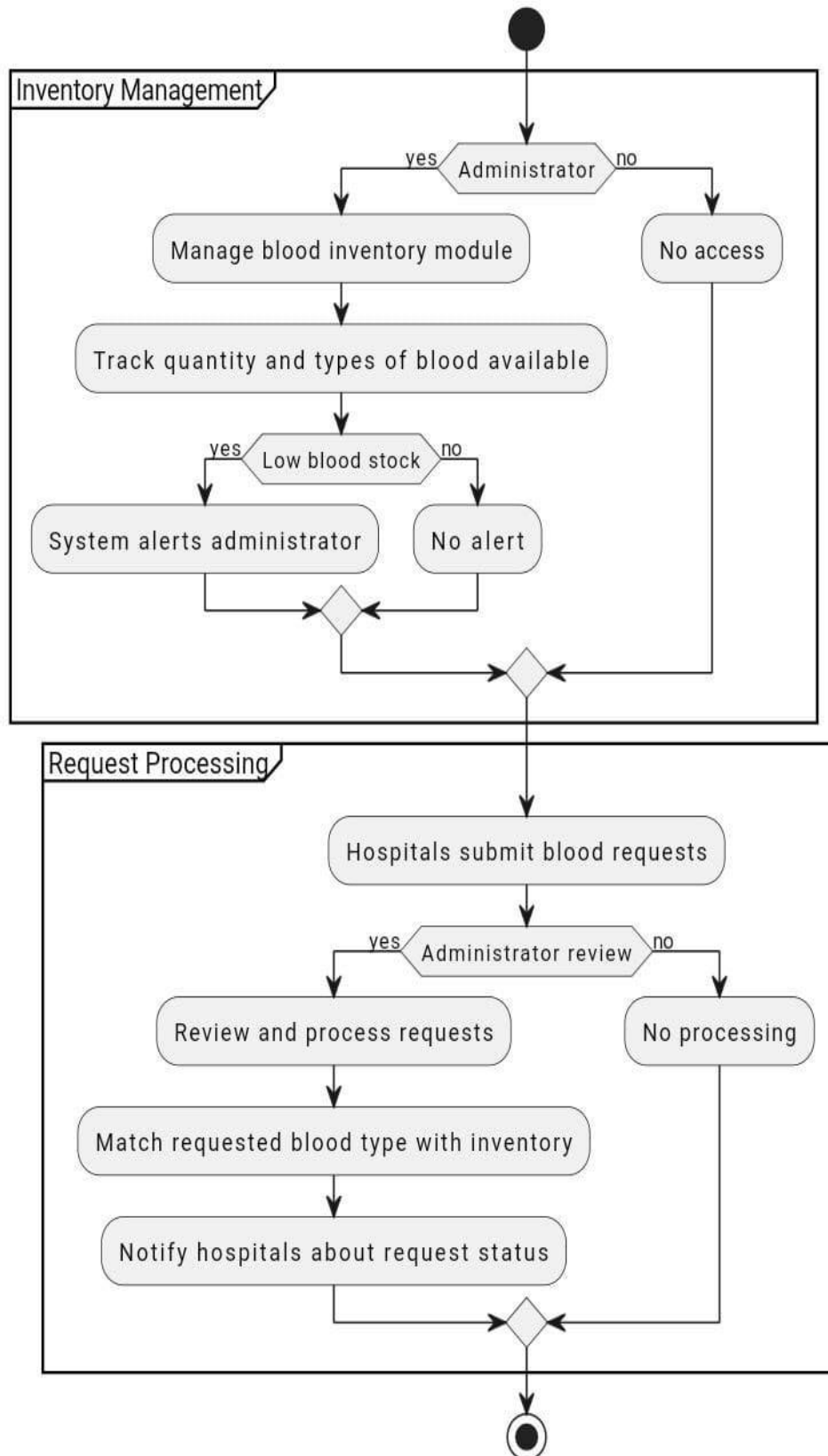**Figure 0-2 Flow Chart 1 User Registration Authentication**
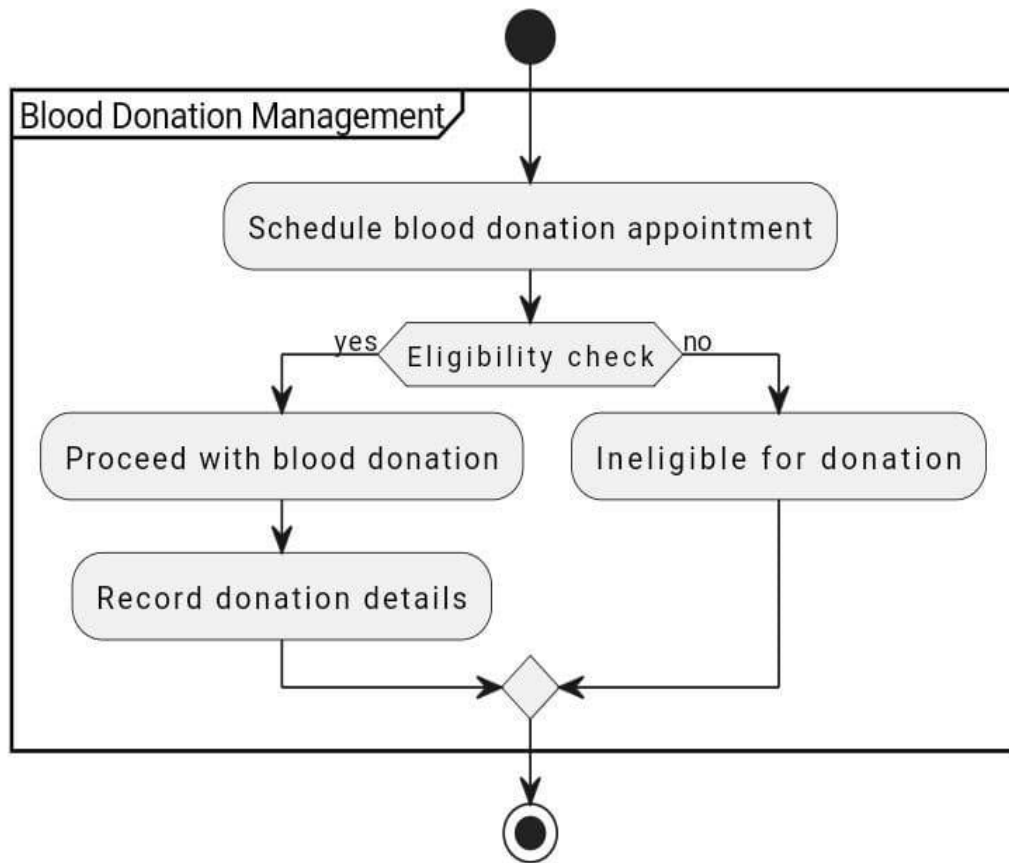
Figure 0-3 Flow Chart 2 request process

