

Summary of LMS Database Objects

Functions

1. CalculateFine

- **Purpose:** Calculates fines for overdue loans
- **Input:** Due date (@DueDate DATE)
- **Output:** Fine amount (\$10/day , max \$200)
- **Used by:** BlockMembersWithOverdueFines procedure & trg_CalculateFine trigger

2. fn_GetTotalFines

- Returns total fines paid by a member
- **Input:** MemberID INT
- **Output:** Sum of all fine payments (DECIMAL(10,2))

3. fn_GetAvailableCopies

- Returns count of available copies for a book
- **Input:** ISBN VARCHAR(13)
- **Output:** Number of available copies (INT)

4. fn_MemberFullName

- Concatenates member first and last names
- **Input:** MemberID INT
- **Output:** Full name (VARCHAR(200))

5. fn_DaysOverdue

- Calculates days overdue based on return date
 - **Input:** ReturnDate DATE
 - **Output:** Days overdue (INT)
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Views

1. vw_MonthlyGenrePopularityByMembership

- Shows loan counts by **genre** and **membership type** (last month)
- **Columns:**
 - MembershipType
 - GenreName
 - LoanCount
- **Order:** By popularity (LoanCount DESC)

2. vw_ActiveLoansByMember

- Displays **current active loans** with member details
- **Columns:**
 - Member name (FirstName , LastName)
 - MembershipType
 - ActiveLoans (count)
 - LoanLimit (based on membership)
- **Filters:** Only members with active loans

3. vw_BooksLostOrDamaged

- Lists books marked as **lost/damaged** with responsible members
- **Columns:**
 - Title
 - Status (Lost / Damaged)
 - LastAuditDate
 - Member name (FirstName , LastName)

4. vw_LoanFinesSummary

- Provides **fine calculations** per loan
 - **Columns:**
 - CalculatedFine (\$10/day , max \$200)
 - TotalPaid (sum of payments)
 - RemainingFine (unpaid balance)
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Stored Procedures

1. ProcessBookCheckout

- **Purpose:** Validates & processes book checkouts
- **Checks:**
 - Member eligibility (`IsActive` , fine limit, loan limits)
 - Book availability (`Status = 'Available'` , `isReferenceOnly = 0`)
- **Sets:**
 - Due date (`Premium: 21 days` , others: `14 days`)
 - Loan type (`Premium: Standard` , others: `ShortLoan`)

2. ProcessBookReturn

- **Purpose:** Handles book returns
- **Actions:**
 - Updates `Loan.ReturnDate` & `BookCopy.Status`
 - Calculates fines if overdue (`$10/day` , max `$200`)
 - Deactivates members with unpaid fines `> $100`

3. GenerateMonthlyGenrePopularityReport

- **Purpose:** Generates borrowing trends report
- **Input:** Date range (`@StartDate` , `@EndDate`)
- **Output:** Loan counts by `Genre` & `MembershipType`

4. MarkBookAsLostOrDamaged

- **Purpose:** Manages lost/damaged books
- **Actions:**
 - Updates `BookCopy.Status` (`Lost` / `Damaged`)
 - Charges replacement cost as fine
 - Logs action in `AuditLog`

5. BlockMembersWithOverdueFines

- **Purpose:** Deactivates members with unpaid fines `> $100`
 - **Called by:** `trg_CalculateFine` trigger
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Triggers

1. `trg_SetDueDate`

- **Runs on:** `Loan` table (`INSERT` / `UPDATE`)
- **Sets due dates** based on loan type:
 - `Standard` → `30 days`
 - `ShortLoan` → `7 days`
 - `InterLibrary` → `1 day`

2. `AutoSetBookStatusToLost`

- **Runs on:** `Loan` table (`UPDATE`)
- **Actions:**
 - Marks books as `Lost` if overdue `>60 days`
 - Creates `ReorderRequest` for lost books

3. `trg_CalculateFine`

- **Runs on:** `Loan` table (`INSERT` / `UPDATE`)
- **Calls:** `BlockMembersWithOverdueFines`
- **Ensures:** Members with fines `> $100` are deactivated

4. `PreventReferenceBookLoans`

- **Runs on:** `Loan` table (`INSERT`)
 - **Blocks:** Loans for `isReferenceOnly = 1` books
 - **Error:** `Cannot loan a reference-only book`
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Summary of the library database queries:

Book-Related Queries

1. Recent Publications

- Retrieves all books published after 2010, showing titles and publication years in descending order

2. Genre Distribution

- Counts books by genre and displays them in order from most to least common

3. Publisher Statistics

- Shows how many books each publisher has published, ranked by volume

4. Inventory Locations

- Lists all book copies with their physical shelf locations, conditions, and current statuses

5. Condition Report

- Provides a count of book copies grouped by their physical condition

Member-Related Queries

6. Membership Breakdown

- Counts active members by their membership type (Student, Premium, Adult)

7. Member Loan History

- Displays the complete borrowing history for a specific member including book titles and dates

8. Active Reservations

- Shows all current book reservations that haven't been completed yet

Staff & Operational Queries

9. Staff Directory

- Lists all staff members with their positions, hire dates, and salary grades

10. Fine Collection Analysis

- Summarizes total fines collected, grouped by payment method (cash, credit, etc.)

11. Upcoming Events

- Displays all future library events with their details and schedules