

Sheet No. – 01

Assignment No: 1

A. Creation of Tables:

(i). Creation of depts table:

Query:

```
create table depts(  
    deptcode char(3) primary key,  
    deptname char(30) not null);
```

depts table after insertion of values:

deptcode	deptname
CE	Civil
CSE	Computer Science
ELE	Electrical
ETC	Electronics
IT	Infomation Technology
MEC	Mechanical

6 rows in set (0.0013 sec)

(ii). Creation of students table:

Query:

```
create table students(  
    rollno numeric(8) primary key,  
    name char(30),  
    bdate date check(bdate < '1997-01-01'),  
    deptcode char(3) references depts(deptcode)  
    on delete cascade,  
    hostel numeric check(hostel<10),  
    parent_inc numeric(8,1));
```

students table after insertion of values:

rollno	name	bdate	deptcode	hostel	perent_inc
92005101	Oishika Dutta	1996-07-22	CSE	4	370000.0
92005102	Lasiewdor Rapsang	1996-12-05	IT	4	450000.0
92005108	Debargha Ghosh	1996-09-09	ELE	5	88630.0
92005201	Anish Banerjee	1995-08-03	CSE	7	500000.0
92005205	Fardeen Hossain	1995-08-10	CSE	7	420000.0
92005207	Ashish Kumar	1996-11-12	IT	2	440000.0
92005208	Rahul Hansda	1994-12-16	MEC	6	150000.0
92005215	Tanis Ahamed	1995-09-15	ELE	5	250000.0
92005219	Sanmai Reddy	1995-06-19	ETC	5	80000.0
92005220	Anudeep Mondal	1992-11-24	CE	6	400000.0
92005222	Ayush Yadav	1995-10-18	MEC	2	540000.0
92005224	Vinita Yadav	1995-06-23	CSE	3	70000.0
92005225	Joyabrata Acharyya	1993-07-09	ELE	7	100000.0
92005230	Tausif Islam	1994-06-27	ETC	7	335000.0
92005232	Swarnila Roy	1996-02-20	IT	4	320000.0
92005234	Tanmoy Paul	1996-01-12	MEC	7	540000.0
92005242	Pushpender Singh	1994-09-18	IT	6	240000.0
92005245	Sangita Basak	1995-06-23	CE	3	300000.0
92005249	Devika Simlai	1994-10-19	ETC	4	670000.0
92005259	Ankita Das	1995-04-30	CE	3	90000.0
92005260	Sudip Datta	1996-03-10	ETC	6	82000.0
92005264	Sayak Saha	1995-01-24	CE	6	460000.0
92005267	Ishan Dasgupta	1995-05-10	ELE	6	250000.0
92005281	Sourik Saha	1994-03-26	CSE	2	84000.0
92005288	Vamsi Swarup	1995-07-09	ELE	7	360000.0
92005290	Ustav Kumar	1994-09-26	MEC	5	250000.0

26 rows in set (0.0018 sec)

(iii). Creation of faculty table:

Query:

```
create table faculty(  
    fac_code char(8) primary key,  
    fac_name char(30) not null,  
    fac_dept char(3) references depts(deptcode));
```

faculty table after insertion of values:

fac_code	fac_name	fac_dept
AB	Aritra Banyopadhyay	ELE
ARB	Aheli Roy Banerjee	MEC
dbp	Bipradeep Bera	ETC
MT	Manas Tripathi	CSE
nls	Pratik Srivastav	CE
PB	Prithijit Banerjee	IT
PM	Prayas Mazumder	CSE
RS	Raj Shah	CE
SS	Sankhya Samanta	ELE
YK	Yashwanth Kota	IT

10 rows in set (0.0013 sec)

(iv). Creation of crs_offrd(course offered) table:

Query:

```
create table crs_offrd(  
    crs_code char(5) primary key,  
    crs_name char(35) not null,  
    crs_credits numeric(2,1),  
    crs_fac_cd char(8) references faculty(fac_code));
```

crs_offrd table after insertion of values:

crs_code	crs_name	crs_credits	crs_fac_cd
CE201	Water Resources	6.0	RS
CE204	Building Material	8.2	nls
CS101	OS	9.0	PM
CS201	Software Engg	8.5	MT
CS207	DBMS	8.0	PM
EC202	Control Signal	6.3	dbp
EC203	Communication System	5.6	dbp
EE101	Basic Electrical Engg	7.5	SS
EE201	Induction Motor	7.0	AB
IT106	Automata Theory	8.0	YK
IT201	Digital Logic	4.9	PB
ME208	Fluid Mechanics	9.3	ARB
PH106	Quantum Physics	8.8	nls

