BloodCenterOS V3

The SQL script creates a database named `BloodCenterOS_DB3` for managing a blood center's operations. Below is a categorized list of tables grouped by their functional area, along with a brief description of each table's purpose to assist developers in understanding the database structure and its intended use.

1. Core Blood Center Management

These tables manage the core entities and configurations of the blood center.

#BloodCenterMaster
Description: Stores details about blood centers, such as their name, address, license number, contact information, and status.
Purpose: Central repository for blood center information, used as a reference for associating other entities (e.g., donors, collections) to specific centers.

#BranchMaster
Description: Contains information about branches of a blood center, including branch code, name, address, and contact details.
Purpose: Manages multiple locations under a single blood center, enabling localized operations.

#CenterConfig
Description: Stores configuration settings specific to each blood center, with key-value pairs.
Purpose: Allows customization of system behavior per center (e.g., operational rules, thresholds).

#SystemConfig
Description: Stores global system-wide configuration settings with key-value pairs and descriptions.
Purpose: Manages universal settings applicable across all centers.

2. Donor Management

Tables related to donor information, their health, donation history, and interactions.

#DonorMaster
Description: Stores donor details like name, blood group, contact info, Aadhaar number, address, and donation count.
Purpose: Central table for donor profiles, used for tracking donor eligibility and history.

#DonorHealthHistory
Description: Records health metrics of donors during visits, such as weight, temperature, blood pressure, hemoglobin, and pulse rate.
Purpose: Tracks donor health to ensure eligibility for donations.

#DonorDonationHistory
Description: Logs each donation event with details like donation date, type, volume, and bag number.
Purpose: Maintains a history of donor contributions for tracking and reporting.

#DonorAppointment
Description: Manages donor appointment schedules, including date, time slot, and status.
Purpose: Facilitates scheduling and tracking of donor visits.

#DeferralRecord
Description: Records donor deferrals with reasons and deferral period.
Purpose: Tracks temporary or permanent ineligibility of donors for safety and compliance.

#DonorCommunicationLog
Description: Logs communications with donors via various channels (e.g., SMS, email) with message details and status.
Purpose: Tracks outreach efforts for reminders, updates, or campaigns.

3. Blood Collection and Processing

Tables handling blood collection, testing, component preparation, and storage.

#CollectionRecord
Description: Records details of blood collection events, including donor, blood bag, volume, and collection time.
Purpose: Tracks the collection process, linking donors and blood bags.

#CollectionStaffMap
Description: Maps staff members to collection events, specifying their roles.
Purpose: Tracks staff involvement in blood collection for accountability.

#BloodBagMaster
Description: Stores details of blood bags, including barcode, lot number, volume, status, and expiry date.
Purpose: Manages the lifecycle of blood bags from collection to disposal.

#BloodTestRecord
Description: Logs blood testing events with details like sample time, performer, and overall status.
Purpose: Tracks testing processes to ensure blood safety.

#BloodTestResult
Description: Records individual test results for blood bags, including test code, result, method, and kit used.
Purpose: Stores detailed test outcomes for quality assurance.

#TestTechnicianMap
Description: Maps technicians to blood test records.
Purpose: Tracks which technicians performed specific tests.

#TestKitMaster
Description: Stores information about test kits, including name, manufacturer, lot number, and expiry date.
Purpose: Manages inventory and usage of testing kits.

#ComponentMaster
Description: Tracks blood components (e.g., plasma, platelets) derived from blood bags, with details like type, volume, and status.
Purpose: Manages processed blood components for inventory and distribution.

#ComponentTypeMaster
Description: Defines types of blood components with codes and descriptions.
Purpose: Standardizes component classifications.

#ComponentPreparation
Description: Logs the preparation of blood components, including type, volume, and preparer.
Purpose: Tracks the process of separating blood into components.

#ComponentPreparationLog
Description: Records additional details or notes about component preparation events.
Purpose: Provides audit trail for component processing.

#ComponentStorage
Description: Tracks storage details of components, including fridge location and placement time.
Purpose: Manages storage conditions for blood components.

#FridgeStorageMaster
Description: Stores details of storage fridges, including code, name, capacity, and temperature logging requirements.

Purpose: Manages storage infrastructure for blood components.

#DiscardRecord
Description: Logs discarded blood bags or components with reasons and details.
Purpose: Tracks disposal for compliance and inventory management.

#ComponentTransferLog
Description: Records transfers of components between centers, including transport details.
Purpose: Tracks movement of blood components for inventory and traceability.

4. Inventory Management

Tables for managing blood stock and transactions.

#InventoryStock
Description: Tracks stock levels of blood components by blood group, including available, reserved, and quarantined quantities.
Purpose: Manages real-time inventory for planning and fulfillment.

#InventoryTransactionLog
Description: Logs inventory transactions (e.g., additions, issues) with details like quantity, location, and type.
Purpose: Provides an audit trail for inventory movements.

5. Blood Requests and Issuance

Tables for handling blood requests, cross-matching, and issuance to patients or hospitals.

