

Exercise 1:

```
CREATE DATABASE techDB;
USE techDB;

CREATE TABLE accounts (
  username  VARCHAR(32) PRIMARY KEY,
  fullname  VARCHAR(100) NOT NULL,
  balance   INT NOT NULL
) ENGINE=InnoDB;

INSERT INTO accounts (username, fullname, balance) VALUES
  ('jones',      'Alice Jones',      82),
  ('bitdiddle', 'Ben Bitdiddle',     65),
  ('mike',       'Michael Dole',      73),
  ('alyssa',     'Alyssa P. Hacker',  79);
```

Exercise 2:

2.1:

```
-- Session A
START TRANSACTION;
SELECT username, fullname, balance FROM accounts ORDER BY username;
```

2.2:

```
-- Session B
START TRANSACTION;
INSERT INTO accounts (username, fullname, balance)
VALUES ('chuck', 'Charles Robinson', 55);
SELECT username, fullname, balance FROM accounts ORDER BY username;
```

2.3:

```
-- Session A
SELECT username, fullname, balance FROM accounts ORDER BY username;
```

```
MySQL localhost:3306 techdb ★ SQL > SELECT username, fullname, balance
FROM accounts ORDER BY username;
+-----+-----+-----+
| username | fullname | balance |
+-----+-----+-----+
| alyssa   | Alyssa P. Hacker | 79 |
| bitdiddle | Ben Bitdiddle | 65 |
| jones    | Alice Jones | 82 |
| mike     | Michael Dole | 73 |
+-----+-----+-----+
4 rows in set (0.0011 sec)
```

```
-- Session B
SELECT username, fullname, balance FROM accounts ORDER BY username;
```

```
MySQL localhost:3306 techdb ★ SQL > SELECT username, fullname, balance
FROM accounts ORDER BY username;
+-----+-----+-----+
| username | fullname      | balance |
+-----+-----+-----+
| alyssa   | Alyssa P. Hacker | 79      |
| bitdiddle | Ben Bitdiddle   | 65      |
| chuck    | Charles Robinson | 55      |
| jones    | Alice Jones     | 82      |
| mike     | Michael Dole    | 73      |
+-----+-----+-----+
5 rows in set (0.0005 sec)
```

They are not the same because the “red” terminal hasn’t committed the change, so the “blue” terminal does not see the insertion.

2.4:

```
-- Session B
COMMIT;
```

2.5:

```
-- Session A
SELECT username, fullname, balance FROM accounts ORDER BY username;
```

```
MySQL localhost:3306 techdb ★ SQL > SELECT username, fullname, balance
FROM accounts ORDER BY username;
+-----+-----+-----+
| username | fullname      | balance |
+-----+-----+-----+
| alyssa   | Alyssa P. Hacker | 79      |
| bitdiddle | Ben Bitdiddle   | 65      |
| jones    | Alice Jones     | 82      |
| mike     | Michael Dole    | 73      |
+-----+-----+-----+
4 rows in set (0.0008 sec)
```

No chuck because the “blue” terminal hasn’t committed, so it hasn’t updated.

2.6:

```
-- Session A
COMMIT;
SELECT username, fullname, balance FROM accounts ORDER BY username;
```

```
MySQL localhost:3306 techdb ★ SQL > COMMIT;
Query OK, 0 rows affected (0.0004 sec)
MySQL localhost:3306 techdb ★ SQL > SELECT username, fullname, balance FROM
accounts ORDER BY username;
+-----+-----+-----+
| username | fullname | balance |
+-----+-----+-----+
| alyssa   | Alyssa P. Hacker | 79 |
| bitdiddle | Ben Bitdiddle | 65 |
| chuck   | Charles Robinson | 55 |
| jones    | Alice Jones | 82 |
| mike     | Michael Dole | 73 |
+-----+-----+-----+
5 rows in set (0.0007 sec)
```

The result now includes “chuck”, this is because the “blue” terminal committed and therefore integrated the database update.

