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| **Database Systems (CS2005)** |
| Date: Tue, 25 Feb 2025 |
| **Course Instructor(s)** |
| IR, ZA, MN, AA, HI, MM, SA |

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| **Sessional-1 Exam** | |
| **Total Time (Hrs.):** | **1** |
| **Total Marks:** | **30** |
| **Total Questions:** | **3** |

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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.**

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| **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]

1. 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'

);

1. 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;

1. 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

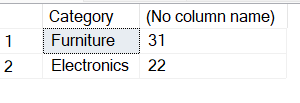
JOIN Inventory I2 ON IA2.InventoryId = I2.InventoryID AND I2.ItemName = 'Laptop'

WHERE E.Department = 'CS' AND E.OfficeNo IS NULL;

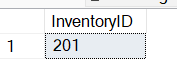
***CLO # 4:*** *Use SQL for database definition and manipulation in any DBMS.*

**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]

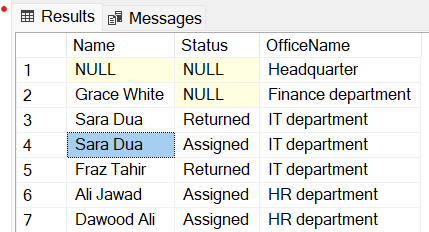
a) Select Category, sum(Quantity) - sum(QuantityAssigned) From Inventory I join InventoryAssignment ia on ia.InventoryID=i.InventoryID Group by Category Having count(\*) >1 Order by Category desc



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`



1. 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

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***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]

1. Delete from Employee;

unsuccessful

Integrity constraint violation

1. Delete from Office Where OfficeNo = 3;

unsuccessful

Integrity constraint violation

1. Update Office Set OfficeNo = 6 Where OfficeNo = 4;

1 row affected in office.

1. Delete from Office WHERE OfficeNo = 1;

1 row affected

1. Delete from InventoryAssignment where Status=`Returned’

2 rows affected