Library Management System Data Dictionary

1. Entities (Tables)

Entity Name	Description	Primary Key
SYSTEM_USER	Base user information for all system users (staff and members).	User_ID
STAFF	Library staff members (subtype of SYSTEM_USER).	Staff_ID
MEMBER	Library members/borrowers (subtype of SYSTEM_USER).	Member_ID
AUTHORS	Book authors information.	Author_ID
CATEGORIES	Book classification categories (e.g., Fiction, Science).	Category_ID
PUBLISHERS	Book publishing companies.	Publisher_ID
BOOKS	Book inventory and details.	Book_ID
BORROWING	Book borrowing transactions.	Borrow_ID
FINE	Fines recorded for late or damaged returns.	Fine_ID

2. Attributes (Columns)

SYSTEM_USER

Attribute	Data Type	Required	Description	Example
User_ID	INT	Yes	Unique user identifier (Primary Key).	1001
Name	VARCHAR	Yes	Full name of user.	"John Smith"
Email	VARCHAR	Yes	Email address (should be unique).	"john@email.com"

STAFF

Attribute	Data Type	Required	Description	Example
Staff_ID	INT	Yes	Unique staff identifier (Primary Key).	2001
User_ID	INT	Yes	Foreign Key referencing SYSTEM_USER.	1001
Role	VARCHAR	Yes	Staff position or job title.	"Librarian"
Hire_Date	DATE	Yes	Employment start date.	"2023-01-15"

MEMBER

Attribute	Data Type	Required	Description	Example

Member_ID	INT	Yes	Unique member identifier (Primary Key).	3001
User_ID	INT	Yes	Foreign Key referencing SYSTEM_USER.	1002
Phone	INT	Yes	Contact number.	5551234567
Address	VARCHAR	Yes	Physical address.	"123 Main St"
Join_Date	DATE	Yes	Membership start date.	"2023-02-20"

AUTHORS

Attribute	Data Type	Required	Description	Example
Author_ID	INT	Yes	Unique author identifier (Primary Key).	4001
Author_Name	VARCHAR	Yes	Full name of author.	"George Orwell"
Nationality	VARCHAR	No	Author's nationality.	"British"

CATEGORIES

Attribute	Data Type	Required	Description	Example
Category_ID	INT	Yes	Unique category identifier (Primary Key).	5001

| Category_Name | VARCHAR | Yes | Category description. | "Fiction" |

PUBLISHERS

Attribute	Data Type	Required	Description	Example
Publisher_ID	INT	Yes	Unique publisher identifier (Primary Key).	6001
Publisher_Name	VARCHAR	Yes	Publishing company name.	"Penguin Books"
Country	VARCHAR	No	Publisher's country of origin.	"UK"

BOOKS

Attribute	Data Type	Required	Description	Example
Book_ID	INT	Yes	Unique book identifier (Primary Key).	7001
Title	VARCHAR	Yes	Book title.	"1984"
Author_ID	INT	Yes	Foreign Key referencing AUTHORS.	4001
Category_ID	INT	Yes	Foreign Key referencing CATEGORIES.	5001
Publisher_ID	INT	Yes	Foreign Key referencing PUBLISHERS.	6001

ISBN	VARCHAR	Yes	International Standard Book Number (unique identifier for the edition).	"9780451524935"
Publish_Year	INT	No	Year of publication.	1949
Copies_Total	INT	Yes	Total copies the library owns.	5
Copies_Available	INT	Yes	Copies currently available for borrowing.	3
Shelf_Location	VARCHAR	Yes	Physical location in library.	"A-12-F"

BORROWING

Attribute	Data Type	Required	Description	Example
Borrow_ID	INT	Yes	Unique borrowing transaction identifier (Primary Key).	8001
Member_ID	INT	Yes	Foreign Key referencing MEMBER (The borrower).	3001
Book_ID	INT	Yes	Foreign Key referencing BOOKS (The item	7001

			borrowed).	
Staff_ID	INT	Yes	Foreign Key referencing STAFF (The staff member processing the loan).	2001
Borrow_Date	DATE	Yes	Date book was checked out.	"2024-01-10"
Due_Date	DATE	Yes	Expected return date.	"2024-01-24"
Return_Date	DATE	No	Actual return date (NULL if not yet returned).	"2024-01-20"
Status	VARCHAR	Yes	Borrowing status ("Borrowed", "Returned", "Overdue").	"Returned"

FINE

Attribute	Data Type	Required	Description	Example
Fine_ID	INT	Yes	Unique fine identifier (Primary Key).	9001
Borrow_ID	INT	Yes	Foreign Key referencing BORROWING (The transaction the fine relates to).	8001
Amount	DECIMAL	Yes	Fine amount in	5.00

			currency.	
Paid	VARCHAR	Yes	Payment status ("Yes", "No").	"Yes"

3. Relationships

Relationship	Type	Parent → Child	Description
User Inheritance (Staff)	IS-A	SYSTEM_USER → STAFF	Staff are a specialized type of system user.
User Inheritance (Member)	IS-A	SYSTEM_USER → MEMBER	Members are a specialized type of system user.
Book Authorship	1:N	AUTHORS → BOOKS	One author writes many books.
Book Categorization	1:N	CATEGORIES → BOOKS	One category contains many books.
Book Publication	1:N	PUBLISHERS → BOOKS	One publisher publishes many books.
Member Borrowing	1:N	MEMBER → BORROWING	One member can have many borrowing transactions.
Book Borrowing	1:N	BOOKS → BORROWING	One book (title/edition) can be borrowed multiple times.
Staff Processing	1:N	STAFF → BORROWING	One staff member processes many borrowing

			transactions.
Borrowing Fine	1:1	BORROWING → FINE	One borrowing transaction may result in zero or one fine.