

Array - kinda list
Array 2D - kinda matrix
Array 3D+ - kinda tensor

Binary Plus Tree (B+Tree) - Binary Tree modification, where intermediate nodes don't contain data, but values against which actual data is compared and then stored in leaf nodes.

Hash function - maps arbitrary sized data to fixed size data.

Set Operations: $A = \{1, 3, 4, 5, 7\}$
 $C = \{1, 2, 4, 6, 7, 8, 9\}$

- Union: $A \cup B = 1, 2, 3, 4, 5, 6, 7, 8, 9$
- Intersect: $A \cap B = 1, 4, 7$
- Except(Minus): $A \setminus B = A - B = 3, 5$

Join combines columns from one or more tables.

Relations - inner, outer.

Joins:

- Nested loop https://en.wikipedia.org/wiki/Nested_loop_join
- Merge join https://en.wikipedia.org/wiki/Sort-merge_join
- Hash join https://en.wikipedia.org/wiki/Hash_join

Transaction is a single unit of logic or work, sometimes made up of multiple operations. Any logical calculation done in a consistent mode in a database is known as a transaction.

- Atomicity - transaction must either complete in its entirety or have no effect whatsoever
- Consistency - transaction must conform to existing constraints in the database
- Isolation - transaction must not affect other transactions
- Durability - transaction must get written to persistent storage

Isolation levels define the degree to which a transaction must be isolated from the data modifications made by any other transaction in the database system

Levels of transaction isolation:

- Read uncommitted - allows dirty reads (transactions that haven't been committed yet).

- Read committed - guarantees that any data read is committed at the moment of reading, but allows non repeatable read (if row read many times it may contain different data).
- Repeatable Read - transaction holds lock on all rows it is using, allows phantom read (same query can return different result in different points in time).
- Serializable - transaction fully locks whole database it works on.