

Practical No-05

Aim: Draw E-R diagram, data flow diagram and sequence diagram for problem statement.

Problem Statement:

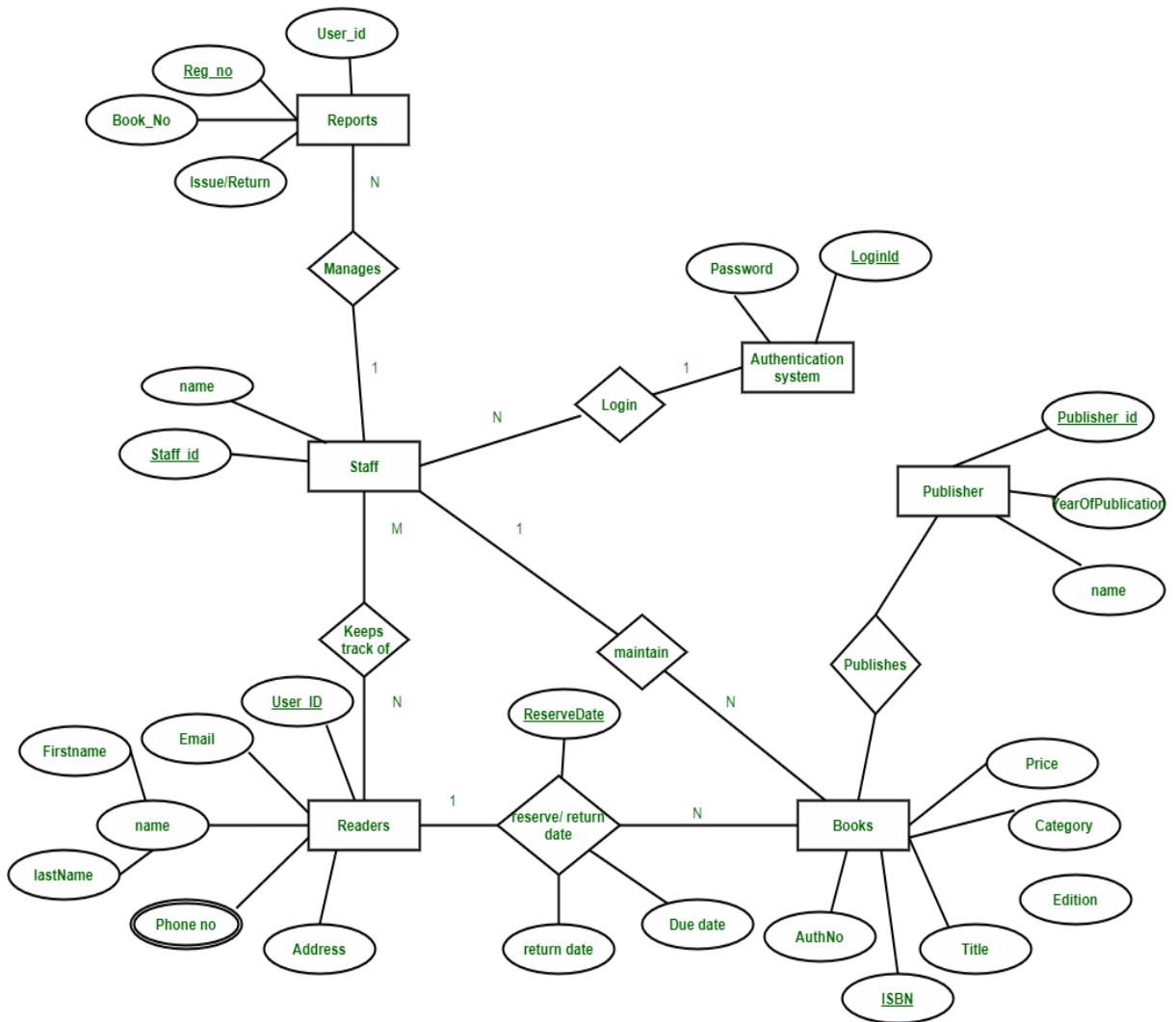
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Name of Member:

1. **ER Diagram** is known as Entity-Relationship Diagram, it is used to analyze the structure of the Database. It shows relationships between entities and their attributes. An ER Model provides a means of communication.