2.7:

```
-- Session A
START TRANSACTION;
UPDATE accounts SET balance = balance + 5 WHERE username = 'mike';
```

```
MySQL localhost:3306 techdb ★ SQL > START TRANSACTION;
Query OK, 0 rows affected (0.0008 sec)
MySQL localhost:3306 techdb ★ SQL > UPDATE accounts SET balance = balance + 5 WHERE username = 'mike';
Query OK, 1 row affected (0.0512 sec)
Rows matched: 1 Changed: 1 Warnings: 0
```

2.8:

```
-- Session B
START TRANSACTION;
UPDATE accounts SET balance = balance - 10 WHERE username = 'mike';
```

```
MySQL localhost:3306 techdb ★ SQL > START TRANSACTION;
Query OK, 0 rows affected (0.0010 sec)
MySQL localhost:3306 techdb ★ SQL > UPDATE accounts SET balance = balance - 10 WHERE username = 'mike';
```

2.9:

The row ‘mike’ is now “write” locked, exclusively, by the “blue” terminal. So, when the “red” terminal tries to do the same, it has to wait for the “blue” terminal to finish.

2.10:

```
-- Session A  
ROLLBACK;
```

```
MySQL localhost:3306 techdb ★ SQL > ABORT;  
ERROR: 1064 (42000): You have an error in your SQL syntax; check the manual  
that corresponds to your MariaDB server version for the right syntax to use  
near 'ABORT' at line 1  
MySQL localhost:3306 techdb ★ SQL > ROLLBACK;  
Query OK, 0 rows affected (0.0436 sec)  
MySQL localhost:3306 techdb SQL > |
```

2.11:

The “red” terminal can now continue with its procedure.

2.12:

```
-- Session B  
COMMIT;  
SELECT balance FROM accounts WHERE username = 'mike';
```

```
MySQL localhost:3306 techdb SQL > COMMIT;  
Query OK, 0 rows affected (0.0003 sec)  
MySQL localhost:3306 techdb SQL > SELECT balance FROM accounts WHERE use  
rname = 'mike';  
+-----+  
| balance |  
+-----+  
|      63 |  
+-----+  
1 row in set (0.0007 sec)
```

The resulting balance in Mike’s bank account is \$63.

2.13:

```
SELECT username, balance FROM accounts  
WHERE username IN ('bitdiddle','alyssa')  
ORDER BY username;  
  
-- Session B  
START TRANSACTION;  
UPDATE accounts SET balance = balance - 15 WHERE username = 'bitdiddle';
```

“Blue” terminal

```
MySQL localhost:3306 techdb SQL > SELECT username, balance FROM accounts
                                -> WHERE username IN ('bitdiddle','alyssa
')
                                -> ORDER BY username;

+-----+-----+
| username | balance |
+-----+-----+
| alyssa   |      79 |
| bitdiddle |      65 |
+-----+-----+
2 rows in set (0.0192 sec)
```

“Red” Terminal

```
MySQL localhost:3306 techdb SQL > START TRANSACTION;
Query OK, 0 rows affected (0.0004 sec)
MySQL localhost:3306 techdb ★ SQL > UPDATE accounts SET balance = balance - 15 WHERE username = 'bitdiddle';
Query OK, 1 row affected (0.0397 sec)

Rows matched: 1  Changed: 1  Warnings: 0
```

2.14:

“Blue” Terminal

```
MySQL localhost:3306 techdb SQL > SELECT username, balance FROM accounts
WHERE username IN ('bitdiddle','alyssa') ORDER BY username;

+-----+-----+
| username | balance |
+-----+-----+
| alyssa   |      79 |
| bitdiddle |      65 |
+-----+-----+
2 rows in set (0.0010 sec)
```

No change shown in “Blue” terminal.

2.15:

```
-- Session B
UPDATE accounts SET balance = balance + 15 WHERE username = 'alyssa';
COMMIT;

MySQL localhost:3306 techdb SQL > SELECT username, balance FROM accounts
WHERE username IN ('bitdiddle','alyssa') ORDER BY username;

+-----+-----+
| username | balance |
+-----+-----+
| alyssa   |      94 |
| bitdiddle |      50 |
+-----+-----+
2 rows in set (0.0008 sec)
```

It's when the "red" terminal commits the commands.