13 rows in set (0.0015 sec)

(iv). Creation of crs_regd(course registered) table:

Query:

```
create table crs_regd(  
    crs_rollno numeric(8) references students(rollno),  
    crs_cd char(5) references crs_offrd(crs_code),  
    marks numeric(5,2),  
    primary key(crs_rollno,crs_cd));
```

crs_regd table after insertion of values:

crs_rollno	crs_cd	marks
92005101	CS101	89.00
92005101	CS201	59.00
92005101	CS207	76.00
92005102	IT106	68.00
92005102	IT201	100.00
92005201	CS101	92.00
92005201	CS201	56.00
92005201	CS207	98.00
92005205	CS101	88.00
92005205	CS201	82.00
92005205	CS207	90.00
92005207	IT106	90.00
92005207	IT201	85.00
92005208	ME208	80.00
92005215	EE101	74.00
92005215	EE201	67.00
92005219	EC202	88.00
92005219	EC203	82.00
92005220	CE201	78.00
92005220	CE204	89.00
92005224	CS101	100.00
92005224	CS201	87.00
92005224	CS207	95.00
92005225	EE101	100.00
92005225	EE201	87.00
92005232	IT106	79.00
92005232	IT201	90.00
92005234	ME208	88.00
92005242	IT106	80.00
92005242	IT201	70.00
92005245	CE201	95.00
92005245	CE204	85.00
92005249	EC202	80.00
92005249	EC203	87.00
92005259	CE201	45.00
92005259	CE204	59.00
92005260	EC202	77.00
92005260	EC203	76.00
92005264	CE201	75.00
92005264	CE204	79.00
92005281	CS101	87.00
92005281	CS201	93.00
92005281	CS207	96.00
92005288	EE101	98.00
92005288	EE201	90.00
92005290	ME208	78.00

46 rows in set (0.0014 sec)

B. Queries and their solutions:

1. Try inserting records which violate the constraints:

```
MySQL localhost:33060+ ssl assignment1 SQL > INSERT INTO students (92005229, 'Sagnik Dutta', '1994-17-12', 'MEC', 7, 470000);  
ERROR: 1064: You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near '92005229, 'Sagnik Dutta', '1994-17-12', 'MEC', 7, 470000)' at line 1
```

Explanation:

Here it is showing error because, while creating the table 'students', I added a check constraint that is bdate date check(bdate < '1997-01-01'). But here I added '1994-17-12' where correct formatting of date is not used. Therefore check constraint is violated here.

```
MySQL localhost:33060+ ssl assignment1 SQL > INSERT INTO students (92005244, 'Prakriti Roy', '1995-09-08', 'CSE', 12, 300000);  
ERROR: 1064: You have an error in your SQL syntax; check the manual that corresponds to your MySQL server version for the right syntax to use near '92005244, 'Prakriti Roy', '1995-09-08', 'CSE', 12, 300000)' at line 1
```

Explanation:

Here it is showing error because, at the time of creation of table 'students', a check constraint was added that hostel numeric check(hostel<10). But I entered value 12. So check constraint is violated here.

2. Delete records from dept where deptcode='CSE'. (This deletes records from students whose deptcode='CSE'):

Query:

```
delete from dept  
where deptcode='CSE';
```

Output:

deptcode	deptname
CE	Civil
ELE	Electrical
ETC	Electronics
IT	Infomation Technology
MEC	Mechanical

5 rows in set (0.0004 sec)

rollno	name	bdate	deptcode	hostel	perent_inc
92005102	Lasiewdor Rapsang	1996-12-05	IT	4	450000.0
92005108	Debargha Ghosh	1996-09-09	ELE	5	88630.0
92005207	Ashish Kumar	1996-11-12	IT	2	440000.0
92005208	Rahul Hansda	1994-12-16	MEC	6	150000.0
92005215	Tanis Ahamed	1995-09-15	ELE	5	250000.0
92005219	Sanmai Reddy	1995-06-19	ETC	5	80000.0
92005220	Anudeep Mondal	1992-11-24	CE	6	400000.0
92005222	Ayush Yadav	1995-10-18	MEC	2	540000.0
92005225	Joyabrata Acharyya	1993-07-09	ELE	7	100000.0
92005230	Tausif Islam	1994-06-27	ETC	7	335000.0
92005232	Swarnila Roy	1996-02-20	IT	4	320000.0
92005234	Tanmoy Paul	1996-01-12	MEC	7	540000.0
92005242	Pushpender Singh	1994-09-18	IT	6	240000.0
92005245	Sangita Basak	1995-06-23	CE	3	300000.0
92005249	Devika Simlai	1994-10-19	ETC	4	670000.0
92005259	Ankita Das	1995-04-30	CE	3	90000.0
92005260	Sudip Datta	1996-03-10	ETC	6	82000.0
92005264	Sayak Saha	1995-01-24	CE	6	460000.0
92005267	Ishan Dasgupta	1995-05-10	ELE	6	250000.0
92005288	Vamsi Swarup	1995-07-09	ELE	7	360000.0
92005290	Ustav Kumar	1994-09-26	MEC	5	250000.0

