

DBMS LAB RECORD

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PROGRAM 1 : INSURANCE DATABASE

Consider the Insurance database given below. The primary keys are underlined and the data types are specified.

PERSON (driver-id #: String, name: String, address: String)

CAR (regno: String, model: String, year: int)

ACCIDENT (report-number: int, date: date, location: String)

OWNS (driver-id #: String, Regno: String)

PARTICIPATED (driver-id: String, regno: String, report-number:int, damage-amount:int)

- 1) Create the above tables by properly specifying the primary keys and the foreign keys.

The screenshot shows the MySQL Workbench interface with the SQL tab selected. A query window contains the following SQL code:

```
1 CREATE TABLE PERSON(driver_id char(20), name char(20), address char(50), PRIMARY KEY(driver_id));
2 CREATE TABLE CAR(reg_no char(20), model char(20), year int, PRIMARY KEY(reg_no));
3 CREATE TABLE ACCIDENT(report_number int, date date, location char(50), PRIMARY KEY(report_number));
4 CREATE TABLE OWNS(driver_id char(20), reg_no char(20), FOREIGN KEY(driver_id) REFERENCES PERSON(driver_id) ON DELETE SET NULL ON UPDATE CASCADE, FOREIGN KEY(reg_no)
    REFERENCES CAR(reg_no) ON DELETE SET NULL ON UPDATE CASCADE);
5 CREATE TABLE PARTICIPATED(driver_id char(20), reg_no char(20), report_number int, damage_amount int, FOREIGN KEY(driver_id) REFERENCES PERSON(driver_id) ON DELETE SET NULL
ON UPDATE CASCADE, FOREIGN KEY(reg_no) REFERENCES CAR(reg_no) ON DELETE SET NULL ON UPDATE CASCADE, FOREIGN KEY(report_number) REFERENCES ACCIDENT(report_number) ON DELETE
SET NULL ON UPDATE CASCADE);
```

The screenshot shows the MySQL Workbench interface with the Structure tab selected. It displays the five tables created:

Table	Action	Rows	Type	Collation	Size	Overhead
accident		0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
car		0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
owns		0	InnoDB	utf8mb4_general_ci	48.0 KiB	-
participated		0	InnoDB	utf8mb4_general_ci	64.0 KiB	-
person		5	InnoDB	utf8mb4_general_ci	16.0 KiB	-
5 tables	Sum				160.0 KiB	0 B

2) Enter at least 5 tuples for each relation.

'PERSON' table:

Server: 127.0.0.1 » Database: insurance » Table: person

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Run SQL query/queries on table insurance.person:

```
1 INSERT INTO person(driverid, name, address) VALUES ('D102','Abhishek','Hebbal');
2 INSERT INTO person(driverid, name, address) VALUES ('D101','Sakshi','Basavangudi');
3 INSERT INTO person(driverid, name, address) VALUES ('D104','Taniya','Sahakarnagar');
4 INSERT INTO person(driverid, name, address) VALUES ('D103','Akshay','Yelahanka');
5 INSERT INTO person(driverid, name, address) VALUES ('D105','Shreya','JP Nagar');
```

Server: 127.0.0.1 » Database: insurance » Table: person

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Show query box

1 row inserted. (Query took 0.4008 seconds.)

INSERT INTO PERSON(driver_id, name, address) VALUES ('D102','Abhishek','Hebbal')

[Edit inline] [Edit] [Create PHP code]

1 row inserted. (Query took 0.0497 seconds.)

INSERT INTO PERSON(driver_id, name, address) VALUES ('D101','Sakshi','Basavangudi')

[Edit inline] [Edit] [Create PHP code]

1 row inserted. (Query took 0.0536 seconds.)

INSERT INTO PERSON(driver_id, name, address) VALUES ('D104','Taniya','Sahakarnagar')

[Edit inline] [Edit] [Create PHP code]

1 row inserted. (Query took 0.1037 seconds.)

INSERT INTO PERSON(driver_id, name, address) VALUES ('D103','Akshay','Yelahanka')

[Edit inline] [Edit] [Create PHP code]

1 row inserted. (Query took 0.0430 seconds.)

INSERT INTO PERSON(driver_id, name, address) VALUES ('D105','Shreya','JP Nagar')

[Edit inline] [Edit] [Create PHP code]

Server: 127.0.0.1 » Database: insurance » Table: person

Browse Structure SQL Search Insert Export Import

Showing rows 0 - 4 (5 total, Query took 0.0005 seconds.)

SELECT * FROM `person`

Show all | Number of rows: All ▾ Filter rows: Search this table Sort by

+ Options

	driver_id	name	address
<input type="checkbox"/>	Edit Copy Delete D101	Sakshi	Basavangudi
<input type="checkbox"/>	Edit Copy Delete D102	Abhishek	Hebbal
<input type="checkbox"/>	Edit Copy Delete D103	Akshay	Yelahanka
<input type="checkbox"/>	Edit Copy Delete D104	Taniya	Sahakarnagar
<input type="checkbox"/>	Edit Copy Delete D105	Shreya	JP Nagar

'CAR' table:

Server: 127.0.0.1 » Database: insurance » Table: car

Browse Structure SQL Search Insert Export Import Privileges

Run SQL query/queries on table insurance.car: [?](#)

```

1 INSERT INTO CAR(reg_no, model, year) VALUES ('R201','Baleno',2012);
2 INSERT INTO CAR(reg_no, model, year) VALUES ('R202','Swift',2010);
3 INSERT INTO CAR(reg_no, model, year) VALUES ('R203','Maruti',2011);
4 INSERT INTO CAR(reg_no, model, year) VALUES ('R204','Honda',2008);
5 INSERT INTO CAR(reg_no, model, year) VALUES ('R205','Hyundai',2009);

```

Server: 127.0.0.1 » Database: insurance » Table: car

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Show query box

✓ 1 row inserted. (Query took 0.1359 seconds.)

`INSERT INTO CAR(reg_no, model, year) VALUES ('R201','Baleno',2012)`

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

✓ 1 row inserted. (Query took 0.0294 seconds.)

`INSERT INTO CAR(reg_no, model, year) VALUES ('R202','Swift',2010)`

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

✓ 1 row inserted. (Query took 0.0708 seconds.)

`INSERT INTO CAR(reg_no, model, year) VALUES ('R203','Maruti',2011)`

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

✓ 1 row inserted. (Query took 0.0316 seconds.)

`INSERT INTO CAR(reg_no, model, year) VALUES ('R204','Honda',2008)`

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

✓ 1 row inserted. (Query took 0.0325 seconds.)

`INSERT INTO CAR(reg_no, model, year) VALUES ('R205','Hyundai',2009)`

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

Server: 127.0.0.1 » Database: insurance » Table: car

Browse Structure SQL Search Insert Export Import Privileges

✓ Showing rows 0 - 4 (5 total, Query took 0.0008 seconds.)

`SELECT * FROM `car``

Show all | Number of rows: Filter rows: Sort by key:

+ Options

	 Edit	 Copy	 Delete	reg_no	model	year
<input type="checkbox"/>				R201	Baleno	2012
<input type="checkbox"/>				R202	Swift	2010
<input type="checkbox"/>				R203	Maruti	2011
<input type="checkbox"/>				R204	Honda	2008
<input type="checkbox"/>				R205	Hyundai	2009

'ACCIDENT' table:

Server: 127.0.0.1 » Database: insurance » Table: accident

Browse Structure SQL Search Insert Export Import Privileges Operations

Run SQL query/queries on table insurance.accident:

```
1 INSERT INTO ACCIDENT(report_number, date, location) VALUES (1001,'2020-08-14','MG Road');
2 INSERT INTO ACCIDENT(report_number, date, location) VALUES (1020,'2021-04-13','Church Street');
3 INSERT INTO ACCIDENT(report_number, date, location) VALUES (1031,'2021-04-01','Yelahanka');
4 INSERT INTO ACCIDENT(report_number, date, location) VALUES (1016,'2019-12-13','Whitefield');
5 INSERT INTO ACCIDENT(report_number, date, location) VALUES (1045,'2020-05-21','Basavanagudi');
```

Server: 127.0.0.1 » Database: insurance » Table: accident

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Show query box

✓ 1 row inserted. (Query took 0.2212 seconds.)

```
INSERT INTO ACCIDENT(report_number, date, location) VALUES (1001,'2020-08-14','MG Road')
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0863 seconds.)

```
INSERT INTO ACCIDENT(report_number, date, location) VALUES (1020,'2021-04-13','Church Street')
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.1024 seconds.)

```
INSERT INTO ACCIDENT(report_number, date, location) VALUES (1031,'2021-04-01','Yelahanka')
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0406 seconds.)

```
INSERT INTO ACCIDENT(report_number, date, location) VALUES (1016,'2019-12-13','Whitefield')
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0421 seconds.)

```
INSERT INTO ACCIDENT(report_number, date, location) VALUES (1045,'2020-05-21','Basavanagudi')
```

[Edit inline] [Edit] [Create PHP code]

Server: 127.0.0.1 » Database: insurance » Table: accident

Browse Structure SQL Search Insert Export Import Privileges Operations

Showing rows 0 - 4 (5 total, Query took 0.0007 seconds.)

```
SELECT * FROM `accident`
```

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

+ Options

	report_number	date	location
<input type="checkbox"/>	1001	2020-08-14	MG Road
<input type="checkbox"/>	1016	2019-12-13	Whitefield
<input type="checkbox"/>	1020	2021-04-13	Church Street
<input type="checkbox"/>	1031	2021-04-01	Yelahanka
<input type="checkbox"/>	1045	2020-05-21	Basavanagudi

'OWNS' table:

Server: 127.0.0.1 » Database: insurance » Table: owns

Browse Structure SQL Search Insert Export Import Privileges

Run SQL query/queries on table insurance.owns: [?](#)

```
1 INSERT INTO OWNS(driver_id, reg_no) VALUES ('D102','R201');
2 INSERT INTO OWNS(driver_id, reg_no) VALUES ('D103','R204');
3 INSERT INTO OWNS(driver_id, reg_no) VALUES ('D105','R202');
4
```

Server: 127.0.0.1 » Database: insurance » Table: owns

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Show query box

✓ 1 row inserted. (Query took 0.1512 seconds.)

INSERT INTO OWNS(driver_id, reg_no) VALUES ('D102','R201')

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0264 seconds.)

INSERT INTO OWNS(driver_id, reg_no) VALUES ('D103','R204')

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0684 seconds.)

INSERT INTO OWNS(driver_id, reg_no) VALUES ('D105','R202')

[Edit inline] [Edit] [Create PHP code]

Server: 127.0.0.1 » Database: insurance » Table: owns

Browse Structure SQL Search Insert Export

⚠ Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy a

✓ Showing rows 0 - 2 (3 total, Query took 0.0007 seconds.)

SELECT * FROM `owns`

Show all | Number of rows: 25 [▼](#) Filter rows:

+ Options

driver_id	reg_no
D102	R201
D103	R204
D105	R202

'PARTICIPATED' table:

Server: 127.0.0.1 » Database: insurance » Table: participated

Browse Structure SQL Search Insert Export Import Privileges Operations

Run SQL query/queries on table insurance.participated: [?](#)

```

1 INSERT INTO PARTICIPATED(driver_id, reg_no, report_number, damage_amount) VALUES ('D102','R201',1020,1500);
2 INSERT INTO PARTICIPATED(driver_id, reg_no, report_number, damage_amount) VALUES ('D103','R204',1031,2000);
3 INSERT INTO PARTICIPATED(driver_id, reg_no, report_number, damage_amount) VALUES ('D104','R205',1045,3000) ;
4

```

Server: 127.0.0.1 » Database: insurance » Table: participated

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Show query box

✓ 1 row inserted. (Query took 0.1562 seconds.)

```
INSERT INTO PARTICIPATED(driver_id, reg_no, report_number, damage_amount) VALUES ('D102','R201',1020,1500)
```

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

✓ 1 row inserted. (Query took 0.0278 seconds.)

```
INSERT INTO PARTICIPATED(driver_id, reg_no, report_number, damage_amount) VALUES ('D103','R204',1031,2000)
```

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

✓ 1 row inserted. (Query took 0.1018 seconds.)

```
INSERT INTO PARTICIPATED(driver_id, reg_no, report_number, damage_amount) VALUES ('D104','R205',1045,3000)
```

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

Server: 127.0.0.1 » Database: insurance » Table: participated

Browse Structure SQL Search Insert Export Import Privileges

⚠ Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.

✓ Showing rows 0 - 2 (3 total, Query took 0.0006 seconds.)

```
SELECT * FROM `participated`
```

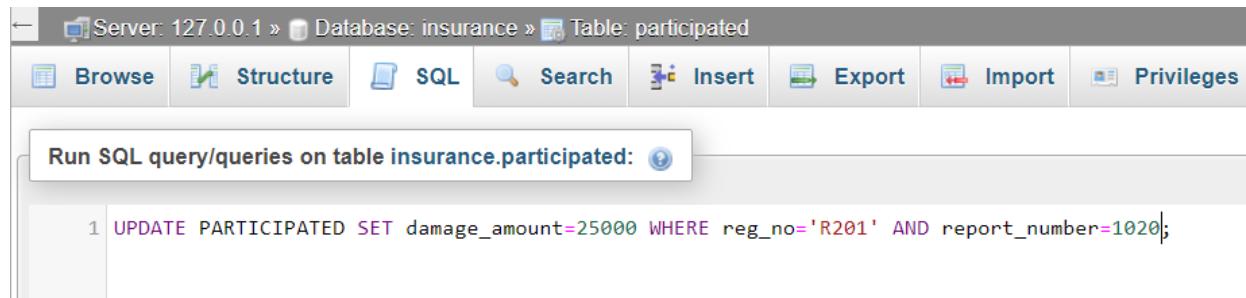
Show all | Number of rows: 25 Filter rows: Sort by key:

+ Options

driver_id	reg_no	report_number	damage_amount
D102	R201	1020	1500
D103	R204	1031	2000
D104	R205	1045	3000

3) Demonstrate how you

- a) Update the damage amount for the car with a specific Regno in the accident with report number 12 to 25000.

