

## SCENARIO

A library tracks and manages book loans and returns for students and faculty members, including user details, book information, and fines for overdue returns. Designing a database to fulfill the following requirements is necessary:

- Students, faculty, books, authors, publishers and staff are basic data of the database. Students and faculty member's ID, name, e-mail, phone number, address, Maximum number of books a student can issue and Maximum duration (in days) for issuing a book, book's ID, title, publication date, issue's ID, date, due date and return date used for issuing a book.
- Student or faculty member issue book from the library. It is important to know which student or faculty member issued which book from the library. When a student or faculty member issues a book, an entry is made in the BookIssues table, recording the issue date and calculating the due date based on the issue duration days from the students or faculty table.
- When the book is returned, the return date is updated in the BookIssues table. If the return date exceeds the due date, a fine is calculated and recorded in the Fines table.
- Fines are calculated based on the number of days late and a predefined rate. The fines table tracks whether the fine has been paid.
- The books table maintains the number of copies available. When a book is issued, the copies count is decremented, and when returned, it is incremented.

## ENTITIES

Entity-1	Entity-2	Entity-3	Entity-4	Entity-5	Entity-6	Entity-7	Entity-8
Students	Faculty	Books	Authors	Publishers	BookIssues	Fines	Staff

## ATTRIBUTES

	Entity-1	Entity-2	Entity-3	Entity-4	Entity-5	Entity-6	Entity-7	Entity-8
	Students	Faculty	Books	Authors	Publishers	BookIssues	Fines	Staff
Attribute-1	student_id	faculty_id	book_id	author_id	publisher_id	issue_id	fine_id	staff_id
Attribute-2	name	name	title	name	name	book_id	issue_id	name
Attribute-3	email	email	author_id			student_id	amount	email
Attribute-4	phone	phone	publisher_id			faculty_id	paid	phone
Attribute-5	address	address	publication_year			issue_date		role
Attribute-6	max_books	max_books	copies			due_date		
Attribute-7	max_duration	max_duration				return_date		

Primary key | Foreign Key | Nullable | Both Foreign Key and Nullable | Boolean

MATRIX DIAGRAM

		Entity-1	Entity-2	Entity-3	Entity-4	Entity-5	Entity-6	Entity-7	Entity-8
		Students	Faculty	Books	Authors	Publishers	BookIssues	Fines	Staff
Entity-1	Students						Issues		
Entity-2	Faculty						Issues		
Entity-3	Books				Written by	Published by	Issued		
Entity-4	Authors			Writes					
Entity-5	Publishers			Publishes					
Entity-6	BookIssues	Issued by	Issued by	Issues				Resulted in	
Entity-7	Fines						Associated with		
Entity-8	Staff								