Information and Database Management Systems I

(CIS 4301)

Spring 2022

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Homework 1

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Pledge (Must be signed[1] according to UF Honor Code)

On my honor, I have neither given nor received unauthorized aid in doing this assignment.
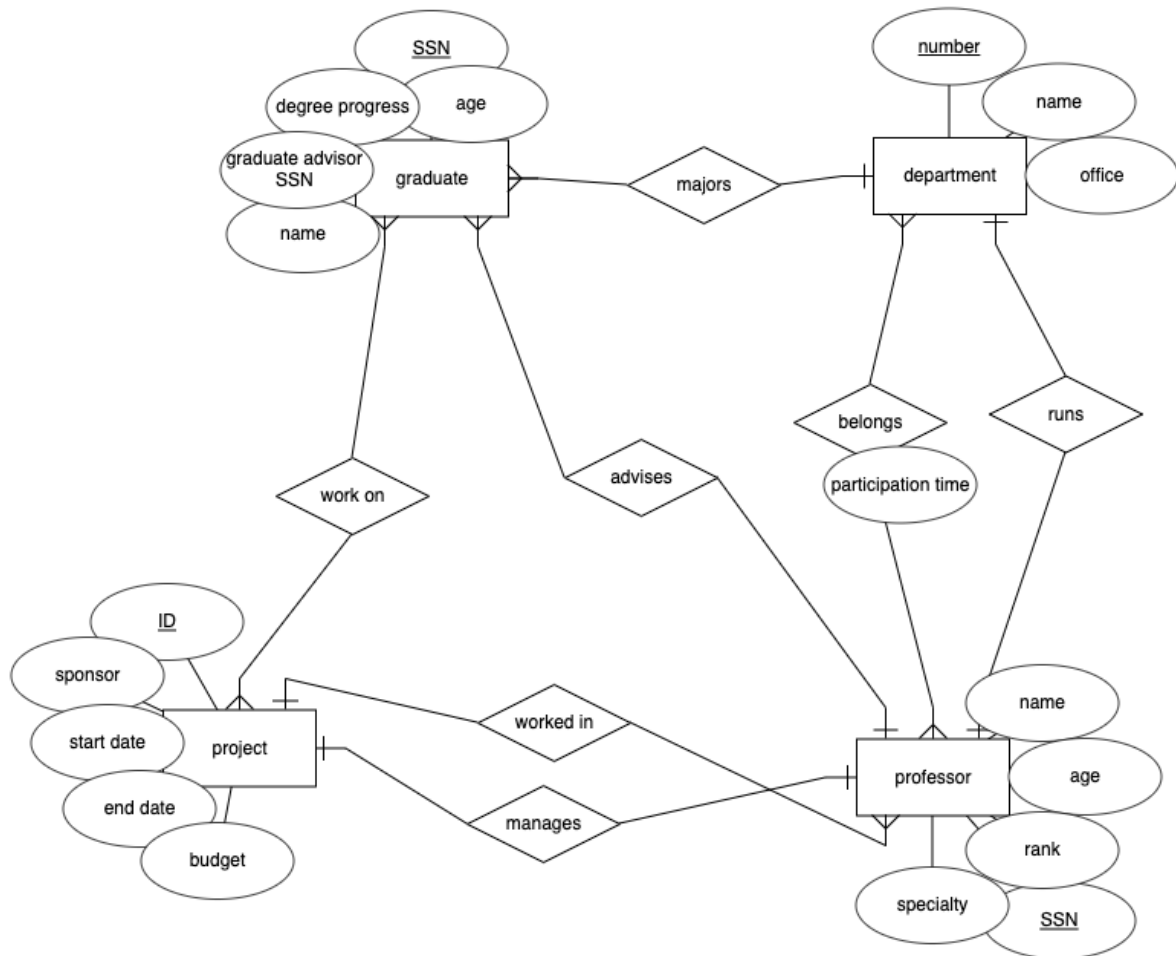
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Student signature

Question 1

Entity-Relationship Diagram

service ticket (service reason, price, date, mechanics)
— has a → Car
— writes → Mechanic

Car (color, make, serial number, year, model)
— services → Mechanic
— sells → Salesperson
— buys → Customer
— records → Invoice

Mechanic (ID)
— d (disjoint) → Employee

Salesperson (ID)
— writes → Invoice
— d (disjoint) → Employee

Employee (name, email address, ID, date of birth, age)
— belong to → Department

Department (departmentID, name, chair name)

