

CMSC 424. Homework 1

Due: February 12

1. Exercise 6.2 from the textbook:

A university registrar's office maintains data about the following entities: (a) courses, including number, title, credits, syllabus, and prereqs; (b) course offerings, including course number, year, semester, section number, instructor(s), timings and classroom; (c) students, including student-id, name, and program; and (d) instructors, including id number, name, dept. and title. Further, the enrollment of students in courses and grades awarded to students in each course they are enrolled for must be appropriately modeled.

Construct an E-R diagram for the registrar's office. Document all assumptions that you make about the mapping constraints.

2. Chapter 6.3.3. discusses "participatory" constraints. Write down a relationship in the model you created in 1. where you might add such a constraint.
3. How can you ensure a student does not take too many or too few classes? Indicate the changes in the diagram from 1.
4. Think of a computer's file system as a database that stores the following entities: (a) file meta-information (name, size, date created, date modified, etc.); (b) physical representation of a file (blocks on disk occupied by it). At a high level, as a user, you would like to be able to create files, add to files (add more blocks), or delete files.
 - i. Describe a conceptual design for such a file system.
 - ii. Provide a high-level description (pseudo-code) of a possible implementation of such a database, and of the three operations described above (create, delete, append-to). Think about this in terms of a high-level view of the code you might write in your favorite programming language to create such a database.
 - iii. Assume this file database will be used by multiple users. What problems might you encounter in the implementation? Don't worry about fixing the description from point (ii), just indicate where issues may arise and why.