21 rows in set (0.0008 sec)

The result shows that the students who have deptcode as 'CSE' are removed from the students as well as from the depts table.

3. Find out the courses offered by the faculty dbp and nls:

Query:

```
select *
from crs_offrd
where crs_fac_cd IN ('dbp', 'nls');
```

Output:

crs_code	crs_name	crs_credits	crs_fac_cd
CE204	Building Material	8.2	nls
EC202	Control Signal	6.3	dbp
EC203	Communication System	5.6	dbp
PH106	Quantum Phyiscs	8.8	nls

4 rows in set (0.0012 sec)

4. Find out the courses with full details offered by dbp:

Query:

```
select *
from crs_offrd
where crs_fac_cd = 'dbp';
```

Output:

crs_code	crs_name	crs_credits	crs_fac_cd
EC202	Control Signal	6.3	dbp
EC203	Communication System	5.6	dbp

2 rows in set (0.0013 sec)

5. Get the courses the credits of which lies between 4.0 and 6.0:

Query:

```
select *
from crs_offrd
where crs_credits BETWEEN 4.0 AND 6.0;
```

Output:

crs_code	crs_name	crs_credits	crs_fac_cd
CE201	Water Resources	6.0	RS
EC203	Communication System	5.6	dbp
IT201	Digital Logic	4.9	PB

3 rows in set (0.0012 sec)

6. Get the courses the credits of which are > 6.5:

Query:

```
select *
from crs_offrd
where crs_credits > 6.5;
```

Output:

crs_code	crs_name	crs_credits	crs_fac_cd
CE204	Building Material	8.2	nls
CS101	OS	9.0	PM
CS201	Software Engg	8.5	MT
CS207	DBMS	8.0	PM
EE101	Basic Electrical Engg	7.5	SS
EE201	Induction Motor	7.0	AB
IT106	Automata Theory	8.0	YK
ME208	Fluid Mechanics	9.3	ARB
PH106	Quantum Physics	8.8	nls

9 rows in set (0.0012 sec)

Assignment No : 2

1. Count the number of students in CSE dept:

Query:

```
select COUNT(*) AS num_students
from students
where deptcode = 'CSE';
```

Output:

```
+-----+
| num_students |
+-----+
|           5 |
+-----+
1 row in set (0.0019 sec)
```

2. Determine the minimum, maximum and average marks of each courses:

Query:

```
select crs_cd,
       MIN(marks) AS min_marks,
       MAX(marks) AS max_marks,
       AVG(marks) AS avg_marks
from crs_regd
GROUP BY crs_cd;
```

Output:

```
+-----+-----+-----+-----+
| crs_cd | min_marks | max_marks | avg_marks |
+-----+-----+-----+-----+
| CS101  |      87.00 |     100.00 | 91.200000 |
| CS201  |      56.00 |      93.00 | 75.400000 |
| CS207  |      76.00 |      98.00 | 91.000000 |
| IT106  |      68.00 |      90.00 | 79.250000 |
| IT201  |      70.00 |     100.00 | 86.250000 |
| ME208  |      78.00 |      88.00 | 82.000000 |
| EE101  |      74.00 |     100.00 | 90.666667 |
| EE201  |      67.00 |      90.00 | 81.333333 |
| EC202  |      77.00 |      88.00 | 81.666667 |
| EC203  |      76.00 |      87.00 | 81.666667 |
| CE201  |      45.00 |      95.00 | 73.250000 |
| CE204  |      59.00 |      89.00 | 78.000000 |
+-----+-----+-----+-----+
12 rows in set (0.0034 sec)
```


3. Determine the total credits of the courses registered by a student:

Query:

```
select cr.crs_rollno, SUM(co.crs_credits) AS total_credits
from crs_regd cr, crs_offrd co where cr.crs_cd = co.crs_code
group by cr.crs_rollno;
```

