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## **Public Library Database**

### **Introduction:**

A rural county in Virginia is receiving a large grant that will allow the significant expansion of its public library system. This means a great deal to the community and taxpayers are demanding a state of the art updated system. A new database must be designed for the libraries to keep track of all the information coming in and out including employees, library members, media, equipment etc. Each branch will be transformative for its community

### **Why Expanding the Library System Matters:**

The library is a community hub offering resources beyond reading materials. It serves as a place for learning, social interaction, and personal enrichment. Libraries contribute to a healthy community ecosystem.

The county aims to enhance library facilities. This involves using technology to streamline access to resources and services, with an emphasis on accessibility. By providing access to information, facilitating educational activities, and employment opportunities the new library branches will make a big impact on life in their communities. The library system expansion will also foster inclusivity. Libraries historically serve as safe spaces where individuals from diverse backgrounds can gather. This will promote a sense of welcome, diversity and belonging. By rebuilding library infrastructure, the county will meet the needs of its citizens through such social equity and engagement.

### **Library Branch Management:**

Each library branch is a hub of community engagement. The database must help keep essential details of branches, including name, address, city, state, postal code, email addresses, and phone numbers.

**Employee Administration:**

The backbone of the library system are the people who work there, with roles ranging from librarians to technicians. The database will include employee data, including employee ID, job title, name, Social Security Number (SSN), and salary information. This will facilitate efficient HR management and streamline payroll processes.

**Certification Tracking:**

Library staff typically pursue certifications relevant to their roles. The system will record certification dates and titles. This ensures compliance with industry standards and staff development.

**Membership Management:**

Membership provides access to an array of resources. The database will include member IDs, contact details, names, and SSNs. This enables easy membership administration and personalized engagement.

**Media:**

A member may access many different varieties of media. Member access is kept track of by date/time of access, due date, and date/time end of access. This way we can keep track of all activity of media used by members. Media falls into two types: rental or non rental media. Each media item may have attributes such as: Item ID, creation date, genre(s), title, studio, publisher, author(s), and artist(s). This ensures exact tracking of circulation activities and resource allocation.

**Equipment and Supplies Tracking:**

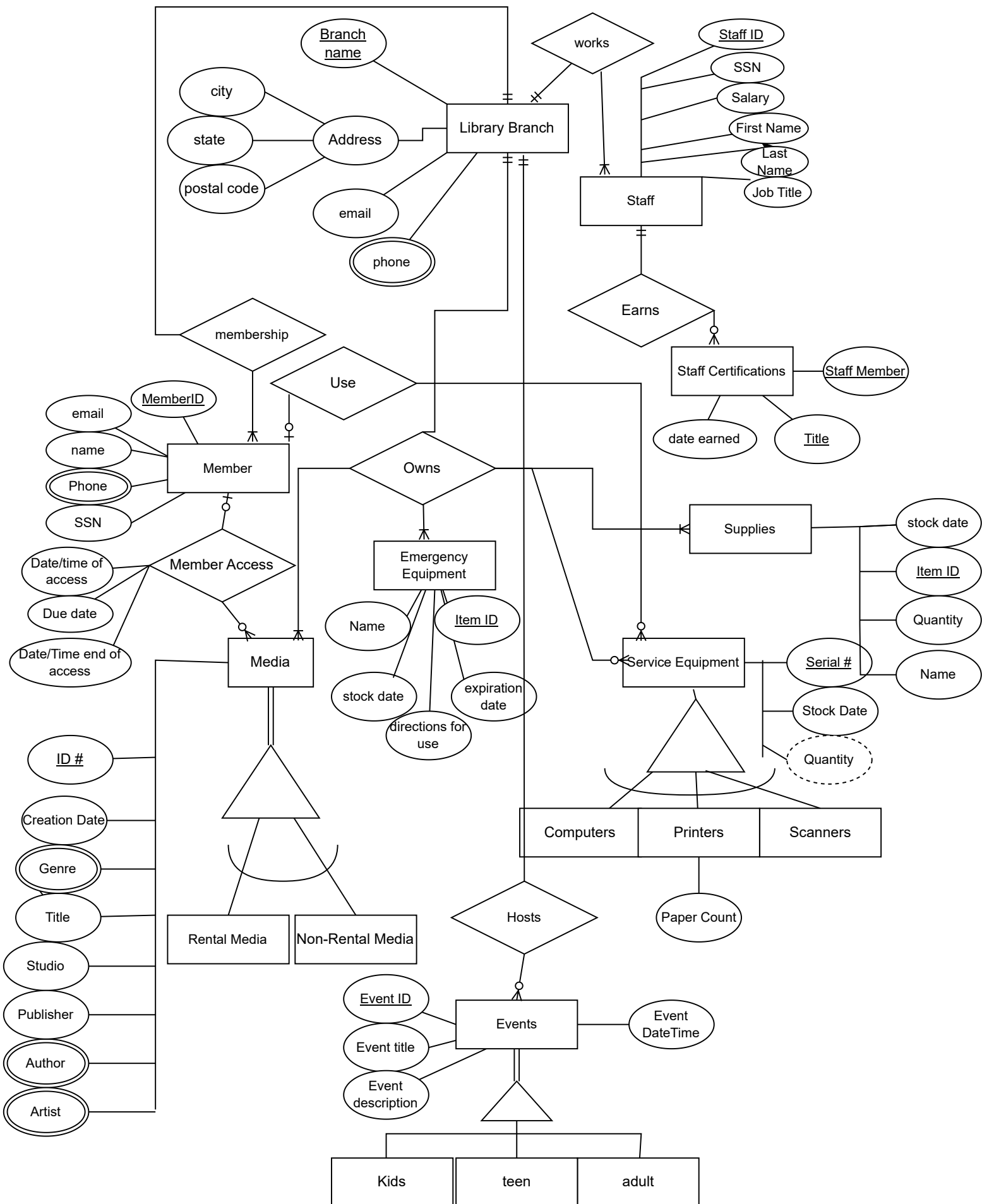
Beyond media, the library has service equipment. Service equipment the library may own could be computers, printers or scanners. Each piece of equipment has a serial number. In addition the library owns various emergency equipment items. These items must be kept track of by item ID, item name, directions for use, item stock date, and item expiration date. The library also owns supplies such as printer paper, pens, pencils etc. which are kept track of by item ID, stock date and quantity. This helps to facilitate routine restocking and optimizing resources.

