

Illinois Institute of Technology

**CS425: Database Design and Applications
Spring 2004**

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Design Assignment (Group Assignment – group size: 3-5 students)

Assignment given on: March 9th

Due Date & Time: March 25th by the start of the class for all sections of the course.

How to Submit: The LIVE section students have to submit the hard copy in the class. The IITV and INTERNET students may submit either hardcopy in the class or submit via courseinfo. Each group has to submit ONLY one solution to the assignment, with the name of all group members on the submission.

Grading: This assignment is 5% of your grade in the semester. (Maximum Points: 50)

A dental practice (DP) wants a database application that supports the needs of the practice. You are to design this database application. Make sure that your design supports the data integrity and data consistency, as otherwise the patients might loose their teeth and you your grade. The DP business requirements are described below:

For each new patient the following data are entered into the database: patient first and last name, social security number (ssn), date of birth, address, phone number, insurance company and member number, one emergency contact person information such as first and last name and phone number of the contact. Same contact may be the contact person of more than one patient. As more than one patient may have same phone and/or address, we never know the exact patient via phone or address.

Each patient is always seen by the same dentist, thus to each patient one dentist is assigned. However, if that dentist, for some reason, is not in the office at the time of visit, any other available dentist may see the patient on that date. Thus, we need to know who was the dentist, who worked on the patient's teeth on any given visit. In any visit only one doctor is stored in database for a given patient. However, each doctor may see many patients on a given day. On any given day only one visit can be scheduled for a patient. The DP office has a list of the dentists working for that office. Each time that a patient visits the office we need also to record the visit date, the diagnosis and procedure for each problem tooth. There are pre-specified diagnosis and procedures that each has a unique name, unique code and a description that must be maintained. More than one tooth can be handled in a given visit, for which one diagnosis, and one performed procedure maybe stored in the database. Although for each diagnosis one or more pre-defined procedure(s) exist that should be stored in the database, the dentist makes the judgment as to which procedure for each diagnosis for each patient's case.

Each procedure has a fee. The database should also keep the total fees associated to each patient visit.

The application should support the tracking of the x-rays belonging to a patient taken on any given date. Each x-ray has an x-ray identifier that identifies the patient who the x-ray belongs to. If the patient has multiple x-rays on the same day or different days, then each x-ray has a different number. As each x-ray might be covering set of teeth, then the tooth number is stored along with the x-ray identifier. For each x-ray, the date the x-ray is taken is to be stored. Also dental office wants to be able to enter a comment on each tooth x-ray. This means that if an x-ray is on set of teeth, then for each tooth in that x-ray, one separate comment should be able to be entered, if needed.

Deliverable:

- Database Schemas in at least 3rd Normal Form.
- List all candidate keys for each schema, and underline the primary key.
- Prove that the design is loss-less.