

Identification

Domination Normal Form - Decomposing Relational Database Schemas (sic)

Henning Köhler, Massey University, Palmerston North, New Zealand.

"5 An Example

A (sic) university has oral examinations at the end of each semester, and wants to manage related data using a relational database. The relevant attributes to be stored are

$$R = \{Student, Course, Chapter, Time, Room\}$$

Here Chapter denotes a chapter from the course textbook the student will be examined about. Every student can get examined about multiple chapters, and chapters may vary for each student. Multiple students can get examined at the same time in the same room, but the course must be the same. Further constraints are that a student gets examined for a course only once, and can't be in multiple rooms at the same time."

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Errata

The gentleman expresses himself backwards, typical of schizophrenics such as the "theoreticians" who contaminate the database space. Second, some requirements are missing. Based on the possibility that the instance table given on page 6 top, is the universal relation, by "multiple chapters" apparently he means:

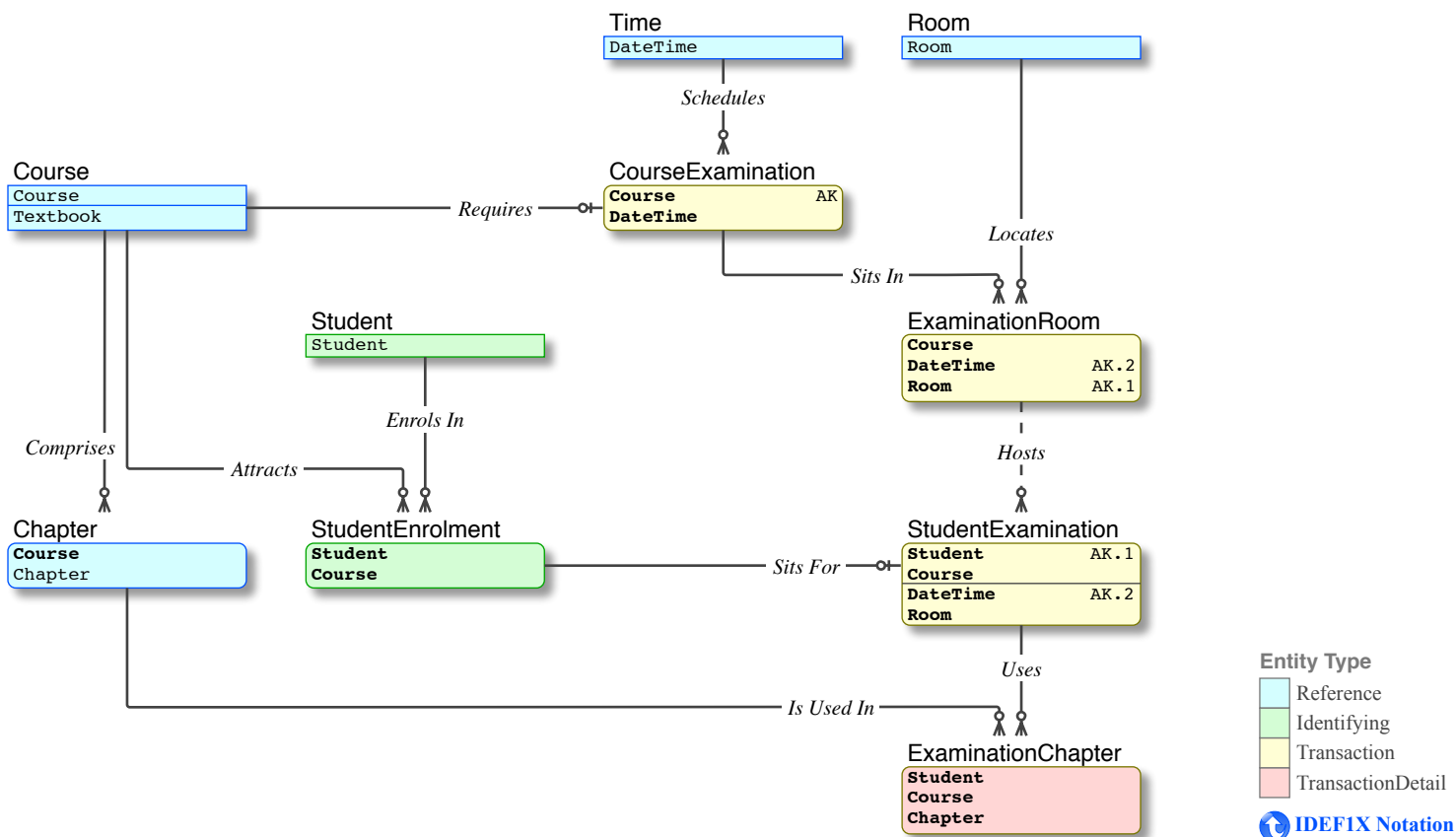
- multiple courses per student
- one exam per course
- multiple chapters per exam, in one sitting.