**Event Organization:**

A library is an enriching place which hosts many special events such as story time for kids. The database will facilitate management of events. These events may be categorized as kids, teen or adult events. Each event is organized by date and event title and will include a description of the event. This will support appropriate event promotion and engagement of members.

**Our Vision:**

A new database system will bring to the community a modern, vibrant library ecosystem. By addressing the needs of library management, employees, membership, media, supplies inventory, and event coordination, this system will help to manage an enriching community hub that benefits the county and its residents.



## Tables and Functional Dependencies (FD)

**Library Branch** (Branch Name: [PK], Email: [not null, unique], City: [not null], State: [not null], Postal Code: [not null])

**FD:**

Branch Name-> Email, City, State, Postal Code

Email-> Branch Name, City, State, Postal Code

CK: Branch Name, Email

In BCNF, 4NF

**Library Numbers** (Phone ID: [PK], Branch Name: [FK, not null], Phone Number: [unique, not null], Department)

**FD:**

Phone ID-> Phone Number, Branch Name, Department

Phone Number-> Phone ID, Branch Name, Department

CK: Phone ID, Phone Number

In BCNF, 4NF

**Member** (Member ID: [PK], Email: [not null], SSN: [unique, not null], First Name: [not null], Last Name: [not null], Branch Name: [FK, not null])

**FD:**

Member ID-> Email, SSN, First Name, Last Name, Branch Name

SSN-> Member ID, Email, First Name, Last Name, Branch Name

Email-> Member ID, SSN, First Name, Last Name, Branch Name

CK's: Member ID, SSN, Email

In BCNF, 4NF

**Member Number** (Phone ID: [PK], Member ID: [FK, not null], Phone Number: [unique, not null])

**FD:**

Phone ID-> MemberID, Phone Number

Member ID-> Phone ID, Phone Number

CK's: Phone ID, Member ID

In BCNF, 4NF

**Member Access** (Member Access ID: [PK, FK1], Media Selection: [PK, FK2], Access Date: [not null], Access Time: [not null], Due Date, End of Access Date:[not null], End of Access Time:[not null])

**FD:**

Member Access ID-> Media Selection, Access Date, Access Time, Due Date, End of Access Date, End of Access Time