Output:

crs_rollno	total_credits
92005101	25.5
92005102	12.9
92005201	25.5
92005205	25.5
92005207	12.9
92005208	9.3
92005215	14.5
92005219	11.9
92005220	14.2
92005224	25.5
92005225	14.5
92005232	12.9
92005234	9.3
92005242	12.9
92005245	14.2
92005249	11.9
92005259	14.2
92005260	11.9
92005264	14.2
92005281	25.5
92005288	14.5
92005290	9.3

22 rows in set (0.0017 sec)

4. Count the number of students in each hostel whose department is CSE:

Query:

```
select s.hostel, COUNT(*) AS num_students
from students s
where s.deptcode = 'CSE'
group by s.hostel;
```

Output:

hostel	num_students
4	1
7	2
3	1
2	1

4 rows in set (0.0013 sec)

5. Display the hostel, rollno, parent inc of the student who has the max(parent inc) in a hostel:

Query:

```

Select hostel, rollno, perent_inc
from students
where perent_inc in (select max(perent_inc)
                    from students
                    group by hostel)

ORDER BY hostel;

```

Output:

hostel	rollno	perent_inc
2	92005222	540000.0
3	92005245	300000.0
4	92005249	670000.0
5	92005215	250000.0
5	92005290	250000.0
6	92005264	460000.0
6	92005267	250000.0
7	92005234	540000.0

8 rows in set (0.0021 sec)

6. Display the name and parental income of each student greater than the parental income of some rollno 92005008:

Query:

```

select name, perent_inc
from students
where perent_inc > (select perent_inc
                  from students
                  where rollno = 92005208);

```

Output:

name	perent_inc
Oishika Dutta	370000.0
Lasiewdor Rapsang	450000.0
Anish Banerjee	500000.0
Fardeen Hossain	420000.0
Ashish Kumar	440000.0
Tanis Ahamed	250000.0
Anudeep Mondal	400000.0
Ayush Yadav	540000.0
Tausif Islam	335000.0
Swarnila Roy	320000.0
Tanmoy Paul	540000.0
Pushpender Singh	240000.0
Sangita Basak	300000.0
Devika Simlai	670000.0
Sayak Saha	460000.0
Ishan Dasgupta	250000.0
Vamsi Swarup	360000.0
Ustav Kumar	250000.0

18 rows in set (0.0013 sec)

7. Find out marks of students who have marks more than rollno 92005102 for course CH103 and PH106:

Query:

```

select crs_rollno, crs_cd, marks
from crs_regd
where(
    (
        crs_cd = 'CE201'
        AND
        marks > (
            select marks
            from crs_regd
            where crs_rollno = 92005220 AND crs_cd = 'CE201'
        )
    )
    OR
    (
        crs_cd = 'CE204'
        AND
        marks > (
            select marks
            from crs_regd

```

```

        where crs_rollno = 92005220 AND crs_cd = 'CE204'
    )
);

```

Output:

crs_rollno	crs_cd	marks
92005245	CE201	95.00

1 row in set (0.0019 sec)

Assignment No : 3

1. List students (rollno, name, deptcode) registered for course EE101:

Query:

```

select rollno, name, deptcode
from students, crs_regd
where
    crs_rollno = rollno
    AND crs_cd = 'EE101';

```

Output:

rollno	name	deptcode
92005215	Tanis Ahamed	ELE
92005225	Joyabrata Acharyya	ELE
92005288	Vamsi Swarup	ELE

3 rows in set (0.0014 sec)

2. List students (rollno, name) in ELE dept registered for course EE101:

Query:

```

select rollno, name
from students, crs_regd
where
    crs_rollno = rollno
    AND deptcode = 'ELE'
    AND crs_cd = 'EE101';

```

Output:

rollno	name
92005215	Tanis Ahamed
92005225	Joyabrata Acharyya
92005288	Vamsi Swarup

3 rows in set (0.0016 sec)

3. List students (rollno, name) in ELE dept not registered for course EE101:

Query:

```
select s.rollno, s.name
from students s, crs_regd c
where c.crs_rollno = s.rollno
      AND s.deptcode = 'ELE'
EXCEPT
select s.rollno, s.name
from students s, crs_regd c
where c.crs_rollno = s.rollno
      AND s.deptcode = 'ELE'
      AND c.crs_cd = 'EE101';
```

Output:

```
MySQL localhost:33060+ ssl assignment1 SQL > SELECT s.rollno, s.name
-> FROM students s, crs_regd c
-> WHERE c.crs_rollno = s.rollno
->       AND s.deptcode = 'ELE'
-> EXCEPT
-> SELECT s.rollno, s.name
-> FROM students s, crs_regd c
-> WHERE c.crs_rollno = s.rollno
->       AND s.deptcode = 'ELE'
->       AND c.crs_cd = 'EE101';

Empty set (0.0028 sec)
```

This returns an empty set because there are no students who does not enrolled in any of the courses. ELE department students have enrolled in all the departmental courses.

