# Semester Project Phase 2

Due: Wednesday, March 15th, 2023

Total: 20 Points

# Project Overview

The Semester project consists of four deliverables reflective of the implementation of a real-world database. Each of these deliverables will build upon each other to create a comprehensive database system that includes a requirements document, a design document, a schema implementation script, and finally a graphical user interface with simple CRUD Operations.

Since each project phase will depend upon each other, as it is in the real world, you will need to do each in the order specified below. The weight of each phase is as follows:

| Phase | Description | Due Date | Points |
|---|---|---|---|
| 1 | Project Scope and Requirements Document | Feb 15th | 20 |
| 2 | Entity Relationship Diagram and Schema Specifications | Mar 15th | 30 |
| 3 | Database Creation and Seed Scripts | April 12th | 30 |
| 4 | Java GUI Application | April 26th | 30 |
| | Total | | 100 |

The due dates are subject to change depending on the progress of the class. However, once it is determined, there are no exceptions for late work. See the class policy of late work for details. You are expected to submit each phase on its due date to receive full credit for that phase. There is no make-up work for each phase. Since the later phases of the project depends upon the earlier phases, it is in your best interest to complete the phases by the expected date. Every student is expected to work on this project independently and every project is expected to be unique in terms of the organization you choose to use, as well as the design you choose to implement for it. The project will close with a presentation of your GUI implementation on the due date of the last phase, April 26th.

# Phase 2

A key part to database design is to deliver a conceptual design of the database structure. Your role as the database architect is to take the business requirements from your end users and translate them into a design that both your developers and users can understand. One of the most useful tools to do this is an ERD (Entity Relationship Diagram). It shows not only your entities, the primary and foreign key relations, but it also shows the discrete relationships between each entity. The key here is to translate your requirements into a discrete map of how the overall structure of the database.

