

ISYS 464, Exam1 Review and Sample, Fall 2023

This exam covers the techniques practiced with Assignment 1, 2 and 3, and materials presented in PowerPoint:

Week 1: Introduction to database

Week 2: Data modeling with ERD

Week 3: Enhanced data modeling

Week 4: Relational database design

Database implementation: Working with MySQL and DQL DDL

Week 5: Working with multiple tables

You may bring printouts of the PowerPoints, but you may not use computer or smart devices during the exam.

Sample questions:

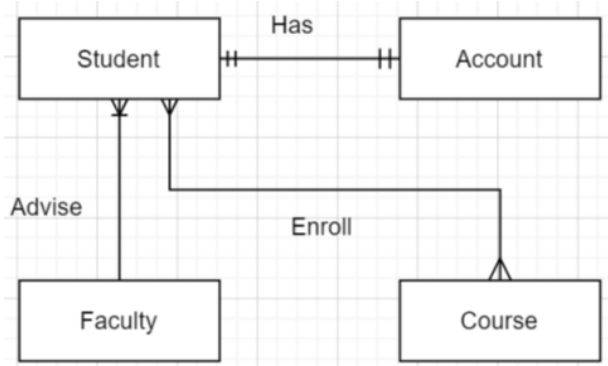
1. What is program-data dependence?
2. What is primary key constraint, domain constraint and referential integrity?
3. Give two examples for
 - a. 1:1, 1:M, and M:M relationships.
 - b. recursive relationship.
 - c. multi-valued attribute.
 - d. attribute of the relationship.
 - f. derived attribute
 - g. Super type and subtype.

You must find your own examples and not using my examples.

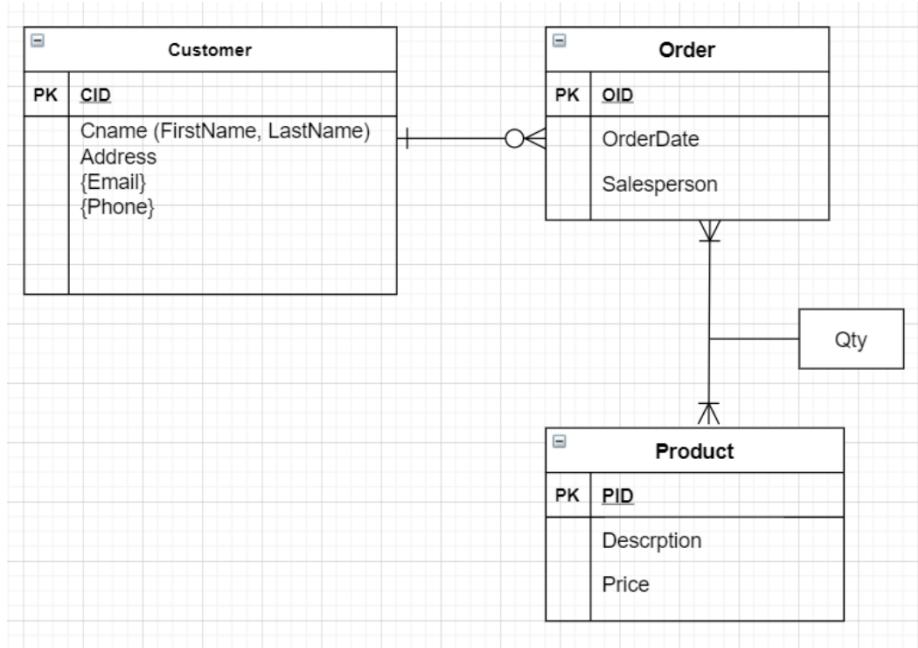
4. Draw an ERD based on a problem description, similar to assignment 1 and 2.

5. Given this ERD, we can conclude that:

- a. A faculty member may teach many courses. (True/False)
- b. A course may be taught by many faculty members. (True/False).