Customer (phone number, name, email, date of birth, age)
— gets → Invoice

Invoice (ID, date, price)
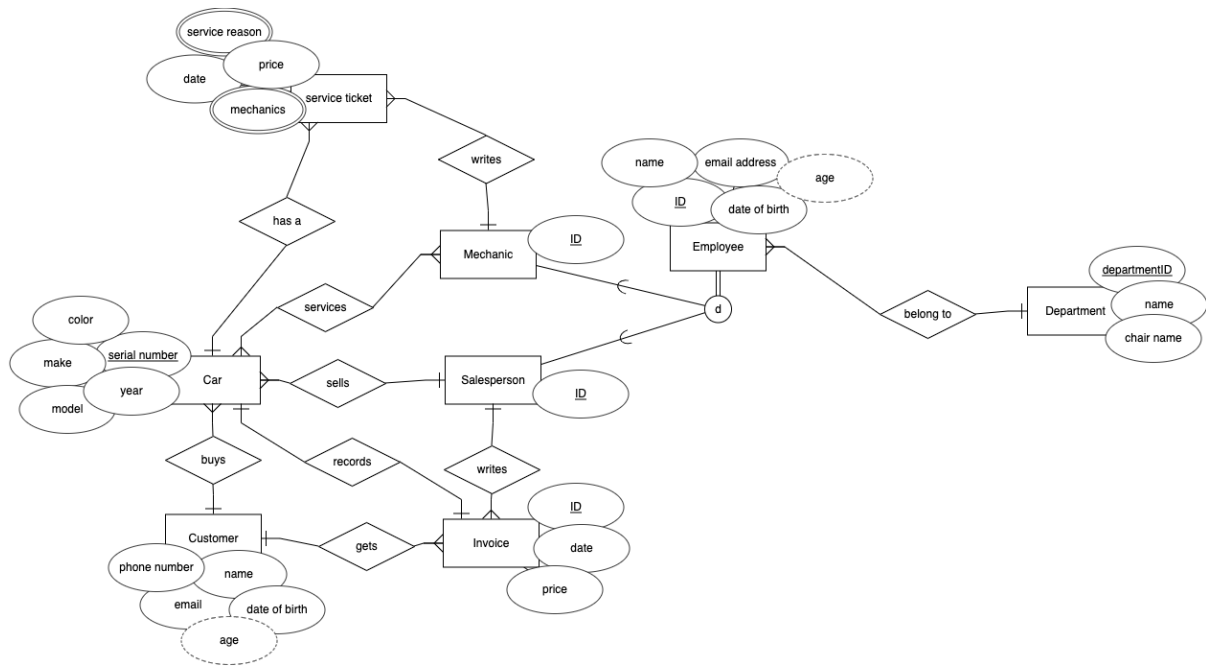
Question 2

Question 3

a) Problems with the ER model

1. ISBN attribute of the Book entity is not indicated as unique
   - Underline the text of the attribute
2. Title attribute of the Book entity is indicated as unique, when there can be multiple identical titles
   - Remove underline from the text of the attribute
3. Authors attribute of the Book entity is not indicated as multivalued
   - Change attribute shape to a double layered circle
4. Copy number attribute is not in ER model
   - Add number as an attribute of the copy weak entity
5. Library entity indicates overlapping subtypes, when they are in fact disjoint
   - Change the set symbol from an **o** to a **j**
6. Main library indicates at least one branch in relationship with a branch

- Change the cardinality contraint to (0,m) on the branch entity
7. Borrower does not have name attribute
    - Add name attribute to borrower entity

b) I believe that the single ternary relationship set is semantically identical to the 3 binary relationship sets because when drawn side by side, it is clear that there is no relationship being left out. If the binary relationship set shows E1 and E2 are related, and another binary relationship set shows that E2 and E3 are related, then it is clear that E1 and E3 both related by E2. The third binary set simply reinforces that point. Furthermore, given the entities do not change depending on their relationship set, there is no lost information whether the relationship set is binary or ternary.

Question 4

Part A

```
create table emp (
empno NUMBER(10) not null,
ename VARCHAR2(1000) not null,
job VARCHAR2(1000) not null,
mgr NUMBER(10),
hiredate DATE not null,
SAL NUMBER(10) not null,
COMM NUMBER(10),
Deptno     NUMBER(2) NOT NULL
);
```

Script Output x

Task completed in 0.095 seconds

Table EMP created.

	COLUMN_NAME	DATA_TYPE	NULLABLE	DATA_DEFAULT	COLUMN_ID	COMMENTS
1	EMPNO	NUMBER(10,0)	No	(null)	1	(null)
2	ENAME	VARCHAR2(1000 BYTE)	No	(null)	2	(null)
3	JOB	VARCHAR2(1000 BYTE)	No	(null)	3	(null)
4	MGR	NUMBER(10,0)	Yes	(null)	4	(null)
5	HIREDATE	DATE	No	(null)	5	(null)
6	SAL	NUMBER(10,0)	No	(null)	6	(null)
7	COMM	NUMBER(10,0)	Yes	(null)	7	(null)
8	DEPTNO	NUMBER(2,0)	No	(null)	8	(null)

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
7369	SMITH	CLERK	7902	17-DEC-10	800	(null)	20
7499	ALLEN	SALESMAN	7698	20-FEB-11	1600	300	30
7521	WARD	SALESMAN	7698	22-FEB-11	1250	200	30
7566	JONES	MANAGER	7839	02-APR-11	2975	30	20
7654	MARTIN	SALESMAN	7698	28-SEP-11	1250	300	30
7698	BLAKE	MANAGER	7839	01-APR-11	2850	(null)	30
7782	CLARK	MANAGER	7839	01-JUN-11	2450	(null)	10
7788	SCOTT	ANALYST	7566	09-OCT-12	3000	(null)	20
7839	KING	PRESIDENT	(null)	17-NOV-08	5000	3500	10
7844	TURNER	SALESMAN	7698	08-SEP-11	1500	0	30
7876	ADAMS	CLERK	7788	12-JAN-13	1100	(null)	20
7900	JAMES	CLERK	7698	03-OCT-11	950	(null)	30
7902	FORD	ANALYST	7566	03-OCT-11	3000	(null)	20
7934	MILLER	CLERK	7782	23-JAN-12	1300	(null)	10