The Library Management System database keeps track of readers with the following considerations –

- The system keeps track of the staff with a single point authentication system comprising login Id and password.
- Staff maintains the book catalog with its ISBN, Book title, price(in INR), category(novel, general, story), edition, author Number and details.
- A publisher has publisher Id, Year when the book was published, and name of the book.
- Readers are registered with their user_id, email, name (first name, last name), Phone no (multiple entries allowed), communication address. The staff keeps track of readers.
- Readers can return/reserve books that stamps with issue date and return date. If not returned within the prescribed time period, it may have a due date too.
- Staff also generate reports that has readers id, registration no of report, book no and return/issue info.



This Library ER diagram illustrates key information about the Library, including entities such as staff, readers, books, publishers, reports, and authentication system. It allows for understanding the relationships between entities.

Entities and their Attributes –

- **Book Entity :** It has authno, isbn number, title, edition, category, price. ISBN is the Primary Key for Book Entity.
- **Reader Entity :** It has UserId, Email, address, phone no, name. Name is composite attribute of firstname and lastname. Phone no is multi valued attribute. UserId is the Primary Key for Readers entity.
- **Publisher Entity :** It has PublisherId, Year of publication, name. PublisherID is the Primary Key.
- **Authentication System Entity :** It has LoginId and password with LoginID as Primary Key.
- **Reports Entity :** It has User_id, Reg_no, Book_no, Issue/Return date. Reg_no is the Primary Key of reports entity.

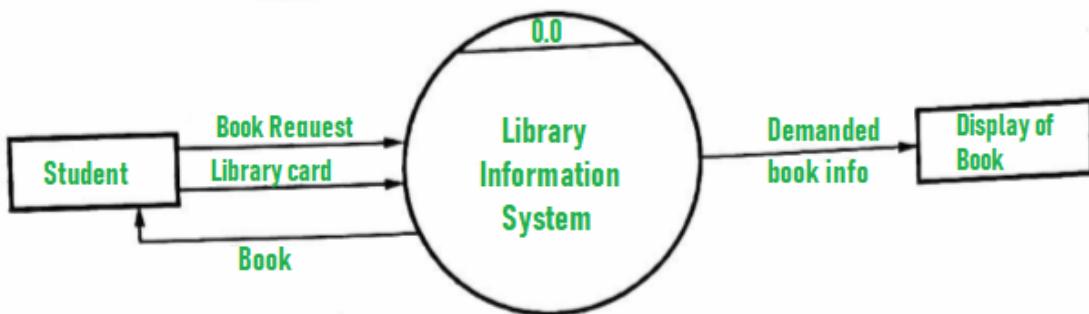
- **Staff Entity** : It has name and staff_id with staff_id as Primary Key.
- **Reserve/Return Relationship Set** : It has three attributes: Reserve date, Due date, Return date.

2. **Data Flow Diagram (DFD)** :depicts the flow of information and the transformation applied when data moves in and out of a system. The overall system is represented and described using input, processing, and output in the DFD. The inputs can be:
- **Book request** when a student requests for a book.
 - **Library card** when the student has to show or submit his/her identity as proof.

The overall processing unit will contain the following output that a system will produce or generate:

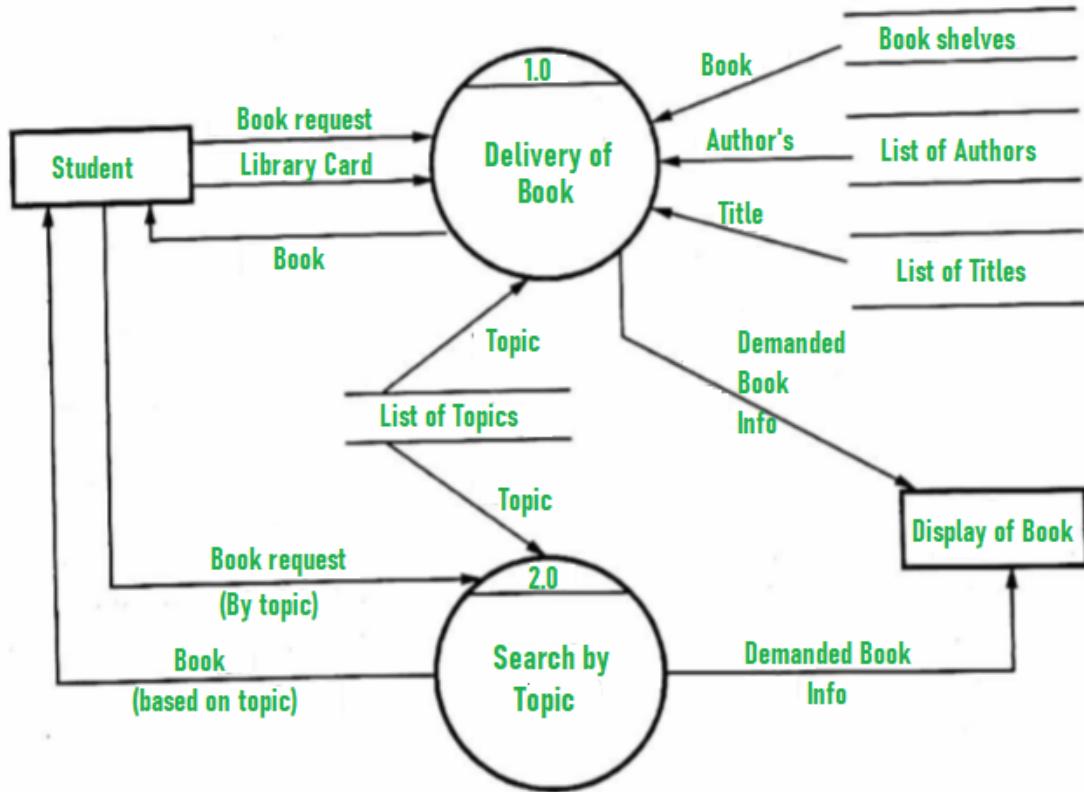
- The book will be the output as the book demanded by the students will be given to them.
- Information on the demanded book should be displayed by the library information system that can be used by the student while selecting the book which makes it easier for the student.

