User Management

Q1:

There three students users S1, S2 and S3, two teacher users T1 and T2 and one departmental head (Dr. Sajjad) user.

The relational schema has been given as follows:

Student (Sid, name, street, city. Mobile, email, CGPA, age, tot-cred)
Enroll (course-id, Sid, semester, year, grade)
Course (course-id, title, credit-hour)
Teacher (Tid, name, designation, street, city, Mobile, email, salary, date-of-birth)
Offer (course-id, Tid, semester, year, remuneration)

S1, S2 and S3 can insert and update on student and enroll table, T1 and T2 can insert and update on teacher and offer table and head can insert, delete and update to all tables.

Manage these users by

i. Granting individual privileges
ii. Creating and granting role (st for student, tch for teacher and hd for head).
iii. Give a comparison of these two methods.

Q2:

New head is Dr. Rashed. How can you authorize Dr. rashed by

i. Revoking and Granting individual privileges
ii. Revoking and granting role.

Integrity Constraint

Q1:
Given the schema
Student (Sid, name, street, city. Mobile, email, CGPA, age, tot-cred)
Enroll (course-id, Sid, semester, year, grade)

Define DDL to have the following integrity constraints:

i. The composite primary key will be (course-id, Sid, semester, year).
ii. Semester can be only ‘Spring’, ’Summer’ or ’Fall’.

iii. Year must be higher than 2017.
iv. Grade must be 0 to 4
v. Sid not present in student is not allowed in the enroll table.

Function and Procedure

Q.1. Given the relation
Instructor(id, name, dept_name, salary).

Write a function named salary-status that will take id as input parameter and return the salary status as follows:
If salary is less than 50000, the status will be ‘low income’
If salary is less than 80000 and greater than or equal to 50000, the status is ‘middle income’
Otherwise, the salary status is ‘high income’.

Write an SQL statement to find the id and salary status of all instructors.

Q2: Given the relation
student(id, name, dept_name, tot-credit).

Write a function named credit-status that will take id as input parameter and return the credit status as follows:
If total credit is less than 100, the status will be ‘Junior’
Otherwise, the status is ‘Senior’.

Write an SQL statement to find the id and credit status of all students.

Q. 3: Given the parents of students schema as follows:

Student_parents(F-NID, M-NID, S-id, F-name, M-name, street, city, annual-income)

Write a function named s-p-income-status that will take S-id type integer as input and return the status of the income as follows:

If annual-income is less than or equal to 2,50,000, the status is ‘Poor’. If annual-income is less than or equal to 30,00,000 and greater than 2,50,000, the status is ‘Middle Class’. Others are ‘Rich’.

Write SQL statement to find S-id, F-name and income status of all students of Dhaka city.

Procedure

Q4. Given the relation
Instructor(id, name, dept_name, salary).

Write a procedure named salary-update that will take two ids (i-id1 and i-id2) as input parameter and update the salaries as follows:
Consider i-id2 is always greater than i-id1.
For all instructors id less than or equal to i-id1, salary will be increased 20%.
For all instructors id less than or equal to i-id2 and greater than i-id1, salary will be increased 15%.
For all other instructors, salary will be increased 10%.

Call the procedure for updating salaries of instructors as above with i-di1 = 50 and i-id2 =80.

Q. 5: The courses taken by students have been given in the schema as follows:

Takes (id, course-id, semester, year, section-id, credit-hour, grade)

Write a procedure course-count-tot-credit that will have id (integer type) as input variable and two output variables t-course-count (integer type) and tot-credit (integer type). The total number of courses taken by the student id will be assigned to t-course-count and sum of the credit-hour of all courses taken by the student id will be assigned to tot-credit.

Call the procedure with id = 1001 and two variables t-count and t-ctrdit of integer type.

Index, Transaction and Recovery

Q. 1:
Give the following relation:
Person (NID, name, DOB, street, city)
Person relation is stored physically sorted order of NID. Answer the following questions.

i. Which type of indexing is created for DOB (primary/secondary)?
ii. Which type of indexing is created for ID (primary/secondary)?
iii. Why secondary index must be dense index?

Q. 2:
Write the abbreviation of ACID in transaction. Show the transaction states in a diagram.

Q. 3:
When is trigger executed in Database? Explain with a real life example (You do not need to write any code in SQL).

Q. 4: Write the following transactions:

a. transfer Taka 500 from account A to Account B
b. Give 10% profit to accounts A, B and C
c. Debit taka 1000 from B
d. Credit Tk. 2000 to C

Q. 5: Prepare a serial schedule for 4.a and 4.b

Q 6: Prepare a concurrent schedule for 4.a and 4.b

Q7: Write log records for Q 5

Q8: Write log records for Q 6

Q9: Explain with an example, how transactions are recovered from failure using the log records.

Q 10: A table will be given. You will have to created dense index, sparse index, secondary index with bucket. SQL will be given. You will have to explain how the SQL will be executed using the index.