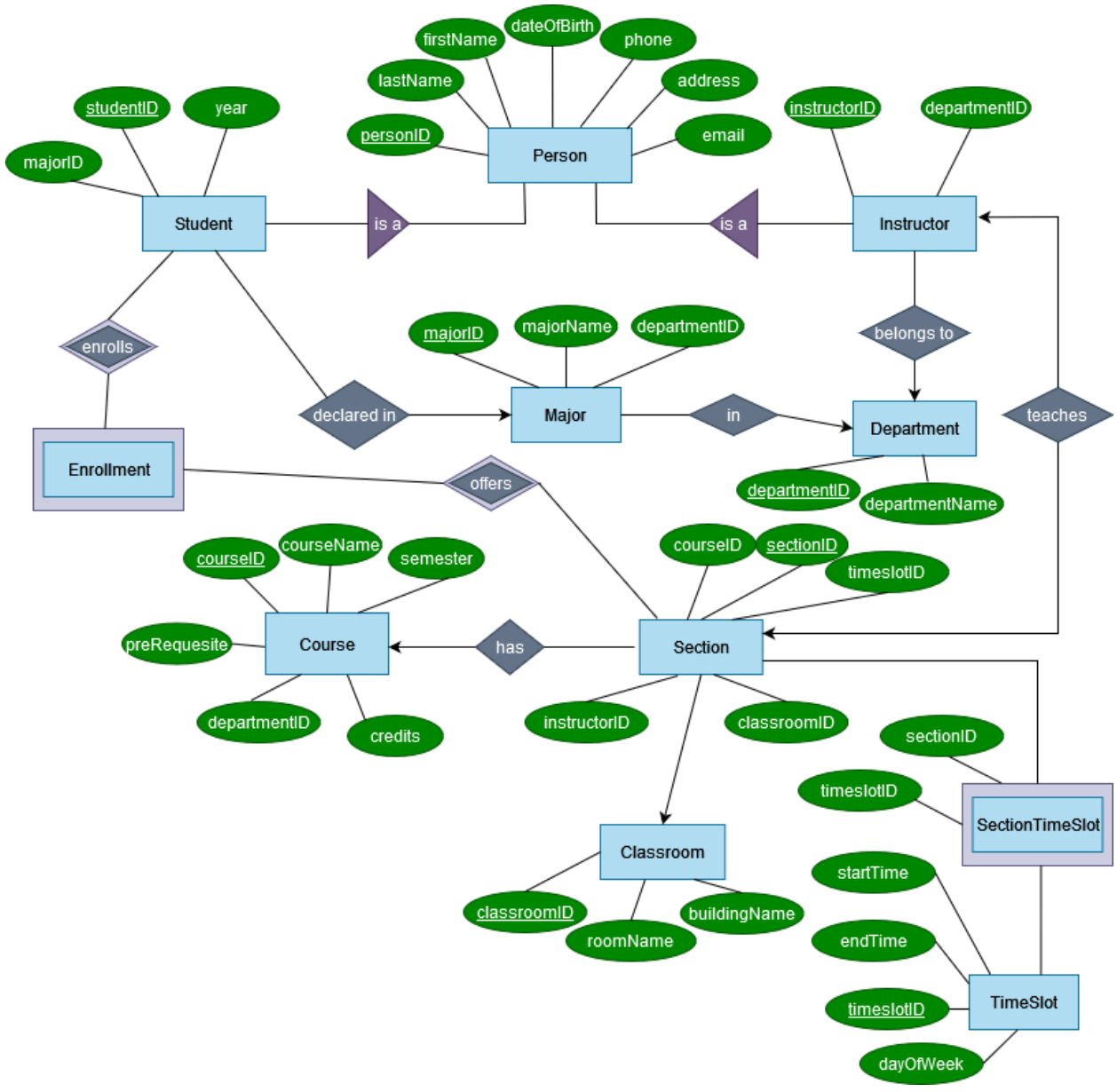
G5 — Krishna Ramesh, Manoj Arulmurugan, Scott Huddleston

We all met up and brainstormed about an application we wanted to build a database for. We came up with different entities, attributes, and relationships that would make sense for our setting. Scott then used this information to create the ER diagram, Manoj translated it to a relational schema, and Krishna wrote the paragraph/summary describing the application specifics.