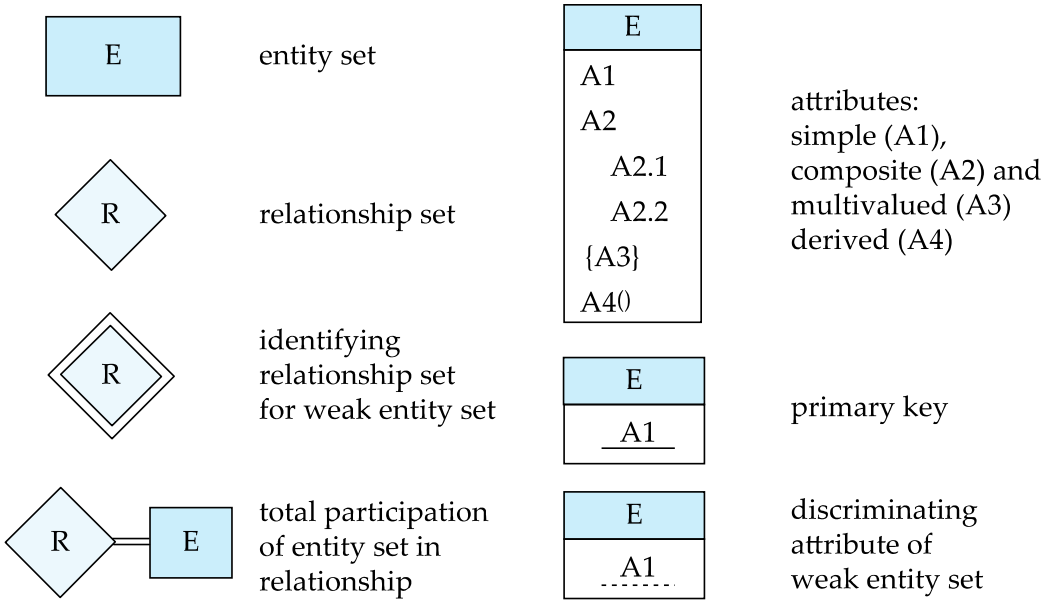
## Draw the Relationship Diagram

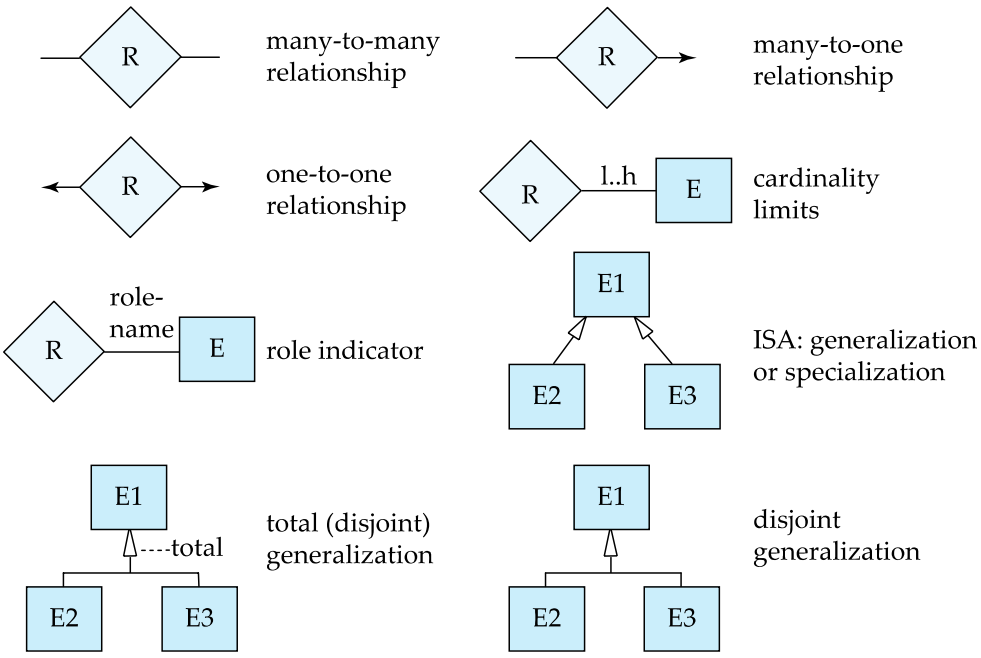
Draw the Entity-Relationship Diagram (ERD) for your application to show the entities and relationships. You must use the form as demonstrated in class and in your book. See the examples in lecture 7 to ensure you adhere to this rule. Make sure to clearly reflect the following Criteria:

1. All entities (i.e., objects) that are needed to implement your application. Make sure to clearly describe the purpose of each entity.
    - Each entity must have a primary key and a set of attributes to describe the entity.

- Foreign keys shall be indicated when needed

2. List clearly all relationships and relationship cardinalities for all relationships in your ERD (1-to-1, 1-to-M, or M-to-M). Also, include **business rules** to identify the relationships among your entities. For example, in a company database, the following two rules describe two different applications:
   - An employee can work in **only one** project but a project may have **more than one** employee
   - An employee can work in **more than one project** and a project may have **more than one** employee.
3. All attributes must be reflective of the entity that it resides in.
   - For example: A student entity has a first and last name, a student id, an email, an address, a phone number, etc.
   - Things that are not part of the student should not be in the student entity, such as class name which would belong in a class table.
4. Your ERD must comply with the following notation. Points will be deducted for not following this notation.






## Database Implementation

Convert the ERD that you designed in the previous part into the corresponding relational schema. The relational schema should include the following:

- Table names
- attribute names and data types
- data constraints based on your business rules
- primary keys
- foreign key constraints

Criteria:

1. The database schema name shall be named as the following: <Team Name>Project. For example, my database for team Vue would be called: VueProject. This is used to differentiate your database from other groups. Make sure this criteria is met. Points will be deducted if it is not met.
2. Refine the Database Tables to conform to the 3rd normal form.
   - This means that all Many to Many relationships should not be present in your system. All many to many relationships must be converted to a One to Many and a Many to One relationship, with a linking table between the Many to Many entity relationships.
   - Duplication of data shall be minimized, meaning all data besides keys shall not be duplicated across the database.
   - Note that a Many to Many relationship can be represented in the ERD but must be converted in your Database implementation.
3. All scripts written for this project shall be assumed to be executable without modifications. You must target the correct database for your scripts as well as ensure that no SQL errors are produced when running those scripts.

### Submission

Submit your Phase 2 project as Word document and a sql document for the relational schema in D2L under the Project Phase 2 Group assignment. Please note that the submission is time stamped, so submissions after the due date and time will be counted as late and penalties will be applied respectively. Only one person needs to submit the project.

### Assessment

15 Points—The ERD of the database

15 Points—The database schema script that must execute without errors or modifications. Points will be taken off if this cannot be run in one go so be sure to check to make sure that your database can be recreated with a simple execution of the script. Any errors will be deducted from the score.

Grades will be assessed on the entire group. If you find that one of your group members are not participating, this must be addressed within your team and a majority consensus will need to bring forth the complaint. An email to me with all students in a group must be sent to me with the complaint so that we can resolve the matter. If the matter cannot be resolved, the group will be forced into individual projects and all deliverables will be expected from each student. It is in your best interest to work with each other so that this does not happen since the workload is meant to be for a group of three and not one student.

## Learning Outcomes

This second phase of the project demonstrates the one of the key components of designing a database, the analysis and design phase. To design the structure of your schema, an analysis needs to be done on identifying the different relationships of each table to their counter parts. If the exercise was done right, you should end up with a database in the third normal form, which minimizes data storage and in addition prevents the duplication of data in the system.

## Disclaimer

Please review the syllabus on academic integrity and the submission policy. I will follow both strictly, so please adhere to the policy for each assignment and project.