Figure 0-4 Flow Chart 3 Blood Donation Management
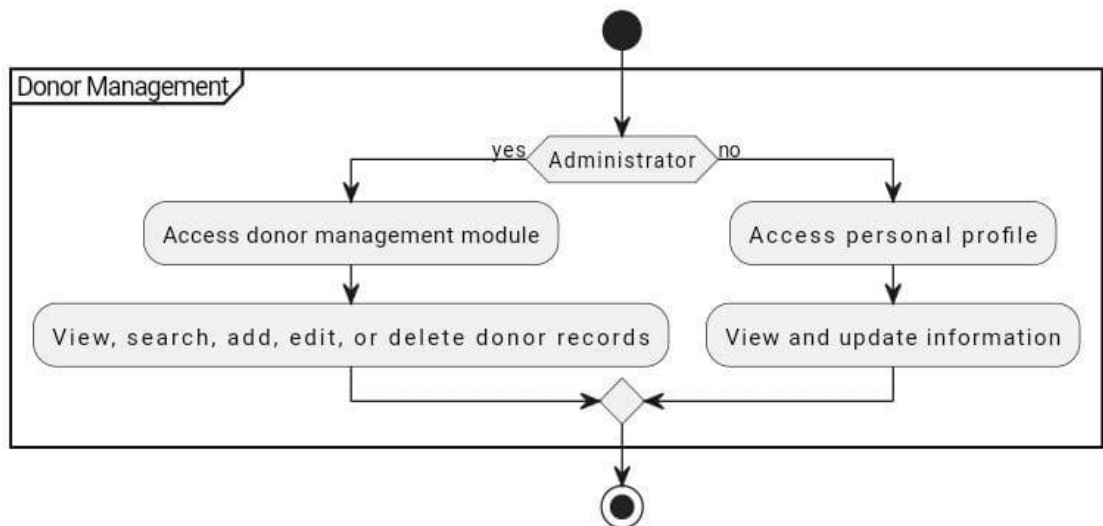

Figure 0-5 Flow Chart 4 Donor Management

2.7 Development Methodology

Waterfall Methodology

We as a project will use this type because This model provides a structured approach through discrete phases that are easy to understand and interpret, provides easily identifiable milestones in the development process, and can be suitable for projects where scope requirements are fixed.

The Waterfall model is a sequential design process typically used in software development processes, in which workflow progresses in steady pieces flowing from top to bottom (like a waterfall) through stages: initiation, analysis, design, construction, testing, production, implementation, and maintenance. And it is by dividing the project activities into linear successive stages, where each stage depends on the outputs of the previous stage and corresponds to a specialization in tasks. The approach is typical of certain areas of engineering design. In software development, it tends to be among the least iterative and flexible approaches, as progress flows in largely one direction ("down" like a waterfall) through the phases of conceptualization, initiation, analysis, design, build, testing, deployment.

Figure 0-6 Waterfall Methodology

2.8   Summary

The chapter concludes with a summary of the project requirements and system analysis, encapsulating key insights and decisions that inform the subsequent phases of system development.
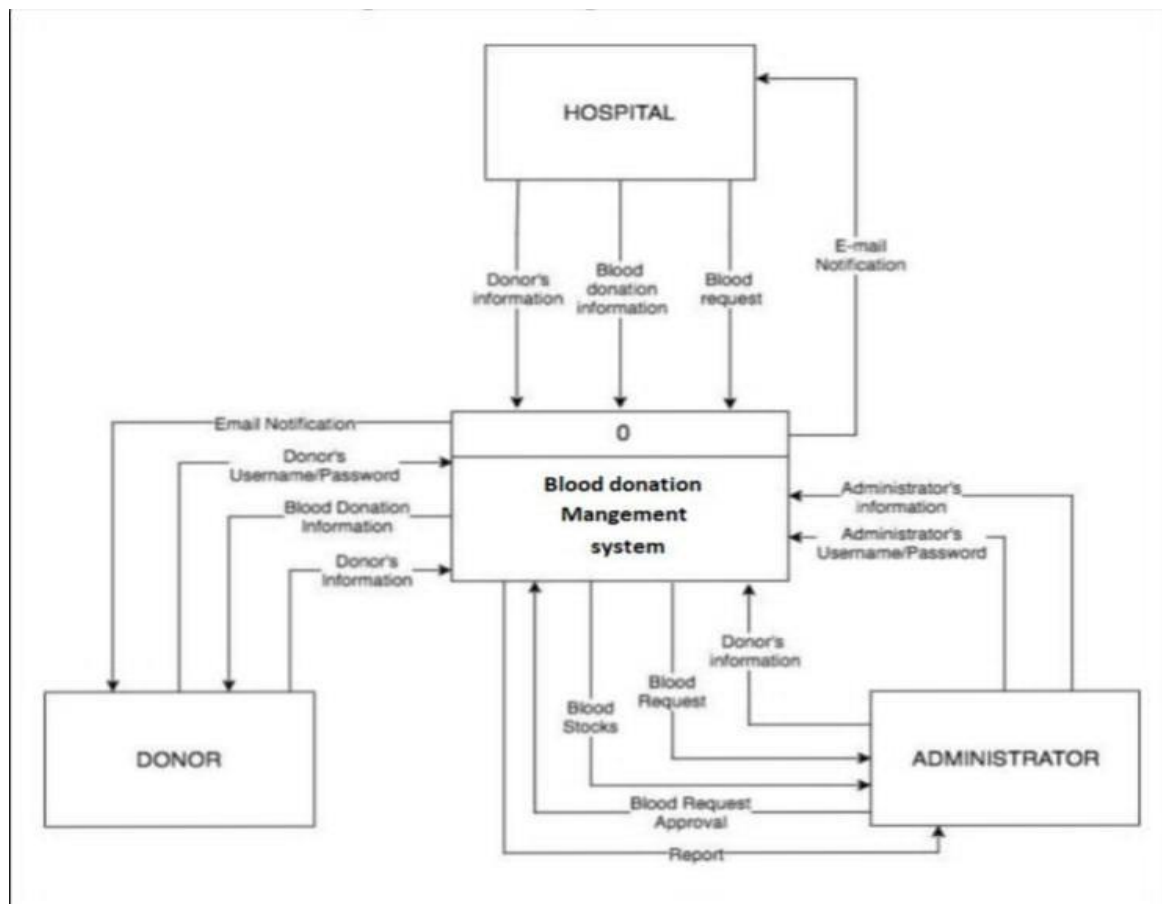
Chapter 4: System Design