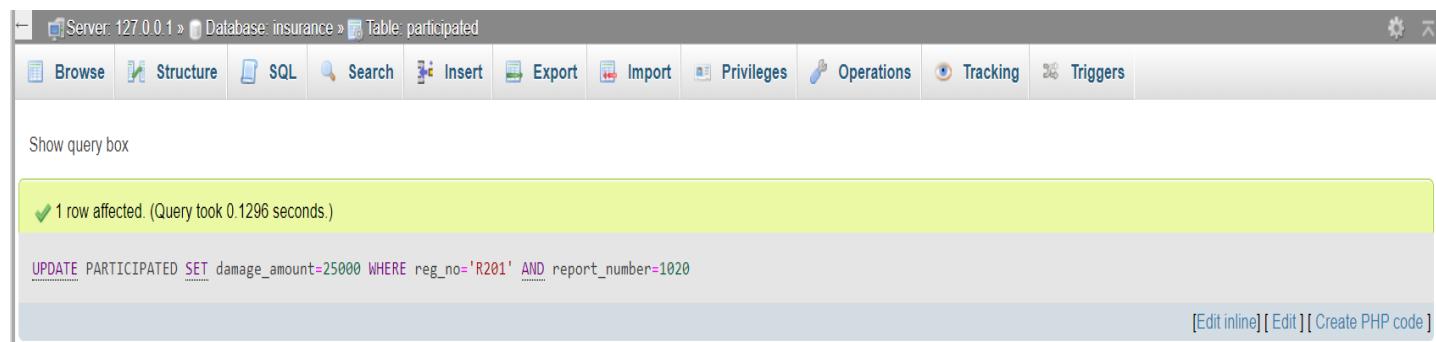


Server: 127.0.0.1 » Database: insurance » Table: participated

Browse Structure SQL Search Insert Export Import Privileges

Run SQL query/queries on table insurance.participated:

```
1 UPDATE PARTICIPATED SET damage_amount=25000 WHERE reg_no='R201' AND report_number=1020;
```



Server: 127.0.0.1 » Database: insurance » Table: participated

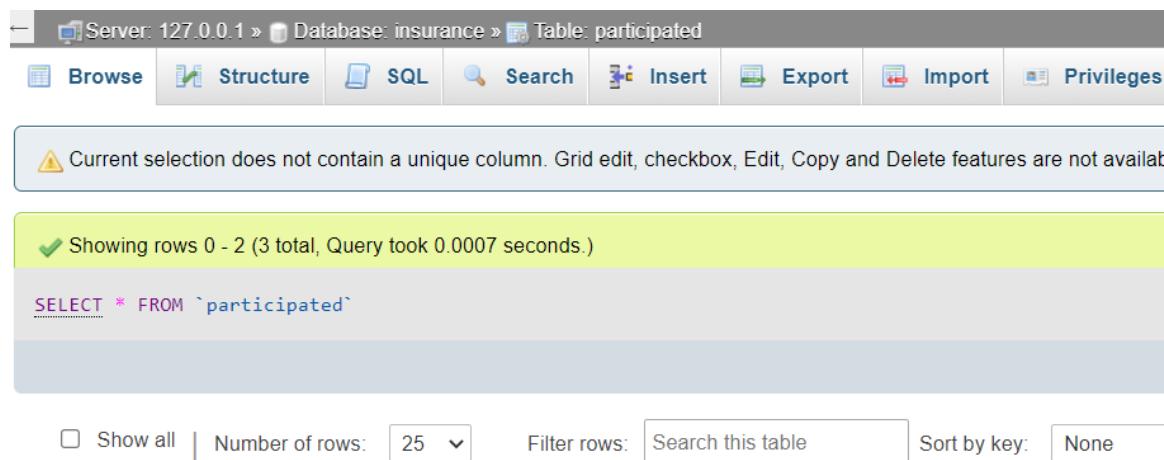
Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Show query box

✓ 1 row affected. (Query took 0.1296 seconds.)

```
UPDATE PARTICIPATED SET damage_amount=25000 WHERE reg_no='R201' AND report_number=1020
```

[Edit inline] [Edit] [Create PHP code]



Server: 127.0.0.1 » Database: insurance » Table: participated

Browse Structure SQL Search Insert Export Import Privileges

⚠ Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.

✓ Showing rows 0 - 2 (3 total, Query took 0.0007 seconds.)

```
SELECT * FROM `participated`
```

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

+ Options

driver_id	reg_no	report_number	damage_amount
D102	R201	1020	25000
D103	R204	1031	2000
D104	R205	1045	3000

b) Add a new accident to the database.

← Server: 127.0.0.1 » Database: insurance » Table: accident

Browse Structure SQL Search Insert Export Import Privileges Operations

Run SQL query/queries on table insurance.accident:

```
1 INSERT INTO ACCIDENT (report_number,date, location) VALUES (1037,'2021-03-17', 'Sahakarnagar')
```

← Server: 127.0.0.1 » Database: insurance » Table: accident

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Show query box

✓ 1 row inserted. (Query took 0.1072 seconds.)

```
INSERT INTO ACCIDENT (report_number,date, location) VALUES (1037,'2021-03-17', 'Sahakarnagar')
```

[Edit inline] [Edit] [Create PHP code]

← Server: 127.0.0.1 » Database: insurance » Table: accident

Browse Structure SQL Search Insert Export Import Privileges Operations

✓ Showing rows 0 - 5 (6 total, Query took 0.0006 seconds.)

```
SELECT * FROM `accident`
```

Show all | Number of rows: 25 ▾ Filter rows: Sort by key: ▾

+ Options

	report_number	date	location
<input type="checkbox"/>  Edit  Copy  Delete	1001	2020-08-14	MG Road
<input type="checkbox"/>  Edit  Copy  Delete	1016	2019-12-13	Whitefield
<input type="checkbox"/>  Edit  Copy  Delete	1020	2021-04-13	Church Street
<input type="checkbox"/>  Edit  Copy  Delete	1031	2021-04-01	Yelahanka
<input type="checkbox"/>  Edit  Copy  Delete	1037	2021-03-17	Sahakarnagar
<input type="checkbox"/>  Edit  Copy  Delete	1045	2020-05-21	Basavanagudi

4) Find the total number of people who owned cars that were involved in accidents in 2021.

Server: 127.0.0.1 » Database: insurance » Table: accident

Browse Structure SQL Search Insert Export Import Privileges

Run SQL query/queries on table insurance.accident: ?

```
1 SELECT COUNT(DISTINCT driver_id) CNT FROM PARTICIPATED A, ACCIDENT B WHERE
2 A.report_number=B.report_number AND B.date LIKE '2021%';
```

Server: 127.0.0.1 » Database: insurance » Table: accident

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking

Show query box

⚠ Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available. ?

Your SQL query has been executed successfully.

```
SELECT COUNT(DISTINCT driver_id) CNT FROM PARTICIPATED A, ACCIDENT B WHERE A.report_number=B.report_number AND B.date LIKE '2021%'
```

Profiling

+ Options

CNT
2

- 5) Find the number of accidents in which cars belonging to a specific model (say 'Hyundai') were involved.

Server: 127.0.0.1 » Database: insurance » Table: car

Browse Structure SQL Search Insert Export Import Privileges

Run SQL query/queries on table insurance.car:

```
1 SELECT COUNT(report_number) CNT FROM PARTICIPATED A, CAR B WHERE A.reg_no=B.reg_no AND
2 model='Hyundai';
```

Server: 127.0.0.1 » Database: insurance » Table: car

Browse Structure SQL Search Insert Export Import Privileges Operations

Show query box

Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.

Your SQL query has been executed successfully.

```
SELECT COUNT(report_number) CNT FROM PARTICIPATED A, CAR B WHERE A.reg_no=B.reg_no AND model='Hyundai'
```

+ Options

CNT
1

PROGRAM 2 : BANKING ENTERPRISE DATABASE

Consider the following database for a banking enterprise.

BRANCH (branch-name: String, branch-city: String, assets: real)

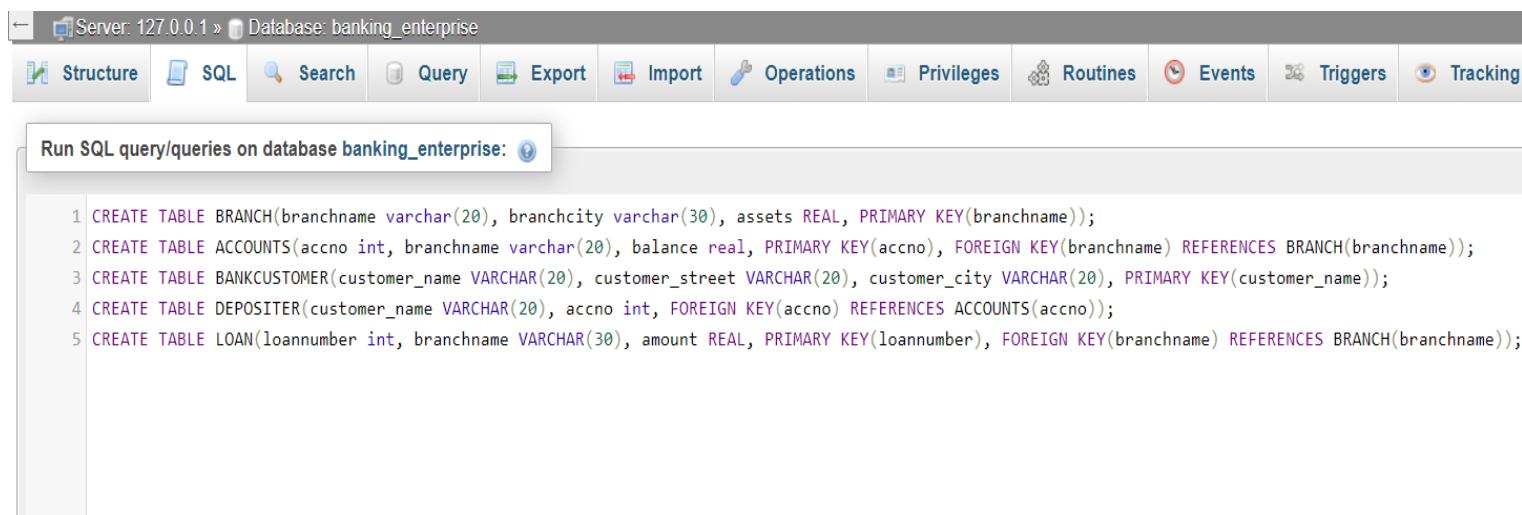
ACCOUNTS (accno: int, branch-name: String, balance: real)

BANKCUSTOMER (customer-name: String, customer-street: String, customer-city: String)

DEPOSITER (customer-name: String, accno: int)

LOAN (loan-number: int, branch-name: String, amount: real)

- 1) Create the above tables by properly specifying the primary keys and the foreign keys.



```
1 CREATE TABLE BRANCH(branchname varchar(20), branchcity varchar(30), assets REAL, PRIMARY KEY(branchname));
2 CREATE TABLE ACCOUNTS(accno int, branchname varchar(20), balance real, PRIMARY KEY(accno), FOREIGN KEY(branchname) REFERENCES BRANCH(branchname));
3 CREATE TABLE BANKCUSTOMER(customer_name VARCHAR(20), customer_street VARCHAR(20), customer_city VARCHAR(20), PRIMARY KEY(customer_name));
4 CREATE TABLE DEPOSITER(customer_name VARCHAR(20), accno int, FOREIGN KEY(accno) REFERENCES ACCOUNTS(accno));
5 CREATE TABLE LOAN(loannumber int, branchname VARCHAR(30), amount REAL, PRIMARY KEY(loannumber), FOREIGN KEY(branchname) REFERENCES BRANCH(branchname));
```

