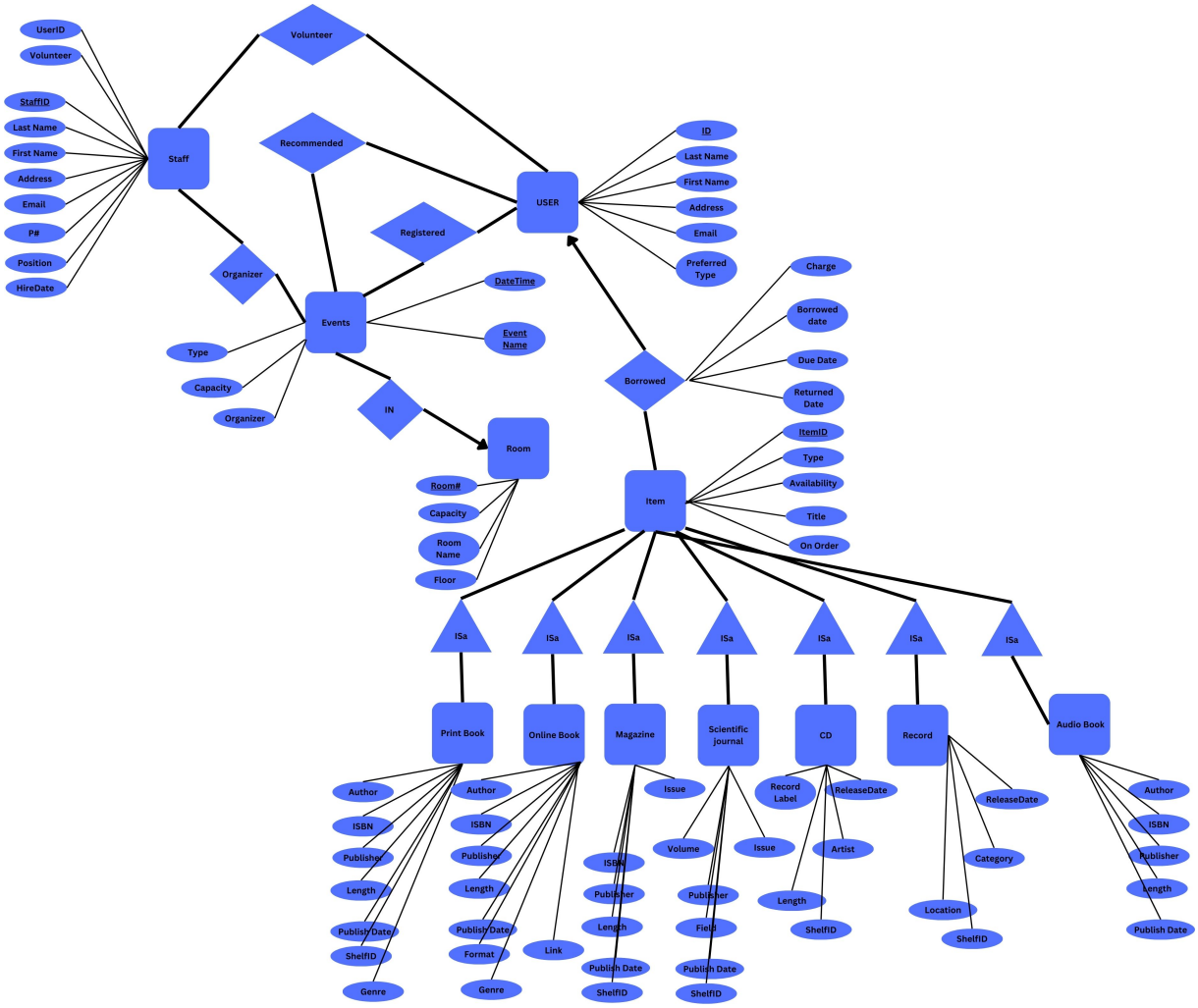
Project Specifications Step(2)

- Every user has a UserID (Primary key), First name, Last name, Email, Address, Preferred Type
- A user can borrow a book for 7 days and they will be added to the table for borrowed which hold there userID, ItemID, borrow date, due date
- If the user fail to return the book in 7 days they are added to the table for fines which holds there userID, ItemID and fine amount (This should not remove them from the table for borrowed)
- If there user has an outstanding fine they can not borrow a book
- There is a table for all the items in the library which has ItemID (Primary key), Title, type, Availability, and Ordered
- Item Type must be one of {'BOOK', 'ONLINE BOOK', 'MAGAZINE', 'CD', 'RECORD', 'JOURNAL', 'AUDIOBOOK'}
- There is a entity for Staff which holds there StaffID, First name, Last name, Email, Address, phone number, position, if the staff is a volunteer and the user id if they are a volunteer
- Every event has a name, event type, organizer, capacity and date
- Recommends events to users if the preferred type matched event type
- The User can search for an item using its title and find out if the availability, item type and ItemID for items with that name
- The User can register an account to get an UserID to login by providing First name, Last name, Email, Address and a Preferred type of event
- The user can borrow an Item by typing in the ItemID if the item is available and there are no outstanding charges on the users account
- The user can check what item they have currently borrowed
- The user can return an item by giving its ItemID
- The User can choose to pay their outstanding charges
- The user can donate an Item by giving the item type and the relevant information for that item type
- The user can find an event using the event name this will return the event room and date
- The user can register for an event using the event name and date of the event
- The user can volunteer at the library by providing there First name, Last name, Email, Phone#, Address and Position
- The user can ask for help and an Librarian will be assigned to them to help
- The user can be recommended events based on their choice of preferred type of event
- The admin can add staff to the library which includes the position of manager with is not available as a volunteer
- The admin can change the shelfID of an Item if the item has been moved
- Library has print books, online books, magazines, scientific journals, CDs, records
- Library holds event of type {'BOOK EVENT', 'BOOK CLUB', 'CLUB', 'ART SHOW', 'FILM SCREENING', 'READING', 'LECTURE', 'MEET AND GREET'}

ER Model Step(3)



Relations and Anomolies In DB Schema Step(4)

This is a proof that our schema is in BCNF.

