

ComS 363 Fall 2022
Class Participation for Week 3

Topic: Conceptual design using Entity-Relationship Model

Learning objective: To practice modeling the database requirements using the Entity Relationship (ER) model. An ER diagram is used to formally describe entities (real-world things) and their properties, relationships among the entities, and the constraints on the entities and relationships. ER notations are varied, but they are all based on the same concept. Use the ER diagram notations as discussed in class.

Instruction: To earn a full credit for this class participation, your effort should show your attempt to capture **all the database requirements** below in your ER diagram.

Grading: Grading is **not** based on whether your answers are correct or not, but based on your effort to solve all the required problems and on time submission.

Collaborative work or not: Collaborative work with students currently enrolled in one of the sections of ComS 363 this semester is encouraged.

Submission is done individually. Include the pdf version of your ER diagram into the zip file for the submission of all the class participations.

Question: Suppose your start-up company is asked to develop a database with the following requirements. Your company have interviewed the client and obtained the following database requirements.

- a) Employees of the client's company have social security number, date of birth, name, gender, address, salary, profile picture. Your client wants to be able to perform a search on either first name, last name, or middle name.
- b) An employee has no supervisor or at most one supervisor who is also an employee. A supervisor can have zero or more supervisees.
- c) For each department, the department name, department number, locations are needed to be stored in the database. The department name is unique. The department number is also unique.
- d) A department can be located in several locations. Some new departments may not have any location assigned to them initially. Each location has its own id and address. The location ID is unique. A location may not house any department or may house one or more departments.
- e) Each department must have at least one employee. Each employee must work for only one department. The database users also want to query the number of employees in a department.
- f) Each department must be managed by one employee only. An employee can be a manager of only one department. The date when the employee becomes a manager for the department needs to be maintained.
- g) A department can control several projects. Each project must be controlled by only one department. The name of the project, the project number, and the project site need to be stored in the database. Each project is located in at most one site. The project name is unique. The project number is unique.
- h) Each employee works on at least one project and each project must have at least one employee. The number of hours per week that an employee works on a project may be recorded.