

SE305 Database System Technology

Assignment 4 (due Oct 16, 2018)

1. Explain the difference between a weak and a strong entity set.
2. Compute the closure of the following set F of functional dependencies for relation schema $R = (A, B, C, D, E)$.

$$\begin{aligned}A &\rightarrow BC \\ CD &\rightarrow E \\ B &\rightarrow D \\ E &\rightarrow A\end{aligned}$$

List the candidate keys for R.

3. Using the functional dependencies given in above problem, compute the canonical cover.
4. Construct an E-R diagram for a car insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. Each insurance policy covers one or more cars, and has one or more premium payments associated with it. Each payment is for a particular period of time, and has an associated due date and the date when the payment was received.
5. Consider the E-R diagram in Figure 1, which models an online bookstore.
 - a. List the entity sets and their primary keys.
 - b. Suppose the bookstore adds Blu-ray discs and downloadable video to its collection. The same item may be present in one or both formats, with differing prices. Extend the E-R diagram to model this addition, ignoring the effect on shopping baskets.
 - c. Now extend the E-R diagram, using generalization, to model the case where a shopping basket may contain any combination of books, Blu-ray discs, or downloadable video.
6. A functional dependency $a \rightarrow b$ is called a partial dependency if there is a proper subset g of a such that $g \rightarrow b$. We say that b is partially dependent on a. A relation schema R is in second normal form (2NF) if each attribute A in R meets one of the following criteria:
 - It appears in a candidate key.
 - It is not partially dependent on a candidate key. Show that every 3NF schema is in 2NF.

(Hint: Show that every partial dependency is a transitive dependency.)

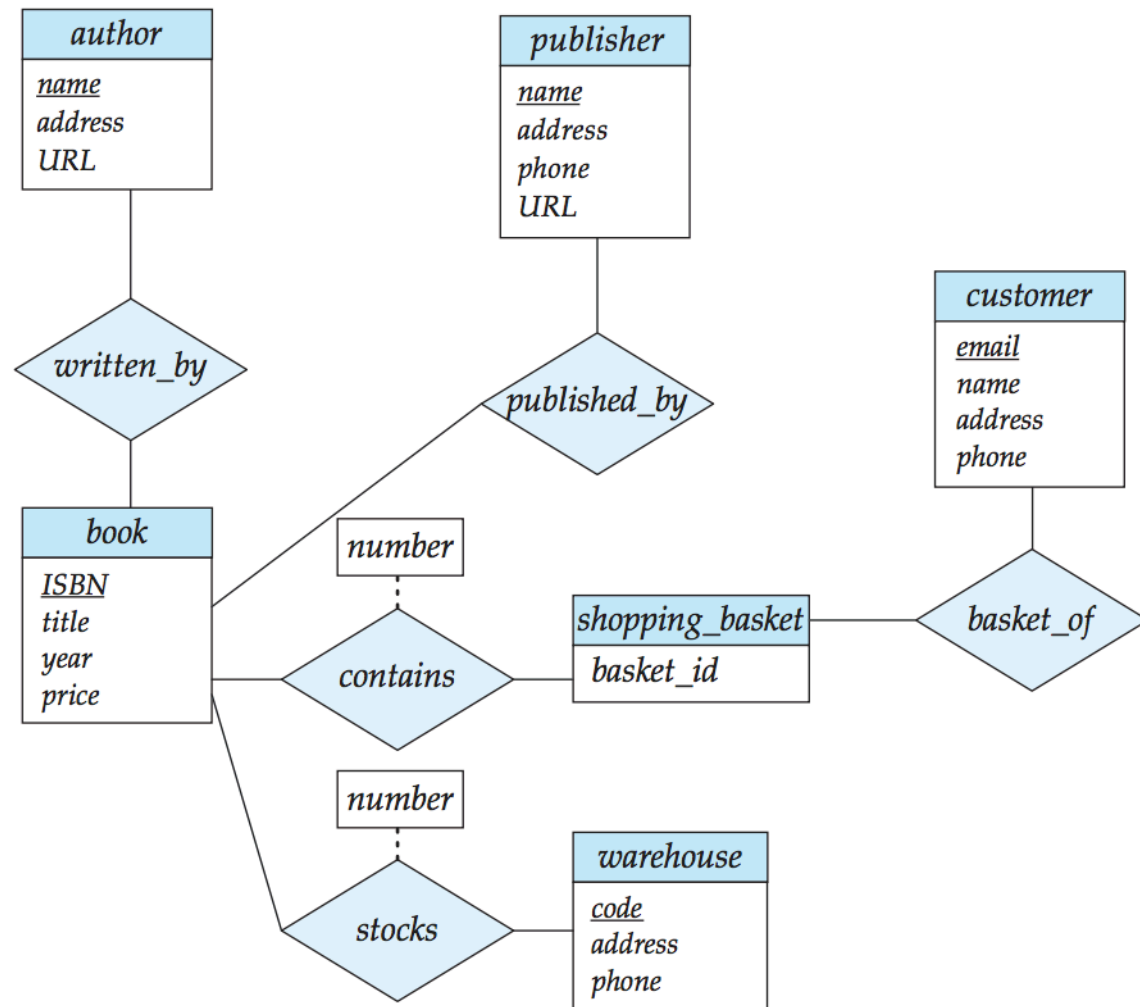


Figure1