#PatientRequest
Description: Records blood requests from patients or hospitals, including blood group, component type, and urgency.
Purpose: Manages demand for blood components.

#EmergencyRequest
Description: Logs urgent blood requests with details like patient name, blood group, and status.
Purpose: Handles critical blood needs with priority.
#EmergencyDonorResponse
Description: Tracks donor responses to emergency requests, including contact details and verification status.
Purpose: Facilitates rapid donor mobilization for emergencies.

#ReplacementDonor
Description: Records donors who provide blood to replace issued units for patient requests.
Purpose: Manages replacement donation processes.

#CrossMatchRecord
Description: Logs cross-matching results for blood compatibility, including method and performer.
Purpose: Ensures safe blood transfusions.

#IssueRecord
Description: Records issuance of blood components to patients or hospitals, including issue date and billing details.
Purpose: Tracks blood distribution.

#ReturnRecord
Description: Logs returns of issued blood components with reasons.
Purpose: Manages returned inventory for reprocessing or disposal.

#RequestStatusLog
Description: Tracks changes in the status of blood requests with timestamps and notes.
Purpose: Provides audit trail for request processing.

6. Billing and Payments

Tables for managing financial transactions related to blood issuance and services.

#BillingTransaction
Description: Records billing details for blood or services, including invoice number, patient, amount, and payment status.
Purpose: Manages financial transactions for blood center services.

#InvoiceDetail
Description: Stores line items for billing transactions, including component or service details, quantity, and price.
Purpose: Breaks down billing into specific charges.

#PaymentRecord
Description: Logs payments made for billing transactions, including amount, mode, and reference.
Purpose: Tracks payment status and history.

#ServiceChargeMaster
Description: Defines service charges with codes, names, and amounts.
Purpose: Standardizes pricing for services provided by the blood center.

7. Blood Camps

Tables for organizing and managing blood donation camps.

#BloodCampMaster
Description: Stores details of blood donation camps, including name, venue, date, and expected donors.
Purpose: Manages planning and execution of blood camps.

#CampDonorMap
Description: Maps donors to specific blood camps.
Purpose: Tracks donor participation in camps.

#CampOrganizer
Description: Stores information about camp organizers, including contact details and address.
Purpose: Manages relationships with camp organizers.

#CampInventory
Description: Tracks inventory items used in blood camps, such as equipment or supplies.
Purpose: Manages logistics for camps.

#CampExpenseLog
Description: Logs expenses incurred during blood camps, including category and amount.
Purpose: Tracks financial aspects of camp operations.

8. User and Role Management

Tables for managing users, roles, and permissions within the system.

#UserMaster
Description: Stores user details, including username, email, password hash, and login status.
Purpose: Manages user accounts for system access.

#CenterUserMap
Description: Maps users to specific blood centers with assigned roles.
Purpose: Controls user access to specific centers.

#RoleMaster
Description: Defines roles within the system with names and descriptions.

Purpose: Manages role-based access control.

#RolePermissionMap
Description: Maps permissions to roles for access control.
Purpose: Defines what actions a role can perform.

#PermissionMaster
Description: Stores permission codes and descriptions.
Purpose: Defines granular access rights for system actions.

#UserRoleMap
Description: Maps users to roles for access control.
Purpose: Assigns specific roles to users.

#UserSettings
Description: Stores user-specific settings with key-value pairs.
Purpose: Allows customization of user experience.

#LoginHistory
Description: Logs user login and logout events with IP address and user agent.
Purpose: Tracks user activity for security and auditing.

9. Auditing and Logging

Tables for tracking system activities, errors, and changes.

#AuditLog
Description: Logs user actions on records, including old and new values, IP address, and user agent.
Purpose: Provides an audit trail for system changes.

#ChangeLog
Description: Tracks changes to entities with details like entity name, ID, and change type.
Purpose: Logs modifications for traceability.

#ErrorLog
Description: Records system errors with messages and stack traces.
Purpose: Facilitates debugging and error tracking.

#SchedulerJobLog
Description: Logs execution details of scheduled jobs, including status and messages.
Purpose: Monitors automated tasks.

10. Integration and Communication

Tables for managing external integrations, notifications, and uploads.

#ApiIntegrationMaster
Description: Stores details of API integrations, including base URL, API key, and credentials.
Purpose: Manages connections to external systems.

#ApiResponseLog
Description: Logs API requests and responses with payloads and status codes.
Purpose: Tracks API interactions for debugging and auditing.

#DataUploadHistory
Description: Records history of data uploads to external systems with status and payload details.
Purpose: Tracks data synchronization activities.

#PortalUploadQueue
Description: Manages queued uploads to external portals with attempt counts and status.
Purpose: Handles asynchronous data uploads.

#OutboxLog
Description: Logs outgoing messages (e.g., SMS, email) with recipient and status details.
Purpose: Tracks communication attempts.

#NotificationMaster
Description: Stores notification templates with type, title, body, and target audience.
Purpose: Manages system-wide notifications.

