

Laboratory Exercises

HW3

① Problem 4-29
 (a) EER Diagram
 (b) Convert to Relational Design

② Convert HW1 Solution of Prob 3.34 (Conf.-review system) to relational design.

4.28. Consider a GRADE_BOOK database in which instructors within an academic department record points earned by individual students in their classes. The data requirements are summarized as follows:

- Each student is identified by a unique identifier, first and last name, and an email address.
- Each instructor teaches certain courses each term. Each course is identified by a course number, a section number, and the term in which it is taught. For each course he or she teaches, the instructor specifies the minimum number of points required in order to earn letter grades A, B, C, D, and F. For example, 90 points for an A, 80 points for a B, 70 points for a C, and so forth.
- Students are enrolled in each course taught by the instructor.
- Each course has a number of grading components (such as midterm exam, final exam, project, and so forth). Each grading component has a maximum number of points (such as 100 or 50) and a weight (such as 20% or 10%). The weights of all the grading components of a course usually total 100.
- Finally, the instructor records the points earned by each student in each of the grading components in each of the courses. For example, student 1234 earns 84 points for the midterm exam grading component of the section 2 course CSc2310 in the fall term of 2005. The midterm exam grading component may have been defined to have a maximum of 100 points and a weight of 20% of the course grade.

Design an enhanced Entity-Relationship diagram for the grade book database and build the design using a data modeling tool such as ERWin or Rational Rose.

4.29. Consider an ONLINE_AUCTION database system in which members (buyers and sellers) participate in the sale of items. The data requirements for this system are summarized as follows:

- The online site has members, each of whom is identified by a unique member number and is described by an email address, name, password, home address, and phone number.
- A member may be a buyer or a seller. A buyer has a shipping address recorded in the database. A seller has a bank account number and routing number recorded in the database.
- Items are placed by a seller for sale and are identified by a unique item number assigned by the system. Items are also described by an item title, a description, starting bid price, bidding increment, the start date of the auction, and the end date of the auction.
- Items are also categorized based on a fixed classification hierarchy (for example a modem may be classified as COMPUTER→HARDWARE→MODEM).

- Buyers make bids for items they are interested in. Bid price and time of bid is recorded. The bidder at the end of the auction with the highest bid price is declared the winner and a transaction between buyer and seller may then proceed.
- The buyer and seller may record feedback regarding their completed transactions. Feedback contains a rating of the other party participating in the transaction (1–10) and a comment.

Design an enhanced Entity-Relationship diagram for the ONLINE_AUCTION database and build the design using a data modeling tool such as ERWin or Rational Rose.

4.30. Consider a database system for a baseball organization such as the major leagues. The data requirements are summarized as follows:

- The personnel involved in the league include players, coaches, managers, and umpires. Each is identified by a unique personnel id. They are also described by their first and last names along with the date and place of birth.
- Players are further described by other attributes such as their batting orientation (left, right, or switch) and have a lifetime batting average (BA).
- Within the players group is a subset of players called pitchers. Pitchers have a life time ERA (earned run average) associated with them.
- Teams are uniquely identified by their names. Teams are also described by the city in which they are located and the division and league in which they play (such as Central division of the American league).
- Teams have one manager, a number of coaches, and a number of players.
- Games are played between two teams with one designated as the home team and the other the visiting team on a particular date. The score (runs, hits, and errors) are recorded for each team. The team with the most runs is declared the winner of the game.
- With each finished game, a winning pitcher and a losing pitcher are recorded. In case there is a save awarded, the save pitcher is also recorded.
- With each finished game, the number of hits (singles, doubles, triples, and home runs) obtained by each player is also recorded.

Design an enhanced Entity-Relationship diagram for the BASEBALL database and enter the design using a data modeling tool such as ERWin or Rational Rose.

4.31. Consider the EER diagram for the UNIVERSITY database shown in Figure 4.9. Enter this design using a data modeling tool such as ERWin or Rational Rose. Make a list of the differences in notation between the diagram in the text and the corresponding equivalent diagrammatic notation you end up using with the tool.