Errata 2

Further to Nicola's labours, based on the possibility that the instance table given on page 6 bottom, is correct, the statement "multiple students can get examined at the same time in the same room" is woefully incomplete:

- multiple courses per student
- multiple chapters per exam, in one exam (sitting)
- one exam (sitting) per course
- multiple rooms per exam (sitting).

- This presents a model for the requirement in Köhler's DNF paper, **plus** Nicola's interpretation (for bonus marks), for **evaluation purposes only**:
- 'one predicate is "the 1 exam for Course is scheduled at 1 DateTime" (which may be populated, say, while the course has not finished yet)
 - the other is "the exam session for Course scheduled at 1 DateTime will take place in 0-n Rooms" (each of which may be populated, say, a few days before the exam session)'.



Predicate

Data modellers and developers can *read* all the Predicates directly from the data model. However, users and Relational novices cannot, thus it is provided for them. These are *all* the Predicates (Constraints; Business Rules) that govern the data, expressed in formal syntax. (For the sake of brevity, two Predicates with the same two variables can be combined with *and*). Stated otherwise, this is the definition of Facts as modelled herein, which is given to the user, for the purpose of verification.

Chapter is Dependent on, and is an element of, 1 Course
 Chapter is Identified by (Course, Chapter)
 Chapter Identifies, and is used in 0-n ExaminationChapters

Course is Independent
 Course is Identified by (Course)
 Course is Described by (Textbook)
 Course Identifies, and attracts 0-n StudentEnrolments
 Course Identifies, and comprises 0-n Chapters
 Course Identifies, and requires 0-1 CourseExamination

CourseExamination is Dependent on, and a requirement of, 1 Course
 CourseExamination is Dependent on, and a schedule of, 1 Time
 CourseExamination is Primarily Identified by(Course, DateTime)
 CourseExamination is Alternately Identified by (Course)
 CourseExamination sits in 0-n ExaminationRooms

-- provide Course 1::0-1 relation

ExaminationChapter is Dependent on, and used in, 1 StudentExamination
 ExaminationChapter is Dependent on, and uses, 1 Chapter
 ExaminationChapter is Identified by (Student, Course, Chapter)

ExaminationRoom is Dependent on, and a sitting of, 1 CourseExamination
 ExaminationRoom is Dependent on, and located in, 1 Room
 ExaminationRoom is Primarily Identified by (Course, DateTime, Room) -- establish PK for migration
 ExaminationRoom is Alternately Identified by (DateTime, Room) -- prevent double booking
 ExaminationRoom hosts 0-n StudentExaminations

Room is Independent
 Room is Identified by (Room)
 Room Identifies, and locates 0-n ExaminationRooms

Student is Independent
 Student is Identified by (Student)
 Student Identifies, and enrolls in 0-n StudentEnrolments

StudentEnrolment is Dependent on, and an enrollment of, 1 Student
 StudentEnrolment is Dependent on, and attracted by 1 Course
 StudentEnrolment is Identified by (Student, Course)
 StudentEnrolment Identifies, and sits for 0-1 StudentExamination

StudentExamination is Dependent on, and a sitting of, 1 StudentEnrolment
 StudentExamination is Primarily Identified by (Student, Course)
 StudentExamination is Alternately Identified by (Student, DateTime)
 StudentExamination is hosted by 1 ExaminationRoom
 StudentExamination Identifies, and uses, 0-n ExaminationChapter

Time is Independent
 Time is Identified by (DateTime)
 Time Identifies, and schedules, 0-n CourseExaminations

Status

- Having put the previous creatures who were harming the eye, out of their misery, it appears this data model resolves the *requirement*.
- Whether the data model *itself* is correct for the requirement, or not, is yet to be determined.