System Design Document

for

Blood Bank Management System

Prepared by Group

Number : 34

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Course: **Database Management Systems CS3002D**

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1 PURPOSE

The primary purpose of this System Design Document (SDD) is to provide a comprehensive description of the Blood Bank Management System (BBMS). This document explains the purpose, architecture, data models, and functionality of the BBMS, serving as a crucial reference for the development team, system administrators, and all stakeholders involved in the project. Additionally, it lays the foundation for effective project management, quality assurance, and system testing.

1.1 Document Objectives

1. System Architecture: This section offers a detailed explanation of the architectural components of the Blood Bank Management System, encompassing hardware, software, and network components. It provides insights into how the system is structured and how these components interact to ensure the system's smooth operation.

2. Data Model: In this part, we describe the database schema, entity-relationship diagrams, and data structures used in the Blood Bank Management System. It outlines the structure of the database, the relationships between various data entities, and how data is organized and stored.

1.2 Target Audience

1. **Development Team**: This includes developers, database administrators, and IT professionals responsible for the design, development, and maintenance of the BBMS. It provides them with essential insights into the system's architecture and data model.

2. **Blood Bank Administrators:** Blood bank managers, executives, and personnel involved in decision-making processes within the blood bank. The document helps them understand the technical aspects of the system and how it supports their operational needs.

3. **Quality Assurance and Testing Teams:** Teams responsible for testing the BBMS to ensure it functions correctly and adheres to performance and security standards. The document provides a basis for crafting test cases and evaluating system performance.

4. **Blood Bank Staff:** Staff working directly with the Blood Bank Management System on a daily basis, including blood bank technicians, administrators, and operational roles that rely on the system for their day-to-day tasks. This document gives them a deeper understanding of the system's inner workings.

1.3 Definitions, Acronyms and Abbreviations

- BBMS: Blood Bank Management System
- SDD: System Design Document
- DBMS: Database Management System
- ERD: Entity-Relationship Diagram
- NITC: National Institute of Technology, Calicut
- 1NF: First Normal Form
- 2NF: Second Normal Form
- 3NF: Third Normal Form

1.4 References and Acknowledgments

- Fundamentals of Database Systems by Ramez Elmasri
- https://dbdiagram.io/
- https://erdplus.com/
- https://mermaid.live/

2 Assumptions and Constraints

2.1 Assumptions

The following are assumptions made while developing the project:

Data Migration: Assuming that the BBMS has access to existing data related to blood inventory, donor and patient information, and other relevant data, which will be migrated into the new database system without significant data quality issues.

Hardware and Software Availability: Assuming that the necessary hardware, servers, database management software, and development tools required for the BBMS project are available and meet the project's technical requirements.

Data Cleansing and Transformation: Assuming that any data cleansing or transformation required during the migration process is within the project scope and manageable, ensuring that the data in the new system is reasonably accurate.

Data Security Measures: Assuming that appropriate data security measures, including access controls and encryption, are in place to protect the BBMS database from unauthorized access and potential security breaches.

Scalability: Assuming that the BBMS is designed to be scalable, capable of accommodating potential future growth in terms of blood donation records, patient information, user accounts, and additional features to meet the evolving needs of the blood bank.

User Acceptance: Assuming that the BBMS will be accepted and utilized effectively by blood bank employees and staff, with adequate training and user-friendly interfaces to support their daily operations.

Maintenance and Updates: Assuming that the project team will provide regular maintenance, updates, and enhancements to the BBMS to ensure it continues to function optimally, remains secure, and meets changing requirements in the field of blood banking.

2.2 Constraints

The design contain the following constraints:

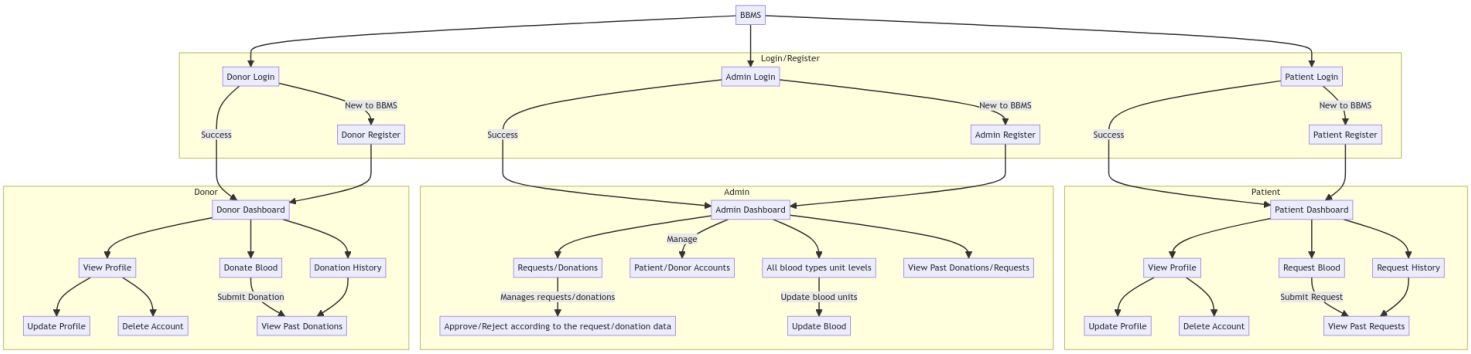
Development and Maintenance Constraints: The BBMS software is exclusively designed, delivered, and maintained by the project team.