3.1 Introduction

This chapter presents the system design considering the main dimensions of our proposed system. Further, it discusses the various aspects of system design, including architectural, object-oriented, Database design, and user interface design.

4.1.2DATA FLOW DLGRAMS (DFD)

- Data Flow Diagram - Context Diagram

- Data Flow Diagram - Level 0
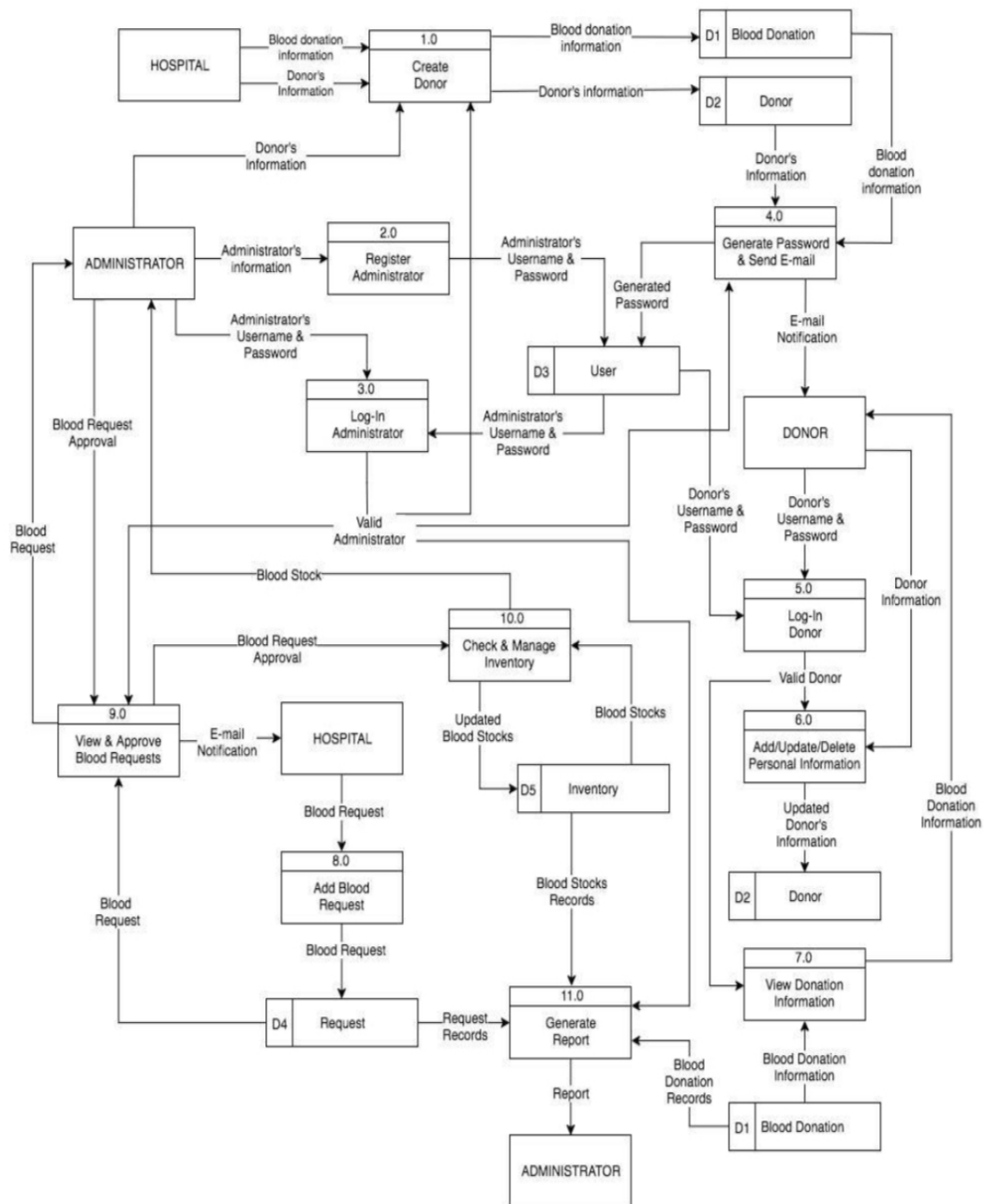
Figure 3-2 -   Data Flow Diagram - Level 0

Data Flow Diagram - Level 1
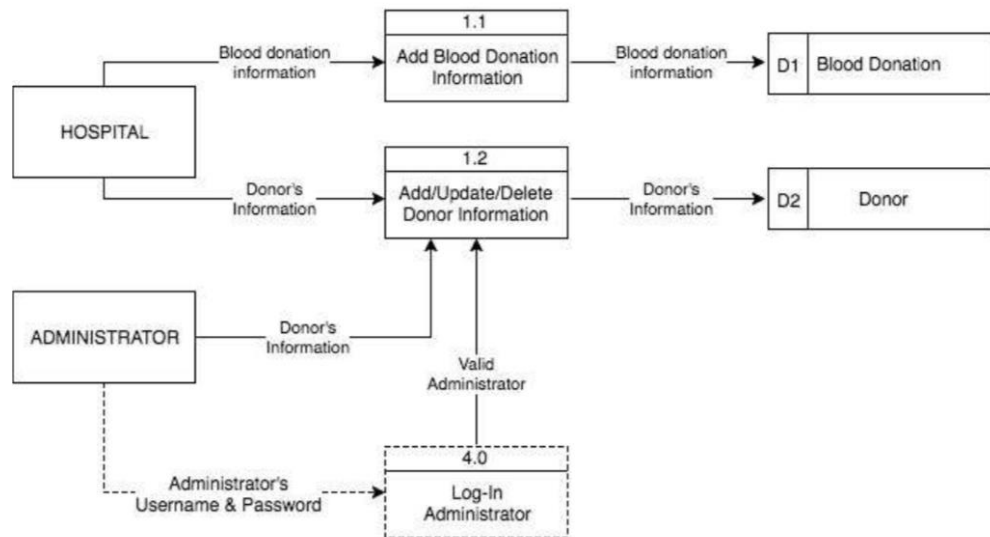
Figure 3-3 Data Flow Diagram - Level 1

