

ER diagram

1. Construct an ER 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.
2. Construct an ER diagram for a hospital with a set of patients and a set of doctors. Associate with each patient a log of the various tests and examinations conducted.
3. Construct an ER diagram of the library system at your college.
4. Construct an ER diagram to maintain data about students, instructors, semester, and courses in a college.
5. Design an ER schema for keeping track of information about marks that students get in different exams of different courses.
6. A database is being constructed to keep track of the teams and games of a sports league. A team has a number of players, not all of whom participate in each game. It is desired to keep track of the players participating in each game for each team, the positions they played in that game, and the result of the game. Design an ER schema for this application.
7. Design an ER schema for the bank. The bank has multiple branches and, in each branch, customers open account and borrow loans.

Relational Algebra and SQL

8. Consider the university database for maintaining information concerning students, teachers, courses, and grades in a university environment as given below.

TEACHER(TID, Tname, Taddress, Salary, Qualification)

TEACHES(TID, SID)

STUDENT(SID, Sname, Saddress, Section)

GRADE_REPORT(SID, CID, Grade)

COURSE(CID, Cname, Credit_hours)

Specify the following queries in SQL on this database schema.

- a. Create all the tables in the database with proper primary key, foreign key, and referential integrity constraints.
- b. Insert appropriate data in the database.
- c. Retrieve the names of all teachers whose address is Kathmandu.
- d. Retrieve the names of all teachers whose salary is greater than 50000.
- e. Retrieve the names of all students taught by Nawaraj Paudel.
- f. Retrieve the names and grades obtained on all courses by the student Ram Timalina.
- g. Retrieve the average salary of teachers.
- h. Count the number of students in each section.
- i. Count the number of students who studies DBMS course.

Also, write equivalent Relational Algebra queries for SQL queries in questions c to f above.