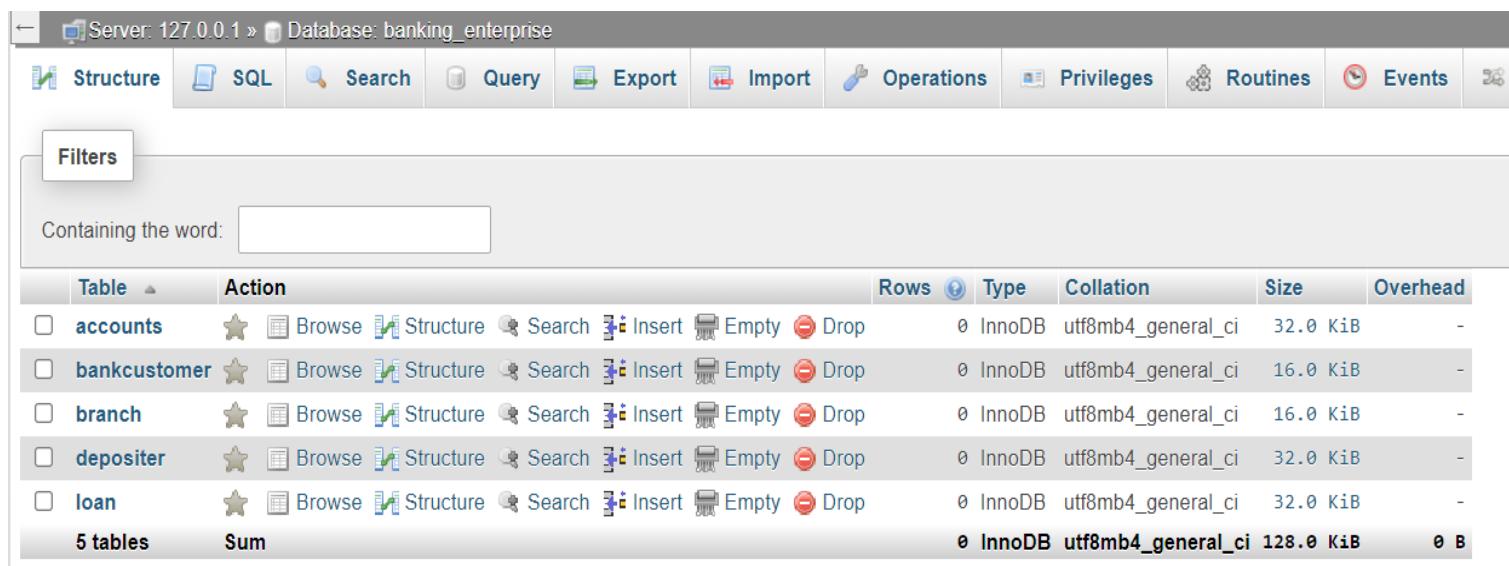


Table	Action	Rows	Type	Collation	Size	Overhead
accounts		0	InnoDB	utf8mb4_general_ci	32.0 KiB	-
bankcustomer		0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
branch		0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
depositor		0	InnoDB	utf8mb4_general_ci	32.0 KiB	-
loan		0	InnoDB	utf8mb4_general_ci	32.0 KiB	-
5 tables	Sum	0	InnoDB	utf8mb4_general_ci	128.0 KiB	0 B

2) Enter at least 5 tuples for each relation.

'BRANCH' table:

The screenshot shows the MySQL Workbench interface with the 'branch' table selected. The table has three columns: branch_id (int), address (varchar), and balance (float). Five rows have been inserted:

branch_id	address	balance
1	SBI Chamrajpet, Bangalore	50000
2	SBI Residency Road, Bangalore	10000
3	SBI Shivaji Road, Bombay	20000
4	SBI Parliament Road, Delhi	10000
5	SBI Jantarmantar, Delhi	20000

The screenshot shows the MySQL Workbench interface with the 'branch' table selected. Five INSERT queries are shown, each followed by a success message indicating 1 row was inserted and the execution time.

- 1 row inserted. (Query took 0.1481 seconds.)
INSERT INTO branch VALUES("SBI Chamrajpet", "Bangalore", 50000)
[Edit inline] [Edit] [Create PHP code]
- 1 row inserted. (Query took 0.0291 seconds.)
INSERT INTO branch VALUES("SBI Residency Road", "Bangalore", 10000)
[Edit inline] [Edit] [Create PHP code]
- 1 row inserted. (Query took 0.1043 seconds.)
INSERT INTO branch VALUES("SBI Shivaji Road", "Bombay", 20000)
[Edit inline] [Edit] [Create PHP code]
- 1 row inserted. (Query took 0.2135 seconds.)
INSERT INTO branch VALUES("SBI Parliament Road", "Delhi", 10000)
[Edit inline] [Edit] [Create PHP code]
- 1 row inserted. (Query took 0.0658 seconds.)
INSERT INTO branch VALUES("SBI Jantarmantar", "Delhi", 20000)
[Edit inline] [Edit] [Create PHP code]

Server: 127.0.0.1 » Database: banking_enterprise » Table: branch

[Browse](#) [Structure](#) [SQL](#) [Search](#) [Insert](#) [Export](#) [Import](#)

Showing rows 0 - 4 (5 total, Query took 0.0005 seconds.)

```
SELECT * FROM `branch`
```

Show all | Number of rows: 25 ▾ Filter rows: Sort by k

+ Options

	<input type="checkbox"/>	<input type="checkbox"/> Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	branchname	branchcity	assets
	<input type="checkbox"/>	<input type="checkbox"/> Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	SBI Chamrajpet	Bangalore	50000
	<input type="checkbox"/>	<input type="checkbox"/> Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	SBI Jantarmantar	Delhi	20000
	<input type="checkbox"/>	<input type="checkbox"/> Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	SBI Parliament Road	Delhi	10000
	<input type="checkbox"/>	<input type="checkbox"/> Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	SBI Residency Road	Bangalore	10000
	<input type="checkbox"/>	<input type="checkbox"/> Edit	<input type="checkbox"/> Copy	<input type="checkbox"/> Delete	SBI Shivaji Road	Bombay	20000

'ACCOUNTS' table:

Server: 127.0.0.1 » Database: banking_enterprise » Table: branch

[Browse](#) [Structure](#) [SQL](#) [Search](#) [Insert](#) [Export](#) [Import](#)

Run SQL query/queries on table banking_enterprise.branch: [?](#)

```

1 INSERT INTO ACCOUNTS VALUES("1","SBI Chamrajpet",2000);
2 INSERT INTO ACCOUNTS VALUES("2","SBI Residency Road",5000);
3 INSERT INTO ACCOUNTS VALUES("3","SBI Shivaji Road",6000);
4 INSERT INTO ACCOUNTS VALUES("4","SBI Parliament Road",9000);
5 INSERT INTO ACCOUNTS VALUES("5","SBI Jantarmantar",8000);
6 INSERT INTO ACCOUNTS VALUES("6","SBI Shivaji Road",4000);
7 INSERT INTO ACCOUNTS VALUES("8","SBI Residency Road",4000);
8 INSERT INTO ACCOUNTS VALUES("9","SBI Parliament Road",3000);
9 INSERT INTO ACCOUNTS VALUES("10","SBI Residency Road",5000);
10 INSERT INTO ACCOUNTS VALUES("11","SBI Jantarmantar",2000);
```

Server: 127.0.0.1 » Database: banking_enterprise » Table: branch

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

✓ 1 row inserted. (Query took 0.1276 seconds.)

```
INSERT INTO ACCOUNTS VALUES("1","SBI Chamrajpet",2000)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0638 seconds.)

```
INSERT INTO ACCOUNTS VALUES("2","SBI Residency Road",5000)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.2065 seconds.)

```
INSERT INTO ACCOUNTS VALUES("3","SBI Shivaji Road",6000)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0454 seconds.)

```
INSERT INTO ACCOUNTS VALUES("4","SBI Parliament Road",9000)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0453 seconds.)

```
INSERT INTO ACCOUNTS VALUES("5","SBI Jantarmantar",8000)
```

[Edit inline] [Edit] [Create PHP code]

Server: 127.0.0.1 » Database: banking_enterprise » Table: branch

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

✓ 1 row inserted. (Query took 0.0322 seconds.)

```
INSERT INTO ACCOUNTS VALUES("6","SBI Shivaji Road",4000)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0319 seconds.)

```
INSERT INTO ACCOUNTS VALUES("8","SBI Residency Road",4000)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0313 seconds.)

```
INSERT INTO ACCOUNTS VALUES("9","SBI Parliament Road",3000)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0324 seconds.)

```
INSERT INTO ACCOUNTS VALUES("10","SBI Residency Road",5000)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0325 seconds.)

```
INSERT INTO ACCOUNTS VALUES("11","SBI Jantarmantar",2000)
```

[Edit inline] [Edit] [Create PHP code]

Server: 127.0.0.1 » Database: banking_enterprise » Table: accounts

Browse Structure SQL Search Insert Export

Showing rows 0 - 9 (10 total, Query took 0.0007 seconds.)

```
SELECT * FROM `accounts`
```

Show all Number of rows: 25 Filter rows: Search this table

+ Options

	accno	branchname	balance
<input type="checkbox"/>	1	SBI Chamrajpet	2000
<input type="checkbox"/>	2	SBI Residency Road	5000
<input type="checkbox"/>	3	SBI Shivaji Road	6000
<input type="checkbox"/>	4	SBI Parliament Road	9000
<input type="checkbox"/>	5	SBI Jantarmantar	8000
<input type="checkbox"/>	6	SBI Shivaji Road	4000
<input type="checkbox"/>	8	SBI Residency Road	4000
<input type="checkbox"/>	9	SBI Parliament Road	3000
<input type="checkbox"/>	10	SBI Residency Road	5000
<input type="checkbox"/>	11	SBI Jantarmantar	2000

'BANKCUSTOMER' table:

Server: 127.0.0.1 » Database: banking_enterprise » Table: bankcustomer

Browse Structure SQL Search Insert Export Import Privileges

Run SQL query/queries on table banking_enterprise.bankcustomer:

```

1 INSERT INTO BANKCUSTOMER VALUES("Avinash","Bull_Temple_Road","Bangalore");
2 INSERT INTO BANKCUSTOMER VALUES("Dinesh","Bannergatta_Road","Bangalore");
3 INSERT INTO BANKCUSTOMER VALUES("Satish","NationalCollege_Road","Bangalore");
4 INSERT INTO BANKCUSTOMER VALUES("Ramesh","Akbar_Road","Delhi");
5 INSERT INTO BANKCUSTOMER VALUES("Rohini","Prithviraj_Road","Delhi");

```

Server: 127.0.0.1 » Database: banking_enterprise » Table: bankcustomer

[Browse](#) [Structure](#) [SQL](#) [Search](#) [Insert](#) [Export](#) [Import](#) [Privileges](#) [Operations](#) [Tracking](#) [Triggers](#)

Show query box

```
✓ 1 row inserted. (Query took 0.0985 seconds.)
```

```
INSERT INTO BANKCUSTOMER VALUES("Avinash","Bull_Temple_Road","Bangalore")
```

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

```
✓ 1 row inserted. (Query took 0.0380 seconds.)
```

```
INSERT INTO BANKCUSTOMER VALUES("Dinesh","BannerGatta_Road","Bangalore")
```

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

```
✓ 1 row inserted. (Query took 0.0448 seconds.)
```

```
INSERT INTO BANKCUSTOMER VALUES("Satish","NationalCollege_Road","Bangalore")
```

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

```
✓ 1 row inserted. (Query took 0.0455 seconds.)
```

```
INSERT INTO BANKCUSTOMER VALUES("Ramesh","Akbar_Road","Delhi")
```

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

```
✓ 1 row inserted. (Query took 0.0324 seconds.)
```

```
INSERT INTO BANKCUSTOMER VALUES("Rohini","Prithiviraj_Road","Delhi")
```

[\[Edit inline\]](#) [\[Edit\]](#) [\[Create PHP code\]](#)

Server: 127.0.0.1 » Database: banking_enterprise » Table: bankcustomer

[Browse](#) [Structure](#) [SQL](#) [Search](#) [Insert](#) [Export](#) [Import](#)

```
✓ Showing rows 0 - 4 (5 total, Query took 0.0006 seconds.)
```

```
SELECT * FROM `bankcustomer`
```

<input type="checkbox"/> Show all	Number of rows:	25	Filter rows:	Search this table	Sort by																																									
<input type="checkbox"/> + Options																																														
<table border="1"> <thead> <tr> <th colspan="2"></th> <th>customer_name</th> <th>customer_street</th> <th>customer_city</th> <th></th> </tr> </thead> <tbody> <tr> <td><input type="checkbox"/></td> <td>Edit</td> <td>Copy</td> <td>Delete</td> <td>Avinash</td> <td>Bull_Temple_Road</td> <td>Bangalore</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Edit</td> <td>Copy</td> <td>Delete</td> <td>Dinesh</td> <td>BannerGatta_Road</td> <td>Bangalore</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Edit</td> <td>Copy</td> <td>Delete</td> <td>Ramesh</td> <td>Akbar_Road</td> <td>Delhi</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Edit</td> <td>Copy</td> <td>Delete</td> <td>Rohini</td> <td>Prithiviraj_Road</td> <td>Delhi</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Edit</td> <td>Copy</td> <td>Delete</td> <td>Satish</td> <td>NationalCollege_Road</td> <td>Bangalore</td> </tr> </tbody> </table>								customer_name	customer_street	customer_city		<input type="checkbox"/>	Edit	Copy	Delete	Avinash	Bull_Temple_Road	Bangalore	<input type="checkbox"/>	Edit	Copy	Delete	Dinesh	BannerGatta_Road	Bangalore	<input type="checkbox"/>	Edit	Copy	Delete	Ramesh	Akbar_Road	Delhi	<input type="checkbox"/>	Edit	Copy	Delete	Rohini	Prithiviraj_Road	Delhi	<input type="checkbox"/>	Edit	Copy	Delete	Satish	NationalCollege_Road	Bangalore
		customer_name	customer_street	customer_city																																										
<input type="checkbox"/>	Edit	Copy	Delete	Avinash	Bull_Temple_Road	Bangalore																																								
<input type="checkbox"/>	Edit	Copy	Delete	Dinesh	BannerGatta_Road	Bangalore																																								
<input type="checkbox"/>	Edit	Copy	Delete	Ramesh	Akbar_Road	Delhi																																								
<input type="checkbox"/>	Edit	Copy	Delete	Rohini	Prithiviraj_Road	Delhi																																								
<input type="checkbox"/>	Edit	Copy	Delete	Satish	NationalCollege_Road	Bangalore																																								

'DEPOSITER' table:

The screenshot shows the MySQL Workbench interface with the following details:

- Server: 127.0.0.1
- Database: banking_enterprise
- Table: depositer
- Toolbar buttons: Browse, Structure, SQL, Search, Insert, Export.
- A large text area titled "Run SQL query/queries on table banking_enterprise.depositor:" containing the following SQL code:

```
1 INSERT INTO DEPOSITER VALUES("Avinash",1);
2 INSERT INTO DEPOSITER VALUES("Dinesh",2);
3 INSERT INTO DEPOSITER VALUES("Nikil",4);
4 INSERT INTO DEPOSITER VALUES("Ravi",5);
5 INSERT INTO DEPOSITER VALUES("Avinash",8);
6 INSERT INTO DEPOSITER VALUES("Nikil",9);
7 INSERT INTO DEPOSITER VALUES("Dinesh",10);
8 INSERT INTO DEPOSITER VALUES("Nikil",11);
```

The screenshot shows the MySQL Workbench interface with the following details:

- Server: 127.0.0.1
- Database: banking_enterprise
- Table: depositer
- Toolbar buttons: Browse, Structure, SQL, Search, Insert, Export, Import, Privileges, Operations, Tracking, Triggers.
- A message bar at the top says "Show query box".
- Four successful insert operations are listed in a log:

- 1 row inserted. (Query took 0.0793 seconds.)
INSERT INTO DEPOSITER VALUES("Avinash",1)
[Edit inline] [Edit] [Create PHP code]
- 1 row inserted. (Query took 0.0286 seconds.)
INSERT INTO DEPOSITER VALUES("Dinesh",2)
[Edit inline] [Edit] [Create PHP code]
- 1 row inserted. (Query took 0.1365 seconds.)
INSERT INTO DEPOSITER VALUES("Nikil",4)
[Edit inline] [Edit] [Create PHP code]
- 1 row inserted. (Query took 0.0430 seconds.)
INSERT INTO DEPOSITER VALUES("Ravi",5)
[Edit inline] [Edit] [Create PHP code]
- 1 row inserted. (Query took 0.0430 seconds.)
INSERT INTO DEPOSITER VALUES("Avinash",8)
[Edit inline] [Edit] [Create PHP code]

Server: 127.0.0.1 » Database: banking_enterprise » Table: depositer

[Browse](#) [Structure](#) [SQL](#) [Search](#) [Insert](#) [Export](#) [Import](#) [Privileges](#) [Operations](#) [Tracking](#) [Triggers](#)

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0430 seconds.)

```
INSERT INTO DEPOSITER VALUES("Ravi",5)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0430 seconds.)

```
INSERT INTO DEPOSITER VALUES("Avinash",8)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0429 seconds.)

```
INSERT INTO DEPOSITER VALUES("Nikil",9)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0319 seconds.)

```
INSERT INTO DEPOSITER VALUES("Dinesh",10)
```

[Edit inline] [Edit] [Create PHP code]

✓ 1 row inserted. (Query took 0.0322 seconds.)

```
INSERT INTO DEPOSITER VALUES("Nikil",11)
```

[Edit inline] [Edit] [Create PHP code]

Server: 127.0.0.1 » Database: banking_enterprise » Table: depositer

[Browse](#) [Structure](#) [SQL](#) [Search](#) [Insert](#) [Export](#)

⚠ Current selection does not contain a unique column. Grid edit, checkbox, Edit

✓ Showing rows 0 - 7 (8 total, Query took 0.0019 seconds.)

```
SELECT * FROM `depositor`
```

Show all | Number of rows: 25 ▾ Filter rows: Search this table

+ Options

customer_name	accno
Avinash	1
Dinesh	2
Nikil	4
Ravi	5
Avinash	8
Nikil	9
Dinesh	10
Nikil	11

'LOAN' table:

The screenshot shows the MySQL Workbench interface with the following details:

- Server: 127.0.0.1
- Database: banking_enterprise
- Table: loan
- Tab selected: SQL
- Text area content:

```
1 INSERT INTO LOAN VALUES(1,"SBI Chamrajpet",1000);
2 INSERT INTO LOAN VALUES(2,"SBI Residency Road",2000);
3 INSERT INTO LOAN VALUES(3,"SBI Shivaji Road",3000);
4 INSERT INTO LOAN VALUES(4,"SBI Parliament Road",4000);
5 INSERT INTO LOAN VALUES(5,"SBI Jantarmantar",5000);
```

The screenshot shows the MySQL Workbench interface with the following details:

- Server: 127.0.0.1
- Database: banking_enterprise
- Table: loan
- Tab selected: SQL
- Text area content:

```
1 row inserted. (Query took 0.1079 seconds.)  
INSERT INTO LOAN VALUES(1, "SBI Chamrajpet", 1000)  
  
1 row inserted. (Query took 0.0395 seconds.)  
INSERT INTO LOAN VALUES(2, "SBI Residency Road", 2000)  
  
1 row inserted. (Query took 0.1152 seconds.)  
INSERT INTO LOAN VALUES(3, "SBI Shivaji Road", 3000)  
  
1 row inserted. (Query took 0.0435 seconds.)  
INSERT INTO LOAN VALUES(4, "SBI Parliament Road", 4000)  
  
1 row inserted. (Query took 0.0432 seconds.)  
INSERT INTO LOAN VALUES(5, "SBI Jantarmantar", 5000)
```
- Buttons at the bottom right of each result block: [Edit inline] [Edit] [Create PHP code]

✓ Showing rows 0 - 4 (5 total, Query took 0.0008 seconds.)

```
SELECT * FROM `loan`
```

 Show all

Number of rows:

25

Filter rows:

Search this table

+ Options

	loannumber	branchname	amount
<input type="checkbox"/> Edit Copy Delete	1	SBI Chamrajpet	1000
<input type="checkbox"/> Edit Copy Delete	2	SBI Residency Road	2000
<input type="checkbox"/> Edit Copy Delete	3	SBI Shivaji Road	3000
<input type="checkbox"/> Edit Copy Delete	4	SBI Parliament Road	4000
<input type="checkbox"/> Edit Copy Delete	5	SBI Jantarmantar	5000

3) Find all the customers who have at least two accounts at the Main branch.

Server: 127.0.0.1 » Database: banking_enterprise

Structure SQL Search Query Export Import Operations Privileges Routines Events

Run SQL query/queries on database banking_enterprise:

```
1 SELECT C.customer_name FROM BANKCUSTOMER C WHERE EXISTS(SELECT D.customer_name, COUNT(D.customer_name) FROM DEPOSITER D,
2 ACCOUNTS BA WHERE D.accno=BA.accno AND C.customer_name=D.customer_name AND BA.branchname='SBI Residency Road' GROUP BY
3 D.customer_name HAVING COUNT(D.customer_name)>=2);
```

Server: 127.0.0.1 » Database: banking_enterprise » Table: BANKCUSTOMER

Browse Structure SQL Search Insert Export Import

Show query box

Showing rows 0 - 0 (1 total, Query took 0.0025 seconds.)

```
SELECT C.customer_name FROM BANKCUSTOMER C WHERE EXISTS(SELECT D.customer_name, COUNT(D.customer_name) FROM DEPOSITER D,
C.customer_name=D.customer_name AND BA.branchname='SBI Residency Road' GROUP BY D.cus
```

Show all | Number of rows: 25 Filter rows: Search this table

+ Options

← T →

Edit Copy Delete

customer_name
Dinesh

- 4) Find all the customers who have an account at all the branches located in a specific city.

Server: 127.0.0.1 » Database: banking_enterprise » Table: DEPOSITER

Browse Structure SQL Search Insert Export Import Privileges

Run SQL query/queries on table banking_enterprise.DEPOSITER:

```
1 SELECT customer_name FROM BANKCUSTOMER WHERE NOT EXISTS(SELECT branchname  
2 FROM BRANCH WHERE branchcity='Delhi');
```

Server: 127.0.0.1 » Database: banking_enterprise » Table: BANKCUSTOMER

Browse Structure SQL Search Insert Export Import Privileges Operations

Show query box

MySQL returned an empty result set (i.e. zero rows). (Query took 0.0239 seconds.)

```
SELECT customer_name FROM BANKCUSTOMER WHERE NOT EXISTS(SELECT branchname FROM BRANCH WHERE branchcity='Delhi')
```

customer_name

Query results operations

Create view

5) Demonstrate how you delete all account tuples at every branch located in a specific city.

Server: 127.0.0.1 » Database: banking_enterprise

Structure SQL Search Query Export Import Operations

Run SQL query/queries on database banking_enterprise:

```
1 DELETE FROM ACCOUNTS WHERE branchname IN (SELECT branchname FROM BRANCH  
2 WHERE branchcity='Bombay');
```

Server: 127.0.0.1 » Database: banking_enterprise » Table: accounts

Browse Structure SQL Search Insert Export Import

Showing rows 0 - 7 (8 total, Query took 0.0004 seconds.)

```
SELECT * FROM `accounts`
```

Show all Number of rows: 25 Filter rows: Search this table Sort by k

+ Options

	accno	branchname	balance
<input type="checkbox"/>	1	SBI Chamrajpet	2000
<input type="checkbox"/>	2	SBI Residency Road	5000
<input type="checkbox"/>	4	SBI Parliament Road	9000
<input type="checkbox"/>	5	SBI Jantarmantar	8000
<input type="checkbox"/>	8	SBI Residency Road	4000
<input type="checkbox"/>	9	SBI Parliament Road	3000
<input type="checkbox"/>	10	SBI Residency Road	5000
<input type="checkbox"/>	11	SBI Jantarmantar	2000

PROGRAM 3 : SUPPLIER DATABASE

Consider the following schema for a Supplier database:

SUPPLIERS (sid: integer, sname: string, address: string)

PARTS (pid: integer, pname: string, color: string)

CATALOG (sid: integer, pid: integer, cost: real)

The Catalog relation lists the prices charged for parts by Suppliers. Write the following queries in SQL:

Creating tables:

MySQL Workbench interface showing the creation of three tables:

- SUPPLIERS**:
CREATE TABLE SUPPLIERS (sid int, sname varchar(20), address varchar(40), PRIMARY KEY(sid))
- PARTS**:
CREATE TABLE PARTS (pid int, pname varchar(20), color varchar(20), PRIMARY KEY(pid))
- CATALOG**:
CREATE TABLE CATALOG (sid int, pid int, cost real, FOREIGN KEY(sid) REFERENCES SUPPLIERS(sid) ON DELETE SET NULL ON UPDATE CASCADE, FOREIGN KEY(pid) REFERENCES PARTS(pid) ON DELETE SET NULL ON UPDATE CASCADE)

MySQL Workbench interface showing the table structure and statistics:

Table	Action	Rows	Type	Collation	Size	Overhead
catalog	Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	48.0 KiB	-
parts	Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
suppliers	Browse Structure Search Insert Empty Drop	0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
3 tables	Sum	0	InnoDB	utf8mb4_general_ci	80.0 KiB	0 B

'SUPPLIERS' table:

The screenshot shows the MySQL Workbench interface with the following details:

- Server: 127.0.0.1
- Database: supplier
- Table: suppliers
- Toolbar buttons: Browse, Structure, SQL, Search, Insert, Export, Import, Privileges.
- Text area: Run SQL query/queries on table supplier.suppliers:
1 INSERT INTO `suppliers`(`sid`, `sname`, `address`) VALUES (101,'Acme Widget','Bangalore');
2 INSERT INTO `suppliers`(`sid`, `sname`, `address`) VALUES (102,'Johns','Kolkata');
3 INSERT INTO `suppliers`(`sid`, `sname`, `address`) VALUES (103,'Vimal','Mumbai');
4 INSERT INTO `suppliers`(`sid`, `sname`, `address`) VALUES (104,'Reliance','Delhi');

The screenshot shows the MySQL Workbench interface with the following details:

- Server: 127.0.0.1
- Database: supplier
- Table: suppliers
- Toolbar buttons: Browse, Structure, SQL, Search, Insert, Export.
- Message bar: Showing rows 0 - 3 (4 total, Query took 0.0006 seconds.)
- Text area: SELECT * FROM `suppliers`
- Filter controls: Show all (unchecked), Number of rows: 25, Filter rows: Search this table.
- Table data grid:

	sid	sname	address
<input type="checkbox"/>	101	Acme Widget	Bangalore
<input type="checkbox"/>	102	Johns	Kolkata
<input type="checkbox"/>	103	Vimal	Mumbai
<input type="checkbox"/>	104	Reliance	Delhi

'PARTS' table:

Server: 127.0.0.1 » Database: supplier » Table: parts

Browse Structure SQL Search Insert Export Import

Run SQL query/queries on table supplier.parts: [?](#)

```
1 INSERT INTO `parts`(`pid`, `pname`, `color`) VALUES (201,'Book','Red');
2 INSERT INTO `parts`(`pid`, `pname`, `color`) VALUES (202,'Pen','Red');
3 INSERT INTO `parts`(`pid`, `pname`, `color`) VALUES (203,'Pencil','Green');
4 INSERT INTO `parts`(`pid`, `pname`, `color`) VALUES (204,'Mobile','Green');
5 INSERT INTO `parts`(`pid`, `pname`, `color`) VALUES (205,'Charger','Black');
```

Server: 127.0.0.1 » Database: supplier » Table: parts

Browse Structure SQL Search Insert

Showing rows 0 - 4 (5 total, Query took 0.0006 seconds.)