Entities

User

- (A) UserID: Integer
- (B) Last Name: String
- (C) First Name: String
- (D) Address: String
- (E) Email: String
- (F) PrefType: String

$A \rightarrow BCDEF$

This table is in BCNF, and does not allow anomolies.

Item

- (A) ItemID: Integer
- (B) Type: String
- (C) Availability: Bool
- (D) Title: String
- (E) OnOrder: Boolean

$$A \rightarrow BCDE$$

This table is in BCNF, and does not allow anomolies.

We will use additional tables to form "IsA" relationships with the item table.

Book

- (A) ItemID: Integer
- (B) Author: String
- (C) PublishDate: Date
- (D) Length: Integer
- (E) ISBN: Integer
- (F) Publisher: String
- (G) Title: String
- (H) ShelfID: Integer
- (I) Genre: String

$$A \rightarrow BCDEFGHI$$

This table is in BCNF, and does not allow anomolies.

OnlineBook

- (A) ItemID: Integer
- (B) Author: String
- (C) PublishDate: Date
- (D) Length: Integer
- (E) ISBN: Integer
- (F) URL: String
- (G) Format: String
- (H) Publisher: String
- (I) Title: String
- (J) Genre: String

$$A \rightarrow BCDEFGHIJ$$

This table is in BCNF, and does not allow anomolies.

Magazine

- (A) ItemID: Integer
- (B) IssueNum: Integer
- (C) PublishDate: Date
- (D) Length: Integer
- (E) ISBN: Integer
- (F) Publisher: String
- (G) ShelfID: Integer
- (H) Title: String

$$A \rightarrow BCDEFGH$$

This table is in BCNF, and does not allow anomolies.

CD

- (A) ItemID: Integer
- (B) Artist: String
- (C) ReleaseDate: Date
- (D) Length: Float
- (E) Label: String
- (F) ShelfID: Integer
- (G) Title: String

$$A \rightarrow BCDEFG$$

This table is in BCNF, and does not allow anomolies.

Record

- (A) ItemID: Integer
- (B) Date: Date
- (C) Location: String
- (D) Category: String
- (E) ShelfID: Integer
- (F) Title: String

$$A \rightarrow BCDEF$$

This table is in BCNF, and does not allow anomolies.

Journal

- (A) ItemID: Integer
- (B) PublishDate: Date
- (C) Publisher: String
- (D) Field: String
- (E) IssueNum: Integer
- (F) Volume: Integer
- (G) Title: String
- (H) ShelfID: String

$$A \rightarrow BCDEFGH$$

This table is in BCNF, and does not allow anomolies.

AudioBook

- (A) ItemID: Integer
- (B) Author: String
- (C) PublishDate: Date
- (D) Length: Integer
- (E) ISBN: Integer
- (F) Publisher: String
- (G) Title: String

$$A \rightarrow BCDEFG$$

This table is in BCNF, and does not allow anomolies.

Events

- (A) EventName: String
- (B) Date: Date
- (C) Organizer: String
- (D) Capacity: Integer
- (E) Type: String

$$AB \rightarrow CDE$$

This table is in BCNF, and does not allow anomolies.

Room

- (A) RoomNum: Integer
- (B) RoomName: String
- (C) Capacity: Integer
- (D) Floor: Integer

$$A \rightarrow BCD$$

This table is in BCNF, and does not allow anomolies.

Staff

- (A) StaffID: Integer
- (B) Last Name: String
- (C) First Name: String
- (D) Address: String
- (E) Email: String
- (F) PhoneNum: Integer
- (G) HireDate: Date
- (H) Position: String
- (I) Volunteer: Boolean
- (J) UserID: Integer

$$A \rightarrow BCDEFGHIJ$$

This table is in BCNF, and does not allow anomolies.

Borrowing

- (A) UserID: Integer
- (B) ItemID: Integer
- (C) BorrowedDate: Date
- (D) DueDate: Date
- (E) ReturnDate: Date
- (F) Charge: Float

$$BC \rightarrow ADEF$$

This table is in BCNF, and does not allow anomolies.

Relations

Registered

- (A) UserID: Integer
- (B) EventName: String
- (C) EventDate: Date

The key here is ABC, so all FD's are trivial

This table is in BCNF, and does not allow anomolies.

Location

- (A) EventName: String
- (B) EventDate: Date
- (C) RoomNum: Integer

The key here is ABC, so all FD's are trivial

This table is in BCNF, and does not allow anomolies.

As all tables are in BCNF by its definition, we know that the databse schema as a whole is in BCNF.

Therefore, the schema does not allow for anomolies.