Student ID: 202112047

Lab 05

1. List Faculty (ID, Name) for all courses of Autumn'2010.

π i.instructorid, i.instructorname (σ o.SEMESTER = 'Autumn' and o.ACADYEAR=2010 (INSTRUCTOR i $*$ OFFERS o))

```
select instructorid,instructorname from instructor i natural join
offers o where o.semester='Autumn' and o.acadyear=2010;
```

2. List Students (ID, Name) from batch 2008 registered for course MT101 in Autumn'2008.

r1 $\leftarrow$ π studentid(σ courseno = 'MT101' and semester = 'Autumn' and acadyear = 2008(REGISTERS))

r2 $\leftarrow$ π studentid(σ batch = 2008 (STUDENT))

r $\leftarrow$ r1 $\cap$ r2

π studentid,name(r * STUDENT)

```
select studentid, name from student natural join
(select studentid from registers where courseno = 'MT101'
intersect
select studentid from registers where acadyear = 2008
intersect
select studentid from registers where semester = 'Autumn'
intersect
select studentid from student where batch = 2008) as r;
```

OR

π s.studentid, s.name (σ s.BATCH = 2008 and r.COURSENO='MT101' o.SEMESTER = 'Autumn' and o.ACADYEAR=2008 (STUDENT s * REGISTERS r))

```
select s.studentid,s.name from student s natural join registers r
where s.batch=2008 and r.courseno='MT101' and
r.semester='Autumn' and r.acadyear=2008;
```

3. List Students (ID, Name) from B Tech (progid='01') batch 2008 registered for course MT101 in Autumn'2008.

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$r1 \leftarrow \pi_{studentid}(\sigma_{progid='01' \text{ and } batch='2008'}(STUDENT))$

$r2 \leftarrow \pi_{studentid}(\sigma_{courseno='MT101' \text{ and } semester='Autumn' \text{ and } acadyear=2008}(REGISTERS))$

$r \leftarrow r1 \cap r2$

$\pi_{studentid,\ name}(r * STUDENT)$

select studentid, name from student natural join

(select studentid from student where progid = '01' and batch = 2008

intersect

select studentid from registers where courseno = 'MT101' and semester = 'Autumn' and acadyear = 2008) as r;OR

OR

$\pi_{s.studentid,\ s.name}(\sigma_{s.progid='01' \text{ and } s.batch='2008' \text{ and } r.courseno='MT101' \text{ and } r.semester='Autumn' \text{ and } r.acadyear=2008}(STUDENT\ s) * (r))$

select s.studentid,s.name from student s natural join registers r where s.progid='01' and s.batch=2008 and r.courseno='MT101' and r.semester='Autumn' and r.acadyear=2008;

4. List courses that were offered but students were not registered in those offerings.

$$r1 \leftarrow \pi_{courseno}(offers) - \pi_{courseno}(REGISTERS)$$

$$r \leftarrow \pi_{courseno,\ coursename,\ credit}\ (r1 * COURSE)$$

```
select * from course natural join
(select courseno from offers
except
select courseno from registers) as r;
```

5. List students (id, name, courseno, grade) who got 'F' grade in Autumn'2008

$$r1 \leftarrow \pi_{studentid,\ courseno,\ grade}(\sigma_{acadyear=2008}(REGISTERS))$$

$$r2 \leftarrow \pi_{studentid,\ courseno,\ grade}(\sigma_{semester='Autumn'\ and\ grade='F'}(REGISTERS))$$

$$r \leftarrow r1 \cap r2$$

$$\pi_{studentid,\ name,\ courseno,\ grade}(r * STUDENT)$$

```
select studentid, name, courseno, grade from student  natural join
```

(select studentid, grade, courseno from registers where acadyear = 2008

intersect

select studentid, grade, courseno from registers where semester = 'Autumn' and grade = 'F') r1;

OR

π s.studentid, s.name, r.courseno, r.grade(σ r.grade='F' and r.semester='Autumn' and r.acadyear=2008(STUDENT s)*(REGISTERS r))

select s.studentid, s.name, r.courseno, r.grade from student s natural join registers r where r.grade='F' and r.semester = 'Autumn' and r.acadyear = 2008;

6. List Courses (Course No, Title, Credits) offered by Instructor (ID='PMJ') in semester Winter'2010.

π c.courseno, c.coursename, c.credit(σ o.instructorid='PMJ' and o.semester='Winter' and o.acadyear=2010 (COURSE c)*(OFFERS o))

select courseno,coursename,credit from course c natural join offers o where o.instructorid='PMJ' and semester='Winter' and acadyear=2010;

7. Produce transcript of student '200711002' for Academic year 2008-09 List Course No, Course Name, Course Credit, Grade.

$$r1 \leftarrow \pi_{courseno,\ grade}(\sigma_{studentid='200711002'}(REGISTERS))$$

$$r2 \leftarrow \pi_{courseno,\ grade}(\sigma_{acadyear=2008\ or\ acadyear=2009}(REGISTERS))$$

$$r \leftarrow r1 \cap r2$$

$$\pi_{course.*}(r * COURSE)$$

```
select * from course natural join
(select courseno, grade from registers where studentid =
'200711002'
intersect
select courseno, grade from registers where acadyear = 2008 or
acadyear = 2009) r1;
```

OR

```
select c.courseno,c.coursename,c.credit,r.grade from course c
natural join registers r where r.studentid=200711002 and
r.acadyear between 2008 and 2009;
```

8. List ID of students who have taken both courses - 'MT101' AND 'MT104'.

$$r1 \leftarrow \pi_{studentid}(\sigma_{courseno='MT101'}(REGISTERS))$$

$$r2 \leftarrow \pi_{studentid}(\sigma_{courseno='MT104'}(REGISTERS))$$

$$r \leftarrow r1 \cap r2$$

$$\pi_{studentid}(r * STUDENT)$$

```
select studentid from student natural join
(select studentid from registers where courseno = 'MT101'
intersect
select studentid from registers where courseno = 'MT104') as r;
```

9. List ID of students who have taken 'MT101' but not 'MT104'.

$$r1 \leftarrow \pi_{studentid}(\sigma_{courseno='MT101'}(REGISTERS))$$

$$r2 \leftarrow \pi_{studentid}(\sigma_{courseno='MT104'}(REGISTERS))$$

$$r \leftarrow r1 - r2$$

$$\pi_{studentid}(r * STUDENT)$$

```
select studentid from student natural join
(select studentid from registers where courseno = 'MT101'
except
select studentid from registers where courseno = 'MT104') as r;
```