4. List the names of the students who have registered for both the courses 'DBMS' and 'OS':

Query:

```
select name
from students, crs_regd, crs_offrd
where
      crs_rollno = rollno
```

```

        AND crs_cd = crs_code
        AND crs_offrd.crs_name = 'DBMS'
INTERSECT
select name
from students, crs_regd, crs_offrd
where
        crs_rollno = rollno
        AND crs_cd = crs_code
        AND crs_offrd.crs_name = 'OS';

```

Output:

```

+-----+
| name          |
+-----+
| Oishika Dutta |
| Anish Banerjee|
| Fardeen Hossain|
| Vinita Yadav  |
| Sourik Saha   |
+-----+
5 rows in set (0.0028 sec)

```

5. Find the names of the faculty members who have offered either 'Automata Theory' or 'Software Engg.':

Query:

```

select fac_name
from faculty, crs_offrd
where
        crs_fac_cd = fac_code
        AND crs_name = 'Automata Theory'
UNION
select fac_name
from faculty, crs_offrd
where
        crs_fac_cd = fac_code
        AND crs_name = 'Software Engg';

```

Output:

```

+-----+
| fac_name      |
+-----+
| Yashwanth Kota|
| Manas Tripathi|
+-----+
2 rows in set (0.0007 sec)

```

6. Find the names of the faculty members who have offered 'Automata Theory' but not offered 'Software Engg.':

Query:

```
select fac_name from faculty, crs_offrd
where
    fac_code = crs_fac_cd
    AND crs_name = 'Automata Theory'
EXCEPT
select fac_name
from faculty, crs_offrd
where
    fac_code = crs_fac_cd
    AND crs_name = 'Software Engg';
```

Output:

```
+-----+
| fac_name |
+-----+
| Yashwanth Kota |
+-----+
1 row in set (0.0006 sec)
```

7. Find out the students in each hostel who are not registered for any course:

Query:

```
select rollno, name, hostel
from students
LEFT JOIN crs_regd ON (rollno = crs_rollno)
where crs_rollno IS NULL order by hostel;
```

Output:

```
+-----+-----+-----+
| rollno | name          | hostel |
+-----+-----+-----+
| 92005222 | Ayush Yadav   | 2      |
| 92005108 | Debargha Ghosh | 5      |
| 92005267 | Ishan Dasgupta | 6      |
| 92005230 | Tausif Islam  | 7      |
+-----+-----+-----+
4 rows in set (0.0008 sec)
```

8. Select the students who are in ELE dept or who have registered for course CS101:

Query:

```
select rollno, name, deptcode
from students
where deptcode = 'ELE'
UNION
select rollno, name, deptcode
from students, crs_regd
where
    rollno = crs_rollno
    AND crs_cd = 'CS101';
```

Output:

rollno	name	deptcode
92005108	Debargha Ghosh	ELE
92005215	Tanis Ahamed	ELE
92005225	Joyabrata Acharyya	ELE
92005267	Ishan Dasgupta	ELE
92005288	Vamsi Swarup	ELE
92005101	Oishika Dutta	CSE
92005201	Anish Banerjee	CSE
92005205	Fardeen Hossain	CSE
92005224	Vinita Yadav	CSE
92005281	Sourik Saha	CSE

10 rows in set (0.0008 sec)

9. Display the students who have registered to all the courses:

Query:

```
select crs_rollno, name, deptcode
from students, crs_regd
where rollno = crs_rollno
group by crs_rollno, rollno
HAVING COUNT(*) = (SELECT COUNT(*) from crs_offrd);
```

Output:

```
MySQL localhost:33060+ ssl assignment1 SQL > SELECT crs_rollno, name, deptcode
-> FROM students, crs_regd
-> WHERE rollno = crs_rollno
-> GROUP BY crs_rollno, rollno
-> HAVING COUNT(*) = (SELECT COUNT(*) FROM crs_offrd);
Empty set (0.0045 sec)
```


This returns an empty set because there are no students who has registered to all the courses.

10. Give Grace Marks 5 in subject 'DBMS' to the students who have scored less than 50 in that subject:

Query:

```
UPDATE crs_regd
SET marks = marks + 5
FROM crs_offrd
WHERE
    crs_code = crs_cd
    AND crs_name = 'DBMS'
    AND marks < 50;
```

Output: