

# Relational Database Design

- Oracle, MySQL, SQL, Server, PostgreSQL and others
- Diagramming Tool - LucidChart
- Or pen and paper
- <https://www.databasestar.com/data-modeling-tools/>

## Database

- Something to store data on your computer, where data can be searched and retrieved later, stored on large computers called servers
- Used - Websites, desktop apps, Phone apps, phone companies, insurance etc
- It contains called Tables
- Table = an object used to store data
- A Table is like spreadsheet, have rows and columns
- Databases have multiple tables
- Alternatives - text files - Easy to search but not easy to update, cannot scale well
- Spreadsheet - it is structured, but dont scale well and not optimised to be assed by applications

## Different types of Database

1. **Relational Database** - represents related sets of data, linked using relationships, easy to update, addition, and removal of data, like mini Database used in websites and applications
2. **Data Warehouse** - Based on a large central table with other linked tables
  - Fewer tables but have more records
  - Used of reporting

## Benefits of Relational Databases

- Data is stored in components
- Table + collection of data about of a particular objects
- Data is stored in separate tables, so as to, easier to report on, teaching is easy, easier to make changes, reduces impact on the rest of the Database

Store	School
Products	Teachers
orders	Students
Customers	Subjects

- Ability to remove duplicate information
- Ensure records are complete
- You specify what you want to store, what objects to store information about, what attributes on each object
- It also specifies, what is required and what is optional
- Naming consistency - similar fields in different tables can be names in a similar way. Eg: birth\_date
- Calculated fields
  - Eg: persons age - store the birth date and calculate the no. of years between birthdate and today.
  - Do not store sage, it should be a calculated field. Do we recalculate the age every year? What is there is data inconsistency, what if there are lot of records
- Format Validation
  - Allows you to use the same format
  - Enforce a valid date
  - Applications can determine how you display data - Jan 4th, 4/1 or 1/4
- Combine data sets easily
  - As many tables exists, tables are related to each other and coming using SQL

Store
Products
orders
Customers

- Increased Security
  - May applications can access the Database
  - Many users can also access it
  - Can restrict the access
- Access to Data
  - Can be restricted with relational Databases

- Users, roles, privileges
- Limit access to tables and columns
- Eg: HR can see all employee data, managers can see name and role and not salary