CSE 3330 Database Systems & File Structures
Project 2 - Part 1
Library Management System Database
GROUP 13

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Introduction

The Library Management System Database project aims to design and implement a robust database system to efficiently manage the operations of a library. This project addresses the need for a comprehensive database that integrates book information, borrower details, and library branch management, facilitating day-to-day operations and enhancing user experience.

Mini-World Description

In this mini world, we envision a library setting where books, borrowers, publishers, and library branches interact to facilitate the borrowing and return of books. Here's an overview of the key components and their interactions within this mini world

Entities

Book
Represents individual books in the library's collection.
Each book is uniquely identified by an "IdNo."
Contains attributes like "Title," "Author," and "Publisher."

Publisher
Represents companies or entities that publish books.
Each publisher has attributes such as "Name," "Phone Number," and "Address."

LibraryBranch
Represents physical branches of the library system.
Each branch is identified by a unique "BranchID" and has attributes like "Name" and "Address."

BookCopy
Represents physical copies of books available in library branches.
Associated with a specific "Book" and "LibraryBranch."

Borrower
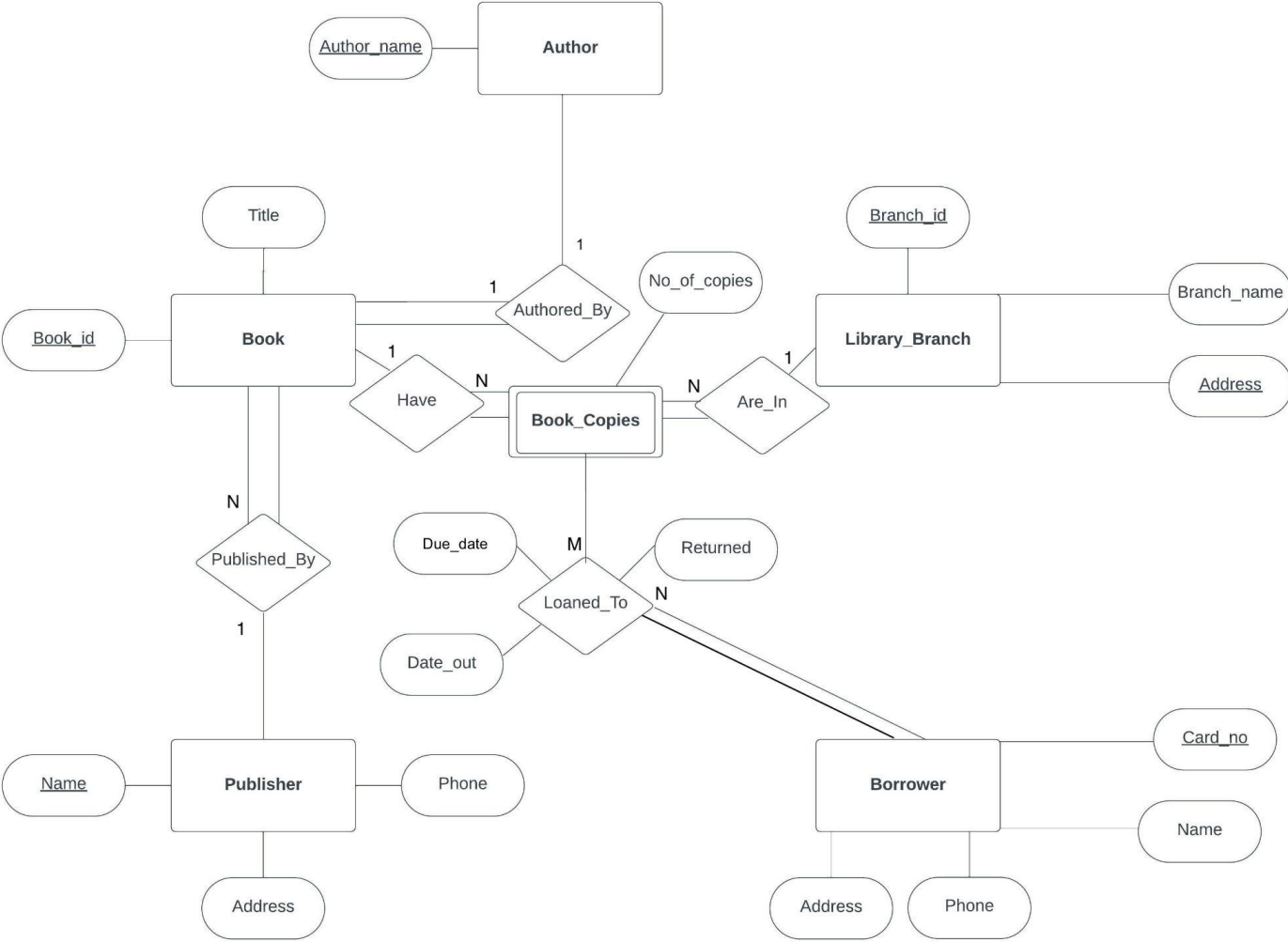Represents individuals who borrow books from the library.
Each borrower has a unique "CardNo." and attributes including "Name," "Address," and "Phone Number."

Operations

In this mini-world, typical library operations include
  - Borrowing books by "Borrowers."
  - Cataloging books by "Title," "Author," and "Publisher."
  - Managing book copies at different "LibraryBranches."