Data Flow Diagram - Level 4
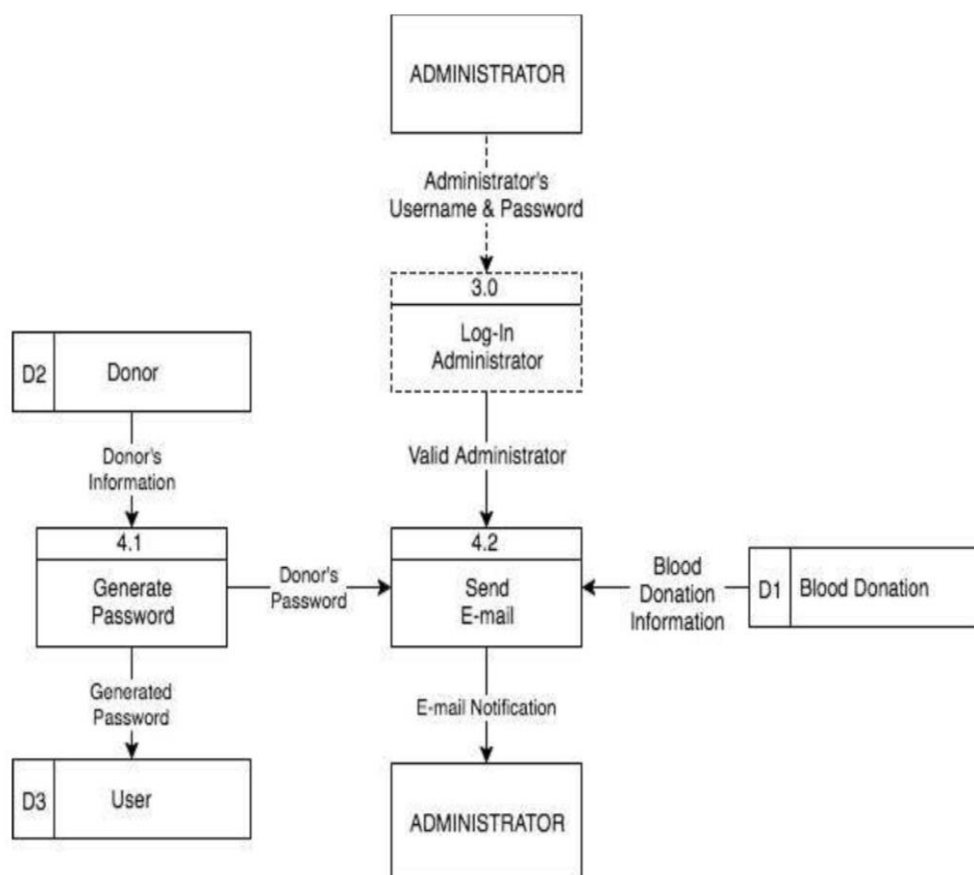
Figure 3-4 Data Flow Diagram - Level 4

