جامعة الإمام عبدالرحمن بن فيصل
IMAM ABDULRAHMAN BIN FAISAL UNIVERSITY
كلية علوم الحاسب وتقنية المعلومات
College of Computer Science and Information Technology

Project Proposal Form

Section A: Software Details:

1. Project Title

Integrated Supply Chain Management System with QR-Based Employee Attendance Tracking

2. Team Information

Name	Student ID	Role in Project
Jawad Ali Alnatah	2240002923	Team Leader & Backend Developer
Mustafa AbdulKarim AbdRabAlameer	2240002959	Backend Developer & Database Designer
Abdullah Jaffer Masiri	2240004545	UI/UX Designer
Ahmed Hussain Alghazwe	2240002359	Frontend Developer
Abdullah Abdulaziz Alhamadi	2240003012	Frontend Developer & GUI designer
Mohammad Khalid Alqallaf	2240005145	Quality Assurance & Documentation

3. Project Overview

This project aims to develop a desktop application using JavaFX that combines Supply Chain Management with Employee Attendance Tracking through innovative QR code technology. The system addresses the critical business need for integrated resource and workforce management by enabling organizations to efficiently track inventory, manage suppliers, handle procurement workflows, and monitor employee attendance through a unified platform. The main application runs as a desktop program providing full supply management capabilities, while employees can check in and out by scanning personalized

QR codes using their smartphone cameras via a lightweight web interface—no app installation required. Built with Java, JavaFX, and MySQL, the system provides real-time visibility into both supply operations and workforce presence, helping organizations optimize resource allocation, reduce operational costs, and improve accountability across departments.

4. Objectives

- To develop a comprehensive supply chain management system that handles inventory tracking, supplier management, and procurement workflows
- To implement a secure and innovative QR code-based attendance system that allows employees to check in/out using their smartphones without requiring app installations
- To integrate supply management and attendance modules, linking employee presence with supply room access permissions and resource utilization patterns
- To design and implement an intuitive JavaFX desktop interface for supply management operations and an admin dashboard, along with a mobile-responsive web page specifically for QR code scanning
- To create role-based access control supporting multiple user types including employees, managers, warehouse staff, and system administrators
- To develop comprehensive reporting and analytics dashboards that provide actionable insights for both supply metrics and workforce management
- To apply software engineering best practices including proper system architecture, database normalization, version control, testing methodologies, and thorough documentation
- To deliver a production-ready, scalable system that demonstrates enterprise-level software development capabilities

5. Scope of the Project

The project WILL include:

- Complete inventory management system with real-time stock tracking, item cataloging, stock movement history, and automated low-stock alerts within the JavaFX desktop application

- Supplier database management with vendor information, performance ratings, contact details, and payment terms accessible through desktop interface

- Purchase order creation, tracking, and fulfillment workflow from request to delivery managed through the desktop application

- Supply request and multi-level approval workflow system with budget validation in the JavaFX application

- Unique QR code generation for each employee using ZXing library with security tokens, generated and managed from desktop app

- Lightweight web-based QR code scanner using HTML5 camera API accessible through any smartphone browser (separate from main desktop app)

- Real-time attendance tracking with check-in/check-out timestamps, location validation, and time-window restrictions, with data synced to main desktop application

- Employee management module with profiles, department assignments, and role definitions in the JavaFX desktop interface

- Integration layer connecting attendance records (from web scanner) with supply access permissions in the desktop system

- Comprehensive reporting module including inventory reports, usage analytics, attendance summaries, and cost analysis displayed in JavaFX application

- Interactive dashboard with visualizations, charts, and real-time KPIs for both supply and attendance metrics in the desktop application

- User authentication and authorization system with role-based access control (RBAC) in the desktop app

- Admin panel for system configuration, user management, and security settings within JavaFX interface

- Mobile-responsive web page design for QR scanning only

The project WILL NOT include:

- Native mobile applications for iOS or Android platforms (using web page for QR scanning instead)

- Full web-based application (main system is desktop-based with JavaFX)

