

1

a)

```
MySQL 8.0 Command Line Client

mysql> create database ass3;
Query OK, 1 row affected (0.10 sec)

mysql> use ass3;
Database changed
mysql> show tables;
Empty set (0.04 sec)

mysql> CREATE TABLE Manufacturers (
  -> Code INTEGER,
  -> Name VARCHAR(255) NOT NULL,
  -> PRIMARY KEY (Code)
  -> );
Query OK, 0 rows affected (0.27 sec)

mysql> INSERT INTO Manufacturers(Code,Name) VALUES(1,'Sony');
Query OK, 1 row affected (0.06 sec)

mysql> INSERT INTO Manufacturers(Code,Name) VALUES(2,'Creative Labs');
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO Manufacturers(Code,Name) VALUES(3,'Hewlett-Packard');
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO Manufacturers(Code,Name) VALUES(4,'Iomega');
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO Manufacturers(Code,Name) VALUES(5,'Fujitsu');
Query OK, 1 row affected (0.03 sec)

mysql> INSERT INTO Manufacturers(Code,Name) VALUES(6,'Winchester');
Query OK, 1 row affected (0.03 sec)
```

```
MySQL 8.0 Command Line Client

mysql> CREATE TABLE Products (
  -> Code INTEGER,
  -> Name VARCHAR(255) NOT NULL ,
  -> Price DECIMAL NOT NULL ,
  -> Manufacturer INTEGER NOT NULL,
  -> PRIMARY KEY (Code),
  -> FOREIGN KEY (Manufacturer) REFERENCES Manufacturers(Code)
  -> );
Query OK, 0 rows affected (0.23 sec)

mysql> INSERT INTO Products(Code,Name,Price,Manufacturer) VALUES(1,'Hard drive',240,5);
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO Products(Code,Name,Price,Manufacturer) VALUES(2,'Memory',120,6);
Query OK, 1 row affected (0.03 sec)

mysql> INSERT INTO Products(Code,Name,Price,Manufacturer) VALUES(3,'ZIP drive',150,4);
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO Products(Code,Name,Price,Manufacturer) VALUES(4,'Floppy disk',5,6);
Query OK, 1 row affected (0.01 sec)

mysql> INSERT INTO Products(Code,Name,Price,Manufacturer) VALUES(5,'Monitor',240,1);
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO Products(Code,Name,Price,Manufacturer) VALUES(6,'DVD drive',180,2);
Query OK, 1 row affected (0.04 sec)

mysql> INSERT INTO Products(Code,Name,Price,Manufacturer) VALUES(7,'CD drive',90,2);
Query OK, 1 row affected (0.04 sec)

mysql> INSERT INTO Products(Code,Name,Price,Manufacturer) VALUES(8,'Printer',270,3);
Query OK, 1 row affected (0.03 sec)

mysql> INSERT INTO Products(Code,Name,Price,Manufacturer) VALUES(9,'Toner cartridge',66,3);
Query OK, 1 row affected (0.03 sec)

mysql> INSERT INTO Products(Code,Name,Price,Manufacturer) VALUES(10,'DVD burner',180,2);
Query OK, 1 row affected (0.03 sec)
```

```
mysql> select * from Manufacturers;
```

Code	Name
1	Sony
2	Creative Labs
3	Hewlett-Packard
4	Iomega
5	Fujitsu
6	Winchester

```
6 rows in set (0.02 sec)
```

```
mysql> select * from Products;
```

Code	Name	Price	Manufacturer
1	Hard drive	240	5
2	Memory	120	6
3	ZIP drive	150	4
4	Floppy disk	5	6
5	Monitor	240	1
6	DVD drive	180	2
7	CD drive	90	2
8	Printer	270	3
9	Toner cartridge	66	3
10	DVD burner	180	2

```
10 rows in set (0.01 sec)
```

b)

i,ii,iii

```
mysql> select avg(Price) from Products where Manufacturer=2 group by Manufacturer;
```

avg(Price)
150.0000

```
1 row in set (0.01 sec)
```

```
mysql> select count(*) from Products where Price>=180;
```

count(*)
5

```
1 row in set (0.00 sec)
```

```
mysql> select name,Price from Products where Price>=180 order by Price desc,Name asc;
```

name	Price
Printer	270
Hard drive	240
Monitor	240
DVD burner	180
DVD drive	180

```
5 rows in set (0.01 sec)
```

iv,v,vi

MySQL 8.0 Command Line Client

```
mysql> select p.code,p.Name,p.Price,p.Manufacturer,m.Name from Products as p,Manufacturers as m where m.code=p.Manufacturer;
```

code	Name	Price	Manufacturer	Name
5	Monitor	240	1	Sony
6	DVD drive	180	2	Creative Labs
7	CD drive	90	2	Creative Labs
10	DVD burner	180	2	Creative Labs
8	Printer	270	3	Hewlett-Packard
9	Toner cartridge	66	3	Hewlett-Packard
3	ZIP drive	150	4	Iomega
1	Hard drive	240	5	Fujitsu
2	Memory	120	6	Winchester
4	Floppy disk	5	6	Winchester