Admin Access Constraints: Admin access to the system is protected with unique and secure credentials, ensuring the security and integrity of admin-related functions.

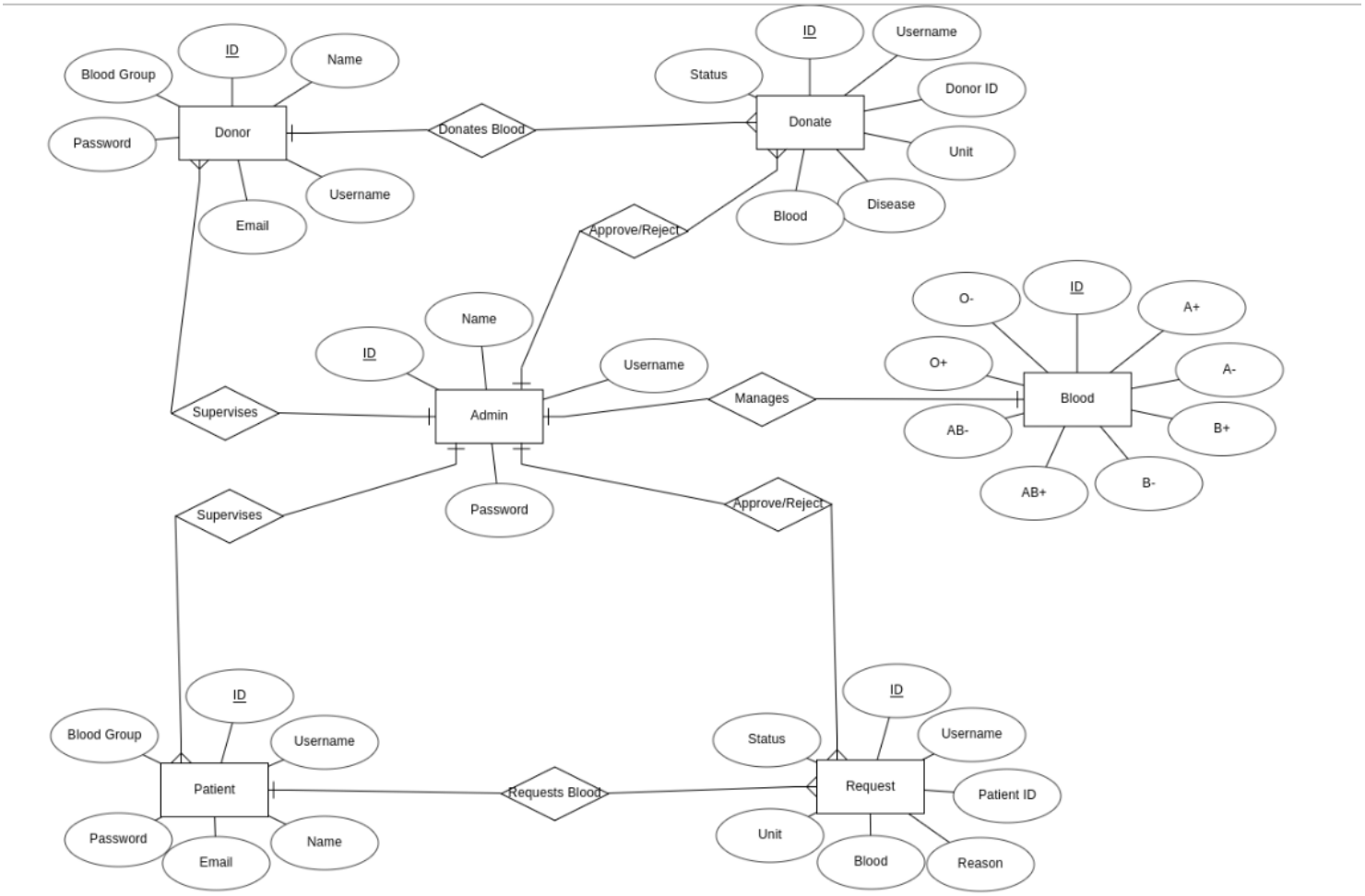
User Role-Based Dashboard Constraints: Each employee or user has different credentials and is provided with a personalized dashboard that aligns with their specific role and responsibilities within the system.

