Database Systems (CS2005)   Sessional-1 Exam

Date: Tue, 25 Feb 2025
Course Instructor(s)
IR, ZA, MN, AA, HI, MM, SA

Total Time (Hrs.): 1
Total Marks: 30
Total Questions: 3

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Roll No   Section   Student Signature

Solution

Instructions: Attempt all the questions in the space provided. Extra sheets will not be checked.

Question: A company has developed the following DB schema for tracking the inventory assigned.

Office

OfficeNo	OfficeName	Location	PhoneExtention
1	Headquarters	Islamabad	1001
2	Finance	Lahore	2002
3	IT Department	Karachi	3003
4	HR Department	Lahore	4004

Employee

EmployeeID	Name	OfficeNo	Department	JobTitle
101	Ali Jawad	4	HR	Manager
103	Sara Dua	3	IT	Software Engineer
104	Dawood Ali	4	HR	Recruiter
106	Fraz Tahir	3	IT	System Administrator
107	Grace White	2	Finance	Financial Analyst

Inventory

InventoryID	ItemName	Category	Quantity
201	Laptop	Electronics	10
202	Printer	Electronics	5
204	Desk Chair	Furniture	20
206	Server	Electronics	2
207	File Cabinet	Furniture	15
208	Pen holder	Accessories	40

InventoryAssignment

AssignmentID	EmployeeID	InventoryId	DateAssigned	QuantityAssigned	Status
301	103	201	2025-02-01	1	Returned
302	101	202	2025-02-02	1	Assigned
304	104	204	2025-02-04	2	Assigned
306	106	201	2025-02-06	1	Returned
307	103	207	2024-02-07	2	Assigned

The following constraints are applied to the above schema.

- **Table Employee** constraint name DF1 default officeno is 1, constraint name FKE foreign key (officeno) references office(officeno) on delete cascade on update set default.

- **Table InventoryAssignment** constraint name fkIA1 foreign key (employeeid) references employee(employeeid) on delete no action, constraint name fIA2 foreign key (inventoryid) references Inventory(inventoryid) on delete cascade on update cascade

CLO # 4: *Use SQL for database definition and manipulation in any DBMS.*

Q. No 1: Consider the above database and specify the following queries in *SQL.* [15]

a) Retrieve the names of the Inventory items that are currently (as of today) not assigned to any employee but previously were assigned to an employee.

```
SELECT DISTINCT I.ItemName
FROM Inventory I
JOIN InventoryAssignment IA1 ON I.InventoryID = IA1.InventoryId
LEFT JOIN InventoryAssignment IA2
    ON I.InventoryID = IA2.InventoryId AND IA2.Status = 'Assigned'
WHERE IA1.Status = 'Returned' AND IA2.InventoryId IS NULL;
```

```
SELECT DISTINCT I.ItemName
FROM Inventory I
JOIN InventoryAssignment IA ON I.InventoryID = IA.InventoryId
WHERE IA.Status = 'Returned'
AND I.InventoryID NOT IN (
    SELECT InventoryId
    FROM InventoryAssignment
    WHERE Status = 'Assigned'
);
```

b) Display the number and name of the office, which is assigned to at least two or more employees with the Job title 'Instructors.'

```
SELECT O.OfficeNo, O.OfficeName
FROM Office O
JOIN Employee E ON O.OfficeNo = E.OfficeNo
WHERE E.JobTitle = 'Instructors'
GROUP BY O.OfficeNo, O.OfficeName
HAVING COUNT(E.EmployeeID) >= 2;
```

c) List the names of employees in the CS department who are not assigned an office but have been assigned a printer and a laptop.

```
SELECT DISTINCT E.Name

FROM Employee E

JOIN InventoryAssignment IA1 ON E.EmployeeID = IA1.EmployeeID

JOIN Inventory I1 ON IA1.InventoryId = I1.InventoryID AND I1.ItemName = 'Printer'

JOIN InventoryAssignment IA2 ON E.EmployeeID = IA2.EmployeeID

JOIN Inventory I2 ON IA2.InventoryId = I2.InventoryID AND I2.ItemName = 'Laptop'

WHERE E.Department = 'CS' AND E.OfficeNo IS NULL;
```
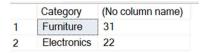
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CLO # 4: *Use SQL for database definition and manipulation in any DBMS.*

Q. No 2: Consider the given database and give the output in the form of DB relation. Also, explain in one sentence what the query is doing. [3+3+4]

a) Select Category, sum(Quantity) - sum(QuantityAssigned) From Inventory I join InventoryAssignment ia on ia.InventoryID=i.InventoryID Group by Category   Having count(*) >1   Order by Category desc

	Category	(No column name)
1	Furniture	31
2	Electronics	22

b) Select InventoryID From Inventory Where Category like 'E%' Intersect Select InventoryID From InventoryAssignment IA join Employee E on IA.EmployeeID=E.EmployeeID Where year(dateassigned)=2025 And Department=`IT`

	InventoryID
1	201

c)   Select E.Name, IA.Status, OfficeName From (Office O Left join Employee E on O.OfficeNo=E.OfficeNo) Left join InventoryAssignment IA on E.EmployeeID=IA.EmployeeID

⊞ Results **🗊 Messages**

	Name	Status	OfficeName
1	NULL	NULL	Headquarter
2	Grace White	NULL	Finance department
3	Sara Dua	Returned	IT department
4	Sara Dua	Assigned	IT department
5	Fraz Tahir	Returned	IT department
6	Ali Jawad	Assigned	HR department
7	Dawood Ali	Assigned	HR department

CLO # 4: *Use SQL for database definition and manipulation in any DBMS.*

Q. No 3: Consider the given database and apply the following operations. State if the operation will be carried out successfully or not. In case of successful operation, indicate the changes that will be made to the above database. Also, state all the integrity constraints violated by each operation, if any. Please note that all operations are independent. [5]

  a) Delete from Employee;

unsuccessful

Integrity constraint violation

  b) Delete from Office Where OfficeNo = 3;

unsuccessful

Integrity constraint violation

  c) Update Office Set OfficeNo = 6 Where OfficeNo = 4;

1 row affected in office.

  d) Delete from Office WHERE OfficeNo = 1;

1 row affected

  e) Delete from InventoryAssignment where Status=`Returned'

2 rows affected