VIT®

Vellore Institute of Technology

(Deemed to be University under section 3 of UGC Act, 1956)

Name- Gaurav Goswami

Reg no-21BBS0025

DATABASE SYSTEMS

DA-1

Consider the schemas given below:

student (sid, sname, sex, age, major,

gpa) dept (dname, numphds) prof

```
create table student(sid char(3) not null primary key,sname varcahr(30),sex char(1),age int,major varchar(5),gpa decimal(4,2));
create table dept(dname varchar(30),numphds int);
create table prof(pname varchar(20) not null primary key,dname varchar(30));
create table course(cno int not null primary key,cname varchar(30),dname varchar(30));
create table section(dname varchar(30),cno int,sectno int,pname varchar(30));
create table enroll(sid int not null primary key,grade char(1), dname varchar(30),cno int,sectno int);
select * from student;
select * from dept;
select * from prof;
select * from course;
select * from section;
select * from enroll;
```

(pname, dname) course (cno, cname,

dname) section (dname, cno, sectno,

pname) enroll (sid, grade, dname, cno,

sectno)

Based on these schemas, provide answers to the following:

1. **Create Tables with suitable constraints. Show the contents of the empty tables.**

OUTPUT-

Student

sid	sname	sex	age	major	gpa
empty					

Dept

dname	numphds
empty	

Prof

pname	dname
empty	

Course

cno	cname	dname
empty		

Section

dname	cno	sectno	pname
empty			

Enroll

sid	grade	dname	cno	sectno
empty				

2. **Fill the tables with your own sample set of data and Print the contents of the tables created by you.**

```
insert into student values('c04','satyam','m',21,'cse',4.9);
insert into student values('c21','ayush','m',20,'cse',3.4);
insert into student values('m07','megha','f',18,'mech',8.4);
insert into student values('e25','awantika','f',19,'ece',9.2);
insert into student values('m10','ananya','f',18,'mech',9.8);

insert into dept values('scope',22);
insert into dept values('scope',22);
insert into dept values('smec',18);
insert into dept values('select',19);
insert into dept values('smec',18);
```

```
insert into prof values('aishwarya','scope');
insert into prof values('pankaj','select');
insert into prof values('shreya', 'smec');
insert into prof values('sanjana','scope');
insert into prof values('balaji','smec');

insert into course values('101','dsa','scope');
insert into course values('105','programming in c','scope');
insert into course values('207','digital electronics','select');
insert into course values('310','fluid mechanics','smec');
insert into course values('344','thermodynamics','smec');
```

```
insert into section values('scope','101',7,'aishwarya');
insert into section values('select','207',2,'pankaj');
insert into section values('smec','310',3,'shreya');
insert into section values('smec','344',5,'balaji');
insert into section values('scope','105',4,'sanjana');

insert into enroll values('c21','C','scope','101',7);
insert into enroll values('m07','B','smec','344',5);
insert into enroll values('m10', 'S', 'smec', '310',3);
insert into enroll values('c04','C','scope','105',4);
insert into enroll values('e25','S','select','207',2);
```

```
select * from student;
select * from dept;
select * from prof;
select * from course;
select * from section;
select * from enroll;
```

OUTPUT-

sid	sname	sex	age	major	gpa
c04	satyam	m	21	cse	4.9
c21	ayush	m	20	cse	3.4
m07	megha	f	18	mech	8.4
e25	awantika	f	19	ece	9.2
m10	ananya	f	18	mech	9.8

dname	numphds
scope	22
scope	22
smec	18
select	19
smec	18

pname	dname
aishwarya	scope
pankaj	select
shreya	smec
sanjana	scope
balaji	smec

cno	cname	dname
101	dsa	scope
105	programming in c	scope
207	digital electronics	select
310	fluid mechanics	smec
344	thermodynamics	smec

dname	cno	sectno	pname
scope	101	7	aishwarya
select	207	2	pankaj
smec	310	3	shreya
smec	344	5	balaji
scope	105	4	sanjana

sid	grade	dname	cno	sectno
c21	C	scope	101	7
m07	B	smec	344	5
m10	S	smec	310	3
c04	C	scope	105	4
e25	S	select	207	2

