National University of Computer and Emerging Sciences

Program: BS(CS)	**Total Marks:** 20 marks
Section: ____	**Time Allowed:** 20 minutes
Date: November 27, 2023	**Instructor:** Bilal Khalid Dar
Student Name: _____	**Student Signature:**
Roll No . _____	_____

Important Instructions for attempting Quiz

READ ALL QUESTIONS AND INSTRUCTIONS CAREFULLY

- Carrying of Mobile phone, digital dairies, digital watch or any electronic device is not allowed.
- Use only Black/Blue color pen. Sharing of anything is forbidden.
- CUTTING IS NOT ALLOWED. Write your answer in the provided space.
- All questions are self-explanatory and require no further explanations during exam time.
- **RETURN the Quiz paper after completion.**

Quiz 8 – A – DB

Convert the following statements into relational algebra expressions and SQL Queries. Consider following schema to provide all answers.

Professor(<u>ssn</u>, profname, status)

Course(<u>crscode</u>, crsname, credits)

Taught(<u>crscode, semester</u>, ssn)

Return those professors ssn who have taught 'csc6710' but never 'csc7710'.

$\pi_{ssn}(\sigma_{crscode='csc6710'}(Taught)) - \pi_{ssn}(\sigma_{crscode='csc7710'}(Taught))$

(SELECT ssn

From Taught

Where crscode = 'CSC6710')

EXCEPT

(SELECT ssn

From Taught

Where crscode = 'CSC7710'))

Return those courses that have been taught ONLY by junior professors.

$\pi_{crscode}$(Course) - $\pi_{crscode}$ ($\sigma_{status\neq'Junior'}$(Professor) ⋈ Taught)

SELECT crscode

FROM Course C

WHERE c.crscode NOT IN(

    (SELECT crscode

     FROM Taught T, Professor P

     WHERE T.ssn = P.ssn AND P.status='Junior'

)

List the names of those courses that professor Smith have never taught.

$\pi_{crsname}$(Course)-$\pi_{crsname}$($\sigma_{profname='Smith'}$(Professor) ⋈ (Taught) ⋈ Course)

SELECT crsname

FROM Course C

WHERE NOT EXISTS

    SELECT *

    FROM Professor P, Taught T

    WHERE P.profname='Smith' AND P.ssn = T.ssn AND   T.crscode = C.crscode

)

List all the course names that professor 'Smith" taught in Fall of 2007.

$\pi_{crsname}$($\sigma_{profname='Smith'}$(Professor) ⋈ $\sigma_{semester='f2007'}$(Taught))

Course)

SELECT crsname

FROM Professor P, Taught T, Course C

WHERE P.profname = 'Smith' AND P.ssn = T.ssn AND T.semester = 'F2007' AND T.crscode = C.crscode

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Return the names of full professors who ever taught 'CSC6710'.

$\pi_{profname}(\sigma_{crscode='csc6710'}(Taught)\ \sigma_{status='full'}(Professor))$

SELECT P.profname

FROM Professor P, Taught T

WHERE P.status = 'full' AND P.ssn = T.ssn AND T.crscode = 'CSC6710'

Return the names of professors who ever taught 'CSC6710'.

$\pi_{profname}(\sigma_{crscode='csc6710'}(Taught)\qquad Professor)$

SELECT P.profname

FROM Professor P, Taught T

WHERE P.ssn = T.ssn AND T.crscode = 'CSC6710'

Return those courses that have been taught at least in two semesters.

$\pi_{crscode}(\sigma_{semester1 <> semester2}($

Taught[crscode, ssn1, semester1]   Taught[crscode, ssn2, semester2]))

SELECT T1.crscode

FROM Taught T1, Taught T2

WHERE T1.crscode=T2.crscode AND T1.semester <> T2.semester

Return those courses that have never been taught. $\pi_{crscode}(Course)-\pi_{crscode}(Taught)$ (SELECT crscode FROM Course) EXCEPT (SELECT crscode FROM TAUGHT)
Return those professors who taught 'CSC6710' or 'CSC7710" but not both. $\pi_{ssn}(\sigma_{crscode<>'csc7710' \lor crscode='csc7710'}(Taught))-(\pi_{ssn}(\sigma_{crscode='csc6710'}(Taught)) \cap \pi_{ssn}(\sigma_{crscode='csc7710'}(Taught)))$ (SELECT ssn FROM Taught T WHERE T.crscode='CSC6710' OR T.crscode='CSC7710') Except (SELECT T1.ssn From Taught T1, Taught T2, Where T1.crscode = 'CSC6710') AND T2.crscode='CSC7710' AND T1.ssn=T2.ssn)