

Transactions

CSE 414

ACID

Atomicity: all or nothing

Consistency: only valid data preserved

Isolation: equivalent to serial execution

Durability: commits are fault tolerant

Transaction Statements

BEGIN TRANSACTION;

...

...

COMMIT TRANSACTION;

or

ROLLBACK TRANSACTION;

Prepared Statements

```
private static final String SEARCH_ONE_HOP_SQL =
    "SELECT TOP (?) year,month_id,...,actual_time "
    + "FROM Flights "
    + "WHERE origin_city = ? AND dest_city = ? AND
day_of_month = ? "
    + "ORDER BY actual_time ASC";
    private PreparedStatement searchOneHopStatement;
...
searchOneHopStatement = conn.prepareStatement(SEARCH_ONE_HOP_SQL);
...
searchOneHopStatement.clearParameters();
searchOneHopStatement.setInt(1, numberOfItineraries);
searchOneHopStatement.setString(2, originCity);
searchOneHopStatement.setString(3, destinationCity);
searchOneHopStatement.setInt(4, dayOfMonth);
ResultSet oneHopResults = searchOneHopStatement.executeQuery();
```

HI, THIS IS YOUR SON'S SCHOOL. WE'RE HAVING SOME COMPUTER TROUBLE.



OH, DEAR - DID HE BREAK SOMETHING?

IN A WAY-



DID YOU REALLY NAME YOUR SON Robert'); DROP TABLE Students;-- ?



OH. YES. LITTLE BOBBY TABLES, WE CALL HIM.

WELL, WE'VE LOST THIS YEAR'S STUDENT RECORDS. I HOPE YOU'RE HAPPY.



AND I HOPE YOU'VE LEARNED TO SANITIZE YOUR DATABASE INPUTS.

Testing Your Transactions

Way 1:

`System.in.read();`

+

2 Terminal Instances

Way 2:

Debugging Mode in 2 Eclipse Instances

```
public void transaction_choosePlan(int cid, int pid) throws Exception {
    /* updates the customer's plan to pid: UPDATE customer SET plid = pid */
    try {
        beginTransaction();
        updatePlanStatement.clearParameters();
        updatePlanStatement.setInt(1, pid);
        updatePlanStatement.setInt(2, cid);
        updatePlanStatement.executeUpdate();

        // rollback if customer has too many movies
        int remaining = getRemainingRentals(cid);

        if (remaining < 0) {
            rollbackTransaction();
            System.out
                .println("You cannot switch to this plan!");
        } else {
            commitTransaction();
        }
    } catch (SQLException e) {
        try {
            rollbackTransaction();
        } catch (SQLException se) {
        }
    }
}
}
```