3. **Print the names of professors who work in departments that have fewer than 20 PhD students.**

```
select pname from prof where dname in (select dname from dept where numphds<20);
```

OUTPUT-

pname
pankaj
shreya
balaji

4. **Print the name(s) of the student(s) with the lowest GPA in each major.**

select major, sname from student where gpa = (select MIN(gpa) from student group by major);

```
select major, sname from student where gpa = (select MIN(gpa) from student group by major);
```

OUTPUT-

major	sname
cse	ayush

5. **For each Computer Sciences course, print the course number, section number, and the average gpa of the students enrolled in the class section.**

```
SELECT course.cno, section.sectno, AVG(student.gpa)
FROM course
JOIN section ON section.cno = course.cno
JOIN enroll ON enroll.sectno = section.sectno
JOIN student ON student.sid = enroll.sid
WHERE course.dname = 'scope'
GROUP BY course.cno, section.sectno;
```

OUTPUT-

cno	sectno	AVG(student.gpa)
101	7	3.4
105	4	4.9

6. **Print the names and section numbers of all sections with more than 10 students enrolled in them.**

```
SELECT section.dname, section.sectno
FROM section
JOIN enroll ON enroll.sectno = section.sectno
GROUP BY section.dname, section.sectno
HAVING COUNT(enroll.sid) > 10;
```

OUTPUT-

SQL query successfully executed. However, the result set is empty.

7. **Print the name(s) and sid(s) of the student(s) enrolled in more than 4 courses.**

```
SELECT section.dname, section.sectno
FROM section
JOIN enroll ON enroll.sectno = section.sectno
GROUP BY section.dname, section.sectno
HAVING COUNT(enroll.sid) > 10;
```

OUTPUT-

SQL query successfully executed. However, the result set is empty.

8. **Print the names of departments that have one or more students who are under 18 years old.**

```
select distinct dname from enroll where sid in (select sid from student where age<=18);
```

OUTPUT-

dname
smec

9. **Print the names and majors of students who are taking at least one Programming Language course.**

```
SELECT student.sname, student.major
FROM student
JOIN enroll ON student.sid = enroll.sid
JOIN course ON course.cno = enroll.cno
WHERE course.cname LIKE '%Programming%'
GROUP BY student.sname, student.major
```

OUTPUT-

sname	major
satyam	cse

10. **For those departments that have no students enrolling for a Programming Language course, print the department name and the number of PhD students in the department.**

```
select dept.dname,dept.numphds from dept where dept.dname in (select course.dname from course where
course.cname like '%Programming%');
```

OUTPUT-

dname	numphds
scope	22
scope	22

11. **Print the names of students who are undergoing both a Computer Sciences course and a Mathematics course.**

```
SELECT sname FROM student WHERE major = 'cse' AND major = 'mat';
```

OUTPUT-

SQL query successfully executed. However, the result set is empty.

12. **Print the age difference between the oldest and the youngest Computer Sciences major.**

```
SELECT MAX(student.age) - MIN(student.age) FROM student where student.major like '%cse%';
```

OUTPUT-

MAX(student.age) - MIN(student.age)
1

13. **For each department that has one or more students with a GPA under 4.0, print the name of the department and the average GPA of its students.**

```
SELECT dept.dname, AVG(student.gpa) as avg_gpa
FROM dept JOIN course ON course.dname = dept.dname
JOIN enroll ON enroll.cno = course.cno
JOIN student ON student.sid = enroll.sid
GROUP BY dept.dname HAVING student.gpa < 4.0
```

OUTPUT-

dname	avg_gpa
scope	4.15

14. **Print the ids, names and GPAs of the students who are currently taking all the Computer Science and Engineering courses**

```
select distinct student.sname,student.sid,student.gpa from student where student.sid in (select sid
from enroll where cno < 200);
```

OUTPUT-

sname	sid	gpa
satyam	c04	4.9
ayush	c21	3.4

****