#EmailTemplateMaster
Description: Stores email templates with subject and HTML body.
Purpose: Standardizes email communications.

#SmsTemplateMaster
Description: Stores SMS templates with text content.
Purpose: Standardizes SMS communications.

#NewsletterSubscription
Description: Tracks email subscriptions for newsletters with subscription status.
Purpose: Manages subscriber lists for communications.

11. Reporting and Analytics

Tables for generating reports and storing analytics data.

#AnalyticsDashboardData
Description: Stores key-value pairs for dashboard analytics data.
Purpose: Provides data for real-time dashboards.

#MonthlyReportLog
Description: Logs monthly reports with year, month, type, and data snapshots.
Purpose: Stores historical report data.

#ReportTemplate
Description: Stores templates for generating reports with file paths and types.
Purpose: Standardizes report formats.

#ExportFileLog
Description: Logs exported files with details like name, type, and path.
Purpose: Tracks file exports for reporting or sharing.

12. Inventory and Equipment Management

Tables for managing non-blood inventory and equipment.
#DeviceMaster
Description: Stores details of devices, including name, type, serial number, and warranty.
Purpose: Manages equipment inventory.

#QualityControlRecord
Description: Logs quality control checks for devices with details and performer.
Purpose: Ensures equipment reliability.

13. Financial and Expense Tracking

Tables for managing expenses outside of billing.

#ExpenseMaster
Description: Records general expenses with category, amount, and notes.
Purpose: Tracks operational expenses.

#CampExpenseLog
Description: (Already listed under Blood Camps) Logs camp-specific expenses.

Purpose: Tracks financial aspects of blood camps.

14. Location and Geography

Tables for managing geographical data.

#StateMaster
Description: Stores state names.
Purpose: Provides state-level geographical data.

#DistrictMaster
Description: Stores district names linked to states.
Purpose: Organizes districts for address management.

#CityMaster
Description: Stores city names linked to districts with pincodes.
Purpose: Manages city-level address data.

#PincodeMaster
Description: Stores pincode details linked to cities and areas.
Purpose: Provides precise location data for addresses.

15. Miscellaneous

Tables for various other functionalities.

#BloodGroupMaster
Description: Defines blood group codes and descriptions.
Purpose: Standardizes blood group classifications.

#HospitalMaster
Description: Stores hospital details, including name, address, and contact information.
Purpose: Manages hospital relationships for blood requests and issuance.

#FeedbackMaster
Description: Records feedback from users or donors with source and message details.
Purpose: Collects feedback for improving services.

#HolidayMaster
Description: Stores holiday dates and descriptions for blood centers.
Purpose: Manages center operational schedules.

#DepartmentMaster
Description: Defines departments within a blood center with codes and names.

Purpose: Organizes staff by department.

#DesignationMaster
Description: Stores designation names for employees.
Purpose: Standardizes employee roles.

#EmployeeMaster
Description: Stores employee details, including name, designation, department, and join date.
Purpose: Manages staff information.

#LookupType
Description: Defines types for lookup values (e.g., categories for dropdowns).
Purpose: Organizes reference data.

#LookupValue
Description: Stores specific values for lookup types with codes and text.
Purpose: Provides configurable options for dropdowns or lists.

#ReasonMaster
Description: Stores reasons for various actions (e.g., deferrals, discards) with codes and text.
Purpose: Standardizes reason codes for consistency.

#SequenceCounters
Description: Manages custom sequence numbers for entities (e.g., invoice numbers, bag numbers).
Purpose: Generates unique identifiers with prefixes and increments.

#AttachmentStore
Description: Stores file attachments with details like file name, path, and size.
Purpose: Manages uploaded documents or images.

#BackupLog
Description: Logs database or system backups with type, path, and status.
Purpose: Tracks backup activities for data recovery.

Developer Notes

Relationships: Many tables reference `CenterId` to associate records with specific blood centers, enabling multi-tenant functionality. Foreign keys (e.g., `DonorId`, `BagId`, `ComponentId`) link related entities across tables.

Timestamps: Most tables use `CreatedAt` (defaulting to `sysutcdatetime()`) for auditability. Some include `UpdatedAt` or other event-specific timestamps (e.g., `LastLoginAt`, `DonatedAt`).

Indexes: Non-clustered indexes on `CollectionRecord.CreatedAt` and `DonorMaster.Phone` improve query performance for common searches.

Scalability: The schema supports multiple centers, branches, and users, with flexible configurations (`CenterConfig`, `SystemConfig`).

Security: User authentication (`UserMaster`, `PasswordHash`, `PasswordSalt`) and role-based access (`RoleMaster`, `PermissionMaster`) are implemented.

Data Integrity: Primary keys use `IDENTITY(1,1)` for unique IDs, and default constraints ensure consistent data entry (e.g., `IsActive`, `CreatedAt`).

This schema is designed for a comprehensive blood bank management system, covering donor management, blood processing, inventory, billing, and reporting, with robust auditing and integration capabilities. Developers can use this structure to build features like donor tracking, inventory management, and automated notifications while ensuring compliance and traceability.