10.5 Data Flow Diagram - Level 9
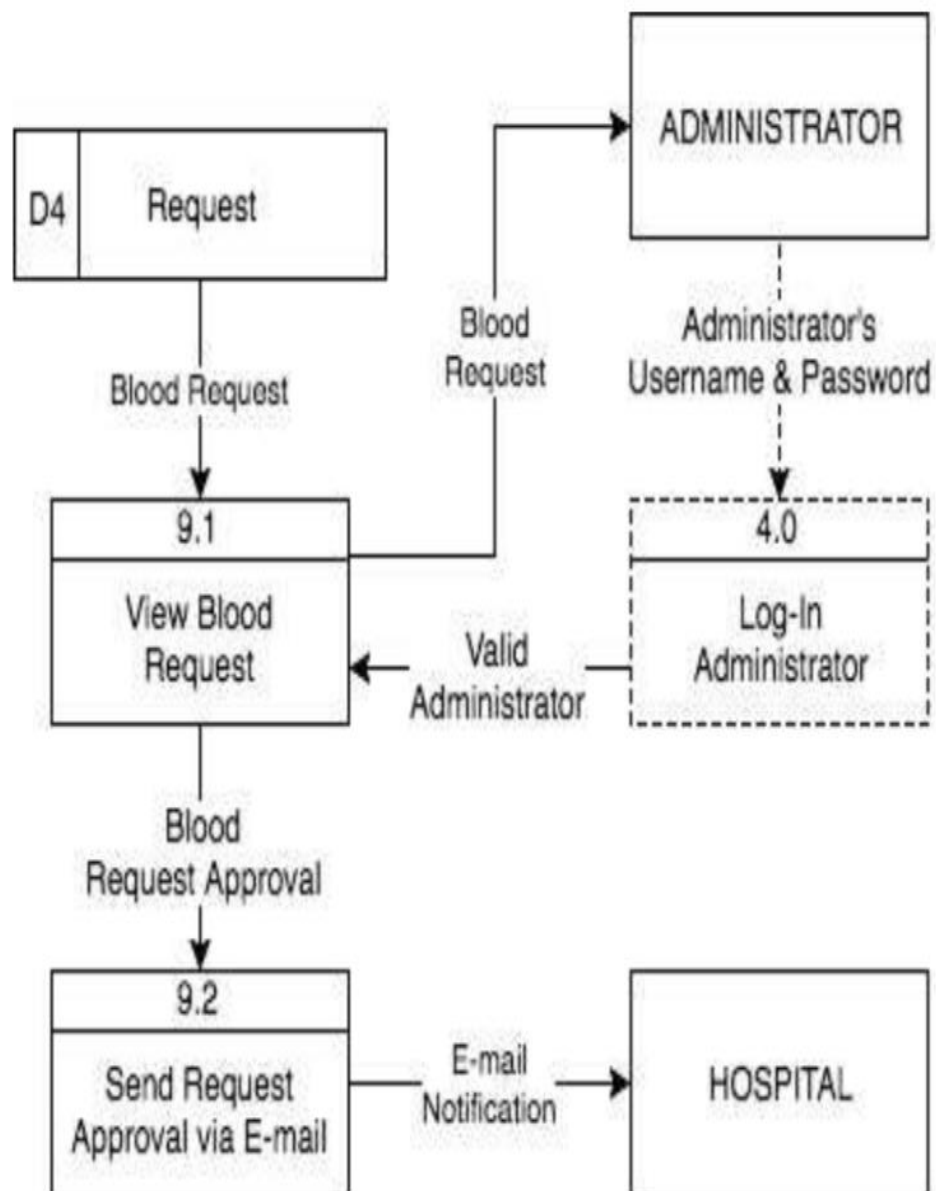
Figure 3-5 10.5 Data Flow Diagram - Level 9
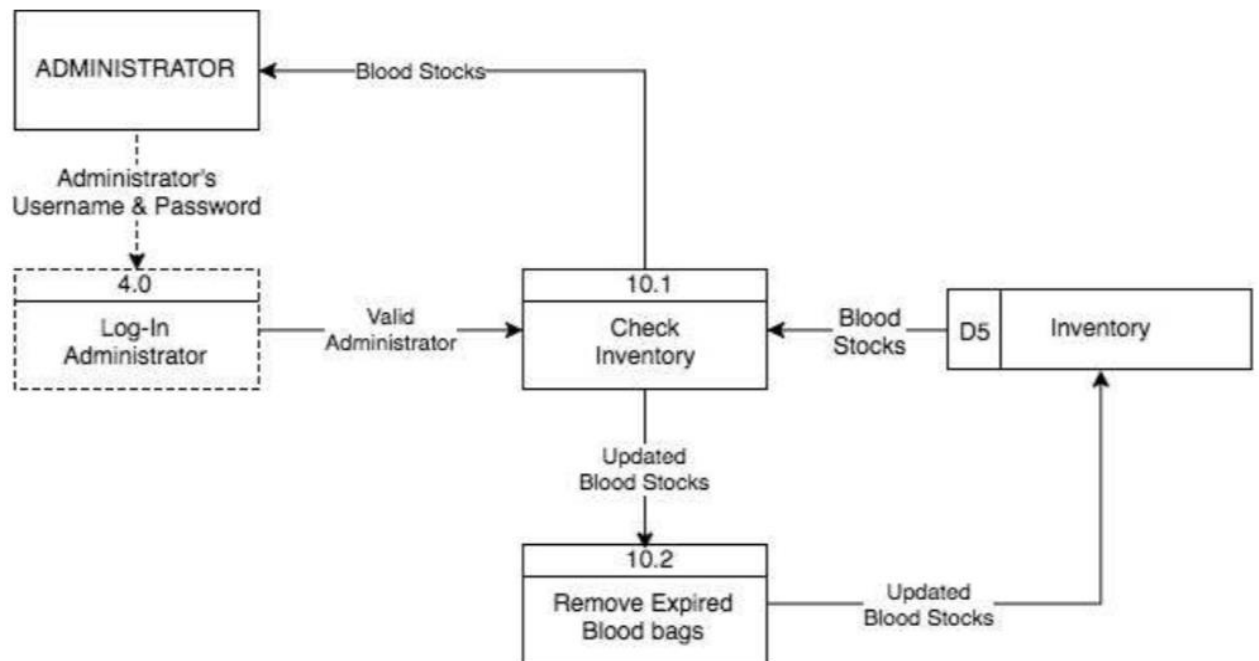
- Data Flow Diagram - Level 10

Figure 3-6 -   **Data Flow Diagram - Level 10**
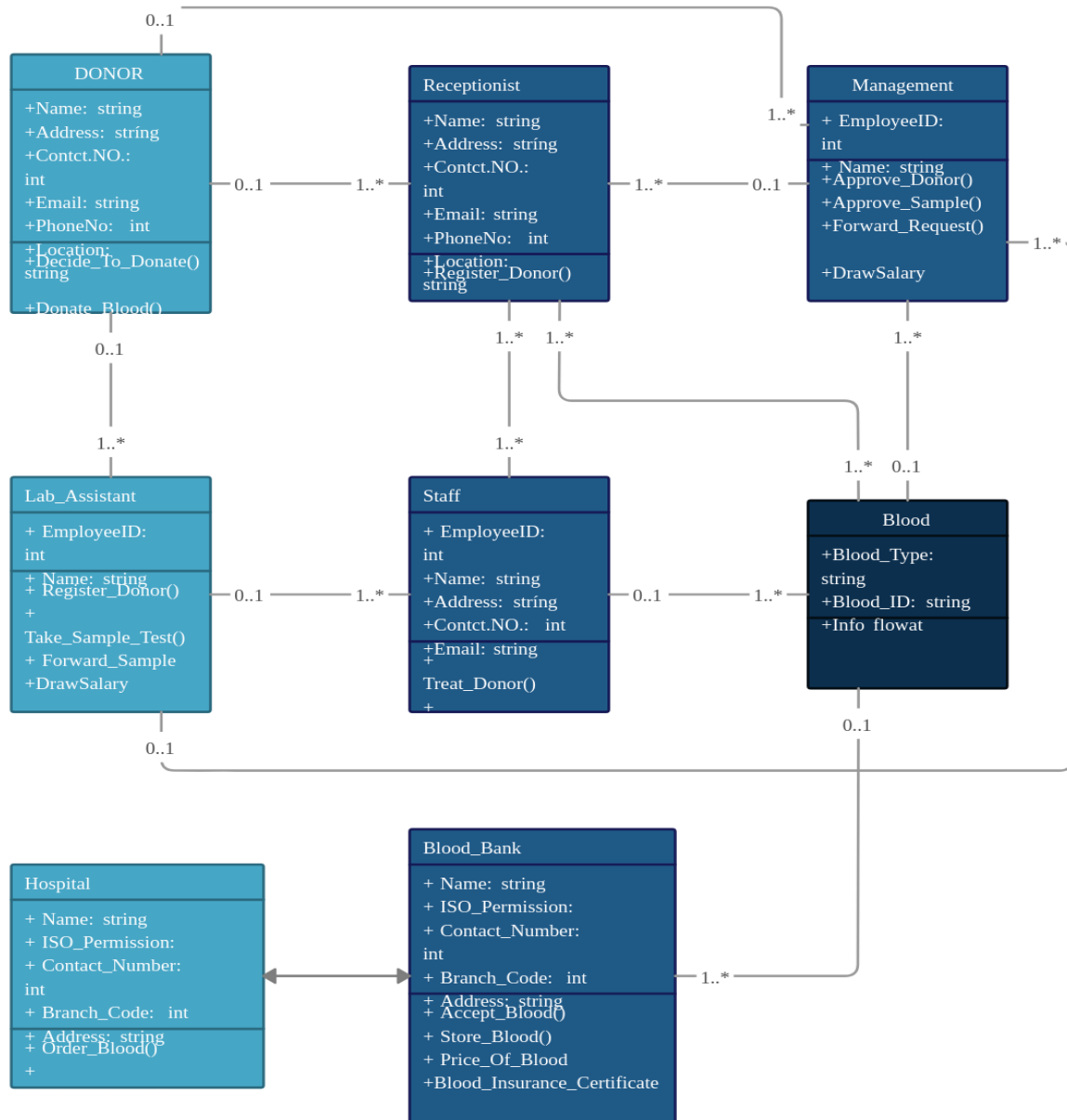
4.1.3 ENTITY RELATIONSHIP DIAGRAM (ERD)