1. **Level 0 DFD** –

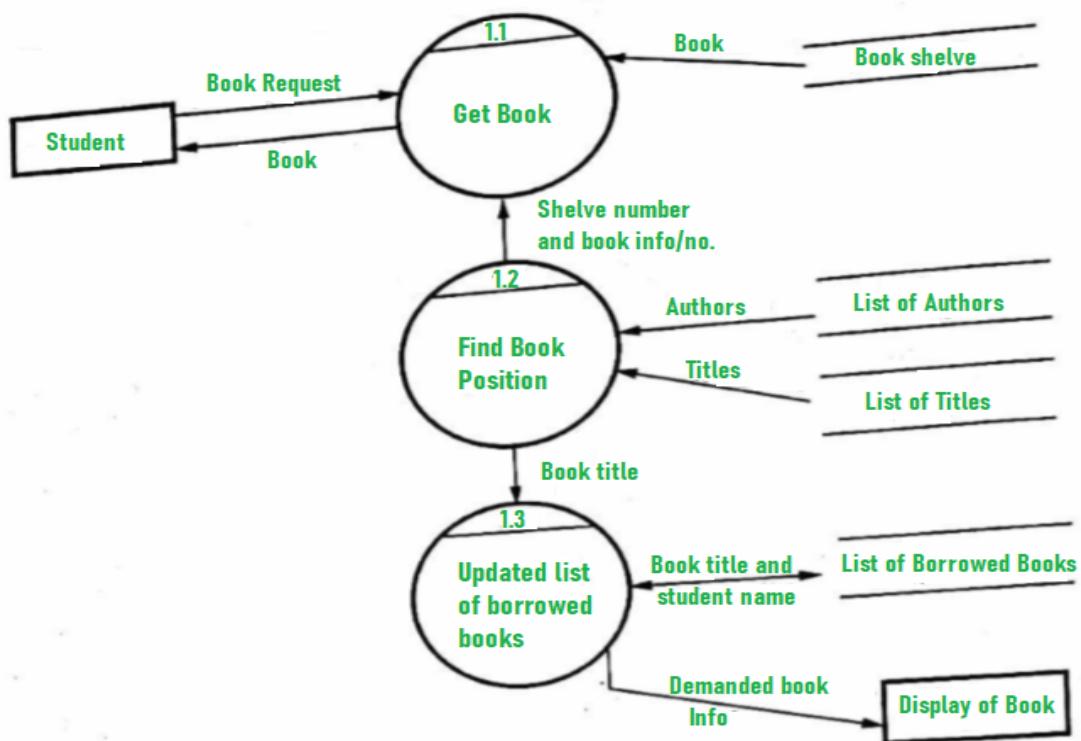


2. **Level 1 DFD** – At this level, the system has to show or exposed with more details of processing. The processes that are important to be carried out are:
- Book delivery
 - Search by topic

List of authors, List of Titles, List of Topics, the bookshelves from which books can be located are some information that is required for these processes. **Data store** is used to represent this type of information.



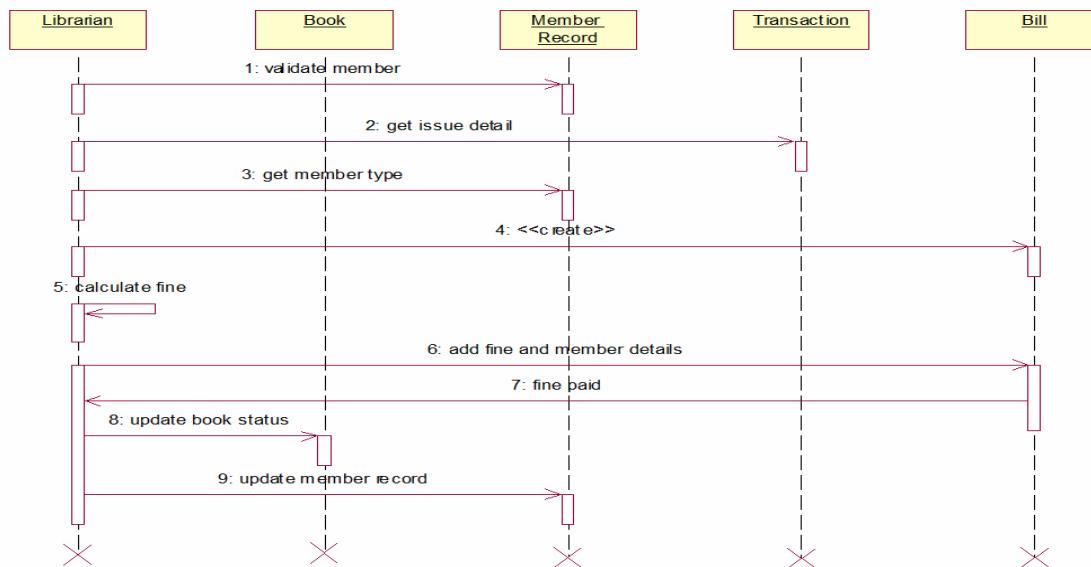
Level 2 DFD –



Level 2 DFD

3. Sequence Diagram:

- **Purpose:** Describes the sequence of interactions between objects or system components over time, showing how messages are passed between them to accomplish a task.
- **Benefit:** Helps in understanding the detailed flow of interactions in a specific scenario, mapping out how various components collaborate to achieve a functionality. It is useful for refining system design and ensuring that the sequence of operations aligns with the expected behavior of the system.



Conclusion:

These diagrams serve as essential tools in system design and analysis. By creating **E-R diagrams, DFDs and Sequence Diagrams**, software engineers can thoroughly understand the problem domain, design efficient systems, and communicate requirements and design elements effectively. Each diagram offers a unique perspective on the system, ensuring a comprehensive approach to problem-solving and system architecture.

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