CAP Theorem

- Basic and one of the most important Concept in Distributed databases.
- CAP :-
- Consistency :- All nodes sees the same data simultaneously.
- Availability :- The system remains operational all of the time.
- Partition Tolerance :- When a distributed system, encounter partition, means break in communication between nodes. If a system is partition tolerance, the system does not fail. The system must replicate records to ensure this.
- CAP Theorem Says...
  The CAP theorem states that a distributed system can only provide two of three properties define above. It could be either Consistent or Available. It's a trade-off between these two features.

(1) CA Database :-

- Consistent and Available database.
- CA databases are not fault tolerance, as partitions are bound to happen in distributed system.
- It could only possible if only one server contains all the database. But it is not very pratically use.
  Eg. MySQL or PostgreSQL.

② CP database :-

- Consistent and Partition tolerance.
- When a partition occurs, the system has to turn off inconsistent nodes until the partition can be fixed.
- E.g. :- Mongo DB

Use case :- Banking System. {Server - Down issue}.

③ AP database :-

- Availability and Partition tolerance.
- When a partition happens, all nodes are available, but they are not updated.
- E.g. :- Apache Cassandra.

Use case :- Facebook, we value availability more than consistency. [Follow Base-Property See further.]