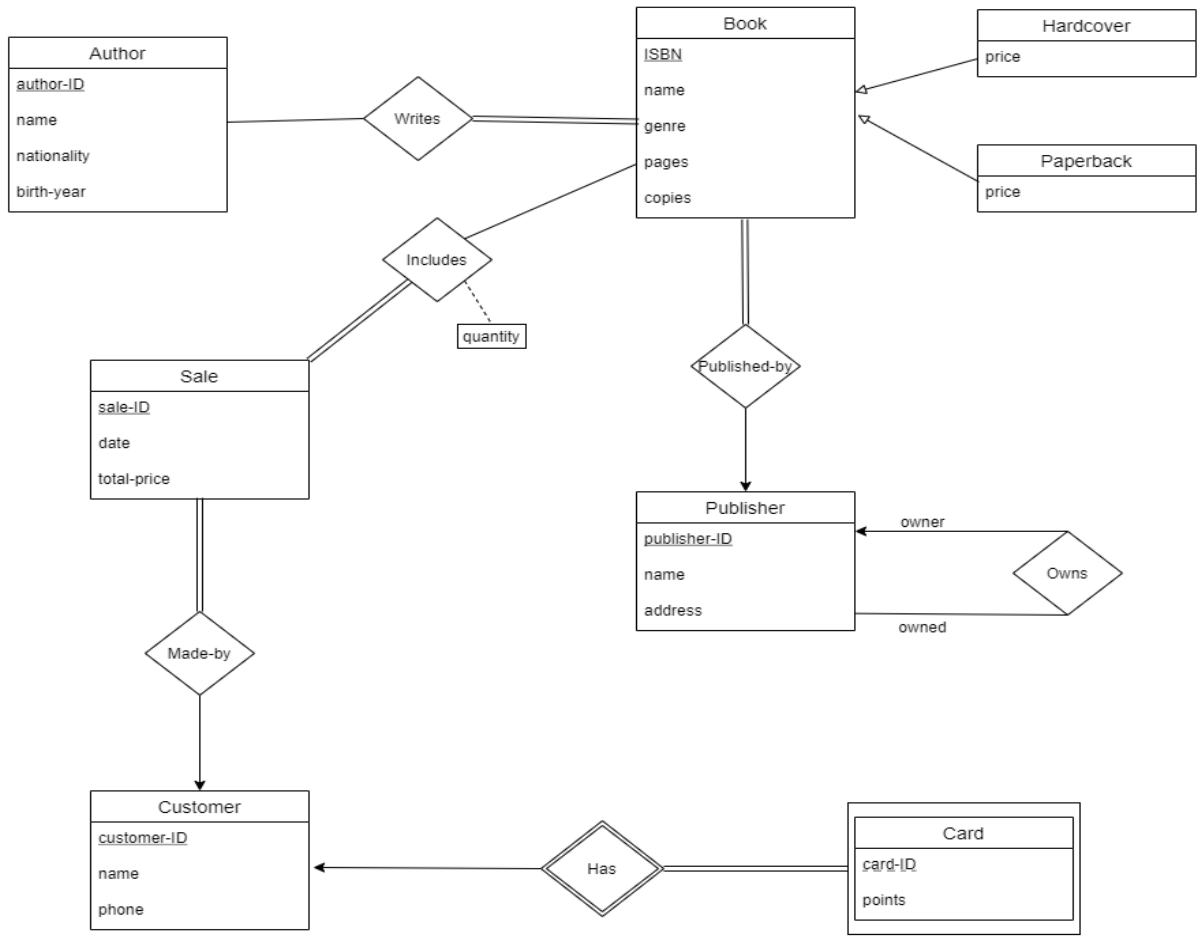
CS 353 Fall 2021
Homework 2 Solutions

Q.1 (70 points) Draw an ER diagram to store information about a bookstore system.
Each book in this system has a unique ISBN in addition to the attributes name, genre, the number of pages, and the number of copies in the bookstore. Books are classified as hardcover and paperback editions, each having an additional price attribute.
Each book is written by one or more authors and published by a publisher.
Authors have unique author ID, name, nationality, and birth year. An author can write more than one book.
Each publisher is identified by a publisher ID, and also has name and address. Some publishers can be owned by another publisher. And, a publisher can own more than one publisher.
Each customer has unique customer ID, name, and phone number. Customers may have customer cards, each card having a card ID and points attributes. Customer cards cannot be identified uniquely and they can exist in the system only with customers.
Each sale in the bookstore is made by a customer, and identified by a sale ID, and also has the date and total price. Each sale is associated with one or more books, specifying the number of copies sold for each book.

Answer:



Q.2 [30 pts]
Translate the E/R diagrams of the previous question into the relational model (i.e., give the relation schemas for each case specifying the table names, together with the attributes, and primary key and foreign key constraints).

Answer:
Author(author-ID, name, nationality, birth-year)
Book(ISBN, name, genre, pages, copies, publisher-ID)
  FK: publisher-ID references Publisher
Hardcover(ISBN, price)
  FK: ISBN references Book
Paperback(ISBN, price)
  FK: ISBN references Book
Writes(author-ID, ISBN)
  FK: author-ID references Author
  FK: ISBN references Book
Publisher(publisher-ID, name, address)
Owned-Publisher(publisher-ID, name, address, owner)
  FK: owner references Publisher(publisher-ID)
Sale(sale-ID, date, total-price, customer-ID)
  FK: customer-ID references Customer
Includes(sale-ID, ISBN, quantity)
  FK: sale-ID references Sale
  FK: ISBN references Book
Customer(customer-id, name, phone)
Card(customer-id, card-id, points)
  FK: customer-ID references Customer