CMPE 351 Database Management System Midterm Examination

04 November 2019 17:00

Duration 75 Mins

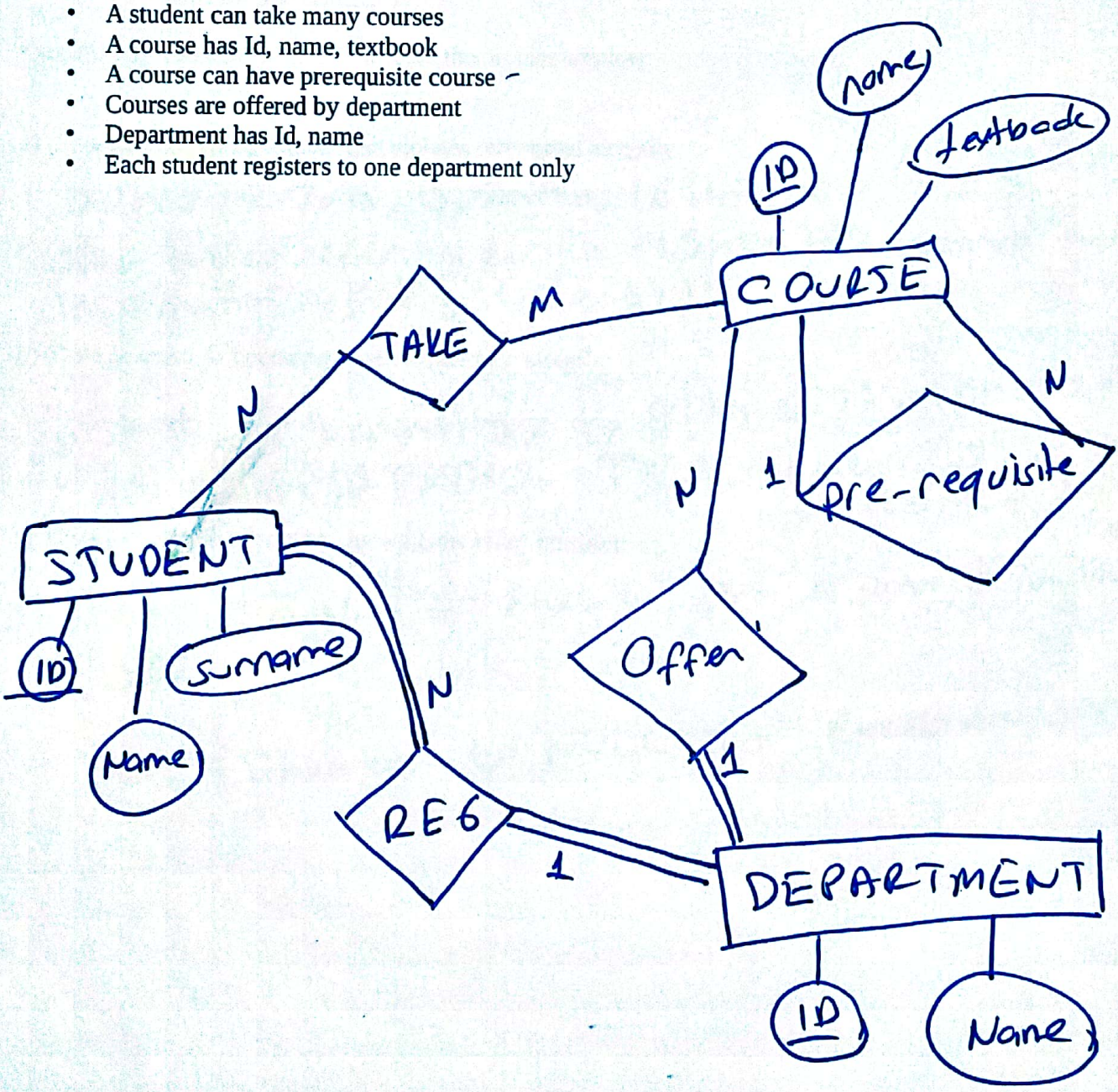
Name:

ID:

Signature:

Question 1) Draw Entity Relation Diagram for the following software requirements

- A student has Id, name, surname
- A student can take many courses
- A course has Id, name, textbook
- A course can have prerequisite course
- Courses are offered by department
- Department has Id, name
- Each student registers to one department only



Question 2) Match **Informal Terms** on the left with **formal terms** on the right

1. Table C
2. Column Header E
3. All possible Column Values D
4. Row B
5. Table Definition F
6. Populated Table A

A) State of the Relation 6
B) Tuple 4
C) Relation 1
D) Domain 3
E) Attribute 2
F) Schema of a Relation 5

Question 3) Use Company DB to solve the problems below

a) Give an example operation that violates referential integrity

Delete < John, B, Smith, 123456789, ... >
Other tables refering to FK 123456789 cannot access information regarding 123456789

b) Give an example operation that violates key integrity

insert < Accounting, 5, 33344555, 1999-9-01 >
into DEPARTMENT TABLE> where "5" is stored as two dept.

c) Give an example operation that violates entity integrity

set SSN-No to NULL for <John, B, Smith .....
OR
set Dnumber to NULL for Research Dept

Question 4)

A) Write a relational algebra to retrieve the fname and the dependent name (if applicable, otherwise Null *) of employees who work on the projects located in Houston.
(* If there is no any dependent of an employee, we keep his/her information but dependent name column will be set to NULL)

PRJ ← $\sigma_{Plocation = "Houston"}$ PROJECT

Emp(SSN) ← π_{ESSN} (WORKS_ON $\bowtie_{Pno = Pnumber}$ PRJ)

Emp2 ← Emp [redacted] * Employee

RESULT ← $\pi_{fname, dependent\_name}$ (Emp2 $\bowtie_{SSN == ESSN}$ DEPENDENT)

B) What would be the output of the query in 4.A (Above)

Fname	Dependent Name
Franklin	Alice
franklin	Theodore
franklin	Joy
Jemifer	Abner
Ramesh	NULL
James	NULL