10 rows in set (0.00 sec)

```
mysql> select Manufacturer,avg(Price) from Products group by Manufacturer;
```

Manufacturer	avg(Price)
1	240.0000
2	150.0000
3	168.0000
4	150.0000
5	240.0000
6	62.5000

6 rows in set (0.00 sec)

```
mysql> select p.Name,p.Price,m.Name from Products as p,Manufacturers as m where m.code=p.Manufacturer;
```

Name	Price	Name
Monitor	240	Sony
DVD drive	180	Creative Labs
CD drive	90	Creative Labs
DVD burner	180	Creative Labs
Printer	270	Hewlett-Packard
Toner cartridge	66	Hewlett-Packard
ZIP drive	150	Iomega
Hard drive	240	Fujitsu
Memory	120	Winchester
Floppy disk	5	Winchester

10 rows in set (0.00 sec)

Vii)

MySQL 8.0 Command Line Client

```
mysql> select m.Name,avg(p.Price) from Products as p,Manufacturers as m where m.code=p.Manufacturer group by m.Name having avg(p.Price)>=150;
```

Name	avg(p.Price)
Sony	240.0000
Creative Labs	150.0000
Hewlett-Packard	168.0000
Iomega	150.0000
Fujitsu	240.0000

5 rows in set (0.01 sec)

viii)

```
mysql> select name,Price from Products where price =(select min(Price) from Products);
```

name	Price
Floppy disk	5

1 row in set (0.01 sec)

ix)

```
MySQL 8.0 Command Line Client
mysql> select p.name,p.Price,m.name from Products as p,Manufacturers as m where price =any(select max(Price) from Products group by Manufacturer) and m.code=p.Manufacturer;
+-----+-----+-----+
| name | Price | name |
+-----+-----+-----+
| Monitor | 240 | Sony |
| DVD drive | 180 | Creative Labs |
| DVD burner | 180 | Creative Labs |
| Printer | 270 | Hewlett-Packard |
| ZIP drive | 150 | Iomega |
| Hard drive | 240 | Fujitsu |
| Memory | 120 | Winchester |
+-----+-----+-----+
7 rows in set (0.00 sec)

mysql> select *from Products;
+-----+-----+-----+-----+
| Code | Name | Price | Manufacturer |
+-----+-----+-----+-----+
| 1 | Hard drive | 240 | 5 |
| 2 | Memory | 120 | 6 |
| 3 | ZIP drive | 150 | 4 |
| 4 | Floppy disk | 5 | 6 |
| 5 | Monitor | 240 | 1 |
| 6 | DVD drive | 180 | 2 |
| 7 | CD drive | 90 | 2 |
| 8 | Printer | 270 | 3 |
| 9 | Toner cartridge | 66 | 3 |
| 10 | DVD burner | 180 | 2 |
+-----+-----+-----+-----+
10 rows in set (0.00 sec)

mysql> select *from Manufacturers;
+-----+-----+
| Code | Name |
+-----+-----+
| 1 | Sony |
| 2 | Creative Labs |
| 3 | Hewlett-Packard |
| 4 | Iomega |
| 5 | Fujitsu |
| 6 | Winchester |
+-----+-----+
6 rows in set (0.00 sec)
```

x)

```
mysql> update products set price=0.9*price where price>=120;
Query OK, 7 rows affected (0.08 sec)
Rows matched: 7 Changed: 7 Warnings: 0

mysql> select *from products;
+-----+-----+-----+-----+
| Code | Name | Price | Manufacturer |
+-----+-----+-----+-----+
| 1 | Hard drive | 216 | 5 |
| 2 | Memory | 108 | 6 |
| 3 | ZIP drive | 135 | 4 |
| 4 | Floppy disk | 5 | 6 |
| 5 | Monitor | 216 | 1 |
| 6 | DVD drive | 162 | 2 |
| 7 | CD drive | 90 | 2 |
| 8 | Printer | 243 | 3 |
| 9 | Toner cartridge | 66 | 3 |
| 10 | DVD burner | 162 | 2 |
+-----+-----+-----+-----+
10 rows in set (0.00 sec)
```

2)

a)