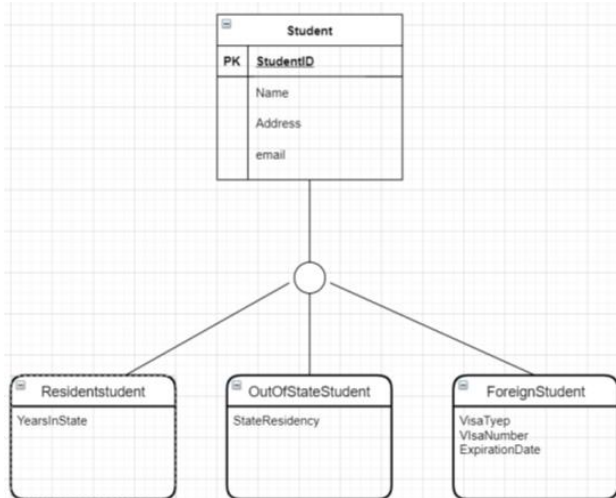
6. You want ChatGPT to help you design a relational database based on this ERD. How to communicate with ChatGPT to help you with the design?



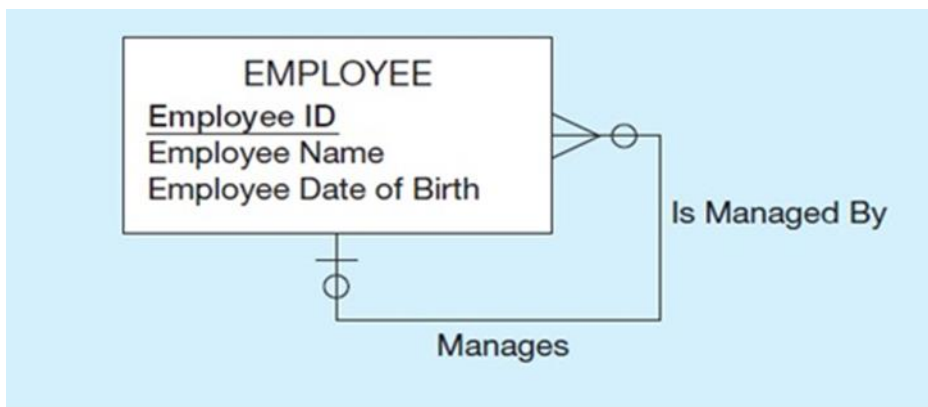
7. A University has three kinds of students: resident, non-resident, and international students.

a. Should the line between the supertype and the circle be a single line or double line?

b. When consider the disjointness constraint, should we enter a letter D or O in the circle?



8. A recursive 1:m relationship of employee managing employee is given below. Design the Employee table to keep track of employee's manager.



9. A 1:m relationship between faculty and student is implemented in the database, and currently we have 3 faculty members and 4 students. Identify the record that violates the referential integrity.

Faculty table

fid	fname	phone
f1	chao	1111
f2	smith	2222
f3	boxer	3333

Student table

sid	sname	sex	gpa	major	fid
s2	paul	m	2.20	art	f2
s1	peter	m	3.20	bus	f1
s3	mary	f	1.50	bus	f11
s4	nancy	f	3.50	bus	f1

10. This database analysis problem is submitted to ChatGPT: identify the entities and their relationships based on this data requirements: The corporate owner (franchisor) of a national chain is seeking to automate the management of its franchised restaurants,

franchisees, and contract data. The company wants an information system whereby it could obtain, for any given restaurant, type of contract in effect, phone number and location of each restaurant (including street address, city, state and zip code), and detailed information about the restaurant owner (including owner's social security number, full name, address, email and phone number). The various contract arrangements are:

Contract 1: 99-year term, Contract 2: 5-year term, Contract 3: 10-year term

Other contract types may be offered in the future. The company currently has 500 franchised restaurants. Expansion plans call for opening an additional 200 restaurants each year for the next three years, all of which are to be franchised. There is no limit on the number of restaurants an individual may own, and owners are encouraged to apply for multiple restaurants.

And ChatGPT provides this solution:

Entities:

Corporate Owner (Franchisor)
Franchised Restaurant
Franchisee
Contract

Relationships:

Corporate Owner (Franchisor) - Franchised Restaurant: The corporate owner (franchisor) owns multiple franchised restaurants.

Franchisee - Franchised Restaurant: Each franchised restaurant is owned by a franchisee.

Franchisee - Contract: Each franchisee has a specific contract type in effect (e.g., Contract 1, Contract 2, or Contract 3).

Franchised Restaurant – Contract: Each franchised restaurant operates under a specific contract type.

Do you agree with this analysis? If not, how to communicate with ChatGPT to correct its error?