Project Design Phase

Solution Architecture

Date: 02 NOV 2025

Team ID: NM2025TMID02325

Title: CRM APPLICATION FOR JEWEL MANAGEMENT

Maximum Marks: 10 Marks

1. Overview

The solution architecture for the CRM application defines the comprehensive structure and interaction patterns of all system components dedicated to jewelry management. This architecture ensures optimal scalability, high reliability, and operational efficiency by supporting essential functions including customer management, inventory tracking, order processing, billing operations, and multi-channel communication capabilities.

2. Architecture Layers

A. Presentation Layer (Frontend)

Purpose: Provides intuitive user interfaces for jewelers, sales representatives, inventory managers, and customers to interact with the system.

Components:

- Web application interface for desktop browser access
- Mobile applications for iOS and Android platforms
- Interactive dashboards for reporting and business analytics
- Customer portal for self-service features

Technologies: React.js / Angular / Vue.js, Bootstrap / Tailwind CSS, Mobile SDKs (Swift/Kotlin)

B. Application Layer (Backend / Business Logic)

Purpose: Processes business logic, manages workflows, and handles data transformations for the CRM system.

Components:

- Customer Management Module - Profile creation, relationship tracking, preferences
- Order & Customization Module - Custom jewelry design and order management
- Billing & Payment Module - Invoice generation and payment processing

- Inventory Management Module - Stock tracking and jewelry catalog management

- Communication Module - Email, SMS, and push notification delivery

- Analytics & Reporting Module - Business intelligence and performance metrics

Technologies: Node.js / Java / .NET, Python Django / Flask, RESTful APIs

C. Data Layer

Purpose: Provides centralized storage and reliable management of all application data.

Components:

- Customer Database - Profile information, preferences, complete purchase history

- Product/Inventory Database - Stock levels, categories, gemstone specifications, precious metal details

- Orders & Billing Database - Order records, invoices, payment statuses, transaction history

- Feedback & Communication Database - Customer messages, notifications, reviews, interactions

Technologies: MySQL / PostgreSQL / MongoDB, Cloud Storage (AWS RDS / Azure SQL)

D. Integration Layer

Purpose: Establishes seamless connections between the CRM system and external platforms.

Components:

- Payment Gateway Integration - Secure online transaction processing

- Communication Services Integration - Third-party email and SMS providers

- Accounting Software Integration - Financial system synchronization

- ERP / Inventory Systems Integration - Enterprise resource planning connectivity (optional)

Technologies: REST / SOAP APIs, Webhooks, Message Queues

E. Security & Access Layer

Purpose: Implements comprehensive protection mechanisms for sensitive customer and financial data.

Components:

- Role-based Access Control - Differentiated permissions for Admin, Manager, Sales Staff, and Customers

- Data Encryption - Protection at rest and in transit using industry-standard encryption

- Audit Logging - Comprehensive tracking of all system activities and data access

- Two-Factor Authentication - Enhanced security for user account access

Technologies: JWT Tokens / OAuth2, SSL/TLS Certificates, AES Encryption, Firewalls

3. Data Flow / Workflow

1. **Data Entry & Updates** - Customer data is entered or updated through the frontend interface (web or mobile application)

2. **Business Logic Processing** - The application layer validates and processes orders, manages inventory, and handles billing transactions

3. **Real-Time Inventory Management** - Inventory status is updated in real-time with automatic alerts triggered when stock levels fall below thresholds

4. **Automated Communication** - Customer notifications including reminders, personalized offers, and delivery status updates are sent automatically

5. **Analytics Generation** - Comprehensive analytics and reports are generated to support management decision-making and strategic planning

