Supermarket System Functional and Non-Functional Requirements

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# Functional Requirements

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| ID | Requirement | Priority | Justification |
| SUP-FR-M-001 | Store product information (name, category, price, stock level). | Must Have | To track all products available for sale. |
| SUP-FR-M-002 | Manage inventory levels (update stock when products are sold or restocked). | Must Have | Maintain accurate stock data to avoid overselling or shortages. |
| SUP-FR-M-003 | Process customer transactions (record purchases, payments). | Must Have | To store sales transactions and payment methods. |
| SUP-FR-M-004 | Manage customer loyalty programs (track points, discounts). | Must Have | To reward frequent shoppers and enhance customer retention. |
| SUP-FR-M-005 | Manage supplier details (contact info, supplied products). | Must Have | Necessary to maintain supplier relationships and restock products efficiently. |
| SUP-FR-M-006 | Store employee details (roles, shifts, access levels). | Must Have | Track employees' roles and manage access. |
| SUP-FR-M-007 | Handle product categorization (e.g., groceries, electronics, clothing). | Must Have | Organizes and retrieves products easily. |
| SUP-FR-M-008 | Track expired or damaged goods. | Must Have | Ensures expired products are removed from inventory. |
| SUP-FR-M-009 | Barcode scanning integration (for easy checkout and inventory updates). | Must Have | Simplifies checkout and keeps inventory accurate. |
| SUP-FR-M-010 | Generate sales reports. | Must Have | Crucial for analyzing business performance. |
| SUP-FR-M-011 | Real-time shelf monitoring to provide stock updates via IoT sensors. | Must Have | Ensures timely restocking via IoT sensors. |
| SUP-FR-S-012 | AI-based product recommendations. | Should Have | Enhances shopping experience with personalized suggestions. |
| SUP-FR-S-013 | Autonomous restocking alerts. | Should Have | Predict stock shortages using AI and real-time trends. |
| SUP-FR-S-014 | Computer vision system to guide users to products. | Should Have | Enables customers to navigate the store efficiently. |
| SUP-FR-S-015 | Mobile app for customers to search for products, track loyalty points, etc. | Should Have | Offers convenience and enhances the customer experience. |
| SUP-FR-S-016 | Mobile app for employees to manage inventory and stock levels. | Should Have | Empowers staff to manage stock more efficiently on the go. |
| SUP-FR-S-017 | AI-driven dynamic pricing. | Should Have | Adjusts prices in real-time based on demand and inventory. |
| SUP-FR-S-018 | Virtual shopping assistant (voice-activated) for customer support. | Should Have | Assists customers in navigating the store and finding products. |
| SUP-FR-S-019 | Automated purchase order generation for suppliers based on inventory levels. | Should Have | Automatically sends purchase orders to suppliers when stock is low, reducing manual effort. |
| SUP-FR-S-020 | Predictive analytics for customer purchasing behavior. | Should Have | Uses historical data to predict customer preferences and optimize product availability. |
| SUP-FR-S-021 | Fraud detection system for payment and employee activity. | Should Have | Identifies and flags suspicious activity in real-time to prevent fraud. |
| SUP-FR-C-022 | Support multiple payment methods (credit card, mobile payments, vouchers). | Could Have | Improves customer experience by offering flexibility in payments. |
| SUP-FR-C-023 | Integration with external analytics tools. | Could Have | Enables advanced insights for business improvement. |
| SUP-FR-C-024 | Virtual reality shopping experience (for e-commerce customers). | Could Have | Provides an immersive experience for customers shopping online by using virtual reality. |
| SUP-FR-C-025 | Automated restocking robots to move products to the shelves. | Could Have | Reduces human intervention in stocking shelves by using robots to replenish goods. |
| SUP-FR-C-026 | Smart shopping carts that track products selected and display total cost. | Could Have | Improves the shopping experience by providing real-time purchase tracking. |
| SUP-FR-C-027 | Integration with social media platforms for marketing promotions. | Could Have | Allows customers to share their experiences and offers directly through social media. |
| SUP-FR-C-028 | Personalized discounts based on customer profiles and purchase history. | Could Have | Uses AI to provide targeted discounts to customers based on their preferences and past purchases. |

# Non-Functional Requirements

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| ID | Requirement | Justification |
| SUP-NFR-001 | Performance: Handle up to 100,000 transactions per day. | High transaction volume is typical, especially during peak hours. |
| SUP-NFR-002 | Scalability: Accommodate new stores or branches easily. | Database must scale as the business expands. |
| SUP-NFR-003 | Security: Customer payment information must be encrypted. | Strong security is needed to protect sensitive customer data. |
| SUP-NFR-004 | Availability: The system should be available 99.9% of the time. | Supermarkets operate continuously and require minimal downtime. |
| SUP-NFR-005 | Usability: Intuitive interface for employees with varying tech skills. | Reduces training time and makes operations smoother. |
| SUP-NFR-006 | Backup and Recovery: The system must back up data every 12 hours and recover within 30 minutes. | Ensures data protection and availability in case of failures or crashes. |
| SUP-NFR-007 | Responsiveness: System should respond to user inputs within 2 seconds. | Provides a seamless experience for both customers and employees during peak usage times. |
| SUP-NFR-008 | Data Retention: All sales and inventory data must be retained for a minimum of 5 years. | Ensures compliance with legal and financial reporting requirements. |
| SUP-NFR-009 | Integration: The system must integrate smoothly with existing POS and ERP systems. | Ensures seamless data flow and reduces manual data entry across the organization. |