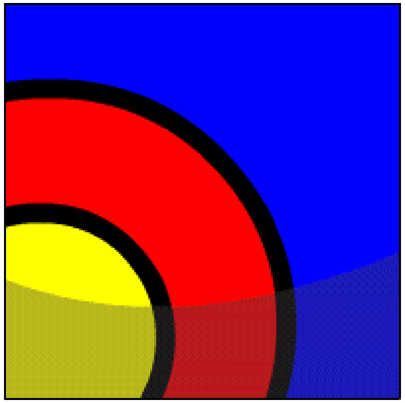
ORACLE Academy

Using Transaction Control Statements

What Will I Learn?

In this lesson, you will learn to:

- Define a transaction and provide an example
- Construct and execute a transaction control statement in PL/SQL



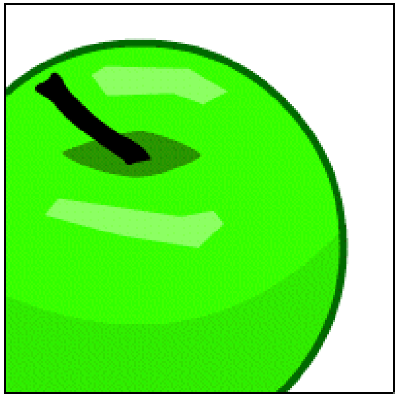
Why Learn It?

In this lesson, you learn how to include transaction control statements such as `COMMIT`, `ROLLBACK`, and `SAVEPOINT` in PL/SQL.

Tell Me/Show Me

Database Transaction

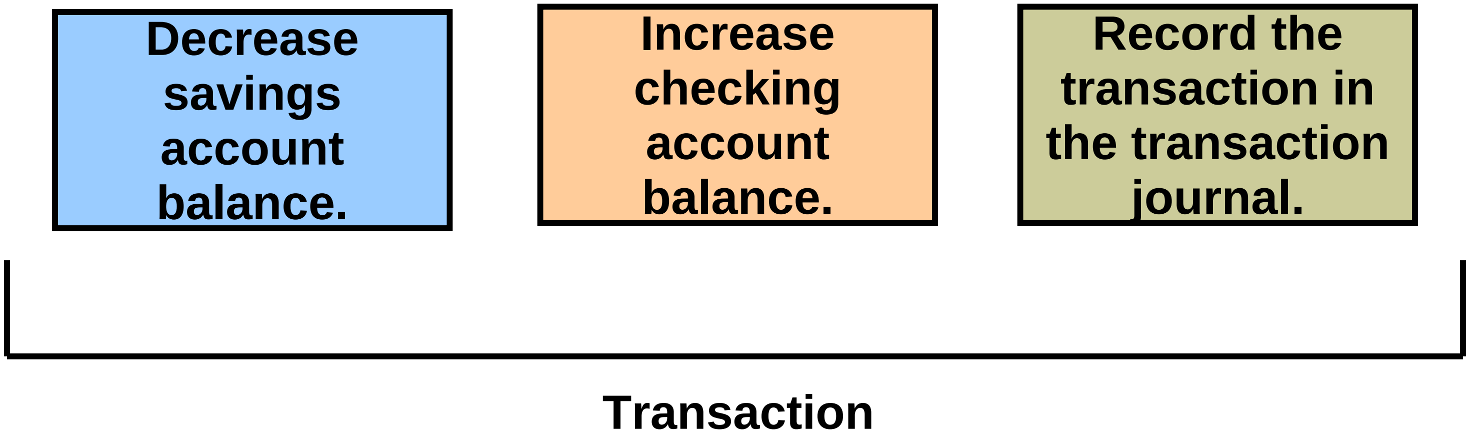
A transaction is an inseparable list of database operations that must be executed either in its entirety or not at all. Transactions maintain data integrity and guarantee that the database is always in a consistent state.



Tell Me/Show Me

Example of a Transaction

To illustrate the concept of a transaction, consider a banking database. When a bank customer transfers money from a savings account to a checking account, the transaction can consist of three separate operations:



Decrease savings account balance.

Increase checking account balance.

Record the transaction in the transaction journal.

Transaction

Tell Me/Show Me

Example of a Transaction (continued)

What would happen if there were insufficient funds in the savings account? Would the funds still be added to the checking account? Would an entry be logged in the transaction journal? What do you think *should* happen?

