DBMS LAB-4

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Question 1

(a) $\sigma_{(stock<reorderlevel)}(items)$

```
SELECT *
FROM items
WHERE stock < reorderlevel;
```

(b) ${}_{invdate}\mathcal{F}_{sum(qty*price)}$(sales $\bowtie_{s.invno=sd.invno}$ salesdetails)

```
SELECT invdate, sum(qty*price)
FROM sales as s
JOIN salesdetails as sd
ON (s.invno=sd.invno)
GROUP BY invdate;
```

(c) $\sigma(({}_{custid}\mathcal{F}_{sum(qty*price)}$(salesdetails $\bowtie_{s.invno=sd.invno}$ sales)) $\bowtie_{s.customerid=c.custid}$ customer)ORDER BY sum desc LIMIT 1

```
SELECT *
FROM ( SELECT sum(qty*price), custid
        FROM (salesdetails as sd
        JOIN sales as s
        ON (s.invno=sd.invno) )
JOIN customer as c
ON (s.customerid=c.custid)
GROUP BY c.custid) as r1
ORDER BY sum desc LIMIT 1;
```

(d) ${}_{itemcode}\mathcal{F}_{sum(qty)}(salesdetails)$ORDER BY sum desc LIMIT 1 OFFSET 1

```
SELECT sum(qty)
FROM salesdetails
GROUP BY itemcode
ORDER BY sum desc
LIMIT 1 OFFSET 1;
```

(e) ${}_{customerid}\mathcal{F}_{sum(sd.price-i.averagepurchaseprice)}$(salesdetails $\bowtie_{sd.invno=s.invno}$ sales $\bowtie_{sd.itemcode=i.code}$ items)ORDER BY sum desc LIMIT 1

```
SELECT sum(sd.price-i.averagepurchaseprice), customerid
```

FROM (salesdetails as sd
JOIN sales as s
ON (sd.invno=s.invno)
JOIN items as i
ON (sd.itemcode=i.code))
GROUP BY customerid
ORDER BY sum desc LIMIT 1;

(f) ${}_{itemcode,year}\mathscr{F}_{(sum(qty),itemcode,extract(yearFROMinvdate)\longrightarrow year)}$(salesdetails $\bowtie_{sd.invno=s.invno}$ sales)ORDER BY sum desc LIMIT 1

SELECT sum(qty), sd.itemcode , extract(year FROM invdate) as year
FROM salesdetails as sd
JOIN sales as s
ON (sd.invno=s.invno)
GROUP BY sd.itemcode, extract(year FROM invdate)
ORDER BY sum desc LIMIT 1;

(g) $\pi_{(i.code,c.*)}(\sigma$(salesdetails $\bowtie_{s.invno=sd.invno}$ sales $\bowtie_{s.customerid=c.custid}$ customer $\bowtie\sqsubset_{i.code=sd.itemcode}$ items))

SELECT i.code , c.*
FROM salesdetails as sd
JOIN sales as s
ON s.invno=sd.invno
JOIN customer as c
ON s.customerid=c.custid
RIGHT JOIN items as i
ON i.code=sd.itemcode;

Question 2

(a) $\pi_{(r1.instructorid,r2.instructorname,r2.coursename,r1.acadyear,r1.semester)}$(
(${}_{instructorid,semester,acadyear}\mathscr{F}_{count(courseno)}$(offers)HAVING count(courseno)>1) $\longrightarrow$ $r1$ $\bowtie_{(r1.instructorid=r2.instructorid\,\&\,r1.semester=r2.semester\,\&\,r1.acadyear=r2.acadyear)}$
(${}_{instructorid,semester,acadyear}\mathscr{F}_{count(courseno)}$(offers)HAVING count(courseno)>1) $\longrightarrow$ $r2$)