```
SELECT * FROM `parts`
```

Show all Number of rows: 25 Filter rows:

+ Options

	pid	pname	color
<input type="checkbox"/>	201	Book	Red
<input type="checkbox"/>	202	Pen	Red
<input type="checkbox"/>	203	Pencil	Green
<input type="checkbox"/>	204	Mobile	Green
<input type="checkbox"/>	205	Charger	Black

'CATALOG' table:

Server: 127.0.0.1 » Database: supplier » Table: catalog

Browse Structure SQL Search Insert Export Import

Run SQL query/queries on table supplier.catalog:

```
1 INSERT INTO `catalog`(`sid`, `pid`, `cost`) VALUES (101,201,10);
2 INSERT INTO `catalog`(`sid`, `pid`, `cost`) VALUES (101,202,10);
3 INSERT INTO `catalog`(`sid`, `pid`, `cost`) VALUES (101,203,30);
4 INSERT INTO `catalog`(`sid`, `pid`, `cost`) VALUES (101,204,10);
5 INSERT INTO `catalog`(`sid`, `pid`, `cost`) VALUES (101,205,10);
6 INSERT INTO `catalog`(`sid`, `pid`, `cost`) VALUES (102,201,10);
7 INSERT INTO `catalog`(`sid`, `pid`, `cost`) VALUES (102,202,20);
8 INSERT INTO `catalog`(`sid`, `pid`, `cost`) VALUES (103,203,30);
9 INSERT INTO `catalog`(`sid`, `pid`, `cost`) VALUES (104,203,40);
```

Server: 127.0.0.1 » Database: supplier » Table: catalog

Browse Structure SQL Search Insert

Current selection does not contain a unique column. Grid edit, checkboxes, etc. will not work correctly.

Showing rows 0 - 8 (9 total, Query took 0.0013 seconds.)

```
SELECT * FROM `catalog`
```

Show all | Number of rows: 25 Filter rows:

+ Options

sid	pid	cost
101	201	10
101	202	10
101	203	30
101	204	10
101	205	10
102	201	10
102	202	20
103	203	30
104	203	40

1) Find the pnames of parts for which there is some supplier.

Server: 127.0.0.1 » Database: supplier

Structure SQL Search Query Export Import Operations Privileges

Show query box

Showing rows 0 - 4 (5 total, Query took 0.1048 seconds.)

```
SELECT DISTINCT PNAME FROM PARTS,CATALOG WHERE CATALOG.PID=PARTS.PID AND CATALOG.SID IS NOT NULL
```

Show all | Number of rows: 25 Filter rows: Search this table

+ Options

PNAME
Book
Pen
Pencil
Mobile
Charger

2) Find the snames of suppliers who supply every part.

Server: 127.0.0.1 » Database: supplier » Table: SUPPLIERS

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking

Show query box

Showing rows 0 - 0 (1 total, Query took 0.0022 seconds.)

```
SELECT S.SNAME FROM SUPPLIERS S WHERE NOT EXISTS((SELECT P.PID FROM PARTS P ) EXCEPT (SELECT C.PID FROM CATALOG C WHERE C.SID = S.SID))
```

Profiling [Edit inline] [Edit]

Show all | Number of rows: 25 Filter rows: Search this table

+ Options

← → SNAME

Edit Copy Delete Acme Widget

3)Find the snames of suppliers who supply every red part.

Server: 127.0.0.1 » Database: supplier » Table: SUPPLIERS

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Show query box

Showing rows 0 - 1 (2 total, Query took 0.0024 seconds.)

```
SELECT S.SNAME FROM SUPPLIERS S WHERE NOT EXISTS (( SELECT P.PID FROM PARTS P WHERE P.COLOR = 'Red' ) EXCEPT ( SELECT C.PID FROM CATALOG C, PARTS P WHERE C.SID = S.SID AND C.PID = P.PID AND P.COLOR = 'Red' ))
```

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all | Number of rows: 25 ▾ Filter rows: Search this table Sort by key: None ▾

+ Options

← T → SNAME

Edit Copy Delete Acme Widget

Edit Copy Delete Johns

4)Find the pnames of parts supplied by Acme Widget Suppliers and by no one else.

Server: 127.0.0.1 » Database: supplier » Table: PARTS

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Show query box

Showing rows 0 - 1 (2 total, Query took 0.0323 seconds.)

```
SELECT P.PNAME FROM PARTS P, CATALOG C, SUPPLIERS S WHERE P.PID = C.PID AND C.SID = S.SID AND S.SNAME = 'Acme Widget' AND NOT EXISTS ( SELECT * FROM CATALOG C1, SUPPLIERS S1 WHERE P.PID = C1.PID AND C1.SID = S1.SID AND S1.SNAME <> 'Acme Widget' )
```

Profiling [Edit inline] [Edit] [Explain SQL] [Create PHP code] [Refresh]

Show all | Number of rows: 25 ▾ Filter rows: Search this table

+ Options

← T → PNAME

Edit Copy Delete Mobile

Edit Copy Delete Charger

5)Find the sids of suppliers who charge more for some part than the average cost of that part (averaged over all the suppliers who supply that part).

Server: 127.0.0.1 » Database: supplier » Table: CATALOG

Browse Structure SQL Search Insert Export Import Privileges Operations

Show query box

⚠ Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.

Showing rows 0 - 1 (2 total, Query took 0.1253 seconds.)

```
SELECT DISTINCT C.SID FROM CATALOG C WHERE C.COST > ( SELECT AVG (C1.COST) FROM CATALOG C1 WHERE C1.PID = C.PID )
```

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

+ Options

SID
102
104

6)For each part, find the sname of the supplier who charges the most for that part.

Server: 127.0.0.1 » Database: supplier » Table: CATALOG

Browse Structure SQL Search Insert Export Import Privileges Operations Tracking Triggers

Show query box

⚠ Current selection does not contain a unique column. Grid edit, checkbox, Edit, Copy and Delete features are not available.

Showing rows 0 - 5 (6 total, Query took 0.0024 seconds.)

```
SELECT * FROM SUPPLIERS S, PARTS P, CATALOG C WHERE P.PID=C.PID AND C.SID=S.SID AND COST IN (SELECT MAX(COST) FROM CATALOG C1 WHERE C1.PID=P.PID)
```

Profiling [Edit inline] [Edit] [Explain SQL]

Show all Number of rows: 25 Filter rows: Search this table

+ Options

sid	sname	address	pid	pname	color	sid	pid	cost
101	Acme Widget	Bangalore	201	Book	Red	101	201	10
101	Acme Widget	Bangalore	204	Mobile	Green	101	204	10
101	Acme Widget	Bangalore	205	Charger	Black	101	205	10
102	Johns	Kolkata	201	Book	Red	102	201	10
102	Johns	Kolkata	202	Pen	Red	102	202	20
104	Reliance	Delhi	203	Pencil	Green	104	203	40

7)Find the sids of suppliers who supply only red parts.

Server: 127.0.0.1 » Database: supplier » Table: SUPPLIERS

Show query box

Showing rows 0 - 0 (1 total, Query took 0.0017 seconds.)

```
SELECT * FROM SUPPLIERS S WHERE NOT EXISTS ((SELECT PID FROM CATALOG C WHERE C.SID=S.SID) EXCEPT (SELECT PID FROM PARTS WHERE COLOR='Red'))
```

Profiling [Edit inline] [Edit] [Export]

Show all | Number of rows: 25 Filter rows: Search this table

+ Options

	sid	sname	address
<input type="checkbox"/>	102	Johns	Kolkata

Edit Copy Delete

PROGRAM 4 : STUDENT FACULTY DATABASE

Consider the following Student enrolment database for course:

STUDENT (snum: integer, sname: string, major: string, level: string, age:integer)

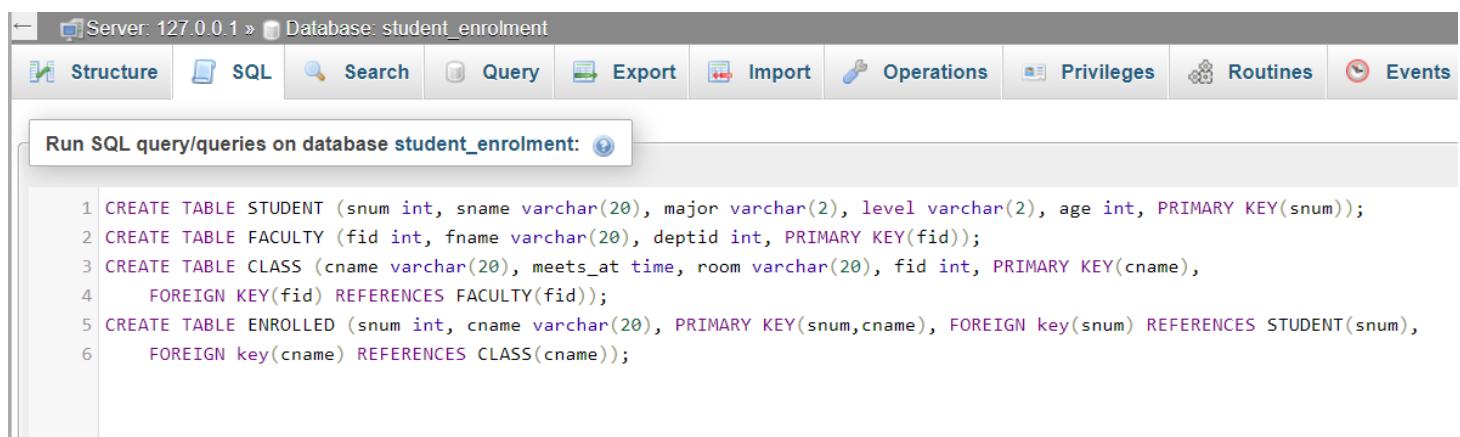
CLASS (name: string, meets at: time, room: string, fid: integer)

ENROLLED (snum: integer, cname: string)

FACULTY (fid: integer, fname: string, deptid: integer)

The meaning of these relations is straightforward; for example, Enrolled has one record per student-class pair such that the student is enrolled in the class. Level is a two character code with 4 different values (example: Junior: JR etc)

Write the following queries in SQL. No duplicates should be printed in any of the answers.