- Advanced biometric authentication such as fingerprint or facial recognition

- Integration with external ERP systems or third-party enterprise software

- Multi-facility real-time synchronization across geographically distributed locations

- Artificial Intelligence or Machine Learning-based predictive analytics

- Payroll processing, salary calculations, or comprehensive HR management features

- Financial accounting, budgeting, or invoice management modules

- IoT sensor integration for automated inventory counting

- Blockchain-based supply chain verification or tracking

- International operations support with multi-currency and multi-language capabilities

- Video surveillance integration or advanced security systems

---

6. Key Features

- **Supply Management Features (JavaFX Desktop Application):**

- Real-time inventory tracking with current stock levels and location information

- Item categorization and comprehensive product catalog with descriptions and specifications

- Purchase order generation, approval, and tracking workflow

- Warehouse location management for organized storage

- Cost tracking and spending analysis by department and category

- **QR Code & Attendance Features:**

- Unique, secure QR code generation for each employee with encryption (generated in desktop app)

- Lightweight web page with QR scanner accessible through smartphone browsers (no app required)

- Real-time attendance recording with precise timestamps synced to desktop application database

- Check-in and check-out functionality with location validation through web interface

- Working hours calculation and overtime tracking displayed in desktop application

- Attendance history and absence reporting in JavaFX interface

- Integration with supply room access permissions managed in desktop app

- Late arrival and early departure notifications in desktop system

- Attendance analytics and trend visualization in JavaFX dashboard

- **Reporting & Analytics (JavaFX Desktop Application):**

- Comprehensive inventory reports showing current stock status and valuation

- Supply usage patterns by department, category, and time period

- Employee attendance summaries with working hours and absence rates

- Cost optimization reports identifying spending trends and opportunities

- Cross-module analytics correlating supply usage with employee presence

- **Administrative Features (JavaFX Desktop Application):**

- User management with role assignment and permission control

- System configuration and customization options

- Audit logs for security and compliance tracking

---

7. Tools and Technologies

Programming Languages:

- Java 11 or higher (Primary language for desktop application and backend)

- HTML5, CSS3, JavaScript (For QR scanning web page only)

- SQL (Database queries and stored procedures)

Frameworks & Libraries:

- JavaFX (Desktop application UI framework)
- JDBC or Hibernate (Database connectivity and ORM)
- ZXing (Zebra Crossing - QR code generation and processing)

- JFreeChart or JavaFX Charts (Data visualization in desktop app)
- Apache HttpServer or embedded Jetty (to serve the QR scanning web page)

Database:

- MySQL 8.0 (Relational database management system)
- MySQL Workbench (Database design and administration)

Development Tools:

- IntelliJ IDEA or Eclipse (Integrated Development Environment)
- Scene Builder (JavaFX visual layout tool)
- Git (Version control system)
- GitHub

Web Component (QR Scanning Only):

- HTML5 Camera API (Smartphone camera access for QR scanning)
- JavaScript QR scanner libraries (html5-qrcode or jsQR)
- Basic CSS for mobile-responsive scanning page
- Simple HTTP server to host the scanning page

8. Timeline / Milestones

Phase	Description	Target Date
Planning	Project Definition & Team Formation	End of Week 3
Design	Database Design & System Architecture Planning	Week 5
Development	Backend Development Start	Week 7

Phase	Description	Target Date
GUI Design	JavaFX UI Development & Desktop Interface Implementation	Week 9
Web development	QR Code System Implementation & Web Scanner Page Development	Week 12
Testing	Comprehensive Testing & Bug Fixes	Week 15
Final Review	Presentation and documentation	Week 16

9. Potential Challenges

Technical Challenges:

- **JavaFX Learning Curve:** Team members may need time to learn JavaFX components, layouts, and best practices; early tutorials and documentation review will help

- **Camera Access from Web Page:** Web browsers require HTTPS for camera access; we'll need to implement proper SSL certificates or use localhost for development and testing

- **Desktop-Web Communication:** Ensuring smooth data flow between the JavaFX desktop app and the web-based QR scanner; will use MySQL as the central data store for synchronization