SELECT
r1.instructorid,r2.instructorname,r2.coursename,r1.acadyear,r1.semester
FROM (SELECT count(courseno),instructorid,semester,acadyear
FROM offers
GROUP by instructorid,semester,acadyear
HAVING count(courseno)>1) AS r1
JOIN

(SELECT *
FROM course as c
NATURAL JOIN offers as o
NATURAL JOIN instructor as i) as r2
ON (r1.instructorid=r2.instructorid AND r1.semester=r2.semester AND
r1.acadyear=r2.acadyear);

(b) $(\sigma(\text{course} \rtimes_{c.courseno=o.courseno} \text{offers})) - (\sigma(\text{course} \bowtie_{c.courseno=o.courseno}$ offers))

SELECT *
FROM course as c
LEFT JOIN offers as o
ON (c.courseno=o.courseno)
EXCEPT
SELECT *
FROM course as c
RIGHT JOIN offers as o
ON (c.courseno=o.courseno);

(c)

$\sigma_{(t.sum<10\ or\ t.sum>20)\ \&\ progname=Btech(CS)\ \&\ t.batch=2007}(\pi_{(name,studentid,sum,progid,batch)}$
$({}_{studentid}\mathscr{F}_{sum(credit)}(\text{course} \bowtie_{c.courseno=r.courseno}$
registers $\bowtie_{s.studentid=r.studentid}$ student)) $\longrightarrow$ t $\bowtie_{t.progid=p.progid}$
program)

SELECT *
FROM (SELECT s.name, s.studentid,sum(c.credit),s.progid,s.batch
FROM course as c
JOIN registers as r
ON (c.courseno=r.courseno)
JOIN student as s
ON (s.studentid=r.studentid)
GROUP BY s.studentid) as t
JOIN program as p
ON (t.progid=p.progid)
WHERE (t.sum<10 or t.sum>20) AND p.progname='Btech(CS)' AND
t.batch='2007';

(d)

$\pi_{(s1.studentid,s1.name)}(\sigma_{count>1}(({}_{t.studentid}\mathscr{F}_{count()grade}(\pi_{s.studentid,s.name,r.grade}$
$(\sigma_{grade='FF'}(\text{registers} \longrightarrow r \bowtie_{s.studentid=r.studentid} \text{student} \longrightarrow s) \longrightarrow$
$t))) \longrightarrow t1 \bowtie_{s1.studentid=t1.studentid} \text{student} \longrightarrow s1))$

SELECT s1.studentid,s1.name
FROM (SELECT count(grade),t.studentid
FROM (SELECT s.studentid,s.name,r.grade

```
                FROM registers as r
                JOIN student as s
                ON (s.studentid=r.studentid)
                WHERE grade='FF') as t
        GROUP BY t.studentid) as t1
JOIN student as s1
ON (s1.studentid=t1.studentid)
WHERE count>1;
```

(e)

$\sigma_{(instructorname=PM\,Jat\,\&\,acadyear>=2007\,\&\,acadyear<=2012)}((\mathscr{F}_{(count(distinctcourseno))} \longrightarrow$ maxm (offers X instructor)) $\bowtie_{r1.maxm=r4.taken}$ ($_{studentid}\mathscr{F}_{count(distinctcourseno)}$ $\longrightarrow$ taken(σ(offers X instructor) $\longrightarrow$ $r2$) X registers $\longrightarrow$ $r3$) $\longrightarrow$ $r4$)

```
SELECT *
FROM ( SELECT count(distinct courseno) as maxm
        FROM offers
        NATURAL JOIN instructor
        WHERE instructorname='P M Jat' and acadyear≥2007 and
acadyear≤2012) as r1
JOIN (SELECT count(distinct courseno) as taken, studentid
        FROM ((SELECT *
                FROM offers
                NATURAL JOIN instructor
                WHERE instructorname='P M Jat' and acadyear≥2007
and acadyear≤012) as r2
                NATURAL JOIN registers) as r3
        GROUP BY studentid) as r4
ON r1.maxm=r4.taken;
```