Washington State University

School of Electrical Engineering and Computer Science

CptS 451 – Introduction to Database Systems

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Homework-2

Due Date: Sunday, May 24th

Name: _____

Student Number:_____

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

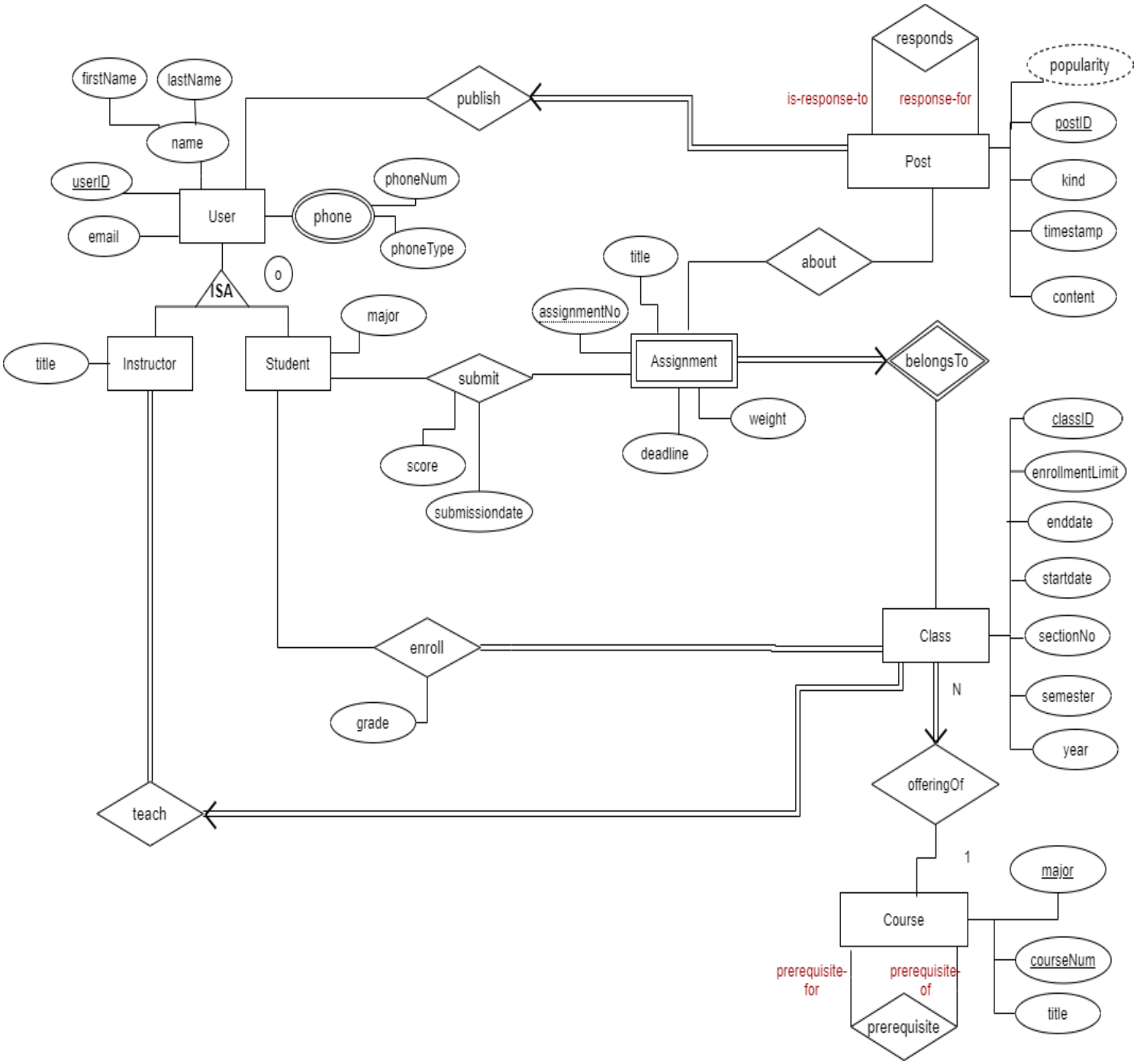
Question 1. (70 pts)

Consider the ER diagram illustrated in the following figure (This is a simplified version of 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	X
1	a1	x1
2	a2	x1
3	a3	x3
4	a4	x4
5	a5	x10

Relation R2

	B	Y
1	b1	y1
2	b2	y5
3	b3	y8
4	b5	y1

Relation R3

	C	A	B
1	c1	a1	b3
2	c2	a1	b2
3	c3	a2	b1
4	c4	a2	b3
5	c5	a2	b5
6	c6	a5	b1
7	c7	a5	b2

Relation R4

	D	C
1	d1	c3
2	d2	c3
3	d3	c3
4	d4	c1

Relation R5

	A	B	Z
1	a3	b1	z1
2	a3	b3	z2
3	a3	b5	z3

Primary Keys (refer to these as PK1 through PK5):

1. Relation **R1**: A
2. Relation **R2**: B
3. Relation **R3**: C
4. Relation **R4**: D
5. Relation **R4**: A,B

The following foreign key constraints are given for relations R1, R2, R3, R4, and R5:
(refer to these as FK1 through FK5)

1. **R3(A)** references **R1(A)**
2. **R3(B)** references **R2(B)**
3. **R4(C)** references **R3(C)**
4. **R5(A)** references **R1(A)**
5. **R5(B)** references **R2(B)**

For all foreign keys:

- assume "CASCADE" policy for delete operations, and
- assume "SET NULL" policy for update operations.

a) (6pts) 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 ('c8', 'a5','b4') into R3.
ii. Insert tuple ('a6', 'b6', 'z3') into R5.
iii. Insert tuple ('a5', 'b5', 'z3') into R5.
iv. Insert tuple ('a6', 'x1') into R1.
v. Insert tuple ('d5', 'c1') into R4.
vi. Insert tuple ('c9', NULL,NULL) into R3.

b) (24pts) 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.) Make the changes on the original tables for each operation below.

i. Delete tuple ('a3', 'x3') from R1.
ii. Delete tuple ('b1', 'y1') from R2.
iii. Delete tuple ('a3', 'b1', 'z1') from R5.
iv. Update tuple ('a4', 'x4') in R1 with values ('a6', 'x4').
v. Update tuple ('b3', 'y8') in R2 with values ('b6', 'y8').
vi. Update tuple ('c1', 'a1', 'b3') in R3 with values ('c1', 'a4', 'b4').

Submission Instructions:

HW2 will be submitted on Blackboard (HW2 dropbox under "Homeworks").

- Question 1: Write all the "CREATE TABLE" statements in text files and save it as HW2_Q1.sql
- Question 2: Write your answers in a Word file and save it as PDF. Name your file "HW2_Q2.pdf").
- Attach both files to the dropbox. Please don't zip the files.

Email submissions will not be accepted.