3 Database Functions

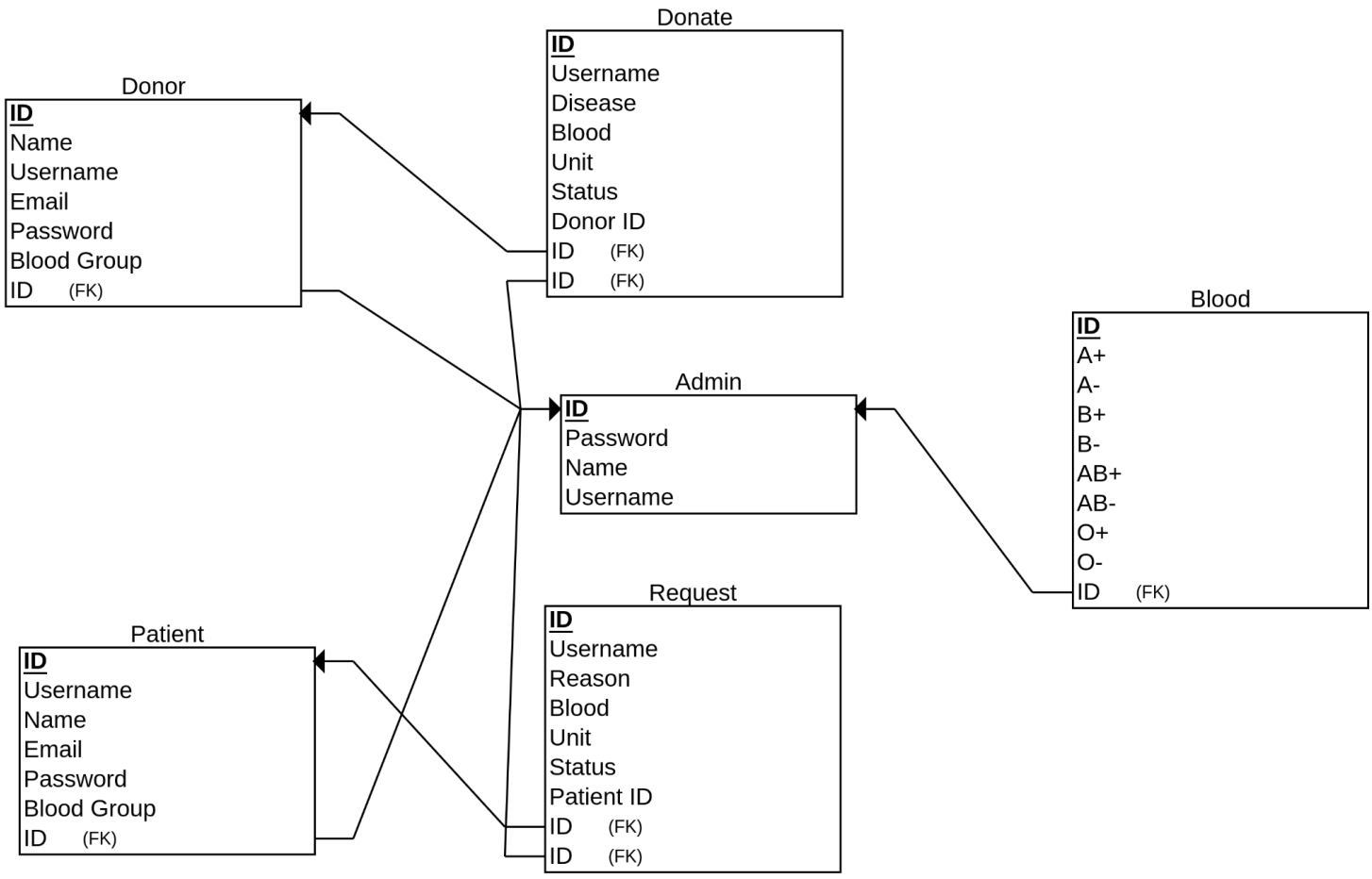
3.1 Control Flow



3.2 Entity-Relation Model



3.3 Relational Schema



3.4 Normalization

- 1NF - The tables are in 1NF, as there are no multivalued or composite attributes. Each table cell contains atomic values, and each record is unique. Hence the database is 1NF normalized.

- 2NF - The tables are already in 1NF as proved above. There are no partial dependencies, that is, there are no non-prime keys solely dependent on only one part of a primary key in any of the tables. Hence the database is 2NF normalized.

- 3NF - The tables are already in 2NF as proved above. There are no transitive functional dependencies in the schema. There are no non-prime keys that are dependent on another non-prime key in any specific table. Hence the database is 3NF normalized.

3.5 Schema Description