


## NORMALIZATION

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### WHAT is Normalization?






**Normalization** is a process in database design used to organize data in such a way that:

- Redundancy is minimized
- Data anomalies (insertion, update, deletion) are prevented
- Data integrity is ensured

 In simple terms: Normalization = Breaking big tables into smaller logical tables to reduce repetition and increase consistency.

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### WHY is Normalization Needed?

Need	Explanation
 Reduce redundancy	Avoid storing same data repeatedly (like student name in every row)
 Eliminate anomalies	Prevent issues during insert, update, and delete
 Ensure data integrity	Keep data accurate and consistent through constraints and relations
 Efficient data structure	Better performance, clean structure, and proper relations
 Easier maintenance	Clear table relationships → easier schema updates

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### MAIN POINTS / RULES

- It is used **only in RDBMS**
- Happens in **design phase**
- Involves **understanding user transactions**
- Primary key is a **by-product**
- Aims to achieve **atomicity**, avoid **redundancy**, and maintain **relationships**
- Uses **keys and dependencies** to split tables