Media Selection-> Member Access ID, Access Date, Access Time, Due Date, End of Access Date, End of Access Time

CK: Member Access ID, Media Selection

In BCNF, 4NF

**Media** (Media ID: [PK], Title: [not null], Creation Date, Studio, Publisher, Rentable: [not null])

**FD:**

Media ID-> Title, Creation Date, Studio, Publisher, Rentable

CK: Media ID

In BCNF, 4NF

**Genre**(Code: [PK], Genre: [unique, not null])

**FD:**

Code-> Genre

CK: Code

In BCNF, 4NF

**Media Genre** (Media ID: [PK, FK1], Genre Code: [PK, FK2])

**FD:**

Media ID-> Genre Code

Genre Code->Media ID

CK: Media ID, Genre Code

In BCNF, 4NF

**Author** (ID: [PK], First Name: [not null], Last Name: [not null])

**FD:**

ID->First Name, Last Name

CK: ID

In BCNF, 4NF

**Author Media** (Author ID: [PK, FK1], Media ID: [PK, FK2])

**FD:**

Author ID: Media ID

Media ID-> Author ID  
CK: Author ID, Media ID  
In BCNF, 4NF

**Artist** (ID: [PK], First Name, Last Name: [not null], Group Name)  
**FD:**  
ID-> First Name, Last Name, Group Name  
CK: ID  
In BCNF, 4NF

**Artist Media** (Artist ID: [PK, FK1], Media ID: [PK, FK2])  
**FD:**  
Artist ID-> Media ID  
Media ID-> Artist ID  
CK: Artist ID, Media ID  
In BCNF, 4NF

**Staff** (Staff ID: [PK], Branch Name: [FK, not null], SSN: [unique, not null], Salary: [not null], First Name: [not null], Last Name: [not null], Job Title [not null])  
**FD:**  
Staff ID-> Branch Name, SSN, Salary, First Name, Last Name, Job Title  
SSN-> Staff ID, Branch Name, Salary, First Name, Last Name, Job Title  
CK: Staff ID, SSN  
In BCNF, 4NF

**Certifications** (Title: [PK], Staff Member: [FK, not null], Date Earned:[not null])  
**FD:**  
Title-> Staff Member, Date Earned  
CK: Title  
In BCNF, 4NF

**Emergency Equipment** (EE ID: [PK], Branch Name: [FK1], Name:[not null], Stock Date: [not null], Expiration Date: [not null], Directions)  
**FD's:**  
EE\_ID-> Branch name, Name, Stock Date, Expiration Date, Directions  
Branch Name-> EE ID, Name, Stock Date, Expiration Date, Directions  
CK: EE ID, Branch Name  
In BCNF, 4NF

**Supplies** (Supply ID: [PK], Branch Name: [FK, not null], Name: [not null], Stock Date: [not null], Quantity: [not null])

**FD:**

Supply ID-> Branch Name, Name, Stock Date, Quantity

CK: Supply ID

In BCNF, 4NF

**Service Equipment** (Equipment Serial Num: [PK], Branch Name: [FK, not null], Stock Date: [not null], Quantity: [not null])

**FD:**

Equipment Serial Num-> Branch Name, Stock Date, Quantity

CK: Equipment Serial Num

In BCNF, 4NF

**Computer** (Equipment Serial Num: [PK, FK])

**FD:**

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In BCNF, 4NF

**Printer** (Equipment Serial Num: [PK, FK], Paper Count)

**FD:**

Equipment Serial Num-> Paper Count

CK: Equipment Serial Num

In BCNF, 4NF

**Scanner** (Equipment Serial Num: [PK, FK])

**FD:**

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In BCNF, 4NF

**Events** (Event ID: [PK], Branch Name: [FK1, not null], Title: [not null], Description, Event Date: [not null], Event Start Time: [not null], Event End Time: [not null])

**FD:**

Event ID-> Branch Name, Title, Description, Event Date, Event start time, Event end time

CK: Event ID

In BCNF, 4NF



**Event Ages** (Event ID: [PK, FK1], Age Code: [PK, FK2])

**FD:**

Event ID-> Age Code

Age Code-> Event ID

CK: Event ID, Age Code

In BCNF, 4NF

**Ages** (Age Code: [PK], Description: [unique, not null])

**FD:**

Age Code-> Description

CK: Age Code

In BCNF, 4NF