Decrease savings account.

```
UPDATE savings_accounts
SET balance = balance - 500
WHERE account = 3209;
```

Increase checking account.

```
UPDATE checking_accounts
SET balance = balance + 500
WHERE account = 3208;
```

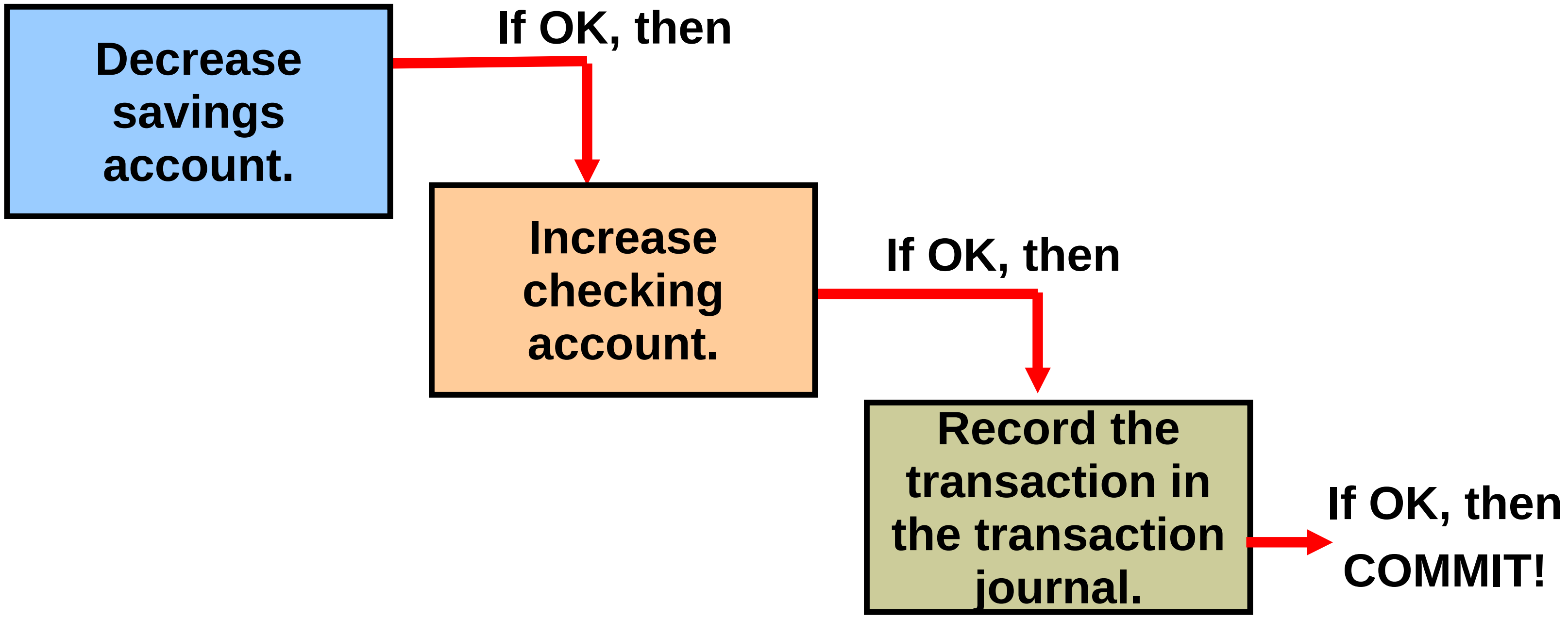
Record the transaction in the transaction journal.

```
INSERT INTO journal VALUES
(journal_seq.NEXTVAL, '1B'
3209, 3208, 500);
```

Tell Me/Show Me

Example of a Transaction (continued)

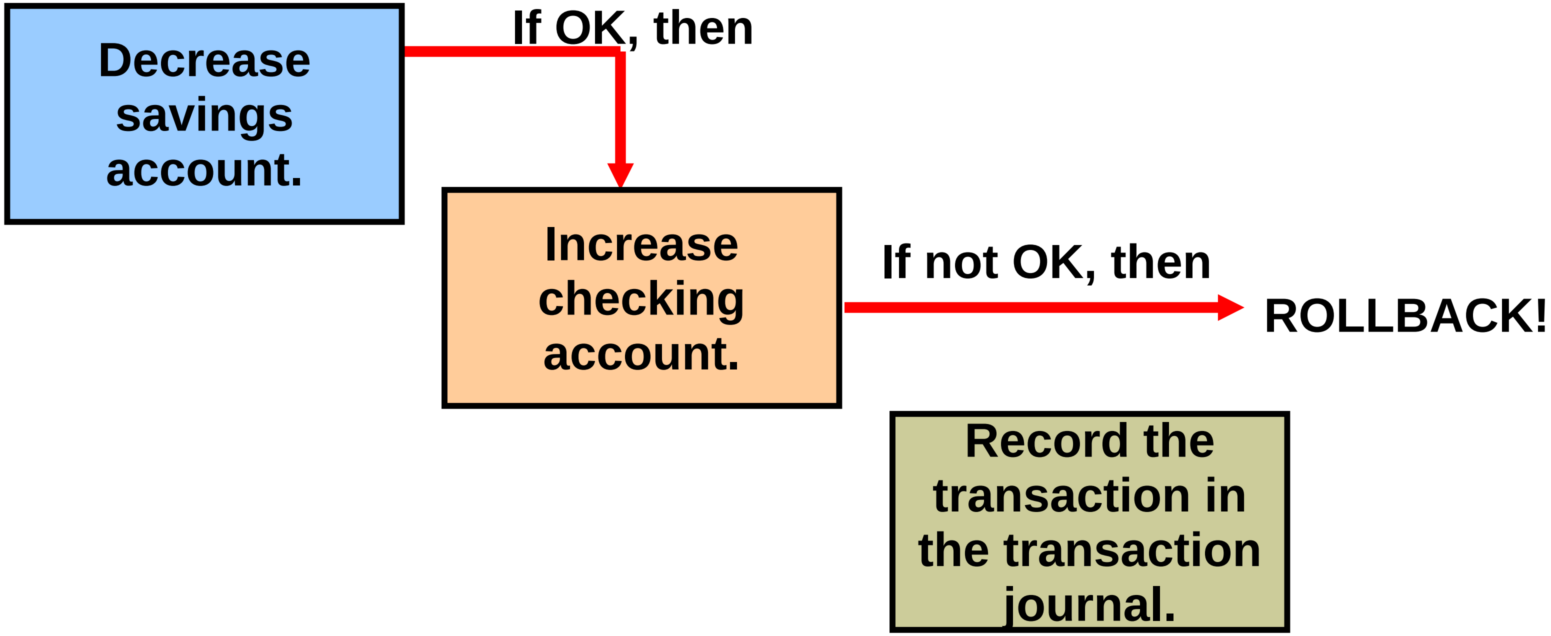
If all three SQL statements can be performed to maintain the accounts in proper balance, the effects of the transaction can be committed, or applied to the database tables.