```
1 CREATE TABLE STUDENT (snum int, sname varchar(20), major varchar(2), level varchar(2), age int, PRIMARY KEY(snum));
2 CREATE TABLE FACULTY (fid int, fname varchar(20), deptid int, PRIMARY KEY(fid));
3 CREATE TABLE CLASS (cname varchar(20), meets_at time, room varchar(20), fid int, PRIMARY KEY(cname),
4 FOREIGN KEY(fid) REFERENCES FACULTY(fid));
5 CREATE TABLE ENROLLED (snum int, cname varchar(20), PRIMARY KEY(snum,cname), FOREIGN key(snum) REFERENCES STUDENT(snum),
6 FOREIGN key(cname) REFERENCES CLASS(cname));
```

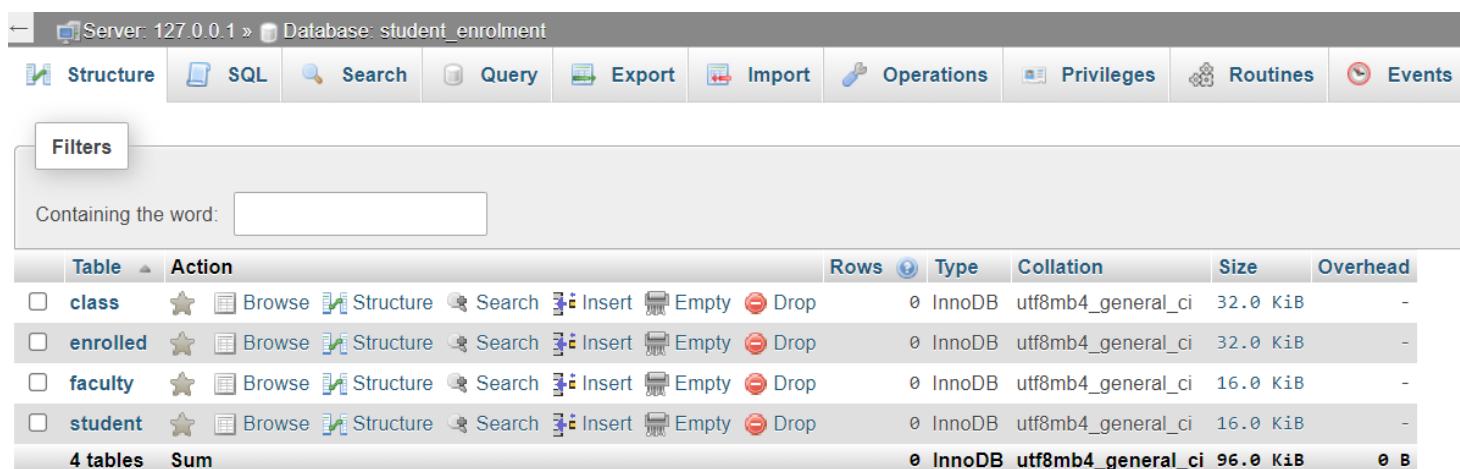
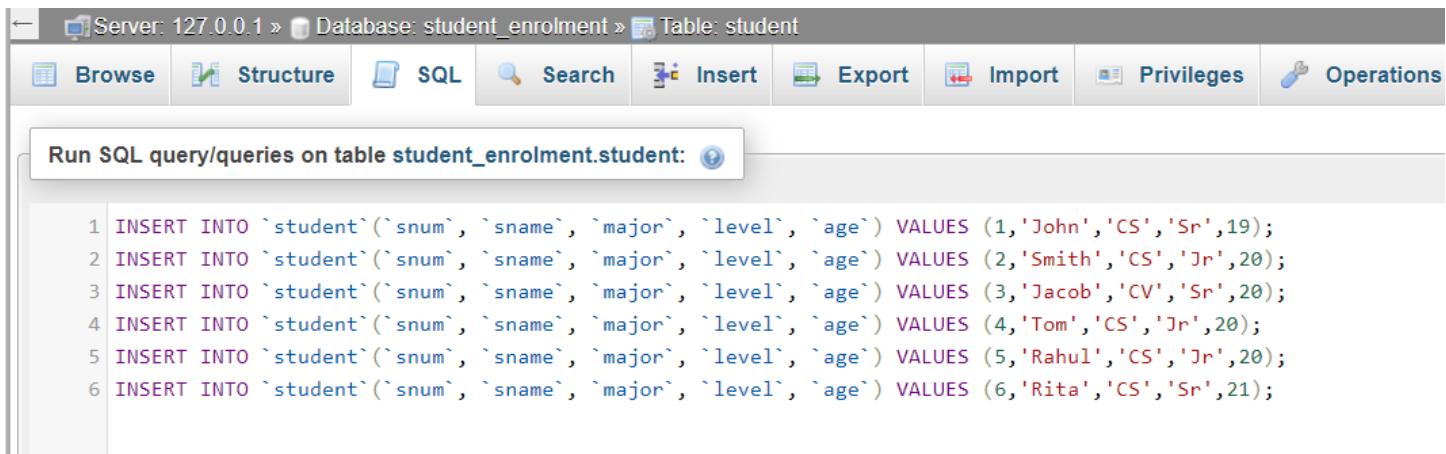


Table	Action	Rows	Type	Collation	Size	Overhead
class		0	InnoDB	utf8mb4_general_ci	32.0 KiB	-
enrolled		0	InnoDB	utf8mb4_general_ci	32.0 KiB	-
faculty		0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
student		0	InnoDB	utf8mb4_general_ci	16.0 KiB	-
4 tables	Sum	0	InnoDB	utf8mb4_general_ci	96.0 KiB	0 B

'STUDENT' table:

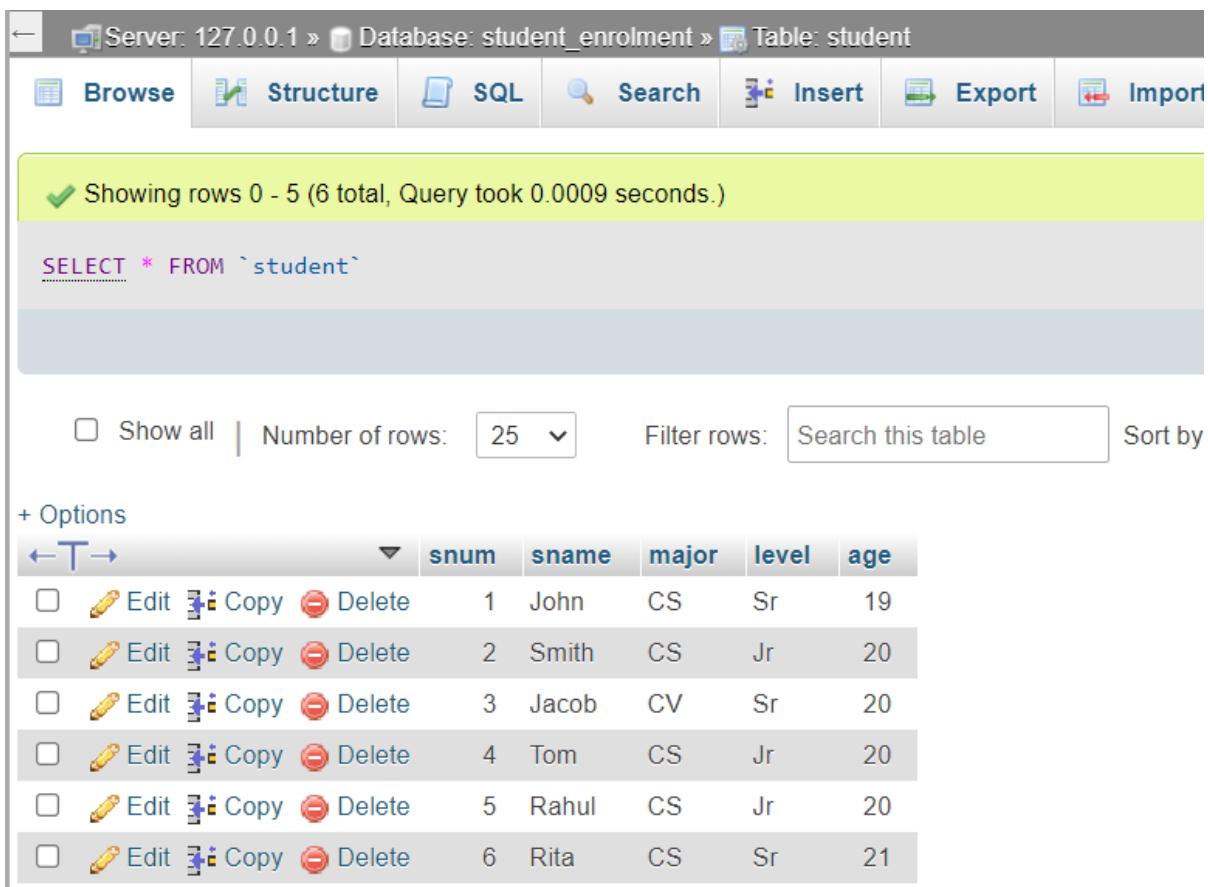


Server: 127.0.0.1 » Database: student_enrolment » Table: student

Browse Structure SQL Search Insert Export Import Privileges Operations

Run SQL query/queries on table student_enrolment.student: ?

```
1 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (1,'John','CS','Sr',19);
2 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (2,'Smith','CS','Jr',20);
3 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (3,'Jacob','CV','Sr',20);
4 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (4,'Tom','CS','Jr',20);
5 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (5,'Rahul','CS','Jr',20);
6 INSERT INTO `student`(`snum`, `sname`, `major`, `level`, `age`) VALUES (6,'Rita','CS','Sr',21);
```



Server: 127.0.0.1 » Database: student_enrolment » Table: student

Browse Structure SQL Search Insert Export Import

Showing rows 0 - 5 (6 total, Query took 0.0009 seconds.)

```
SELECT * FROM `student`
```

Show all Number of rows: 25 Filter rows: Search this table Sort by

+ Options

	snum	sname	major	level	age
<input type="checkbox"/>	1	John	CS	Sr	19
<input type="checkbox"/>	2	Smith	CS	Jr	20
<input type="checkbox"/>	3	Jacob	CV	Sr	20
<input type="checkbox"/>	4	Tom	CS	Jr	20
<input type="checkbox"/>	5	Rahul	CS	Jr	20
<input type="checkbox"/>	6	Rita	CS	Sr	21

'FACULTY' table:

The screenshot shows the MySQL Workbench interface with the following details:

- Server: 127.0.0.1
- Database: student_enrolment
- Table: faculty
- Tab selected: SQL
- Query content:

```
1 INSERT INTO `faculty`(`fid`, `fname`, `deptid`) VALUES (11, 'Harish', 1000);
2 INSERT INTO `faculty`(`fid`, `fname`, `deptid`) VALUES (12, 'MV', 1000);
3 INSERT INTO `faculty`(`fid`, `fname`, `deptid`) VALUES (13, 'Mira', 1001);
4 INSERT INTO `faculty`(`fid`, `fname`, `deptid`) VALUES (14, 'Shiva', 1002);
5 INSERT INTO `faculty`(`fid`, `fname`, `deptid`) VALUES (15, 'Nupur', 1000);
```

The screenshot shows the MySQL Workbench interface with the following details:

- Server: 127.0.0.1
- Database: student_enrolment
- Table: faculty
- Tab selected: Browse
- Message bar: Showing rows 0 - 4 (5 total, Query took 0.0006 seconds.)
- Query content:

```
SELECT * FROM `faculty`
```

Show all | Number of rows: 25 | Filter rows: Search this table

+ Options

	fid	fname	deptid
<input type="checkbox"/>	11	Harish	1000
<input type="checkbox"/>	12	MV	1000
<input type="checkbox"/>	13	Mira	1001
<input type="checkbox"/>	14	Shiva	1002
<input type="checkbox"/>	15	Nupur	1000

'CLASS' table:

The screenshot shows the MySQL Workbench interface. The title bar indicates the connection is to 'Server: 127.0.0.1 » Database: student_enrolment » Table: class'. The toolbar below has tabs for 'Browse', 'Structure', 'SQL', 'Search', 'Insert', 'Export', 'Import', 'Privileges', and 'Operations'. A sub-menu bar above the tabs says 'Run SQL query/queries on table student_enrolment.class:'. The main area contains the following SQL code:

```
1 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class1','12/11/15 10:15:16','R1',14);
2 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class10','12/11/15 10:15:16','R128',14);
3 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class2','12/11/15 10:15:20','R2',12);
4 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class3','12/11/15 10:15:25','R3',11);
5 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class4','12/11/15 20:15:20','R4',14);
6 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class5','12/11/15 20:15:20','R3',15);
7 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class6','12/11/15 13:20:20','R2',14);
8 INSERT INTO `class`(`cname`, `meets_at`, `room`, `fid`) VALUES ('class7','12/11/15 10:10:10','R3',14);
```

The screenshot shows the MySQL Workbench interface with the same connection details as the previous screenshot. The toolbar tabs are 'Browse', 'Structure', 'SQL', 'Search', 'Insert', and 'Export'. A message bar at the top says 'Showing rows 0 - 7 (8 total, Query took 0.0007 seconds.)'. Below it, the SQL query 'SELECT * FROM `class`' is shown. At the bottom, there are filters for 'Show all' (unchecked), 'Number of rows: 25', and a search bar 'Filter rows: Search this table'. The main area displays the data from the 'class' table in a grid:

	cname	meets_at	room	fid
<input type="checkbox"/>	class1	10:15:16	R1	14
<input type="checkbox"/>	class10	10:15:16	R128	14
<input type="checkbox"/>	class2	10:15:20	R2	12
<input type="checkbox"/>	class3	10:15:25	R3	11
<input type="checkbox"/>	class4	20:15:20	R4	14
<input type="checkbox"/>	class5	20:15:20	R3	15
<input type="checkbox"/>	class6	13:20:20	R2	14
<input type="checkbox"/>	class7	10:10:10	R3	14

'ENROLLED' table:

Server: 127.0.0.1 » Database: student_enrolment » Table: enrolled

Browse Structure SQL Search Insert Export Import

Run SQL query/queries on table student_enrolment.enrolled:

```
1 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (1,'class1');
2 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (2,'class1');
3 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (3,'class3');
4 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (4,'class3');
5 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (5,'class4');
6 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (1,'class5');
7 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (2,'class5');
8 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (3,'class5');
9 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (4,'class5');
10 INSERT INTO `enrolled`(`snum`, `cname`) VALUES (5,'class5');
```

← Server: 127.0.0.1 » Database: student_enrolment » Table: enrolled

Browse Structure SQL Search Insert Export

Showing rows 0 - 9 (10 total, Query took 0.0007 seconds.)

```
SELECT * FROM `enrolled`
```

Show all Number of rows: 25 Filter rows: Search this table

+ Options

	snum	cname
<input type="checkbox"/>	1	class1
<input type="checkbox"/>	1	class5
<input type="checkbox"/>	2	class1
<input type="checkbox"/>	2	class5
<input type="checkbox"/>	3	class3
<input type="checkbox"/>	3	class5
<input type="checkbox"/>	4	class3
<input type="checkbox"/>	4	class5
<input type="checkbox"/>	5	class4
<input type="checkbox"/>	5	class5

1) Find the names of all Juniors (level = Jr) who are enrolled in a class taught by 'Harish'.

Server: 127.0.0.1 » Database: student_enrolment

Structure SQL Search Query Export Import

Run SQL query/queries on database student_enrolment:

```
1 SELECT DISTINCT S.sname
2 FROM STUDENT S, CLASS C, ENROLLED E, FACULTY F
3 WHERE S.snum=E.snum AND E cname=C cname AND C fid=F fid AND
4 F fname='Harish' AND S level='Jr';
```

Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export Import

Show query box

Showing rows 0 - 0 (1 total, Query took 0.0036 seconds.)

```
SELECT DISTINCT S.sname FROM STUDENT S, CLASS C, ENROLLED E, FACULTY F WHERE S.snum=E.snum AND S.level='Jr'
```

Show all | Number of rows: 25 Filter rows:

+ Options

Edit Copy Delete Tom

2)Find the names of all classes that either meet in room R128 or have five or more Students enrolled.

Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export

Run SQL query/queries on table student_enrolment.STUDENT:

```
1 SELECT DISTINCT cname
2 FROM class
3 WHERE room='R128' OR cname IN (SELECT E.cname
4                                     FROM ENROLLED E GROUP BY E.cname
5                                     HAVING COUNT(*) >= 5);
```

Server: 127.0.0.1 » Database: student_enrolment » Table: class

Browse Structure SQL Search Insert Export Import

Show query box

Showing rows 0 - 1 (2 total, Query took 0.0266 seconds.)

