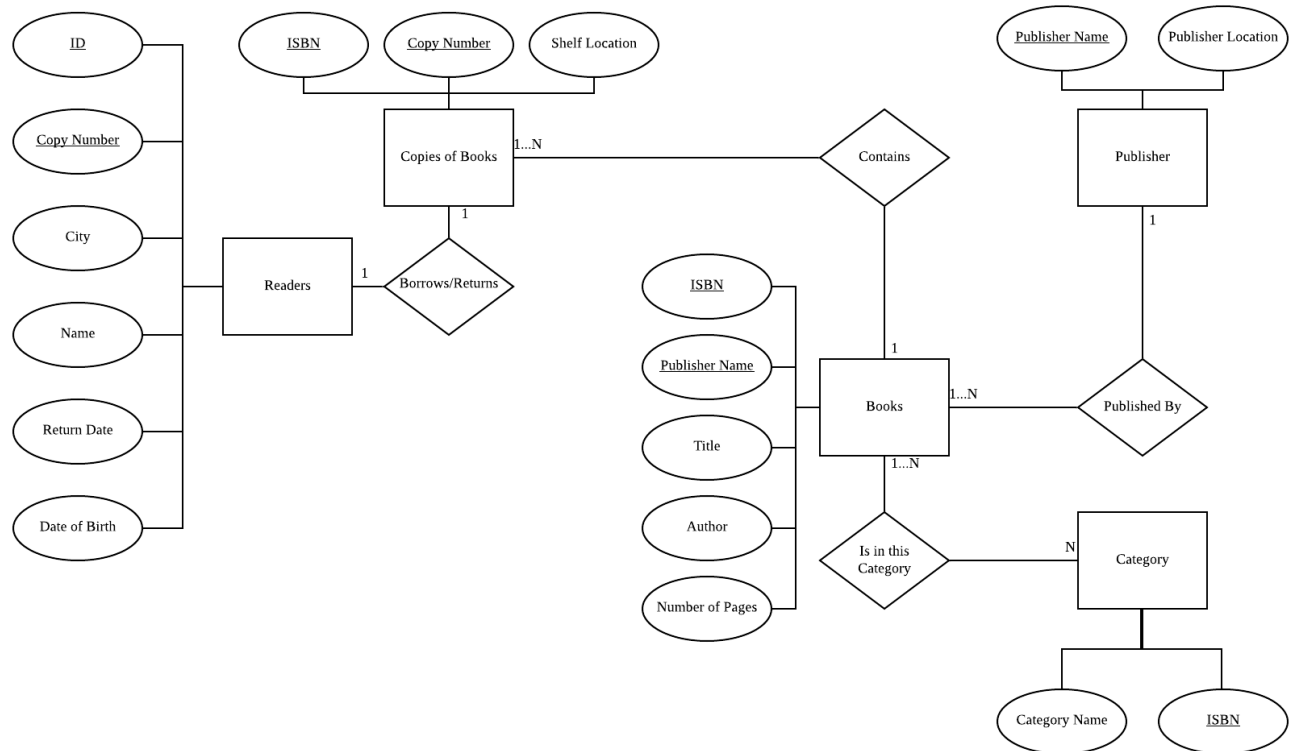


Exercise 1

Question 1

Create an ER diagram of this library system. Give appropriate cardinality information.



Question 2

Translate the diagram into relations.

- Readers (ID, Copy Number, City, Name, Return Date, Date of Birth)
- Copies_Of_Book (ISBN, Copy Number, Shelf Location)
- Books (ISBN, Publisher Name, Title, Author, Number of Pages)
- Publisher (Publisher Name, Publisher Location)
- Category (ISBN, Category Name)

Exercise 2

$$[Q1] \quad \pi_{\text{course-name}} \left(\sigma_{\#} ((\text{Instructor} \bowtie \text{Teachers}) \bowtie \text{Courses}) - \sigma_{\text{user-name} = \text{'Anh Dinh'}} (\text{Instructor} \bowtie \text{Teachers}) \bowtie \text{Courses} \right)$$

Exercise 3

$$[Q1] \quad \pi_{\text{surname}} \left(\pi_{\text{bid}} \left(\pi_{\text{pid}} \sigma_{\text{colour} = \text{'red'}} (\text{Parts}) \right) \bowtie \text{Catalog} \right)$$

$$[Q2] \quad \pi_{\text{surname}} \left(\left(\pi_{\text{pid}} \sigma_{\text{colour} = \text{'red'}} (\text{Parts}) \right) \cap \left(\pi_{\text{pid}} \sigma_{\text{colour} = \text{'green'}} (\text{Parts}) \right) \bowtie \text{Catalog} \right)$$

$$[Q3] \quad \pi_{R1, \text{pid}} \left(\sigma_{R1, \text{pid} = R2, \text{pid} \wedge R1, \text{sid} \neq R2, \text{sid}} \left(\rho_{R1} \text{Catalog} \times \rho_{R2} \text{Catalog} \right) \right)$$