* **Introduction**

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Access to safe and timely blood supply is critical for patient care in hospitals. Manual handling of donor records, blood inventory and request fulfillment often leads to inefficiencies, delays and errors. An Object Oriented Blood Bank Management System (BBMS) will automate these processes, ensuring accurate inventory tracking, donor eligibility checks and streamlined request handling.

* **Project Objectives**
* **Automate Critical Workflows:** Digitize donor registration, blood inventory tracking and request fulfillment to minimize manual errors.
* **Enhance Data Reliability:** Implement real-time stock monitoring and expiration alerts to reduce wastage and shortages.
* **Simplify User Roles:** Provide tailored interfaces and permissions for Admins, Donors, Hospitals and Recipients.
* **Demonstrate OOP Principles:** Build a modular, maintainable codebase showcasing encapsulation, inheritance and polymorphism.
* **Generate Actionable Insights:** Offer reporting dashboards for donation trends, inventory status and request metrics.
* **System Overview**

RedCell is a desktop application that connects blood donors, hospital staff and administrative users through a centralized platform.

* Admins manage user accounts, configure system thresholds and view analytics.
* Donors record new donations, view eligibility status and track their contribution history.
* Hospitals/Recipients place blood unit requests and monitor fulfillment in real time.
* **Key Features**

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| **Feature** | **Description** |
| Donor Management | Register donors, check eligibility (based on age, last donation date), and log donations |
| Request Processing | Hospitals submit unit requests; system matches with available inventory and allocates |
| Role-Based Authentication & Access | Secure login with distinct dashboards and permissions for each user role |
| User Interface | Intuitive GUI built with JavaFX for seamless navigation |
| Data Persistence | Store data using SQLite as an embedded database system |