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ISLAMIC UNIVERSITY OF TECHNOLOGY (IUT)
ORGANISATION OF ISLAMIC COOPERATION (OIC)
Department of Computer Science and Engineering (CSE)

MID SEMESTER EXAMINATION
DURATION: 1 HOUR 30 MINUTES

SUMMER SEMESTER, 2021-2022
FULL MARKS: 50

CSE 4409: Database Management Systems II

Programmable calculators are not allowed. Do not write anything on the question paper.
 Answer **all 3 (three)** questions. Figures in the right margin indicate full marks of questions whereas corresponding CO and PO are written within parentheses.

1. a) Consider the following code fragment in PL/SQL:

```

1 CREATE OR REPLACE FUNCTION GET_STATUS (P_NAME IN VARCHAR2)
2   RETURN NUMBER (10, 2)
3 IS
4   V_SALARY NUMBER := 0;
5   V_TOTAL NUMBER;
6 BEGIN
7   SELECT SALARY INTO V_SALARY
8   FROM EMP
9   WHERE NAME LIKE %P_NAME%;
10  P_NAME := "TEST";
11  V_TOTAL = V_SALARY * 12;
12  RETURN NVL (V_TOTAL, -1);
13 END;
```

5
(CO1)
(PO1)

Code Snippet 1: Code segment for Question 1.a).

Assume the table with records exists and attribute names are correct. Your task is to identify and explain (briefly) the errors (if any) in the above code segment.

- b) State the main advantage of using %TYPE over the basic declaration inside any PL/SQL sub-program.

2
(CO1)
(PO1)

- c) Consider a table EMP (ID, Name, DOB, Salary, Performance). Now write an UPDATE SQL statement to decrease the salary of the employees by 25% who now receive greater than the existing average salary of the company.

3
(CO1)
(PO1)

Write an anonymous block that will execute the above UPDATE statement. If none of the records are affected by the statement then it will print "NO RECORDS HAVE BEEN UPDATED", otherwise it will count the total number (x) of updated records and print the message "A TOTAL OF x RECORDS HAVE BEEN UPDATED".

2. Consider the following description:

Planet Mars (PM) is a large telecom company of Bangladesh. It has customers over 10 million. Only registered customers are eligible to get SIM from PM. Registration requires customer's basic information such as Name, DOB, Address. A customer may get a number of SIMs (i.e. mobile numbers) but he/she registers only once. The company runs a number of *plans* where the important information are *plan name* and *charge per minute*. A customer may have multiple SIMs along with its plan information. Customer's outgoing calls are logged only. Relevant information for each outgoing call is CallID, SIM no (i.e. mobile no), CallBegin (date-time of call initialization), CallEnd (date-time when the call has been finished), and charge (relevant charge for the call based on both plan and duration).

Your tasks are:

- a) Create the required DDL statements to design the given system. You are free to choose attribute name and type as long as they suffice the system requirement. 5
(CO1)
(PO1)
- b) Write a PL/SQL function using the following guideline: 10
Input: SIM no, CallBegin Time, CallEnd Time (CO1)
Output: Charge calculated based on both plan and duration (PO1)
Algorithm: For all charge calculation 1 minute pulse is maintained (i.e. 1 min 5 sec will be considered as 2 minutes!).
- c) The format of the CallID is YYYYMMDD . NNNNNNNN where YYYYMMDD are the year, month (1 to 12) and day (day of the month) based on the CallBegin Date-time while NNNNNNNN is the incrementing numeric value. For instance the first call on January 23, 2023 will have a CallID 20230123.00000001 10
(CO1)
(PO1)

Write a function in PL/SQL to generate the CallID as described and place it in a suitable trigger.

3. Consider the following high-level system requirement: 15
Department of Computer Science and Engineering (CSE) of IUT has got a Merit Scholarship (MS) (CO3)
fund for only 2nd year students of Software Engineering. (PO3)

Entities needed:

Students (ID, Name, Program, Year, CGPA)
Misconducts (StudentID, date-time, description)
StudentTransactions (StudentID, date-time, Amount (paid))

Policy for scholarship distribution: The initial eligibility for MS is:

- Student must have a CGPA of 3.5 or above
- He/She should not be involved in any misconduct as recorded in Misconducts entity (a student with higher CGPA but having misconduct record is automatically disqualified)
- Student with higher CGPA will be given preference
- It may be assumed that no two students have the same CGPA.

The total MS amount for each year is dynamic (changes over time). So, there is no assurance how many students will avail it. In other words it is distributed as long as fund is available. Whenever a student is selected and fund is available an appropriate transaction is made in the StudentTransactions entity.

Your task is to create a PL/SQL function as follows:

Input: Total MS amount, per student amount

Output: Number of students who received MS, number of students who were initially selected but did not receive MS.

Algorithm: Disburse Merit Scholarship as per the given policy.