Chapter 5: Page 184 – Case P8:

“Martial Arts R Us” (MARU) needs a database. MARU is a martial arts school with hundreds of students. The database must keep track of all of the classes that are offered, who is assigned to teach each class, and which students attend each class. Also, it is important to track the progress of each student as they advance. Create a complete Crow’s Foot ERD for these requirements:

* Students are given a student number when they join the school. The number is stored along with their name, date of birth, and the date they joined the school.
* All instructors are also students, but clearly not all students are instructors. In addition to the normal student information, for all instructors, the date that they start working as an instructor must be recorded along with their instructor status (compensated or volunteer).
* An instructor may be assigned to teach any number of classes, but each class has one and only one assigned instructor. Some instructors, especially volunteer instructors may not be assigned to any class.
* A class is offered for a specific level at a specific time, day of the week, and location. For example, one class taught on Mondays at 5:00 p.m. in Room 1 is an intermediate-level class. Another class taught on Mondays at 6:00 p.m. in Room 1 is a beginner-level class. A third class taught on Tuesdays at 5:00 p.m. in Room 2 is an advanced-level class.
* Students may attend any class of the appropriate level during each week, so there is no expectation that any particular student will attend any particular class session. Therefore, the attendance of students at each individual class meeting must be tracked.
* A student will attend many different class meetings, and each class meeting is normally attended by many students. Some class meetings may not be attended by any students. New students may not have attended any class meetings yet.
* At any given meeting of a class, instructors other than the assigned instructor may show up to help. Therefore, a given class meeting may have a head instructor and many assistant instructors, but it will always have at least one instructor who is assigned to that class. For each class meeting, the date of the class and the instructors’ roles (head instructor or assistant instructor) need to be recorded. For example, Mr. Jones is assigned to teach the Monday, 5:00 p.m., intermediate class in Room 1. During a particular meeting of that class, Mr. Jones was the head instructor and Ms. Chen served as an assistant instructor.
* Each student holds a rank in the martial arts. The rank name, belt color, and rank requirements are stored. Most ranks have numerous rank requirements, but each requirement is associated with only one particular rank. All ranks except white belt have at least one requirement.
* A given rank may be held by many students. While it is customary to think of a student as having a single rank, it is necessary to track each student’s progress through the ranks. Therefore, every rank that a student attains is kept in the system. New students joining the school are automatically given the rank of white belt. The date that a student is awarded each rank should be kept in the system. All ranks have at least one student who has achieved that rank at some time.

Business Rules:

* A student may attend many class meetings.
* An instructor may teach many classes.
* A class may be attended by many students.
* Each class has only one assigned instructor.
* A class may have many assistant instructors.
* A rank may have many requirements.
* A rank may be held by many students.
* Each rank has at least one student that has achieved that rank.

Entities:

Student, Instructor, Class, Rank

Attributes:

Student Number (int stu\_num, Primary Key)

Student Name (varchar fname, varchar lname)

Student Date of Birth (date DOB)

Student’s Join/Enrollment Date (date enroll\_date)

Student Rank (varchar stu\_rank)

Instructor Number (int instr\_num, Primary Key)

Instructor’s Hire Date (date hire\_date)

Instructor Status (varchar instr\_status)

Class Day (varchar class\_day)

Class Time (time class\_time)

Class Room (varchar class\_room)

Class’ Head Instructor (int head\_instr\_num, Foreign Key)

Class’ Assistant Instructor (int asst\_instr\_num, Foreign Key)

Class Level (varchar class\_level)

Class’ Attendance Numbers (int attendance\_num)

Rank Name (varchar rank\_name)

Rank Belt Color (varchar rank\_belt\_color)

Rank Requirements (varchar rank\_requirement)

Rank Holder (int stu\_rank\_holder, Foreign Key)

Rank Date Achieved (date date\_rank\_achieved)