**EXPERIMENT NO: 1**

**Date of Performance:   
Date of Submission:**

**AIM**:   
Identify the case study and detail statement of problem. Design an Entity-Relationship (ER) / Extended Entity-Relationship (EER) Model.

**THEORY**:

**Library Management System ER Diagram and Database Design**

A library management system is software that is designed to manage all the functions of a library. It helps librarian to maintain the database of new books and the books that are borrowed by members along with their due dates.

This system completely automates all your library’s activities. The best way to maintain, organize, and handle countless books systematically is to implement a library management system software.

A library management system is used to maintain library records. It tracks the records of the number of books in the library, how many books are issued, or how many books have been returned or renewed or late fine charges, etc.

You can find books in an instant, issue/reissue books quickly, and manage all the data efficiently and orderly using this system. The purpose of a library management system is to provide instant and accurate data regarding any type of book, thereby saving a lot of time and effort.

The **library management system** is designed to contribute well-management of library functions. It offers ease to perform day to day library operations electronically. This practice being many advantages like;

* Simple and easy to operate
* Increase librarian’s efficiencies
* Mobile access, anytime, anywhere
* Search, add, update, and view library materials online
* Helps to manage library functions constructively
* Saves time and reduces overheads
* Reduce library’s operating cost
* Customized reports for better management
* Remove manual processes to issue books and maintain records

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Steps in building the **ER Diagram for Library Management System with Cardinality Ratio**

* **Step 1: Familiarize the ER Diagram Symbols and Cardinality**

Entity Relationship Diagram – shows the structure of data types in a project. It uses symbols to clarify its parts and relationships. Their symbols and applications must be familiarized before you build the ER Diagram.

[**ER Diagram Symbols**](https://www.lucidchart.com/pages/ER-diagram-symbols-and-meaning):

**Fields**: Fields are the parts of a table that define the entity’s characteristics.   
  
**Keys**technique is used to organize ER diagrams and assist users in modeling their databases to ensure that they are efficient. This is also used to connect different tables in a database.  
  
**Primary Key** identifies a single entity instance which means a unique attribute or set of attributes.   
**Foreign Key** is produced when data attributes have one - many relationships with other entities.  
[**ER Diagram Cardinalities**](https://www.lucidchart.com/pages/ER-diagram-symbols-and-meaning#:~:text=Cardinality%20refers%20to%20the%20maximum,instance%20in%20the%20related%20entity.)**:**

The styling of a line and its termination demonstrates cardinality and ordinality. The greatest number of times an instance of one thing can be related to instances of another entity is referred to as cardinality. While Ordinality refers to the fewest number of times a single entity instance can be linked to another.

* **Step 2: Determine the targeted users**

After the symbol familiarization, determine the targeted users. The targeted users will be the ones to use your project. For Library Management System project, targeted users would be the company admin and Librarys. Ask the users about the common activities that they do when doing tasks in Library management. This information will help designer in proceeding with the next step.

* **Step 3: Analyze the entities and their included attributes**

Analyzation is very important in creating ER diagram. It will help you understand the work of the diagram and avoid unwanted errors. The gathered information from the users is very useful in creating the diagram. Designer will evaluate the data and pick the useful ones.

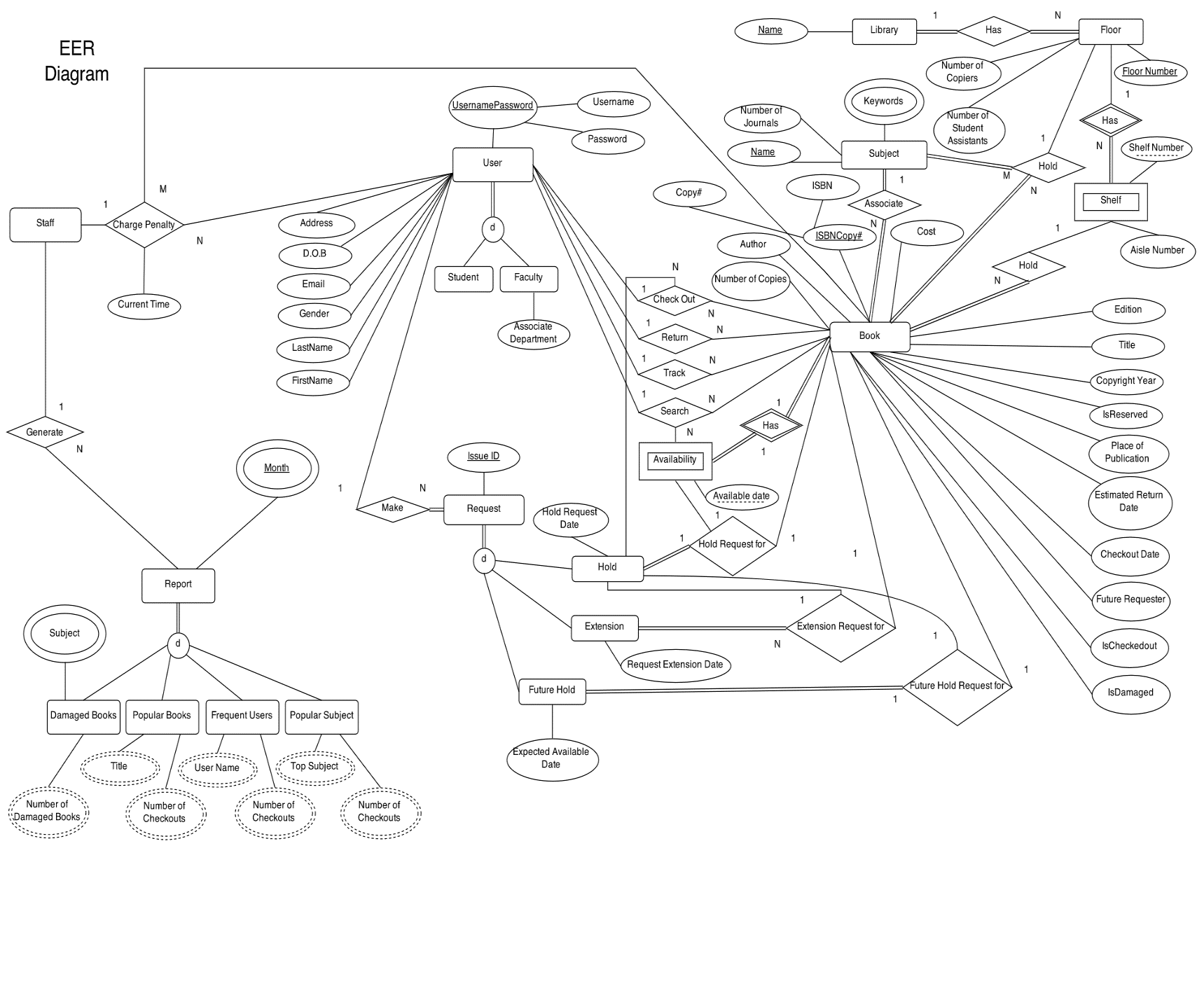
* **Step 4: Plot the Entity Relationship Diagram**

To plot the ERD, designer will need the entities, their attributes, and relationships. He will base the data structure from the evaluated information to have the exact Entity Relationship Diagram.  
  
**CONCLUSION / OUTCOME**:

**MARKS & SIGNATURE:**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **R1  (3 Marks)** | **R2  (5 Marks)** | **R3  (4 Marks)** | **R4  (3 Marks)** | **Total  (15 Marks)** | **Signature** |
|  |  |  |  |  |  |

**EER DIAGRAM FOR LIBRARY MANAGEMENT SYSTEM:**

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