MySQL 8.0 Command Line Client

```
mysql> CREATE TABLE
-> Departments (
-> Code INTEGER
-> PRIMARY KEY,
-> Name varchar(255) NOT NULL ,
-> Budget decimal NOT NULL
-> );
Query OK, 0 rows affected (0.21 sec)

mysql> CREATE TABLE Employees (
-> SSN INTEGER PRIMARY KEY,
-> Name varchar(255) NOT NULL ,
-> LastName varchar(255) NOT NULL ,
-> Department INTEGER NOT NULL ,
-> foreign key (department) references Departments(Code)
-> );
Query OK, 0 rows affected (0.23 sec)

mysql> INSERT INTO Departments(Code,Name,Budget) VALUES(14,'IT',65000);
Query OK, 1 row affected (0.04 sec)

mysql> INSERT INTO Departments(Code,Name,Budget) VALUES(37,'Accounting',15000);
Query OK, 1 row affected (0.04 sec)

mysql> INSERT INTO Departments(Code,Name,Budget) VALUES(59,'Human Resources',240000);
Query OK, 1 row affected (0.05 sec)

mysql> INSERT INTO Departments(Code,Name,Budget) VALUES(77,'Research',55000);
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO Employees(SSN,Name,LastName,Department)
-> VALUES('123234877','Michael','Rogers',14);
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO Employees(SSN,Name,LastName,Department)
-> VALUES('152934485','Anand','Manikutty',14);
Query OK, 1 row affected (0.03 sec)

mysql> INSERT INTO Employees(SSN,Name,LastName,Department)
-> VALUES('222364883','Carol','Smith',37);
Query OK, 1 row affected (0.03 sec)

mysql> INSERT INTO Employees(SSN,Name,LastName,Department)
-> VALUES('326587417','Joe','Stevens',37);
Query OK, 1 row affected (0.05 sec)
```

MySQL 8.0 Command Line Client

```
mysql> INSERT INTO Employees(SSN,Name,LastName,Department) VALUES('332154719','Mary-Anne','Foster',14);
Query OK, 1 row affected (0.09 sec)

mysql> INSERT INTO Employees(SSN,Name,LastName,Department)
-> VALUES('332569843','George','O'Donnell',77);
Query OK, 1 row affected (0.03 sec)

mysql> INSERT INTO Employees(SSN,Name,LastName,Department)
-> VALUES('546523478','John','Doe',59);
Query OK, 1 row affected (0.07 sec)

mysql> INSERT INTO Employees(SSN,Name,LastName,Department)
-> VALUES('631231482','David','Smith',77);
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO Employees(SSN,Name,LastName,Department)
-> VALUES('654873219','Zacary','Efron',59);
Query OK, 1 row affected (0.04 sec)

mysql> INSERT INTO Employees(SSN,Name,LastName,Department)
-> VALUES('745685214','Eric','Goldsmith',59);
Query OK, 1 row affected (0.03 sec)

mysql> INSERT INTO Employees(SSN,Name,LastName,Department)
-> VALUES('845657245','Elizabeth','Doe',14);
Query OK, 1 row affected (0.02 sec)

mysql> INSERT INTO Employees(SSN,Name,LastName,Department)
-> VALUES('845657246','Kumar','Swamy',14);
Query OK, 1 row affected (0.05 sec)
```

```
mysql> select *from departments;
```

Code	Name	Budget
14	IT	65000
37	Accounting	15000
59	Human Resources	240000
77	Research	55000

```
4 rows in set (0.00 sec)
```

```
mysql> select *from employees;
```

SSN	Name	LastName	Department
123234877	Michael	Rogers	14
152934485	Anand	Manikutty	14
222364883	Carol	Smith	37
326587417	Joe	Stevens	37
332154719	Mary-Anne	Foster	14
332569843	George	ODonnell	77
546523478	John	Doe	59
631231482	David	Smith	77
654873219	Zacary	Efron	59
745685214	Eric	Goldsmith	59
845657245	Elizabeth	Doe	14
845657246	Kumar	Swamy	14

```
12 rows in set (0.00 sec)
```

b)

i,ii,iii

```
mysql> select department,count(*) from employees group by department;
```

department	count(*)
14	5
37	2
59	3
77	2

```
4 rows in set (0.01 sec)
```

```
mysql> select e.name,e.lastname,d.name,d.budget from employees as e,departments as d where e.department=d.code;
```