ER Diagram:



Person(personID, firstName, lastName, DOB, phoneNumber, address, email)
Students(studentID, personID, yearInSchool, gpa, majorID)
Instructor(instructorID, personID, departmentID)
Major(majorID, majorName, departmentID)
Department(departmentID, departmentName)
Courses(courseID, courseName, departmentID, credits, semester, preRequisite)
Sections(sectionID, instructorID,courseID, classroomID, timeSlotID)
TimeSlot(timeSlotID, dayOfWeek, startTime, endTime)
Classroom(classroomID, roomNumber, buildingName)
Enrollment(studentID, sectionID)

Updated Relationship Schema:

Person(personID PRIMARY KEY, firstName VARCHAR(50),lastName VARCHAR(50), DOB DATE, phoneNumber VARCHAR(20), address VARCHAR(100), email VARCHAR(100))

Students(studentID PRIMARY KEY, personID FOREIGN KEY REFERENCES, Person(personID),yearInSchool INT, gpa DECIMAL(3,2), majorID FOREIGN KEY REFERENCES Major(majorID))

Instructor(instructorID PRIMARY KEY,personID FOREIGN KEY REFERENCES Person(personID), departmentID FOREIGN KEY REFERENCES Department(departmentID))

Major(majorID PRIMARY KEY, majorName VARCHAR(50),departmentID FOREIGN KEY REFERENCES Department(departmentID))

Department(departmentID PRIMARY KEY, departmentName VARCHAR(50))

Courses(courseID PRIMARY KEY, courseName VARCHAR(50), departmentID FOREIGN KEY REFERENCES Department(departmentID), credits INT, semester VARCHAR(10), preRequisite FOREIGN KEY REFERENCES Courses(courseID))

Sections(sectionID PRIMARY KEY, instructorID FOREIGN KEY REFERENCES Instructor(instructorID), courseID FOREIGN KEY REFERENCES Courses(courseID), classroomID FOREIGN KEY REFERENCES Classroom(classroomID))

SectionTimeSlot(sectionID FOREIGN KEY REFERENCES Sections(sectionID), timeSlotID FOREIGN KEY REFERENCES TimeSlot(timeSlotID), PRIMARY KEY(sectionID, timeSlotID))

TimeSlot(timeSlotID PRIMARY KEY, dayOfWeek VARCHAR(10), startTime TIME, endTime TIME, UNIQUE (dayOfWeek, startTime, endTime))

Classroom(classroomID PRIMARY KEY, roomNumber VARCHAR(10), buildingName VARCHAR(50))

Enrollment(studentID FOREIGN KEY REFERENCES Students(studentID), sectionID FOREIGN KEY REFERENCES Sections(sectionID), PRIMARY KEY (studentID, sectionID))

The two 'is-a' hierarchies in the ER diagram are between the Person-Student and Person-Instructor entities. The type of translation used here is the E/R style translation. The Person entity holds common attributes shared by both Student and Instructor. The Student and Instructor entities have their unique attributes, and the relationships connect to the Person entity via the personID. This implies that Student and Instructor would have separate relations (tables), with each table only including the personID (as the primary key) along with the specialized attributes for each. Thus, E/R Style is the type of translation used in this diagram.

Explaining the Application:

For our application, we chose a situation where students at a University have to enroll in courses for the semester. The database will keep track of the private details of all people (students and instructors). In this University setting, there are many departments, such as the College of Engineering, College of Science, etc.

Majors:

- Each department has many majors, but they are unique to that department.
    - Cannot be cross-listed between multiple departments

Students:

- Are free to declare in more than one major of their choice
- You can enroll in a course by choosing a section

Instructors:

- Many instructors in each department
    - An instructor can only be a part of one department

- Each instructor is limited to teaching at most one section of a course

Sections:

- Are taught uniquely by one instructor
- Every course section occurs in the same classroom but at a different time to avoid scheduling conflicts.