Quiz2 (Solution)

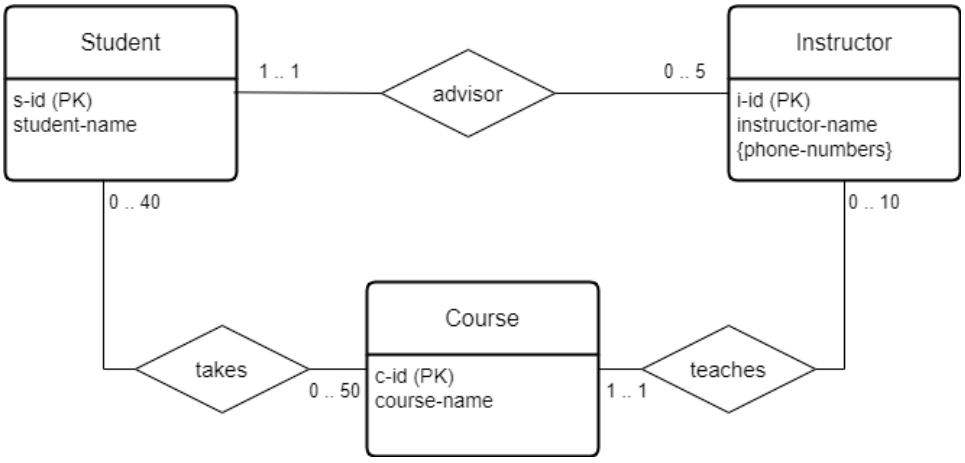
Database Systems
CE 373/ CS 355 (L2)

Fall 2023

Student Name: _____ **Student ID: _____**

Question 1
(3 points)

Consider the following E-R Diagram:



Identify whether the following statements are true or false:

a. The *Instructor* entity set has total participation in the *advisor* relationship set. (True / **False**)
b. There can be an instructor who is not teaching any course. (**True** / False)
c. There can be a student who has no advisor. (Ture / **False**)

Question 2
(5 points)

For the E-R Diagram in Q1, generate the corresponding relation schema. Identify relations, attributes, primary keys, and foreign keys.

Solution:

Student (s-id, student-name, advisor-id (FK to Instructor))

Instructor (i-id, instructor-name)

Phone-numbers (i-id (FK to Instructor), phone-number)

TakesCourse (s-id (FK to Student), c-id (FK to Course)

Course (c-id, course-name, i-id (FK to Instructor))

Question 3

(2 points)

Consider the following relation schema:

RoomCapacities (BuildingName, RoomNumber, TotalRoomsInBuilding, RoomCapacity)

Is this schema in 2NF. If not, convert this into 2NF. Justify the conversion process by identifying the relevant functional dependency.

Solution:

Schema is not in 2NF.
Violating Functional Dependency: {BuildingName} → {TotalRoomsInBuilding}
2NF Schema:

RoomCapacities (BuildingName, RoomNumber, RoomCapacity)
Buildings (BuildingName, TotalRoomsInBuilding)