name	lastname	name	budget
Michael	Rogers	IT	65000
Anand	Manikutty	IT	65000
Mary-Anne	Foster	IT	65000
Elizabeth	Doe	IT	65000
Kumar	Swamy	IT	65000
Carol	Smith	Accounting	15000
Joe	Stevens	Accounting	15000
John	Doe	Human Resources	240000
Zacary	Efron	Human Resources	240000
Eric	Goldsmith	Human Resources	240000
George	ODonnell	Research	55000
David	Smith	Research	55000

```
12 rows in set (0.00 sec)
```

```
mysql> select e.name,e.lastname from employees as e,departments as d where e.department=d.code and d.budget>60000;
```

name	lastname
Michael	Rogers
Anand	Manikutty
Mary-Anne	Foster
Elizabeth	Doe
Kumar	Swamy
John	Doe
Zacary	Efron
Eric	Goldsmith

```
8 rows in set (0.01 sec)
```

iv)

```
mysql> select name from departments where budget>(select avg(budget) from departments);
+-----+
| name          |
+-----+
| Human Resources |
+-----+
1 row in set (0.01 sec)
```

v)

MySQL 8.0 Command Line Client

```
mysql> select name from departments where code=any(select department from employees group by department having count(*)>2);
+-----+
| name          |
+-----+
| IT             |
| Human Resources |
+-----+
2 rows in set (0.01 sec)
```

vi)

```
mysql> select e.name,e.lastname from employees as e where e.department in(select code from departments where budget=(select min(budget) from departments where budget>(select min(budget)from departments)));
+-----+-----+
| name  | lastname |
+-----+-----+
| George | ODonnell |
| David  | Smith    |
+-----+-----+
2 rows in set (0.00 sec)

mysql>
```

vii)

```
mysql> update departments set budget=0.9*budget;
Query OK, 4 rows affected (0.03 sec)
Rows matched: 4  Changed: 4  Warnings: 0
```

```
mysql> select *from departments;
+-----+-----+-----+
| Code | Name          | Budget |
+-----+-----+-----+
| 14   | IT            | 58500  |
| 37   | Accounting    | 13500  |
| 59   | Human Resources | 216000 |
| 77   | Research      | 49500  |
+-----+-----+-----+
4 rows in set (0.00 sec)
```

```
mysql>
```

viii)

MySQL 8.0 Command Line Client

```
mysql> update employees set department=14 where department=77;
Query OK, 2 rows affected (0.03 sec)
Rows matched: 2  Changed: 2  Warnings: 0
```

```
mysql> select *from employees;
```

SSN	Name	LastName	Department
123234877	Michael	Rogers	14
152934485	Anand	Manikutty	14
222364883	Carol	Smith	37
326587417	Joe	Stevens	37
332154719	Mary-Anne	Foster	14
332569843	George	ODonnell	14
546523478	John	Doe	59
631231482	David	Smith	14
654873219	Zacary	Efron	59
745685214	Eric	Goldsmith	59
845657245	Elizabeth	Doe	14
845657246	Kumar	Swamy	14

```
12 rows in set (0.00 sec)
```

ix)

MySQL 8.0 Command Line Client

```
mysql> insert into departments values(11,'Quality Assurance',40000);
Query OK, 1 row affected (0.03 sec)
```

```
mysql> insert into employees values(847219811,'Mary','Moore',11);
Query OK, 1 row affected (0.04 sec)
```

```
mysql> select *from employees;
```

SSN	Name	LastName	Department
123234877	Michael	Rogers	14
152934485	Anand	Manikutty	14
222364883	Carol	Smith	37
326587417	Joe	Stevens	37
332154719	Mary-Anne	Foster	14
332569843	George	ODonnell	14
546523478	John	Doe	59
631231482	David	Smith	14
654873219	Zacary	Efron	59
745685214	Eric	Goldsmith	59
845657245	Elizabeth	Doe	14
845657246	Kumar	Swamy	14
847219811	Mary	Moore	11

```
13 rows in set (0.00 sec)
```

```
mysql> select *from departments;
```

Code	Name	Budget
11	Quality Assurance	40000
14	IT	58500
37	Accounting	13500
59	Human Resources	216000
77	Research	49500

```
5 rows in set (0.00 sec)
```

```
mysql>
```


x)

```
mysql> delete from employees where department=any(select code from departments where budget>=60000);
Query OK, 3 rows affected (0.03 sec)
```

```
mysql> select *from employees;
```

SSN	Name	LastName	Department
123234877	Michael	Rogers	14
152934485	Anand	Manikutty	14
222364883	Carol	Smith	37
326587417	Joe	Stevens	37
332154719	Mary-Anne	Foster	14
332569843	George	ODonnell	14
631231482	David	Smith	14
845657245	Elizabeth	Doe	14
845657246	Kumar	Swamy	14
847219811	Mary	Moore	11

```
10 rows in set (0.01 sec)
```

```
mysql>
```