

CSE 370– Database Systems

Assignment 1

Fall 2025

Submission Instructions:

1. Write your name, id, section on top of the first page
2. Your answer should be handwritten, take pictures and create a single pdf.
3. **Submit the pdf in the following form:** <https://forms.gle/X9NPhGtftjwCkiG26>
4. **Submission Deadline:** 5th November 2025 (Wednesday), 11:59 pm (midnight)
5. **NO LATE SUBMISSION WILL BE ACCEPTED**

Question 1

- a) [5 marks] The data in the table below will be stored in a relational database of “XYZ” company. They aim to design the database to minimize storage usage. Use appropriate ER diagram symbols to represent the data efficiently while ensuring optimal space utilization. The values in the YearsOfService column can be calculated using the following formula.

$$\text{YearsOfService} = \text{Current Year} - \text{JoiningDate}$$

EMPLOYEE

ID	NAME		JoiningDate	YearsOf Service	EMAIL	EmployeeType
	Fname	Lname				
S230	Arif	Hossain	2024-03-05	1	a@bracu.com, a@g.com	Full-Time
S231	Sifat	Ahmed	2023-01-01	2.2	s@bracu.com, s@y.com	Part-Time
S232	Nisat	Tasneem	2020-07-01	5.2	t@bracu.com	Full-Time
S233	Sifat	Hossain	2024-09-01	0.5	s2@bracu.com, s2@g.com, s2@y.com	Full-Time

- b) [3 marks] Identify the different types of attributes you added in your ER diagram.
- c) [2 marks] The company wants to refine the model by showing the details about the different categories of Employee types in the diagram. This can be done by converting the ER into an EER through the specialization process. Apply specialization to update your ER diagram in (a) to an EER diagram according to the stated requirement above.

[Note: Draw again, do not change the previous solution and also redraw unchanged parts].

- d) [7 marks] The company has clients. All clients have a unique ID, name (composed of first and last name), serviceType and several emails. Employees are assigned to Clients, the date of assignment is recorded. Update the EER in (c) to include the new requirements above. [Note: Draw again, do not change the previous solution and also redraw unchanged parts].
- e) [3 marks] Clients and Employees have several common attributes, it is possible to create a superclass from them by the process of generalization. Apply generalization for employee and client and update the EER in (d) according to the requirement above. [Note: Draw again, do not change the previous solution and also redraw unchanged parts].

Question 2 [10 Marks]

A Dog shelter wants to design a database for management and inventory. The requirements are given below.

- Animals are given shelter in the organization. The id, type, breed, date found are recorded in the database.
- The animals are divided into three categories based on condition: Pets, Sick, Police dog. Pets have a tag number, name, date of adoption.
- Sick dogs have medical issues. Medical issues include the following attributes - issue type (where values such as injury or disease will be recorded), date of recording, description, list of medicines. The medicines are composed of name and dosage. Note that the attributes of the medical issues are not guaranteed to be unique. You can assume that on any given date one dog will have only 1 issue recorded, but a dog may have several medical issues in total.
- Customers can adopt dogs that are reserved for the pet category. The customer's name, national id, phone, address are recorded. A customer may be referred by another customer.
- The shelter has three types of employees: vets, trainers and administrators. Employee's id, name, phone, email are recorded.
- Trainers train Police dogs. One trainer can train multiple dogs. Date and time of training is recorded

Draw an **EER** diagram for the dog shelter. Write all assumptions(if any).