Assignment 1 of CSCI 3170

Responsible TA: ckchang@cse.cuhk.edu.hk

Deadline: October 10, 2020, 23:5

In this assignment, you will have 3 problems related to ER-Model. You will have 2 weeks to finish this assignment. Please submit your answer to blackboard before 10 October 2020, 23:59.

1 Problem 1 (10 marks)

Construct appropriate relational schemes for each of the E-R diagrams below. (5 marks each)

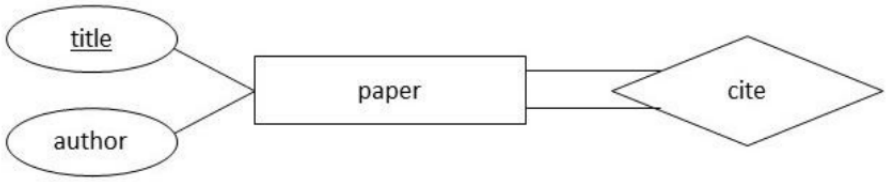

Figure 1: Paper citing

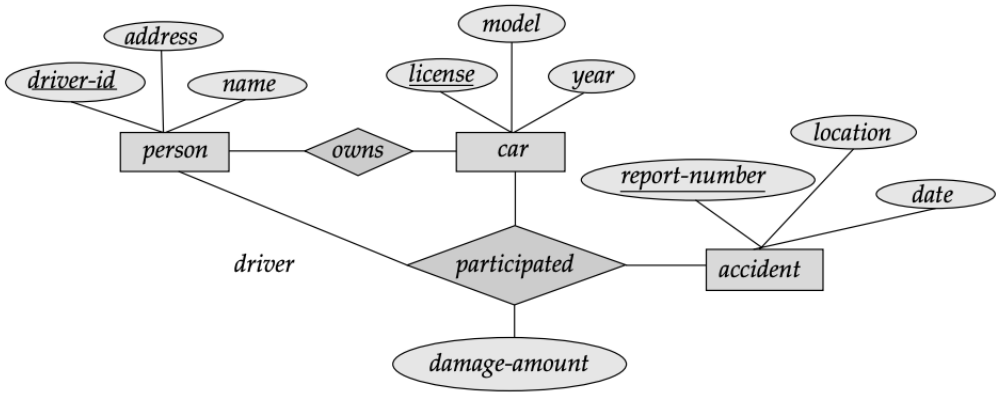

Figure 2: Car-insurance company

1.1 Answer

a. Paper citing:
Paper (title, author)

cite (title1, title2)

b. Car-insurance company:
Person (driver-id, name, address)
Car (license, year, model)
Accident (report-number, date, location)
participated(driver-id, license, report-number, damage-amount)
own(driver-id, license)

2 Problem 2 (10 marks)

Draw an ER-diagram for the following relational schemes. Hint: bed and wardrobe are both furniture.

Customer (customer_id, name) buy (customer_id, product_id) Furniture (product_id, stuff_type, price) Bed (product_id, size) Wardrobe (product_id, height)