- **QR Code Security:** Ensuring QR codes cannot be easily duplicated or spoofed; mitigation includes implementing time-based tokens and encryption

- **Cross-Browser Compatibility for Scanner:** Different mobile browsers handle camera APIs differently; extensive testing needed across Chrome, Safari, Firefox mobile browsers

- **Database Performance:** As data grows, complex queries for reports may slow down; proper indexing and query optimization will be critical

- **Real-time Updates in Desktop App:** Implementing live dashboard updates when attendance is recorded from web; may require periodic database polling or notification mechanism

Project Management Challenges:

- **Learning Curve:** Team members need to learn both JavaFX for desktop UI and basic web development for the scanner page; early training sessions and knowledge sharing will help

- **Module Integration:** Ensuring the desktop application and web scanner work seamlessly together through the shared MySQL database requires careful design

- **Time Constraints:** Balancing project deliverables with other coursework; strict sprint planning and time management are essential

- **Team Coordination:** With 6 members working on different modules (desktop UI, database, web scanner, QR generation), regular communication and version control discipline are crucial

- **Scope Creep:** Risk of adding too many features; we'll maintain strict adherence to defined scope and MVP approach

---

10. Expected Outcomes

Primary Deliverables:

- **Fully Functional Desktop Application:** A complete JavaFX-based desktop system with supply management and attendance tracking capabilities, with data visualization and reporting features

- **QR Scanning Web Page:** A lightweight, mobile-responsive web page that allows employees to scan QR codes using smartphone cameras and record attendance to the shared database

- **Well-Documented Codebase:** Clean, maintainable Java code following best practices with comprehensive inline comments, and README files for setup and deployment

- **Comprehensive Database:** Properly normalized MySQL database schema with sample data, relationships, constraints, and stored procedures where appropriate

- **User Documentation:** User manuals for the desktop application, administrator guides, and instructions for using the QR scanning web page

- **Executable Package:** Distributable JAR or EXE file for easy installation of the desktop application

- **Test Suite:** Unit tests for business logic and TestFX tests for UI components ensuring system reliability

Technical Outcomes:

- Demonstrated expertise in desktop application development using JavaFX framework

- Practical implementation of QR code technology for business applications

- Experience with hybrid architecture combining desktop applications with web components

- Applied knowledge of database design, normalization, and SQL optimization

- Implementation of security best practices including authentication, authorization, and data encryption

- Understanding of client-side web development for mobile camera access

Business Value:

- **Operational Efficiency:** Reduces manual paperwork and data entry for both supply management and attendance tracking

- **Cost Savings:** Better inventory control minimizes overstocking and stockouts; accurate attendance tracking improves workforce management

- **Real-time Visibility:** Management gains instant access to critical supply and attendance metrics for better decision-making

- **Improved Accountability:** Automated tracking creates audit trails for compliance and performance monitoring

- **Integration Benefits:** Unique combination of supply and attendance systems provides insights into resource utilization patterns

Educational Outcomes:

- Hands-on experience applying software engineering principles in realistic team setting

- Enhanced teamwork, communication, and project management skills

- Portfolio-worthy project demonstrating full-stack development capabilities

- Preparation for real-world software development careers

Impact Statement: This project will deliver an innovative, practical solution that addresses real business challenges faced by organizations managing both physical resources and workforce. The integrated approach of combining supply chain management with attendance tracking represents a unique value proposition that goes beyond traditional standalone systems. The successful completion will demonstrate our team's ability to conceptualize, design, implement, and deliver enterprise-grade software while adhering to software engineering best practices and principles.

Section B. Evaluation

To be completed by the instructor or supervisor.

2. Project Proposal (12 points / 2 marks) – Week 4

Criteria	Excellent (4)	Good (3)	Fair (2)	Poor (0-1)	Awarded Score
Title & Motivation	Strong, concise title; well-justified problem.	Adequate but generic.	Weak or unclear link.	Missing.	/4
Team Details	Full list with clear roles and leader.	Some roles unclear.	Incomplete info.	Missing.	/4
Completeness	All template sections filled with quality.	Most sections complete.	Several missing/weak.	Template ignored.	/4