

Overview

- series of steps viewed as atomic unit
 - either fully executed or not
- transactions can be fully committed or rolled back in case an error occurs
 - includes [[Logging and Recovery]]
- transforms database from consistent state into another consistent state
 - via [[Locking and Concurrency Control]]
- transaction satisfy [[ACID]] properties
 - dependent on [[Transaction Isolation Level]]

[[SQL]] Transaction Examples

Example

Transfer 100 Euros from Account 107 to 999

```
START TRANSACTION ISOLATION LEVEL SERIALIZABLE;
UPDATE Account SET Balance=Balance-100
WHERE AID = 107;
UPDATE Account SET Balance=Balance+100
WHERE AID = 999;
COMMIT TRANSACTION;
```

Terminology by Example

#1 **Isolation level** (defined by addressed anomalies)

#2 Start/**begin of TX** (BOT/BT)

#3 **Reads and writes** of data objects

#4 **Abort/rollback TX** (unsuccessful end of transaction, EOT/ET)

#5 **Commit TX** (successful end of)

#6 **Savepoints** (checkpoint for partial rollback)

```
START TRANSACTION ISOLATION LEVEL SERIALIZABLE;
UPDATE Account SET Balance=Balance-100
WHERE AID = 107;
UPDATE Account SET Balance=Balance+100
WHERE AID = 999;
SELECT Balance INTO lbalance
FROM Account WHERE AID=107;
IF lbalance < 0 THEN
    ROLLBACK TRANSACTION;
END IF
COMMIT TRANSACTION;
```