Midterm Exam – CS 631
Name: Precious Emakenemi

[Let's assume sharing office = sharing room]

*1. $\Pi_{\text{EID, ENAME}}$ (IN_BUILDING $\bowtie_{\text{EID = EID}}$ ($\sigma_{\text{ENAME = 'John'}}$ EMPLOYEE) $\bowtie_{\text{BID=BID} \wedge \text{ROOM=ROOM}}$ (IN_BUILDING $\bowtie_{\text{EID = EID}}$ EMPLOYEE))

SELECT I.EID, E.EName
FROM IN_BUILDING I, EMPLOYEE E
WHERE E.EName <> "John"
AND E.EID = I.EID AND I.BID IN
       (SELECT B.BID
       FROM IN_BUILDING B, Employee E
       WHERE E.Ename = "John" AND B.EID = E.EID
       AND ROOM IN
              (SELECT B.ROOM
              FROM IN_BUILDING B, EMPLOYEE E
              WHERE E.EName = "John"
              AND I.EID = E.EID
              GROUP_BY EID))

2. $\Pi_{\text{EID, ENAME, DID}}$ (MANAGES_DEPARTMENT $\bowtie_{\text{DID = DID}}$ (IN_DEPARTMENT $\bowtie_{\text{EID = EID}}$ ($\sigma_{\text{ENAME = 'John'}}$ EMPLOYEE))

SELECT D.DID , E.EID, E.EName,
FROM DEPARTMENT D, EMPLOYEE E, MANAGES_DEPARTMENT M
WHERE E.EID =M.EID AND D.DID = M.DID
AND D.DID IN
       (SELECT N.DID
       FROM EMPLOYEE E, IN_DEPARTMENT N
       WHERE E.EID = N.EID AND E.ENAME = "John")

3. T1 <- Π_{DID}($\sigma_{\text{DName = 'COMPUTING'}}$ DEPARTMENT))
T2 <- Π_{EID} (IN_DEPARTMENT $\bowtie_{\text{DID=DID}}$ T1)
T3 <- Π_{BID} (IN_BUILDING $\bowtie_{\text{EID=EID}}$ T2)
$\Pi_{\text{BID, BName}}$ = (BUILDING $\bowtie_{\text{BID=BID}}$ T3)

SELECT B.BID, B.BNAME
FROM BUILDING B, IN_BUILDING I, IN_DEPARTMENT X, DEPARTMENT D
WHERE D.DID = X.DID

AND DName = "Computing"
AND I.BID = B.BID AND X.EID = I.EID
GROUP BY B.BID

4. T1 <- $\Pi_{EID}(\sigma_{DName = 'COMPUTING'} (DEPARTMENT \bowtie_{DID=DID} IN\_DEPARTMENT))$

T2 <- $\Pi_{EID}(\sigma_{DName = 'FINANCE'} (DEPARTMENT \bowtie_{DID=DID} IN\_DEPARTMENT))$

T3 <- T1 $\cap$ T2

=> $\Pi_{EName} (T3 \bowtie_{EID=EID} EMPLOYEE)$

SELECT EName from Employee
WHERE EID IN
        (SELECT I.EID
        FROM IN_DEPARTMENT I, IN_DEPARTMENT D
        WHERE I.DID IN (SELECT DID FROM DEPARTMENT WHERE DName = "Finance")
        AND D.DID IN (SELECT DID FROM DEPARTMENT WHERE DName = "Computing")
        AND I.EID = D.EID)

5. T1 <- $\Pi_{EID}(EMPLOYEE)$
    T2 <- $\Pi_{EID}(IN\_DEPARTMENT \bowtie_{DID=DID} (\sigma_{DName = 'Computing'} DEPARTMENT))$
    T3 = T1 – T2
    $\Pi_{EName, EID}(T3 \bowtie_{EID=EID} EMPLOYEE)$

NOT(Employees that work for the Computing Department)
SELECT EName, EID FROM EMPLOYEE
WHERE EID NOT IN
        (SELECT EID FROM IN_DEPARTMENT
        WHERE DID IN
                (SELECT DID FROM DEPARTMENT
                WHERE DName = "Computing"))

*6. T1 <- $\Pi_{EID, DID} (IN\_DEPARTMENT \bowtie_{DID=DID} (\sigma_{DName = 'Computing'} DEPARTMENT))$

$\rho_{T2} (EID, No\_of\_department)$ EID $\exists$ count_distinct(DID) (T1)
$\Pi_{EID} (\sigma_{No\_of\_department = '1'} (T2))$

*SELECT EName, EID FROM EMPLOYEE
WHERE EID

IN
     (SELECT X.EID
     FROM IN_DEPARTMENT X, IN_DEPARTMENT Y
     WHERE X.DID IN
        (SELECT DID FROM DEPARTMENT
        WHERE DName = "Computing")
     AND X.EID = Y.EID
     GROUP BY X.EID
     Having COUNT (X.EID) = "1")

7. SELECT EID, EName
FROM EMPLOYEE
WHERE EID NOT IN
     (SELECT DISTINCT EID
     FROM IN_DEPARTMENT)

8. SELECT I.DID, D.DName, COUNT (I.DID) AS No_of_Employees
FROM IN_DEPARTMENT I, DEPARTMENT D
WHERE I.DID = D.DID
GROUP BY DID

9. *SELECT I.DID, D.DName, COUNT(I.DID)
FROM IN_DEPARTMENT I, DEPARTMENT D
WHERE Percent_Time = "100"
AND I.DID = D.DID
GROUP BY I.DID
HAVING COUNT(I.DID) =
     (SELECT max(X)
     FROM
     (SELECT COUNT(DID) AS X
     FROM IN_DEPARTMENT
     WHERE Percent_Time = "100"
     GROUP By DID
) AS Y)

10. *SELECT EID
FROM IN_DEPARTMENT P1, IN_DEPARTMENT P2
WHERE P1.DID = P2.DID