

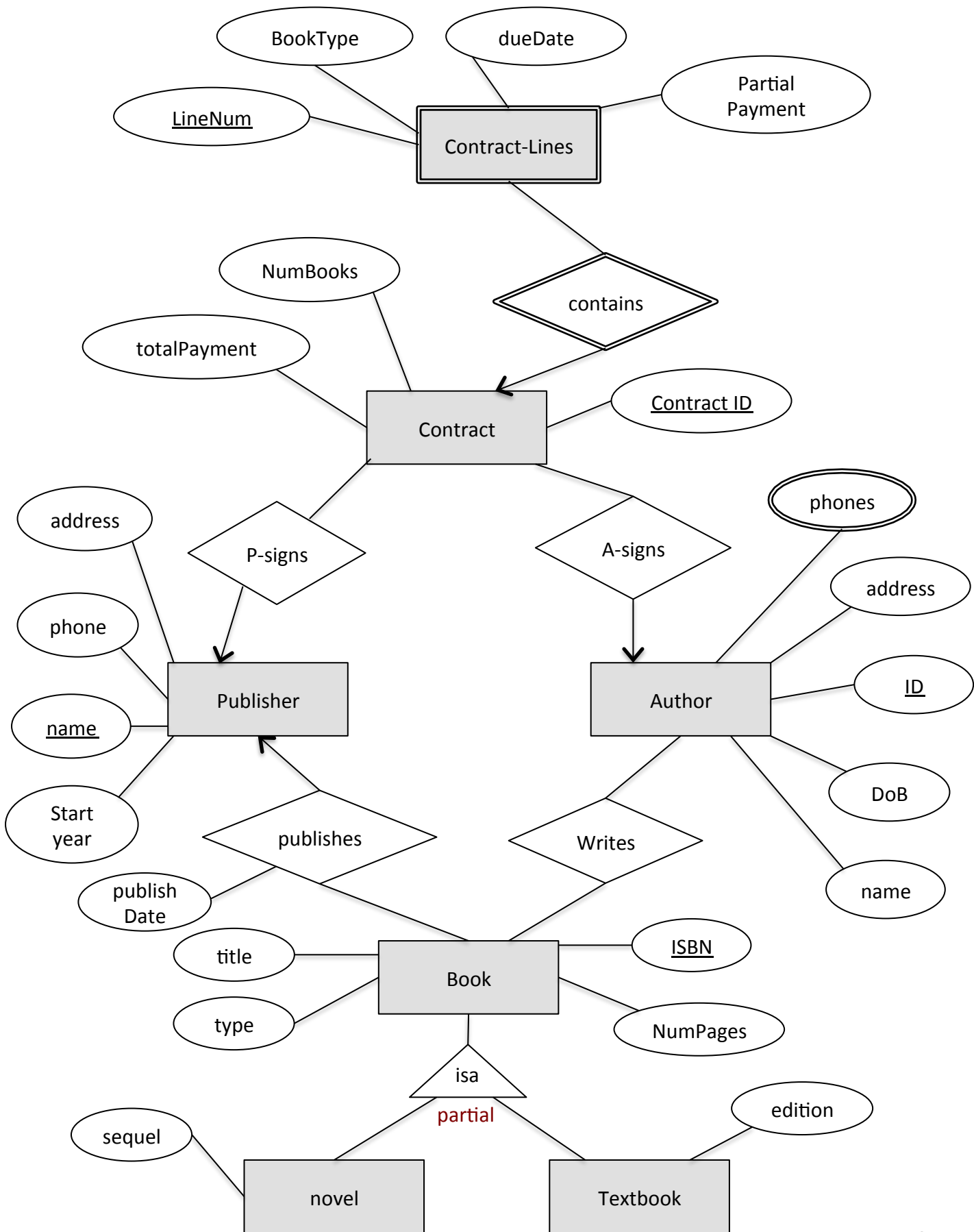
Database Systems I
CS3431
C-2013

Solution of Homework 1

Problem 1

Design Assumptions

- A book must have a publisher defined. That is, each book must have one and only one publisher.
- A book publishing date can be either attached to the relationship “publishes” or to the “book” entity set. This is because the relationship must exist for each book.
- A contract must have one author and one publisher
- A contract is considered a strong entity set because we added a “Contract ID” which is assumed to be unique.
- The contract details are stored in “Contract-Lines” entity set, where each line contains the due date of a given book to be delivered by the author. Each line also specifies the book type, and the partial payment to be paid by the publisher.
- A discriminator attribute “LineNum” is added to the “Contract-Lines” such that this entity set becomes a weak entity set and “Contract” entity set becomes its identifying entity set.
- The primary key of “Contract-Lines” will be (Contract ID, LineNum).
- The ISA relationship for “Book” entity set is marked as “partial” indicating that a book may be neither a novel nor a textbook.
- Business constraints that cannot be modeled in the ERD include:
 - The number of lines in any contract must match the value in “NumBooks” in the contract.
 - The sum of the partial payments in the contract lines must match the total payment defined in the contract.



Problem 2

Design Assumptions

- In this diagram, the “Branch” entity set is weak because the branch ID is unique only within the bank.
- For a transaction, we introduced a new attribute “ID” which we assume to be unique, and in this case the “Transaction” entity set is a strong one.
- In The loan weak entity set, we consider the “year” as part of the key. This means that the primary key for this weak entity set will be (Branch ID, customer SSN, and Year). In this case, a customer cannot take two loans from the same branch at the same time.

