Cesar Santiago

ID: 970403634

COP4710 Database Systems

Pf. J. Teichert

**Checkpoint 8.1:**

1) The main reason why Building is an entity in itself is that it has multiple attributes in itself. Another reason is that building relates to multiple entities in the database, if it was an attribute instead, all entities would be required to have it.

2) Room\_number is attached to the relationship because both entities require the attribute to be related to each other. So here, students live in different room\_numbers of the same building.

3) When an attribute is needed for the connection to make sense then it should be put in the relationship. For example, it makes sense for a Course to have class in a Building, but also that class must have a schedule as well as a room that is relevant to the Building and the Course so that other courses do not interfere in that same room within that timeframe.

4) This would give us the sense that a building may exist but does not need to. If the building information is there then it can be related to the other entities but all of the entities do not require a building to exist.

5) At least one student has to enroll in a course, but many may do so.

6) An Instructor may teach many (one or more) Courses.

7) An instructor is obligated to teach a course.

8) A course does not have to be taught by an instructor.

9) A course can only be taught by one instructor.

**Checkpoint 8.2:**

1) A recursive relationship can happen through an entity having a relationship with itself.

2) A connection between an entity and itself pictures a recursive relationship.

**Checkpoint 8.3:**

1) The lower bound to a full participation relationship is always one.

2) A relationship that has full participation that is one: one means that the upper bound is one and the lower bound is also one. Means that the entity has constant participation of one.

3) The ratio (0: 1) means partial participation with an upper bound of one and a lower bound of zero. Meaning that at most one object of this entity will exist in a relationship, or otherwise, none.

**Checkpoint 8.4:**

1) EMPLOYEE(ID, name, supervisor\_ID)

|  |
| --- |
| EMPLOYEE  **ID name supervisor\_ID**  01 Roger NULL  02 Chris 01  03 Sasha 01  04 Terry 03 |

2) EMPLOYEE(ID, name)

SUPERVISOR(employee\_ID, supervisor\_ID)

|  |
| --- |
| EMPLOYEE  **ID name**  01 Roger  02 Chris  03 Sasha  04 Terry |

|  |
| --- |
| SUPERVISOR  **employee\_ID supervisor\_ID**  01 01  02 01  03 01  03 02  04 01  04 03 |

**Chapter 8 Exercises:**

STUDENT::BUILDING::M(partial)::N

A Student may live in a Building and can live in many Buildings.

A Building may be lived in by a Student and can be lived on by many Students.

STUDENT::COURSE::M(full)::N

A Student must enroll in many (one or more) Courses.

A Course must be enrolled by many (one or more) Students.

COURSE::BUILDING::M(full)::1

A Course may have a class in a Building.

A Building must host a class for a Course and can host classes for many Courses.

COURSE::INSTRUCTOR::M(full)::1

A Course may be taught by an Instructor.

An Instructor must teach a Course and can teach many Courses.

BUILDING::INSTRUCTOR::1(partial)::M

A Building must house an office for an Instructor and can house offices for many Instructors.

An Instructor may have an office in a Building.

The participants of this database are Student, Instructor, Course, and Building. In this database, a Building may not exist, which constrains the other entities because it does not assure that a student will be able to be assigned a building to live in or an instructor an office to work in. There is also a constraint related to the relationship between Course and Building that is addressed in Fig. 8.7 which shows the lack of a room\_number for the class relationship. This is a concern mainly because classes may overlap in the same room\_number if it's not stated.

This database is accurate to a school that hosts online classes because it does not constrain the course to be hosted in a building. However, in that same note, it does not assure that if the class is not online, there will be a building available for it.