ER Diagram

Author_name — **Author**

Title — **Book** — Book_id

Author — 1 — Authored_By — 1 — **Book**

No_of_copies

Branch_id — **Library_Branch** — Branch_name

Library_Branch — Address

Book — 1 — Have — N — **Book_Copies** — N — Are_In — 1 — **Library_Branch**

Book — N — Published_By — 1 — **Publisher**

Book_Copies — M — Loaned_To — N — **Borrower**

Due_date — Loaned_To — Returned

Date_out

Name — **Publisher** — Phone

Publisher — Address

Card_no — **Borrower** — Name

Borrower — Address — Phone

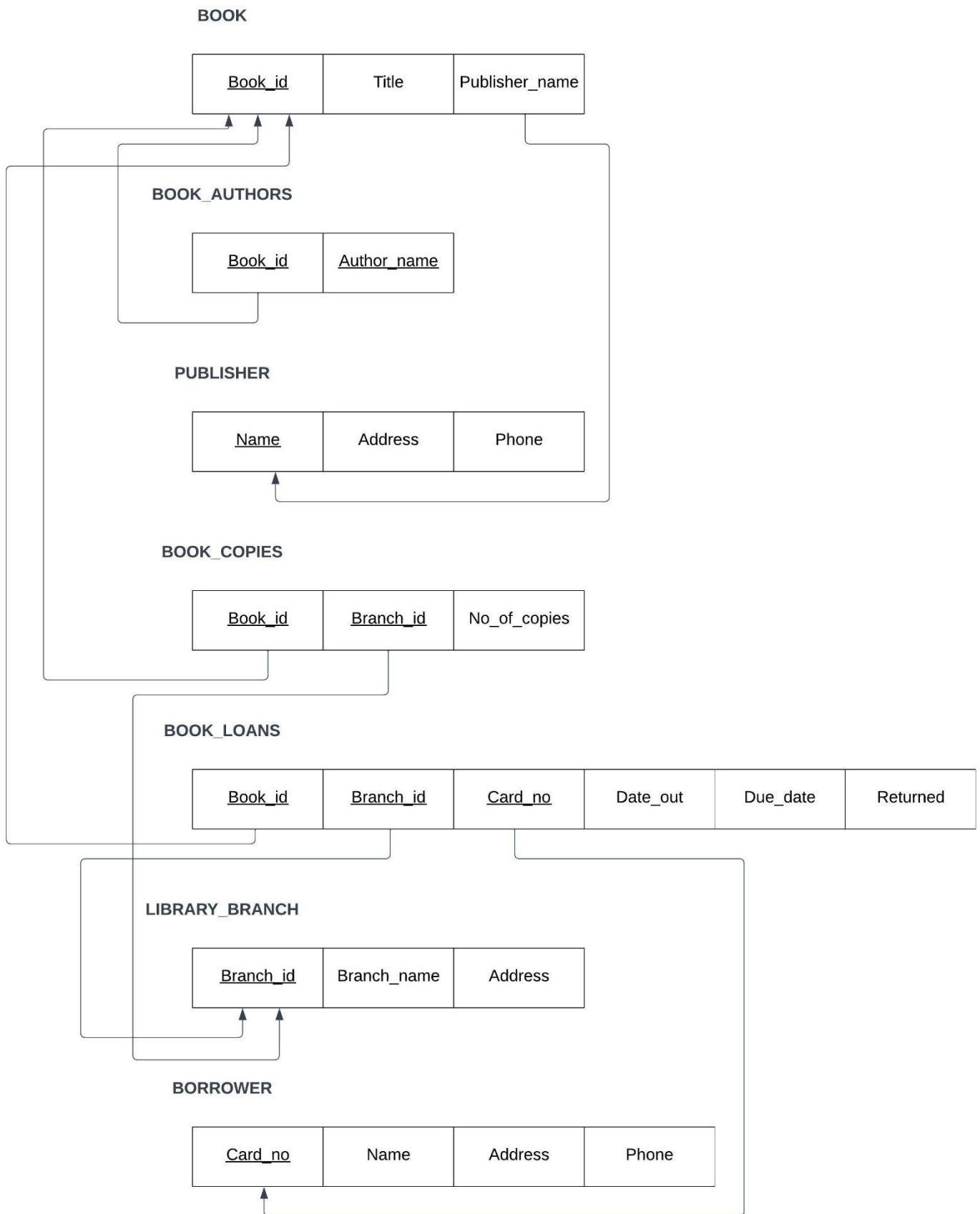# Assumed Assumptions and Missing/Incomplete Requirements

Based on the requirements, the following are some missing or incomplete requirements:

- The requirements do not specify how many copies of a book can be checked out at a time.

- The requirements do not specify what happens if a book is not returned on time.

- The requirements do not specify how a borrower can renew a book.

- The requirements do not specify how a borrower can return a book.

The following are some assumptions that were made that were not part of the requirements:

- Each author has a unique name.

- Each publisher has a unique name.

- Each borrower has a unique card number.

- Borrowers can check out multiple copies of books

- Library branches have multiple copies of books

Relational Database Schema

BOOK

Book_id	Title	Publisher_name

BOOK_AUTHORS

Book_id	Author_name

PUBLISHER

Name	Address	Phone

BOOK_COPIES

Book_id	Branch_id	No_of_copies

BOOK_LOANS

Book_id	Branch_id	Card_no	Date_out	Due_date	Returned

LIBRARY_BRANCH

Branch_id	Branch_name	Address

BORROWER

Card_no	Name	Address	Phone

EXPLANATIONS

Book Authors has been implemented as a separate table so as to make future changes in names of authors consistent (using referential triggers on the implementational level).

Book loans is a table that relates multiple tables to keep track of book copies borrowed - this enables one borrower to to borrow multiple copies of books.

CONTRIBUTION LIST

Mediratta, Rishabh - 1002035684 - ER Diagram, Assumptions/Requirements
Yaksho, Rajesh - 1001852182 - Introduction, Relational Database Schema

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Signed : Rishabh Mediratta and Rajesh Yaksho