1st Normal Form (1NF): Types must be ATOMIC

Anomalies

* redundancy
* update anomalies: by redundant data & partial update
* delete anomalies: by all info in a single table & unintended removal of data
* insert anomalies: by not being able to store partial data in a table

Functional Dependency (FD)

A -> B, A functionally determines B

whenever two tuples agree on A and then agree on B, A & B are attribute sets

Armstrong’s Rules

1. Split/Combine
2. Reduction
3. Transitivity

Closure =

Superkey functionally determines all attributes.

Key is minimal superkey.

BCNF

Main memory / Disk

Buffer

External Merge Algorithm

External Merge Sort

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B-Tree

B+-Tree

Transaction

* recovery & durability
* concurrency
* ACID
  + Atomicity
  + Consistency
  + Isolation
  + Durability