Decrease savings account.
If OK, then
Increase checking account.
If OK, then
Record the transaction in the transaction journal.
If OK, then
COMMIT!

Tell Me/Show Me

Example of a Transaction (continued)

However, if a problem, such as insufficient funds, invalid account number, or a hardware failure prevents one or two of the statements in the transaction from completing, the entire transaction must be rolled back (reversed out) so that the balance of all accounts is correct.


Decrease savings account.
If OK, then
Increase checking account.
If not OK, then
ROLLBACK!
Record the transaction in the transaction journal.

Tell Me/Show Me

Transaction Control Statements

You use transaction control statements to make the changes to the database permanent or to discard them. The three main transaction control statements are:

- `COMMIT`
- `ROLLBACK`
- `SAVEPOINT`

The transaction control commands are valid in PL/SQL and therefore can be used directly in the executable or exception section of a PL/SQL block.

Tell Me/Show Me

COMMIT

COMMIT is used to make the database changes permanent. If a transaction ends with a COMMIT statement, all the changes made to the database during that transaction are made permanent.

```
BEGIN
  INSERT INTO pairtable VALUES (1, 2);
  COMMIT;
END;
```

Note: The keyword END signals the end of a PL/SQL block, not the end of a transaction.

Tell Me/Show Me

ROLLBACK

ROLLBACK is for discarding any changes that were made to the database after the last COMMIT. If the transaction fails, or ends with a ROLLBACK, then none of the statements takes effect.

```
BEGIN
  INSERT INTO pairtable VALUES (3, 4);
  ROLLBACK;
  INSERT INTO pairtable VALUES (5, 6);
  COMMIT;
END;
```

In the example, only the second INSERT statement adds a row of data.

Tell Me/Show Me

SAVEPOINT

SAVEPOINT is used to mark an intermediate point in transaction processing.

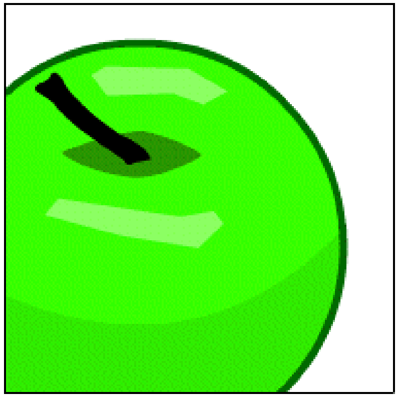
```
BEGIN
  INSERT INTO pairtable VALUES (7, 8);
  SAVEPOINT my_sp_1;
  INSERT INTO pairtable VALUES (9, 10);
  SAVEPOINT my_sp_2;
  INSERT INTO pairtable VALUES (11, 12);
  ROLLBACK to my_sp_1;
  INSERT INTO pairtable VALUES (13, 14);
  COMMIT;
END;
```

Only ROLLBACK can be used to a SAVEPOINT.

Tell Me/Show Me

Terminology

Key terms used in this lesson include:



Transaction

COMMIT

END

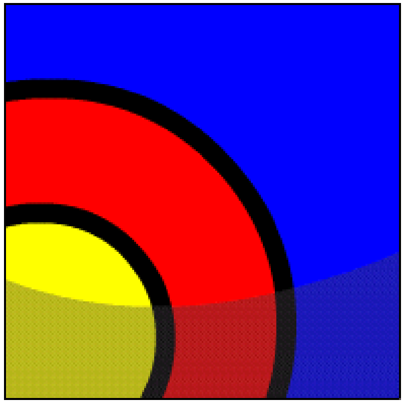
ROLLBACK

SAVEPOINT

Summary

In this lesson, you learned to:

- Define a transaction and provide an example
- Construct and execute a transaction control statement in PL/SQL



Try It/Solve It

The exercises in this lesson cover the following topics:

- Defining transactions and providing an example
- Constructing and executing a transaction control statement in PL/SQL