Washington State University

School of Electrical Engineering and Computer Science

CptS 451 – Introduction to Database Systems

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Homework-2

Due Date: Friday, February 14th

Name: _____

Student Number:_____

Question:	Max points:	Score:
1	70	
2	30	
Total	100	

Question 1. (70 pts)

Consider the ER diagram illustrated in the following figure (this is similar to the ER diagram from HW1). Convert the ER diagram to relations and write SQL DDL statements for creating the tables for those relations. Pick suitable data types for each attribute. For string attributes pick reasonable lengths. Include the appropriate constraints (domain, primary key, foreign key, UNIQUE, and NULL constraints) in your SQL DDL statements. Mention the constraints that could not be enforced.

Note : For the one to many binary relations combine the relation with the many side.

For the superclass-subclass entity sets, translate them using ER-approach.
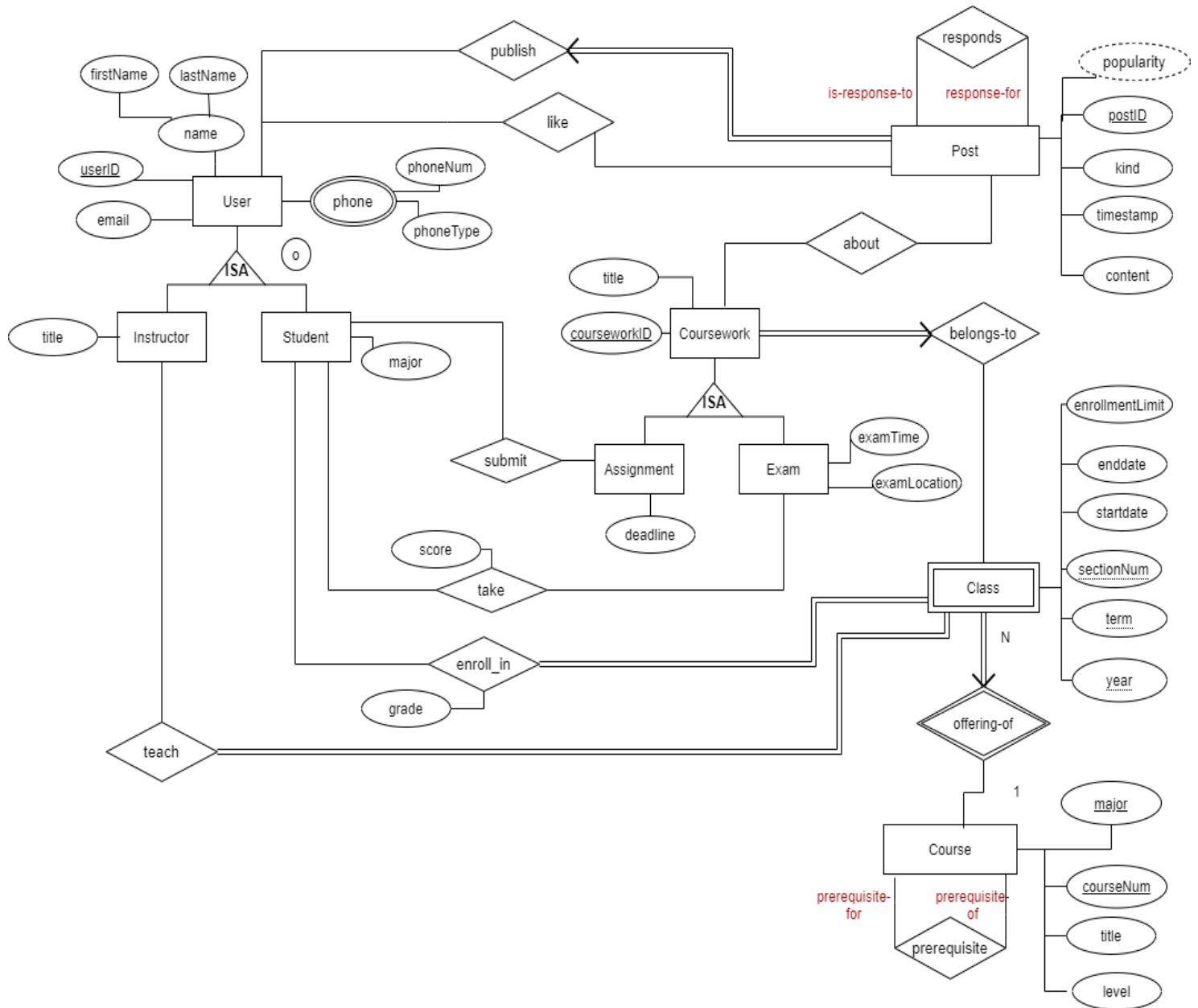
Question 2.

Consider the following relations:

Relation R1

	A	B	C
1	a1	b10	s100
2	a2	b10	s300
3	a2	b20	s200
4	a3	b10	s500
5	a4	b20	s100

Relation R2

	D	E	F
1	d10	50	100
2	d20	125	200
3	d30	150	300
4	d40	75	400
5	d50	100	200

Relation R3

	M	N	O	P
1	a1	b10	d10	25
2	a1	b10	d20	5
3	a2	b10	d20	20
4	a2	b20	d20	15
5	a3	b10	d40	15
6	a4	b20	d40	5
7	a4	b20	d50	10

Relation R4

	J	K	L
1	s200	d20	22
2	s500	d50	55

Relation R5

	S	T	U
1	s100	20	555
2	s200	20	333
3	s300	30	111
4	s400	30	555
5	s500	40	444

Primary Keys (refer to these as PK1 through PK5):
1. Relation **R1**: A,B
2. Relation **R2**: D
3. Relation **R3**: M,N,O
4. Relation **R4**: J,K
5. Relation **R5**: S

The following foreign key constraints are given for relations R1, R2, R3, R4 and R5:
(refer to these as FK1 through FK2)
1. **R3(MN)** references **R1(AB)**
2. **R3(O)** references **R2(D)**
3. **R1(C)** references **R5(S)**
4. **R4(J)** references **R5(S)**
5. **R4(K)** references **R2(D)**

For all foreign keys:
- assume "CASCADE" policy for delete operations, and
- assume "SET NULL" policy for update operations.

a) **(10pts)** For the operations given below, indicate whether execution of the operation would violate some "primary key" or "foreign key constraints". <u>If your answer is yes, specify the constraints (from the above list) that would be violated</u> (e.g. violates FK1) <u>Make the changes on the original tables for each operation below.</u>

    i.   Insert tuple ('a4', 'b10','s100') into R1.
    ii.   Insert tuple ('s200', 'd30', 11) into R4.
    iii.   Insert tuple ('a4', 'b10', 'd50', 5) into R3.
    iv.   Insert tuple ('s200', 10, 111) into R5.

b) **(20pts)** For the operations given below, indicate whether execution of the operation would violate any "primary key" or "foreign key constraints". If your answer is yes:
    i.   specify the constraints (from the above list) that would be violated, and
    ii.   apply "CASCADE" policy for delete operations, and apply "SET NULL" policy for update operations. Update the tables after applying those policies.
 (For deletions, give the relation name and row-number(s) of the tuple(s) that will be deleted. For updates, if the update is possible rewrite the changed tables. Otherwise explain why update can't be performed.) <u>Make the changes on the original tables for each operation below.</u>

    i.   Delete tuple ('s400', 30, 555) from R5.
    ii.   Delete tuple ('a3', 'b10', 's500') from R1.
    iii.   Delete tuple ('d20', 125, 200) from R2.
    iv.   Update tuple ('a1', 'b10', 's100') in R1 with values ('a1', 'b20', 's100')
    v.   Update tuple ('s100', 20, 555) in R5 with values ('s600',60,666)