2.1 Answer

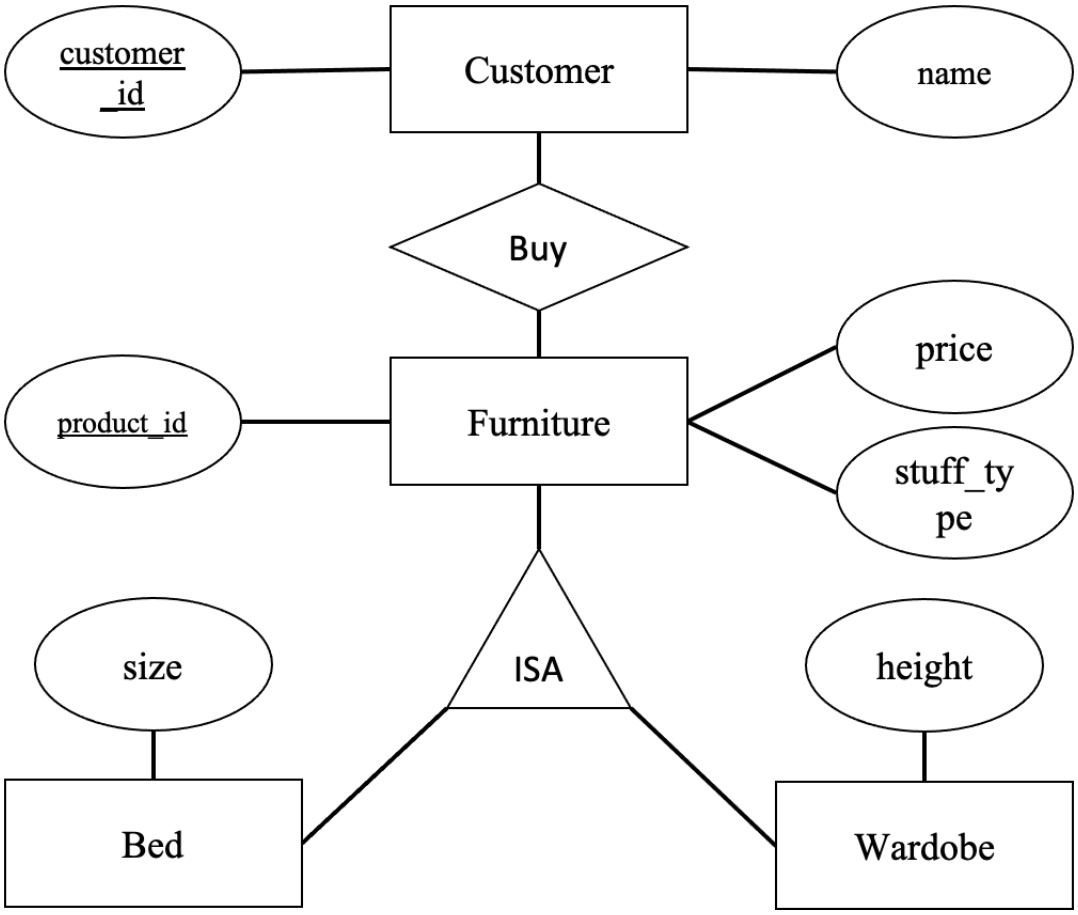

Figure 3: Answer2

3 Problem 3 (25 marks)

Consider the following ER-diagram and assumptions for a university.

1. Every department has a unique dname.
2. Every department can be uniquely identified by its dhead and location.
3. Every advisor has a unique aid.
4. Every student has a unique sid.
5. Every project has a unique pid.
6. Every project can be uniquely identified by its pname and funding.
7. A advisor works in exactly one department.
8. A department has at least one advisor working in it.
9. A student can be assigned any number of projects.

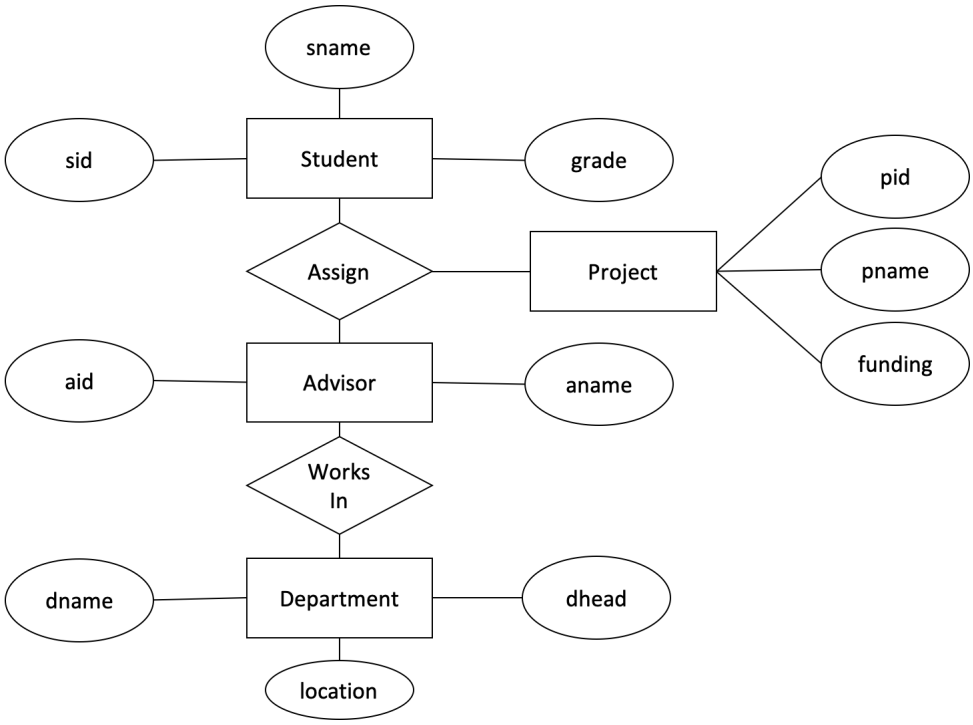

Figure 4: Problem3

a) (5 marks) List all the superkey(s) of "Project".

b) (4 marks) List all the candidate key(s) of "Department"

c) (6 marks) Assume that pid is a primary key, complete the ER-diagram by adding all missing constraints (weak entity, key constraints, participation constraints and relationship constraints).

d) (10 marks) This ER model does not allow a advisor to assign one project to the same student twice. Please briefly state why this is happening and try to modify the diagram to make it work.