Figure 3-7 ENTITY RELATIONSHIP DIAGRAM (ERD)

Hardware and software specification4.1.4

Device name LAPTOP-JRT5VCAG
AMD Ryzen 7 5700U processor with 1.80 GHz Radeon graphics processor
GB installed RAM (15.3 GB used) 16.0
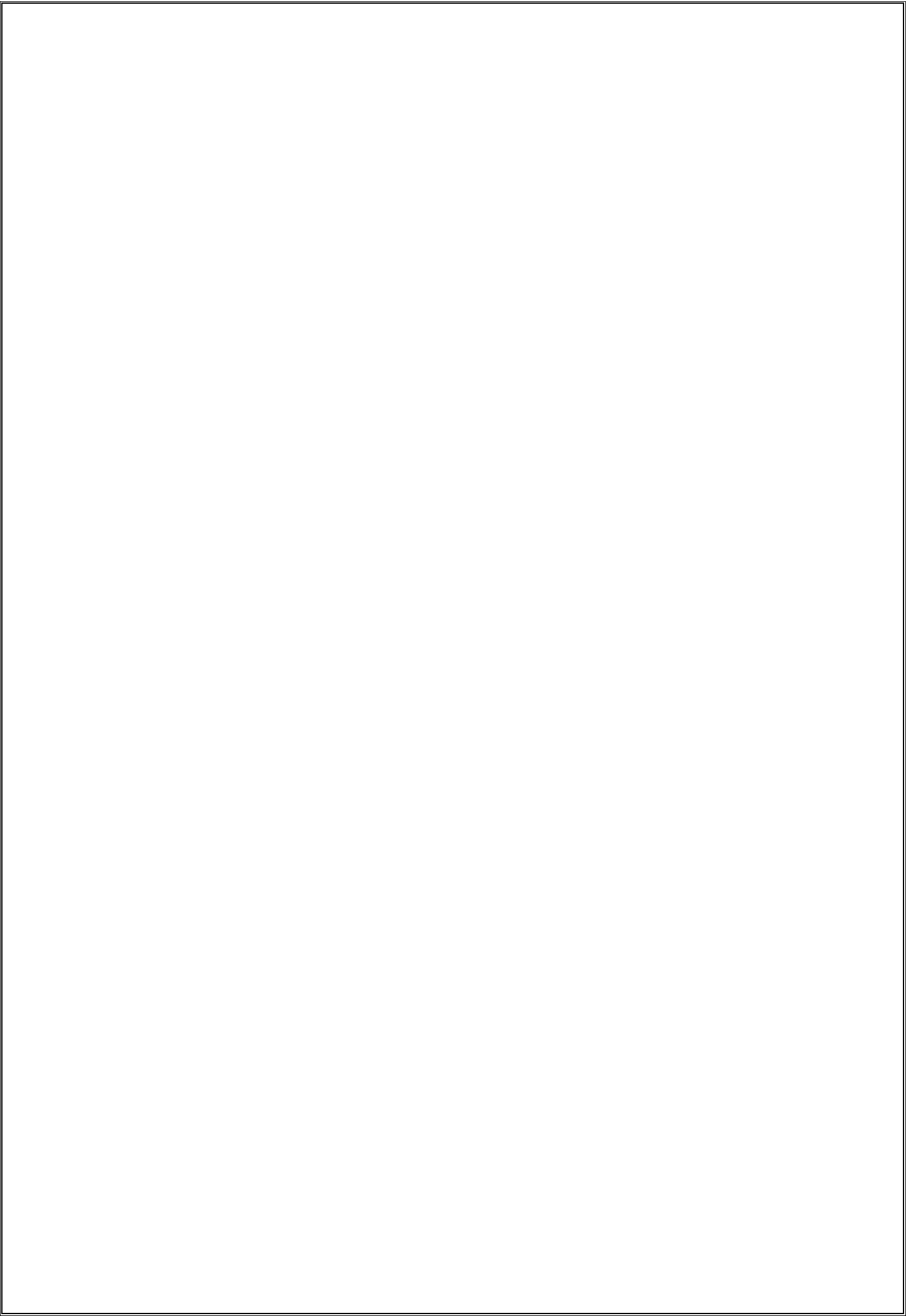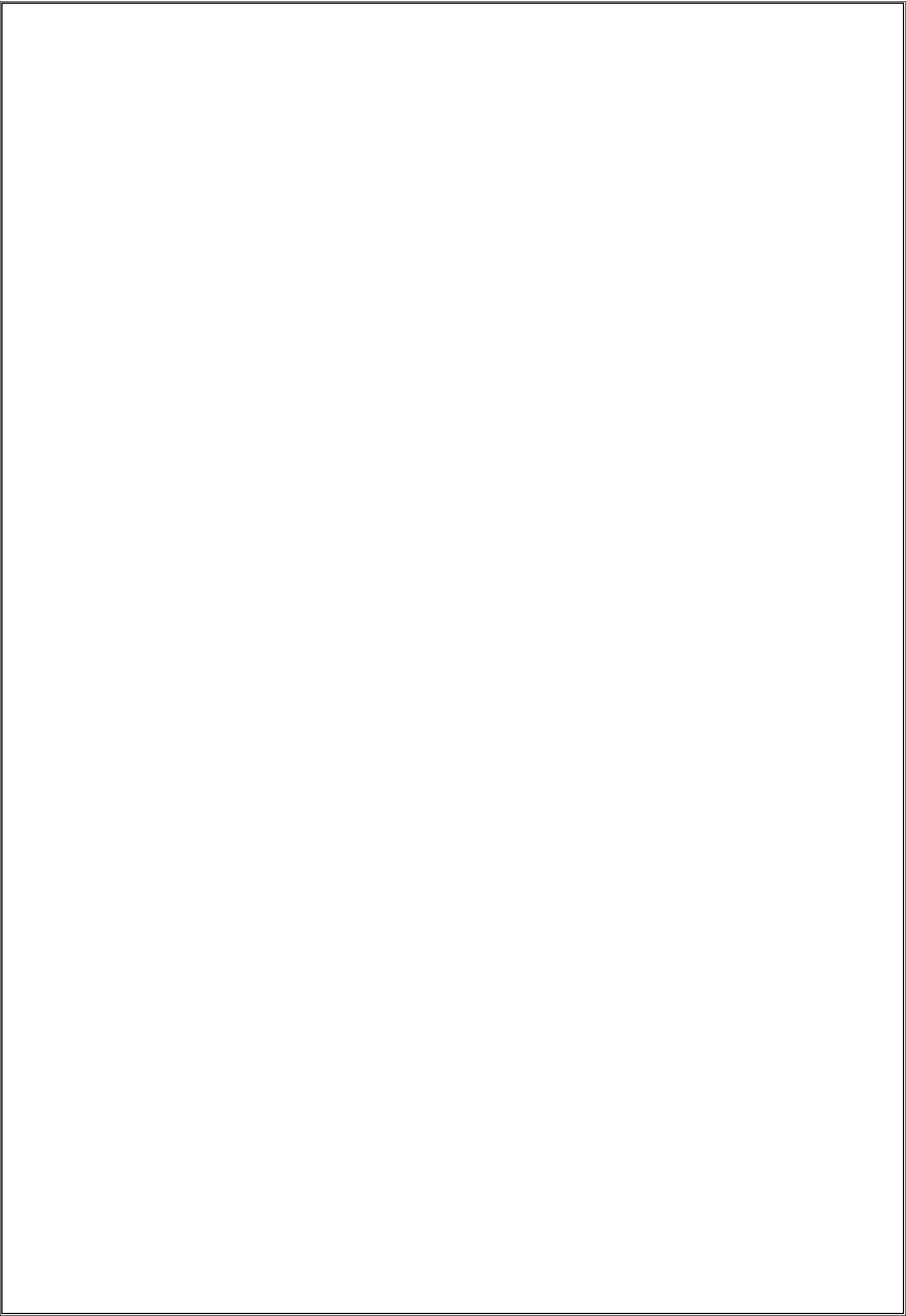Device ID 1A26F6FA-BB8F-4190-ADE9-47F67D062ECE