4. Diagram Representation (High-Level Architecture)

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        +----------------------+
        |   Presentation Layer |
        | Web / Mobile / Dash  |
        +---------+-----------+
                  |
                  v
        +----------------------+
        |   Application Layer  |
        | Business Logic &amp; CRM |
        +---------+-----------+
                  |
       +------------+------------+
       |            |            |
       v            v            v
  +----------+   +---------+   +---------+
  | Customer |   | Orders  |   |Inventory|
  |  Module  |   | Module  |   | Module  |
  +----------+   +---------+   +---------+
                    |
                    v
             +------------+
             |  Billing   |
             |  Module    |
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                    |
                    v
             +------------+
             | Data Layer |
             +------------+
                    |
                    v
             +------------+
             | Integration|
             |   Layer    |
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                    v
```
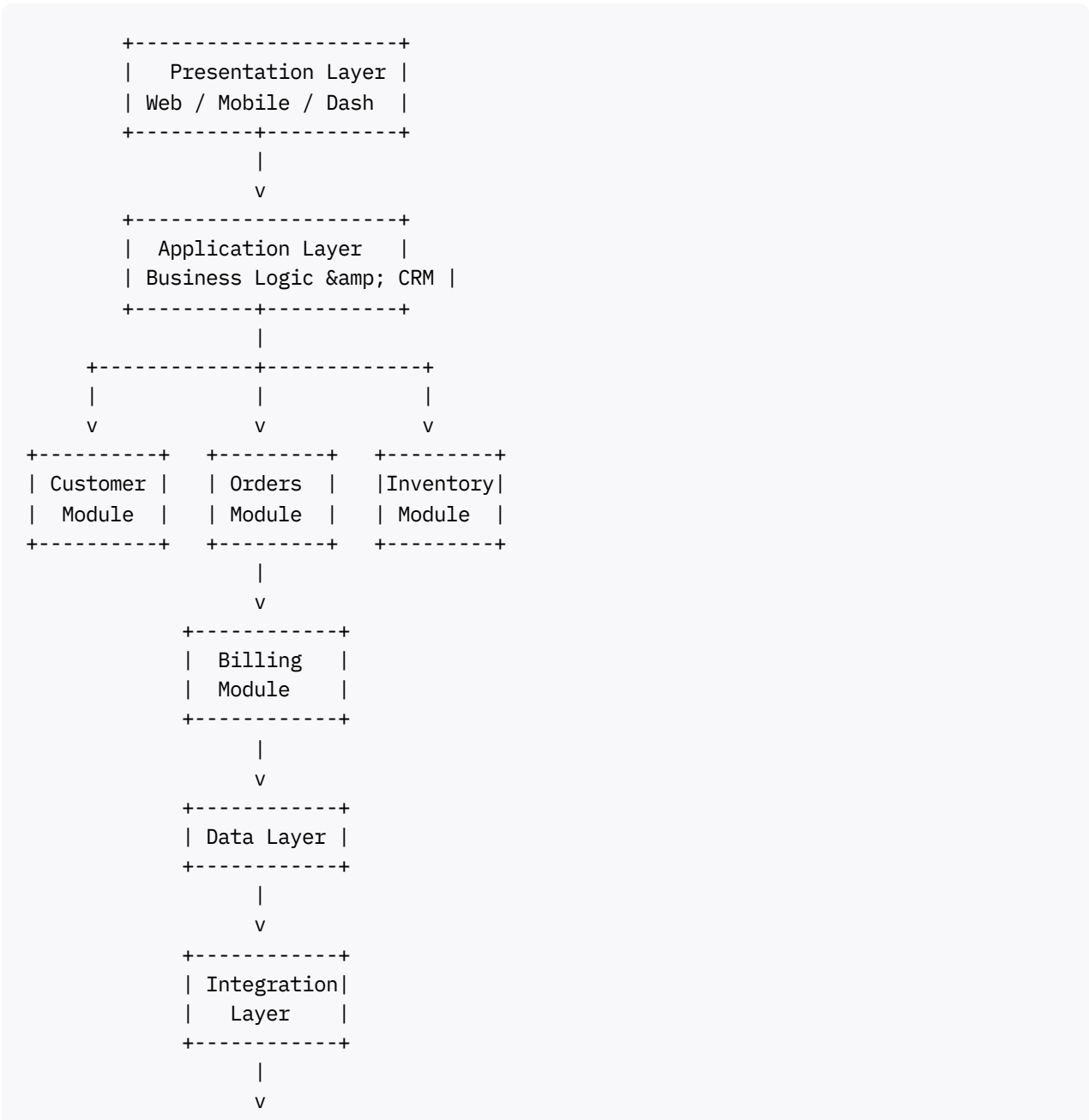
```
        +------------+
        | Security   |
        |   Layer    |
        +------------+
```

5. Key Advantages

Centralized Data Management - Unified CRM data repository ensures efficient tracking of customer information and inventory across all operations

Automated Workflows - Intelligent automation significantly reduces manual errors in billing processes, follow-ups, and order management

Enhanced Customer Experience - Seamless integration with payment gateways and communication services provides superior customer engagement and satisfaction

Scalable Architecture - Modular design approach enables flexible development and supports future enhancements without requiring major system redesign

Security & Compliance - Comprehensive security framework protects sensitive customer and financial data while maintaining audit trails and regulatory compliance

Real-Time Operations - Live inventory updates and instant notifications enable responsive customer service and efficient inventory management