3.1 Answer

a)

{pid}, {pid, pname}, {pid, funding}, {pid, pname, funding}, {pname, funding}

b)

{dname}, {location, dhead}

c)

refer to Figure5

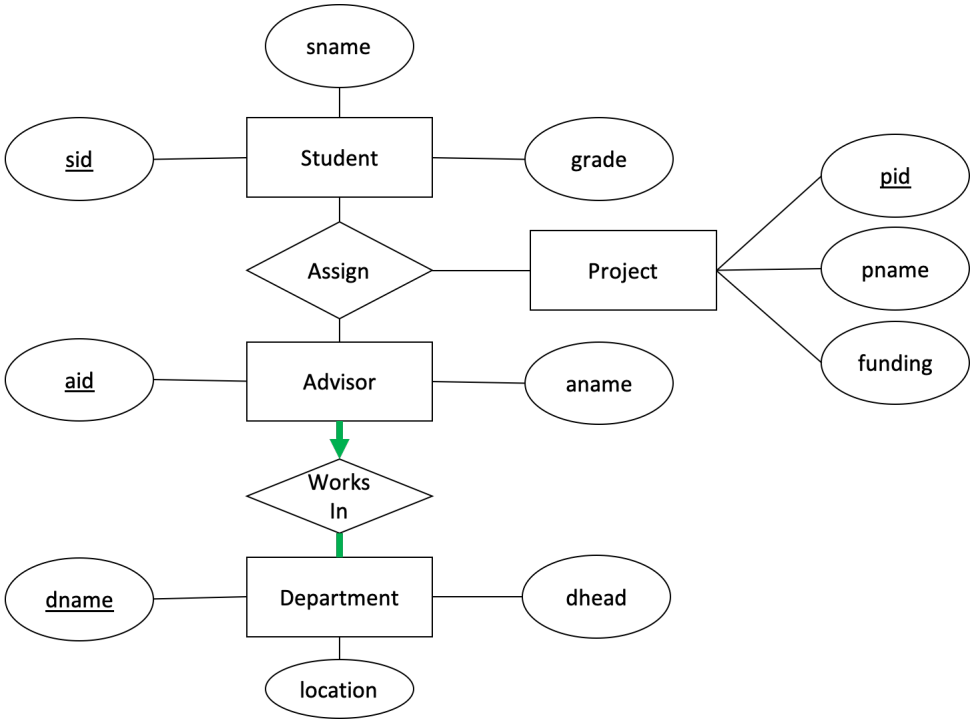

Figure 5: Answer3.c

d)

Because a relationship is uniquely identified by the participating entities. Therefore, multiple assignment with the same aid, pid and sid are not allowed. We can solve this problem by adding a new entity assignment. The new ER diagram is given below 6. (Other reasonable answers are also acceptable).

Notes: Some students add a attributes count to "Assign", which is correct. Here is a question for who are interested in: Think what's the difference between the two solution. The implementation is different, and the efficiency of different workload thus will also be different.

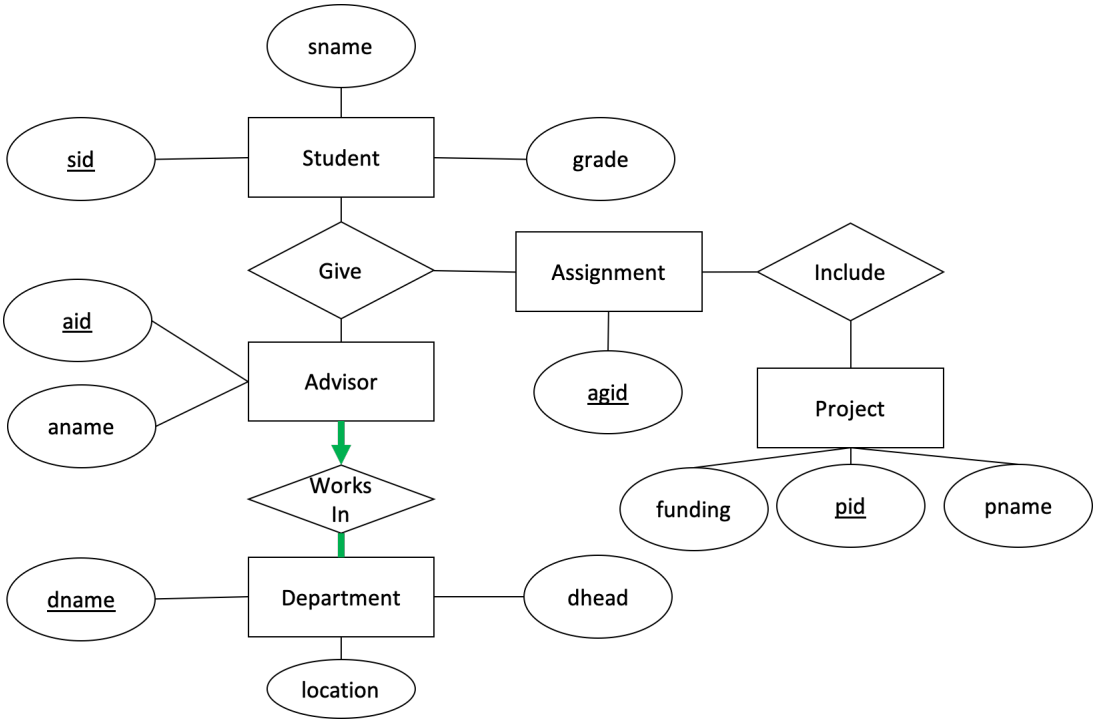

Figure 6: Answer3.d