```
SELECT DISTINCT cname FROM class WHERE room='R128' OR cname IN (SELECT E.cname FROM E
```

Show all Number of rows: 25 Filter rows: Search this table Sort by k

+ Options

	cname
<input type="checkbox"/>  Edit  Copy  Delete	class10
<input type="checkbox"/>  Edit  Copy  Delete	class5

3)Find the names of all students who are enrolled in two classes that meet at the same time.

← Server: 127.0.0.1 » Database: student_enrolment » Table: class

Browse Structure SQL Search Insert Export Import Privileges

Run SQL query/queries on table student_enrolment.class:

```
1 SELECT DISTINCT S.sname
2 FROM STUDENT S
3 WHERE S.snum IN (SELECT E1.snum
4                   FROM ENROLLED E1, ENROLLED E2, CLASS C1, CLASS C2
5                   WHERE E1.snum=E2.snum AND E1 cname<>E2 cname AND
6                   E1 cname=C1 cname AND E2 cname=C2 cname AND C1 meets_at=C2 meets_at);
```

← Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export

Show query box

Showing rows 0 - 0 (1 total, Query took 0.1082 seconds.)

```
SELECT DISTINCT S.sname FROM STUDENT S WHERE S.snum IN (SELECT E1.snum F
E1 cname<>E2 cname AND E1 cname=C1 cname AND E2 cname=C2 cname AND C1 me
```

Show all | Number of rows: 25 ▾ Filter rows: Search this table

+ Options

← → sname

Edit Copy Delete Rahul

4)Find the names of faculty members who teach in every room in which some class is taught.

Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export Import

Run SQL query/queries on table student_enrolment.STUDENT: ?

```
1 SELECT F.fname, F.fid
2 FROM FACULTY F
3 WHERE F.fid IN (SELECT fid
4                   FROM CLASS
5                   GROUP BY fid
6                   HAVING COUNT(*) = (SELECT COUNT(DISTINCT room)
7                                         FROM CLASS));
```

Server: 127.0.0.1 » Database: student_enrolment » Table: FACULTY

Browse Structure SQL Search Insert Export Import

Show query box

Showing rows 0 - 0 (1 total, Query took 0.1073 seconds.)

```
SELECT F.fname, F.fid FROM FACULTY F WHERE F.fid IN (SELECT fid FROM CLASS GROUP BY
```

Show all | Number of rows: 25 ▾ Filter rows: Search this table

+ Options

← → | fname fid

Edit Copy Delete Shiva

fname	fid
Shiva	14

5)Find the names of faculty members for whom the combined enrolment of the courses that they teach is less than five.

Server: 127.0.0.1 » Database: student_enrolment » Table: FACULTY

Browse Structure SQL Search Insert Export

Run SQL query/queries on table student_enrolment.FACULTY:

```
1 SELECT DISTINCT F.fname
2 FROM FACULTY F
3 WHERE 5 > (SELECT COUNT(E.snum)
4             FROM CLASS C, ENROLLED E
5             WHERE C cname=E cname AND C fid=F fid);
6
```

Server: 127.0.0.1 » Database: student_enrolment » Table: FACULTY

Browse Structure SQL Search Insert Export

Show query box

Showing rows 0 - 3 (4 total, Query took 0.0020 seconds.)

```
SELECT DISTINCT F.fname FROM FACULTY F WHERE 5 > (SELECT COUNT(E.snum) FF
```

Show all | Number of rows: 25 Filter rows: Search this table

+ Options

fname
Harish
MV
Mira
Shiva

Edit Copy Delete Harish

Edit Copy Delete MV

Edit Copy Delete Mira

Edit Copy Delete Shiva

6)Find the names of students who are not enrolled in any class.

Server: 127.0.0.1 » Database: student_enrolment

Structure SQL Search Query Export Import

Run SQL query/queries on database student_enrolment:

```
1 SELECT DISTINCT S.sname
2 FROM STUDENT S
3 WHERE S.snum NOT IN (SELECT E.snum
4                         FROM ENROLLED E);|
```

Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export

Show query box

Showing rows 0 - 0 (1 total, Query took 0.0018 seconds.)

SELECT DISTINCT S.sname FROM STUDENT S WHERE S.snum NOT IN (SELECT E.snum

Show all | Number of rows: 25 ▾ Filter rows: Search this table

+ Options

← → sname

Edit Copy Delete Rita

7)For each age value that appears in Students, find the level value that appears most often. For ex, if there are more FR level students aged 18 than SR, JR, or SO students aged 18, you should print the pair (18, FR).

Server: 127.0.0.1 » Database: student_enrolment

Structure SQL Search Query Export Import Operations

Run SQL query/queries on database student_enrolment:

```
1 SELECT S.age, S.level
2 FROM STUDENT S
3 GROUP BY S.age, S.level
4 HAVING S.level IN (SELECT S1.level
5                      FROM STUDENT S1
6                      WHERE S1.age=S.age
7                      GROUP BY S1.age, S1.level
8                      HAVING COUNT(*) >= ALL (SELECT COUNT(*)
9                                     FROM STUDENT S2
10                                    WHERE S1.age=S2.age
11                                    GROUP BY S2.level, S2.age))
12 ORDER BY S.age;
```

Server: 127.0.0.1 » Database: student_enrolment » Table: STUDENT

Browse Structure SQL Search Insert Export Import

Show query box

Showing rows 0 - 2 (3 total, Query took 0.0049 seconds.) [age: 19... - 21...]

```
SELECT S.age, S.level FROM STUDENT S GROUP BY S.age, S.level HAVING S.level IN (SELECT S1.level
COUNT(*) >= ALL (SELECT COUNT(*) FROM STUDENT S2 WHERE S1.age=S2.age GROUP BY S2.level))
```

Show all | Number of rows: 25 Filter rows: Search this table Sort by k

+ Options

	age	level
<input type="checkbox"/>	19	Sr
<input type="checkbox"/>	20	Jr
<input type="checkbox"/>	21	Sr

PROGRAM 5 : AIRLINE FLIGHT DATABASE

Consider the following database that keeps track of airline flight information:

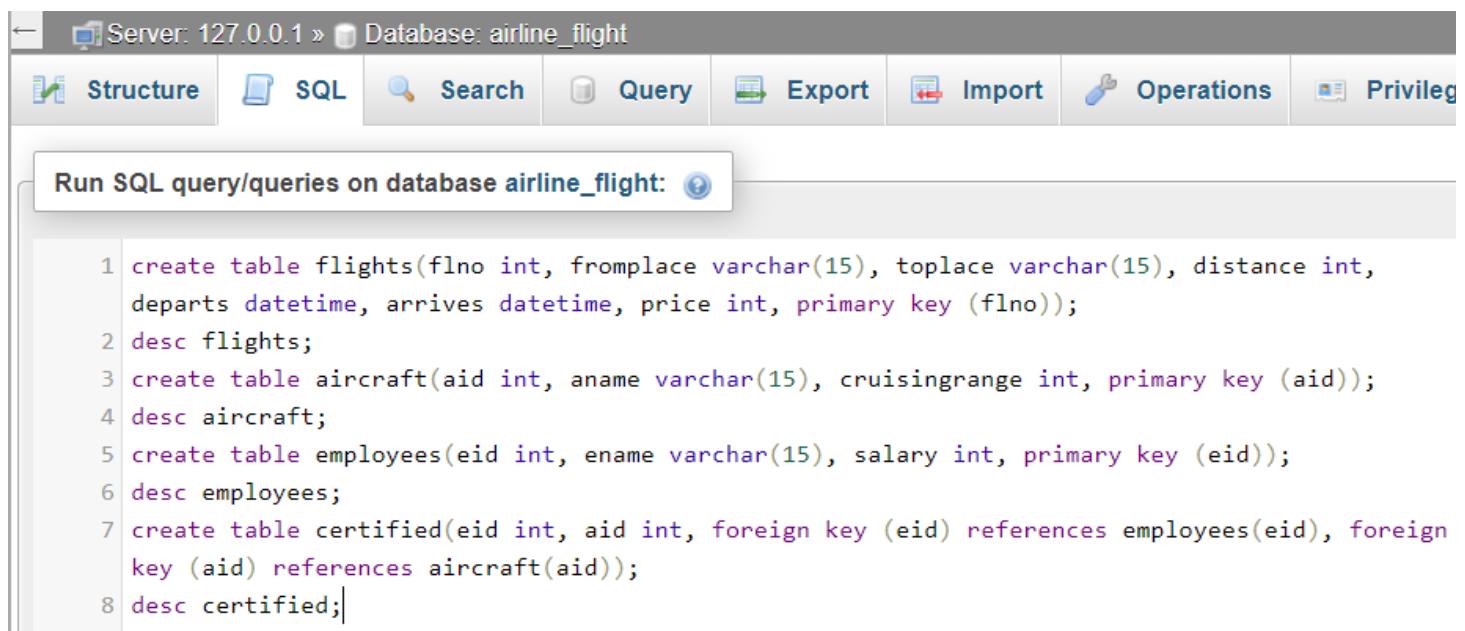
FLIGHTS (flno: integer, from: string, to: string, distance: integer, departs: time, arrives: time, price: integer)

AIRCRAFT (aid: integer, fname: string, cruisingrange: integer)

CERTIFIED (eid: integer, aid: integer)

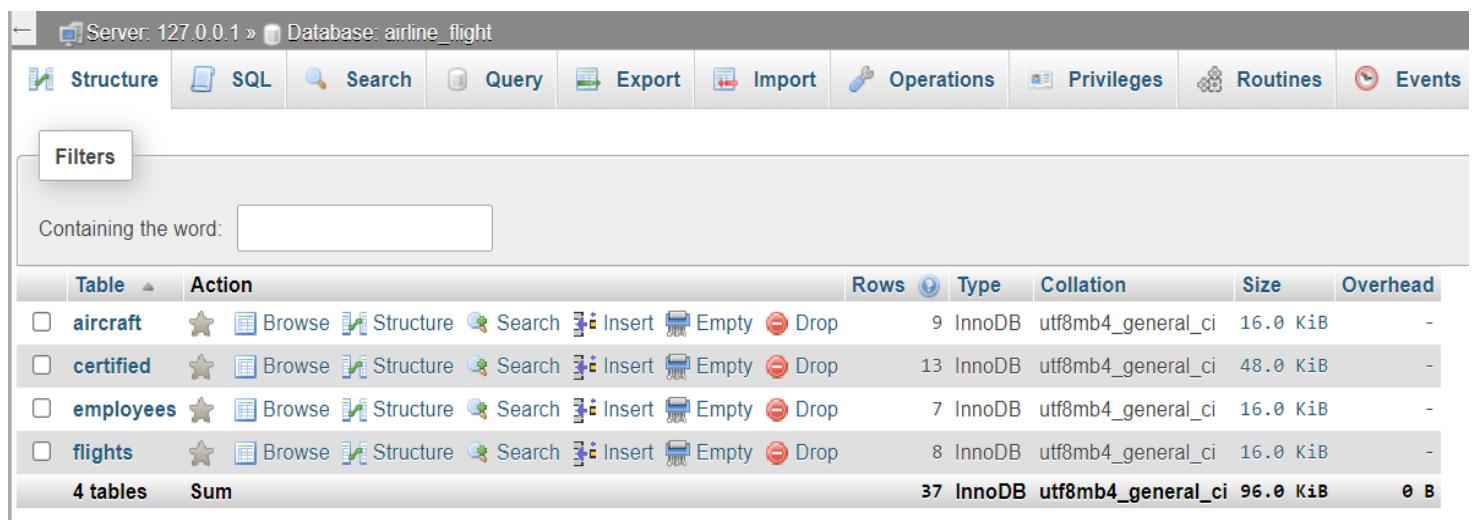
EMPLOYEES (eid: integer, fname: string, salary: integer)

Note that the Employees relation describes pilots and other kinds of employees as well. Every pilot is certified for some aircraft and only pilots are certified to fly. Write each of the following queries in SQL.



The screenshot shows the MySQL Workbench interface with the database 'airline_flight' selected. The 'SQL' tab is active, displaying the following SQL code:

```
1 create table flights(flno int, fromplace varchar(15), toplace varchar(15), distance int,
2 departs datetime, arrives datetime, price int, primary key (flno));
3 create table aircraft(aid int, fname varchar(15), cruisingrange int, primary key (aid));
4 desc aircraft;
5 create table employees(eid int, fname varchar(15), salary int, primary key (eid));
6 desc employees;
7 create table certified(eid int, aid int, foreign key (eid) references employees(eid), foreign
key (aid) references aircraft(aid));
8 desc certified;
```



The screenshot shows the MySQL Workbench interface with the database 'airline_flight' selected. The 'Structure' tab is active, displaying the table structure:

Table	Action	Rows	Type	Collation	Size	Overhead
aircraft		9	InnoDB	utf8mb4_general_ci	16.0 KiB	-
certified		13	InnoDB	utf8mb4_general_ci	48.0 KiB	-
employees		7	InnoDB	utf8mb4_general_ci	16.0 KiB	-
flights		8	InnoDB	utf8mb4_general_ci	16.0 KiB	-
4 tables	Sum	37	InnoDB	utf8mb4_general_ci	96.0 KiB	0 B

'FLIGHTS' table:

Server: 127.0.0.1 » Database: airline_flight

Structure SQL Search Query Export Import Operations Privileges Routines Events

Run SQL query/queries on database airline_flight:

```

1 insert into flights values(101, 'Bangalore', 'Delhi', 2500, '2005-05-13 07:15:31', '2005-05-13 18:15:31', 5000);
2 insert into flights values(102, 'Bangalore', 'Lucknow', 3000, '2013-05-05 07:15:31', '2013-05-05 11:15:31', 6000);
3 insert into flights values(103, 'Lucknow', 'Delhi', 500, '2013-05-05 12:15:31', '2013-05-05 17:15:31', 3000);
4 insert into flights values(107, 'Bangalore', 'Frankfurt', 8000, '2013-05-05 07:15:31', '2013-05-05 22:15:31', 60000);
5 insert into flights values(104, 'Bangalore', 'Frankfurt', 8500, '2013-05-05 07:15:31', '2013-05-05 23:15:31', 75000);
6 insert into flights values(105, 'Kolkata', 'Delhi', 3400, '2013-05-05 07:15:31', '2013-05-05 09:15:31', 7000);
7 insert into flights values(106, 'Bangalore', 'Kolkata', 1000, '2013-05-05 01:15:30', '2013-05-05 09:20:30', 10000);
8 insert into flights values(108, 'Lucknow', 'Kolkata', 1000, '2013-05-05 11:30:30', '2013-05-05 15:20:30', 10000);
9
10 commit;
11
12 select * from flights;

```

Server: 127.0.0.1 » Database: airline_flight » Table: flights

Browse Structure SQL Search Insert Export Import Privileges Operations

Showing rows 0 - 7 (8 total, Query took 0.0007 seconds.)

SELECT * FROM `flights`

Show all Number of rows: 25 Filter rows: Search this table Sort by key: None

+ Options

	flno	fromplace	toplace	distance	departs	arrives	price
<input type="checkbox"/>	101	Bangalore	Delhi	2500	2005-05-13 07:15:31	2005-05-13 18:15:31	5000
<input type="checkbox"/>	102	Bangalore	Lucknow	3000	2013-05-05 07:15:31	2013-05-05 11:15:31	6000
<input type="checkbox"/>	103	Lucknow	Delhi	500	2013-05-05 12:15:31	2013-05-05 17:15:31	3000
<input type="checkbox"/>	104	Bangalore	Frankfurt	8500	2013-05-05 07:15:31	2013-05-05 23:15:31	75000
<input type="checkbox"/>	105	Kolkata	Delhi	3400	2013-05-05 07:15:31	2013-05-05 09:15:31	7000
<input type="checkbox"/>	106	Bangalore	Kolkata	1000	2013-05-05 01:15:30	2013-05-05 09:20:30	10000
<input type="checkbox"/>	107	Bangalore	Frankfurt	8000	2013-05-05 07:15:31	2013-05-05 22:15:31	60000
<input type="checkbox"/>	108	Lucknow	Kolkata	1000	2013-05-05 11:30:30	2013-05-05 15:20:30	10000

'AIRCRAFT' table:

Server: 127.0.0.1 » Database: airline_flight

Structure SQL Search Query Export Import

Run SQL query/queries on database **airline_flight**: [?](#)

```
1 insert into aircraft values(101, '747', 3000);
2 insert into aircraft values(102, 'Boeing', 900);
3 insert into aircraft values(103, '647', 800);
4 insert into aircraft values(104, 'Dreamliner', 10000);
5 insert into aircraft values(105, 'Boeing', 3500);
6 insert into aircraft values(106, '707', 1500);
7 insert into aircraft values(107, 'Dream', 120000);
8 insert into aircraft values(108, '707', 760);
9 insert into aircraft values(109, '747', 1000);
10
11 commit;
12
13 select * from aircraft;
```

Server: 127.0.0.1 » Database: airline_flight » Table: aircraft

Browse Structure SQL Search Insert Export

Showing rows 0 - 8 (9 total, Query took 0.0006 seconds.)

```
SELECT * FROM `aircraft`
```

Show all | Number of rows: 25 Filter rows:

+ Options

	aid	aname	cruisingrange
<input type="checkbox"/>	101	747	3000
<input type="checkbox"/>	102	Boeing	900
<input type="checkbox"/>	103	647	800
<input type="checkbox"/>	104	Dreamliner	10000
<input type="checkbox"/>	105	Boeing	3500
<input type="checkbox"/>	106	707	1500
<input type="checkbox"/>	107	Dream	120000
<input type="checkbox"/>	108	707	760
<input type="checkbox"/>	109	747	1000

'EMPLOYEES' table:

Server: 127.0.0.1 » Database: airline_flight

Structure SQL Search Query Export Import

Run SQL query/queries on database airline_flight: [?](#)

```
1 insert into employees values(701, 'A', 50000);
2 insert into employees values(702, 'B', 100000);
3 insert into employees values(703, 'C', 150000);
4 insert into employees values(704, 'D', 90000);
5 insert into employees values(705, 'E', 40000);
6 insert into employees values(706, 'F', 60000);
7 insert into employees values(707, 'G', 90000);
8
9 commit;
10
11 select * from employees;
```

Server: 127.0.0.1 » Database: airline_flight » Table: employees

Browse Structure SQL Search Insert

Showing rows 0 - 6 (7 total, Query took 0.0006 seconds.)

```
SELECT * FROM `employees`
```

Show all Number of rows: 25 Filter rows: Search

+ Options

	eid	ename	salary
<input type="checkbox"/>	701	A	50000
<input type="checkbox"/>	702	B	100000
<input type="checkbox"/>	703	C	150000
<input type="checkbox"/>	704	D	90000
<input type="checkbox"/>	705	E	40000
<input type="checkbox"/>	706	F	60000
<input type="checkbox"/>	707	G	90000

'CERTIFIED' table:

Server: 127.0.0.1 » Database: airline_flight » Table: certified

Browse Structure SQL Search Insert

Run SQL query/queries on table airline_flight.certified:

```
1 insert into certified values(701, 101);
2 insert into certified values(701, 102);
3 insert into certified values(701, 106);
4 insert into certified values(701, 105);
5 insert into certified values(702, 104);
6 insert into certified values(703, 104);
7 insert into certified values(704, 104);
8 insert into certified values(702, 107);
9 insert into certified values(703, 107);
10 insert into certified values(704, 107);
11 insert into certified values(702, 101);
12 insert into certified values(702, 108);
13 insert into certified values(701, 109);
14
15 commit;
16
17 select * from certified;
```

Server: 127.0.0.1 » Database: airline_flight » Table: certified

Browse Structure SQL Search Insert

Current selection does not contain a unique column. Grid edit, checkboxes, etc. will not work correctly.

Showing rows 0 - 12 (13 total, Query took 0.0005 seconds.)

```
SELECT * FROM `certified`
```

Show all | Number of rows: 25 Filter rows:

+ Options

eid	aid
701	101
701	102
701	106
701	105
702	104
703	104
704	104
702	107
703	107
704	107
702	101
702	108
701	109

1) Find the names of aircraft such that all pilots certified to operate them have salaries more than Rs.80,000.

Server: 127.0.0.1 » Database: airline_flight

Structure SQL Search Query Export Import Operations Privileges

Run SQL query/queries on database airline_flight:

```
1 select distinct a.aname
2 from aircraft a
3 where a.aid in (select c.aid
4                   from certified c, employees e
5                   where c.eid = e.eid and not exists (select *
6                                     from employees e1
7                                     where e1.eid=e.eid and e1.salary<80000));
```

Server: 127.0.0.1 » Database: airline_flight » Table: aircraft

Browse Structure SQL Search Insert

Show query box

Showing rows 0 - 3 (4 total, Query took 0.1342 seconds.)

```
select distinct a.aname from aircraft a where a.aid in (select
e1.eid=e.eid and e1.salary<80000))
```

Show all | Number of rows: 25 ▾ Filter rows:

+ Options

aname
747
Dreamliner
Dream
707

2) For each pilot who is certified for more than three aircrafts, find the eid and the maximum cruising range of the aircraft for which she or he is certified.

Server: 127.0.0.1 » Database: airline_flight

Structure SQL Search Query Export

Run SQL query/queries on database airline_flight:

```
1 select max(a.cruisingrange), c.eid
2 from certified c, aircraft a
3 where c.aid = a.aid
4 group by c.eid
5 having count(c.eid)>3;
```

Server: 127.0.0.1 » Database: airline_flight » Table: certified

Browse Structure SQL Search Insert

Show query box

⚠ Current selection does not contain a unique column. Grid edit, checkboxes, etc. will not work correctly.

✓ Showing rows 0 - 1 (2 total, Query took 0.0024 seconds.)

```
select max(a.cruisingrange), c.eid from certified c, aircraf
```

Show all | Number of rows: 25 ▾ Filter rows: Search

+ Options

max(a.cruisingrange)	eid
3500	701
120000	702

3) Find the names of pilots whose salary is less than the price of the cheapest route from Bengaluru to Frankfurt.

← Server: 127.0.0.1 » Database: airline_flight

Structure SQL Search Query Export Import Operations

Run SQL query/queries on database airline_flight:

```
1 select ename
2 from employees
3 where salary < (select min(price)
4                   from flights
5                   where fromplace='Bangalore' and toplace='Frankfurt');
```

← Server: 127.0.0.1 » Database: airline_flight » Table: employees

Browse Structure SQL Search Insert

Show query box

✓ Showing rows 0 - 1 (2 total, Query took 0.1026 seconds.)

select ename from employees where salary < (select min(price

Show all

Number of rows:

25

Filter rows:

Search

+ Options

ename
A
E

4) For all aircraft with cruising range over 1000 Kms, find the name of the aircraft and the average salary of all pilots certified for this aircraft.

Server: 127.0.0.1 » Database: airline_flight

Structure SQL Search Query Export

Run SQL query/queries on database airline_flight: [?](#)

```
1 select avg(e.salary), c.aid
2 from certified c, employees e
3 where c.aid in (select aid
4                   from aircraft
5                   where cruisingrange>1000)
6                   and e.eid = c.eid
7 group by c.aid;
```

Server: 127.0.0.1 » Database: airline_flight » Table: certified

Browse Structure SQL Search Insert

Show query box

⚠ Current selection does not contain a unique column. Grid edit, checkb

✓ Showing rows 0 - 4 (5 total, Query took 0.0441 seconds.)

`select avg(e.salary), c.aid from certified c, employees e w`

Show all | Number of rows: 25 ▾ Filter rows:

+ Options

avg(e.salary)	aid
75000.0000	101
113333.3333	104
50000.0000	105
50000.0000	106
113333.3333	107

5) Find the names of pilots certified for some Boeing aircraft.

Server: 127.0.0.1 » Database: airline_flight

Structure SQL Search Query Export Import

Run SQL query/queries on database airline_flight:

```
1 select ename
2 from employees
3 where eid in (select eid
4                 from certified
5                 where aid in (select aid
6                               from aircraft
7                               where fname = 'Boeing'));
```

Server: 127.0.0.1 » Database: airline_flight » Table: employees

Browse Structure SQL Search Insert

Show query box

Showing rows 0 - 0 (1 total, Query took 0.0017 seconds.)

select ename from employees where eid in (select eid from ce

Show all

Number of rows:

25 ▾

Filter rows:

Search

+ Options



ename

Edit Copy Delete A

6) Find the aids of all aircraft that can be used on routes from Bengaluru to Delhi.

Server: 127.0.0.1 » Database: airline_flight

Structure SQL Search Query Export Import Operations

Run SQL query/queries on database airline_flight:

```
1 select fname
2 from aircraft
3 where cruisingrange > any (select distance
4                               from flights
5                               where fromplace='Bangalore' and toplace='Delhi');
```

Server: 127.0.0.1 » Database: airline_flight » Table: aircraft

Browse Structure SQL Search Insert

Show query box

Showing rows 0 - 3 (4 total, Query took 0.1056 seconds.)

```
select fname from aircraft where cruisingrange > any (select
```

Show all | Number of rows: 25 ▾ Filter rows:

+ Options

aname
<input type="checkbox"/> Edit <input type="button" value="Copy"/> <input type="button" value="Delete"/> 747
<input type="checkbox"/> Edit <input type="button" value="Copy"/> <input type="button" value="Delete"/> Dreamliner
<input type="checkbox"/> Edit <input type="button" value="Copy"/> <input type="button" value="Delete"/> Boeing
<input type="checkbox"/> Edit <input type="button" value="Copy"/> <input type="button" value="Delete"/> Dream

7) A customer wants to travel from Bangalore to Kolkata with no more than two changes of flight. List the choice of departure times from Bangalore if the customer wants to arrive in Kolkata by 6 p.m.

← Server: 127.0.0.1 » Database: airline_flight

Structure SQL Search Query Export Import Operations

Run SQL query/queries on database airline_flight: [?](#)

```
1 select F.flno, F.departs
2 from flights F
3 where F.flno in (
4     select F0.flno
5         from flights F0
6         where F0.fromplace = 'Bangalore' and F0.toplace = 'Kolkata'
7             and extract(hour from F0.arrives) < 18)
8     UNION
9     (select F0.flno
10        from flights F0, flights F1
11        where F0.fromplace = 'Bangalore' and F0.toplace <> 'Kolkata'
12            and F0.toplace = F1.fromplace and F1.toplace = 'Kolkata'
13            and F1.departs > F0.arrives
14            and extract(hour from F1.arrives) < 18)
15     UNION
16     (select F0.flno
17        from flights F0, flights F1, flights F2
18        where F0.fromplace = 'Bangalore'
19            and F0.toplace = F1.fromplace
20            and F1.toplace = F2.fromplace
21            and F2.toplace = 'Kolkata'
22            and F0.toplace <> 'Kolkata'
23            and F1.toplace <> 'Kolkata'
24            and F1.departs > F0.arrives
25            and F2.departs > F1.arrives
26            and extract(hour from F2.arrives) < 18));

```

+ Options

	← T →	flno	departs
<input type="checkbox"/>	Edit Copy Delete	102	2013-05-05 07:15:31
<input type="checkbox"/>	Edit Copy Delete	106	2013-05-05 01:15:30