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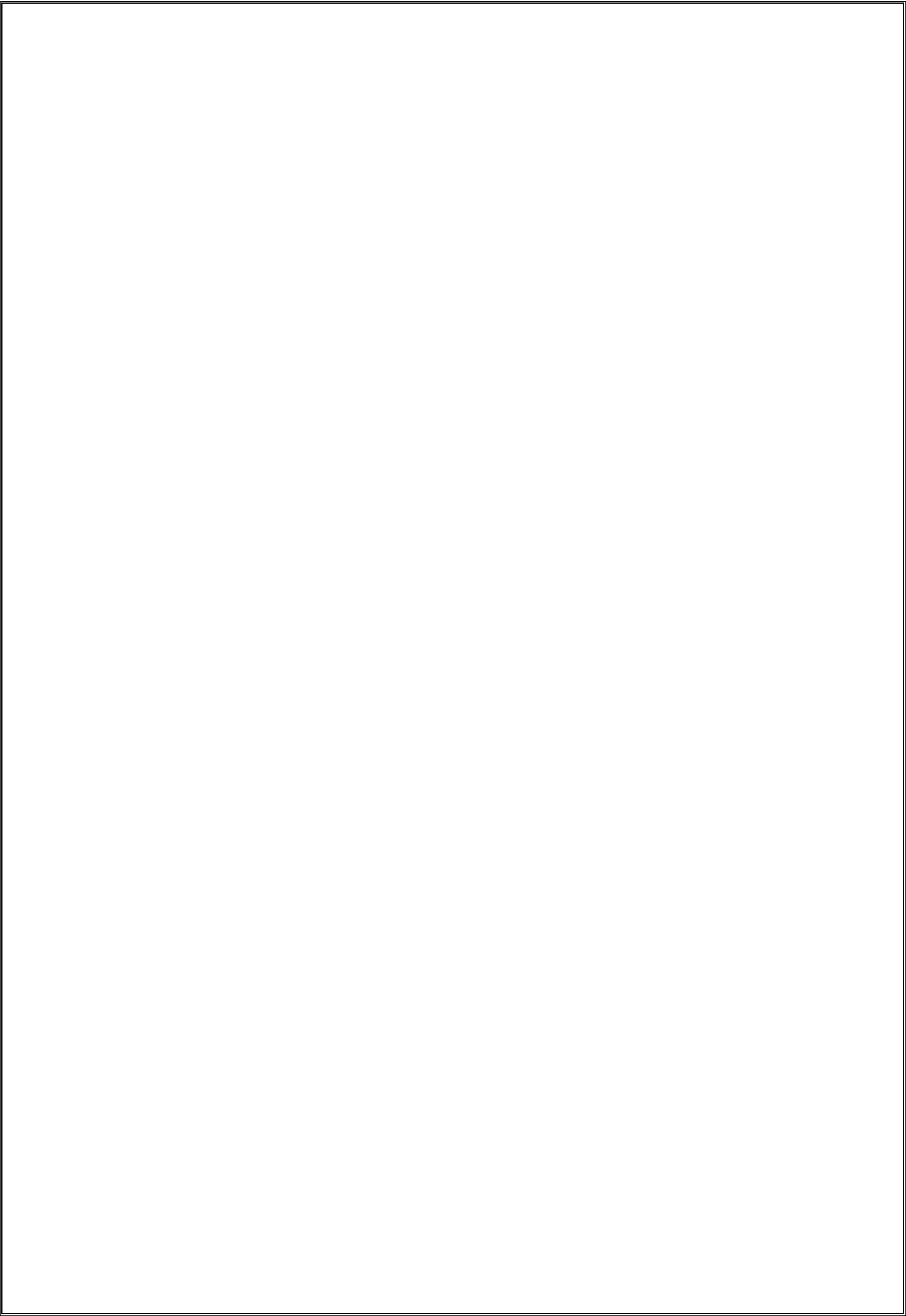Windows Feature Experience Pack 1000.22677.1000.0

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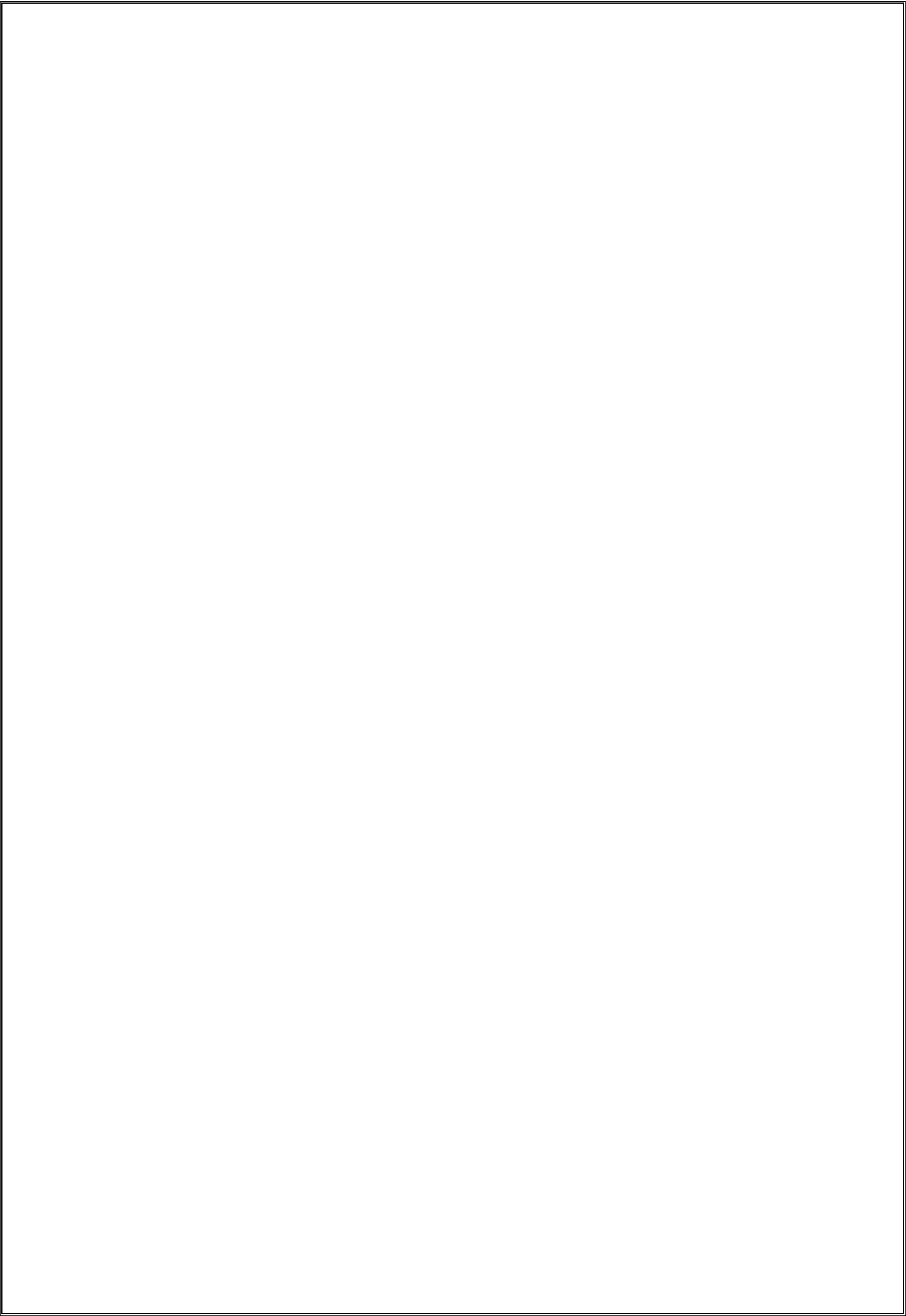
References

The references section provides a detailed list of all sources cited or consulted during the project, adhering to a specified citation format for academic integrity.

[1] P. Likarish, E. Jung, D. Dunbar, T. E. Hansen, and J. P. Hourcade, "B-APT: Bayesian Anti-Phishing Toolbar," 2008 IEEE International Conference on Communications, 2008, pp. 1745-1749, doi: 10.1109/ICC.2008.335.

[2] Phishing website dataset available at https://www.kaggle.com/

[3] http://s3.amazonaws.com/alexa-static/top-1m.csv.zip

[4] . https://github.com/mitchellkrogza/Phishing.Database/blob/master/phishing-domains-ACTIVE.txt.