

The college database organizes the data about the Admin, staff, student and faculty etc.

using the database. You can easily retrieve, insert, and delete the information.

### Database Management system (DBMS)

Database Management system is software which is used to manage the database. For example: MySQL Oracle etc. are a very popular commercial database which is used in different applications.

DBMS provides an interface to perform various operations like database creation, storing data and, updating data, creating a table in database and a lot more.

It provides protection and security to database. In case of multiple user, it also maintains data consistency.

## Characteristics of DBMS

Data definition:

It is used for creation, modification and removal of definition that defines the organization of data in database.

Data updation:

It is used for insertion, modification and deletion of actual data in database.

Data retrieval:

It is used to retrieve the data from database which can be used by administration for various purposes.

User administration:

It is used for registering and monitoring user, maintaining data integrity.

Enforces data security, dealing with concurrent control, monitoring performance and resources info corrupted by unexpected failure.

It provides a digitized representation established and stored and manage the information.

It can provide a clean and logical view of data.

It processes that manipulates data.

DBMS contain automation, backup and restores procedure.

It contains ACID properties which maintains data in a health state in case of failure.

It can reduce the complex relationship between data.

It is used to support manipulation and processing of data.

It is used to provide security of data.

It can view the data from different requirement of user.

Workload according to requirement of user.

## Disadvantages of DBMS

- No. Advantages of DBMS.
- ① Controls data redundancy as it can control data redundancy because it stores all the data in one single database and records data is stored in database.
  - ② Data sharing : In DBMS, the authorized user can share the data among multiple users.
  - ③ Data maintenance : It can be easily maintained.
  - ④ Data organization : Data organization can be done by centralization of data due to centralized nature of database system.
  - ⑤ Reduces development time and maintenance need.
  - ⑥ Backups : It provides backup and recovery.
  - ⑦ Subsystem etc.

## Advantages of DBMS.

- lot of hardware and software:
- It requires a high speed of data processing and large memory size to run DBMS software.
  - It occupies a large space of disk and more memory than efficiently.
  - Large memory requirements.
  - Database system creates additional complexity and requirement.
  - Higher impact of failure.
  - Failure is highly impacted the database because in most of organization all data stored in single database and if the database is damaged due to electric failure or database corruption then the data may be lost forever.

## Concept of Database

To store and manage data efficiently  
in database lets us understand some basic  
terms.

### 1) Database Schema:

This design of database we can  
think it is skeleton of database structures  
that represent the standard type of data will be  
stored in rows and columns constraint  
relationships between the parts.

### 2) Data Constraint:

In a database sometime we put  
some restrictions on table that what type  
of data can be stored in one or more column  
of table. It can be done by using constraints.

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### 4) Data dictionary or metadata:

Metadata is known as data.  
About data. Or how can say that database  
schema along with different type of  
constraints in data is stored by DBMS in

Dictionary is known as metadata.

### 4) Database instance

In a database a database instance is  
used to define the complete database.  
That it is set of memory structures and  
background processes that are used to access  
the database. After

### 5) Query:

In a database a query is used to  
access data from the database when user have  
to write queries to retrieve or manipulate  
data. No database  
from. No deletion  
of data manipulations:

### 6) Data manipulation:

In a database we can easily  
manipulate data using of main operation that  
is Insertion, Deletion and update.

### 7) Data engine:

It is an underlying component that  
is used to create and manage databases.

Phew

## Types of databases

Centralized Database

## Distributed Database

No SQL Database

## Cloud Database

## Relational Database -

Nashua &  
print specimen dates

## Historical Sketch

### Centralized Dictator

It is typical of database of shares data to contain the following information:

centralized database, provides access to stored data from several applications. These systems through several authentication mechanisms contain the authentication process.

biggest users data seem to be Concord California that corrins

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## Advantages of centralized Database

This decreases the risk of data ex. manipulation of data will lead to

Minority  
object core data  
Data Consistency is maintained as it  
is delta in Central Repository.

processes more  
- It provides data quality which enables  
organization to establish data standards.  
It is also cost effective, as there are

It is difficult to handle the data etc.  
backward to handle it etc.

Dendrocones often exceed  
centuries in length  
if not broken by fires which  
are common here for such an elevation

database system servers contain stored data from sensors that constantly change. This causes a large loss of information.

## Distributed Database

multiple computers database system  
distributed system, data is distributed among  
different database systems or connected  
these database system are connected

data communication finds such techniques like  
that uses to access the data easily

No SQL database  
Non-SQL Not only SQL database

of database that is used for storing &  
a wide range of data

& there is not a relationship between them.  
Distributed as it stores data only in the memory.

stored in several different ways.  
& get gain into system like the  
server from multiple nodes are involved

& presented with variety of databases. Now  
techniques in response to demand

key values storage

Document oriented database

Graph database

Column store

5) Cloud Database:

A type of database where data is stored in  
cloud environment and spreads over the cloud  
computing platform. It provides users with  
various cloud computing services (SaaS, PaaS,  
IaaS, etc.) for accessing the database. There are  
numerous cloud platforms best suited options

→ AWS

& Microsoft Azure

& IBM Watson

& Oracle NOS

& Sciensoft soft

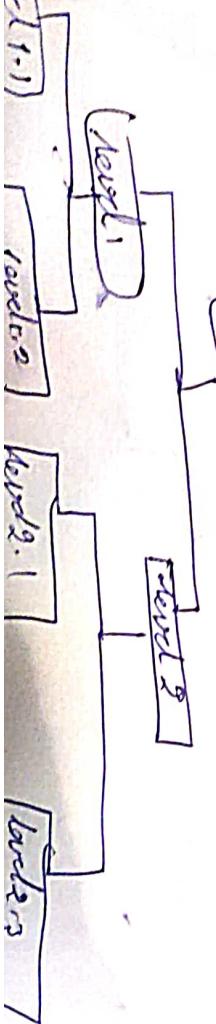
& Google cloud SQL

## 6) Object Oriented Databases

The typical database structure the object-based model approach for storing data in database system. The data is stored in object-oriented form along with class and object and stored as object which can be represented and stored as object oriented programming language.

## 7) Hierarchical Database

This type of database has stored in form of parent-child relation nodes. Relation nodes are stored in tree like structure in form of record. Each record is tree stored in form of record. There is no child record in tree. Data is stored in such a way that each child record is converted into parent. One child will contain only one parent record and parent record can have multiple records.



## 8) Network Database

It is a database that typically follows the network data model. Here the representation of data is in form of nodes connected via links. Unlike the hierarchical database, it allows each record to have multiple children and parent nodes to form a generalizing graph and structure of record database.

Collecting and storing data on user defined fields a personal database is basically designed for single user.

### 1) Operational Database

The type of database which creates and stores the data in real time. It is basically designed for collecting and handling the data for organization uses operational database for data operation in several businesses because managers has day transactions.

## 1.4) Enterprise database.

To store large organization or enterprises data do their will to use this database for managing & maintain control of data. It helps organization to increase and improve their efficiency due to database allows simultaneous access to all.

DBMS application store data as file

In DBMS data is:

generally stored in tables or hierarchical form or normalized form or denormalized form.

Present in DBMS

DBMS does not apply any security with respect to data manipulation.

data manipulation

Acknowledgment  
Consistency  
Isolation

Decentralization

DBMS has to provide some uniform method to store data in tabular form. DBMS application store data in tabular form. RDBMS stores data in tabular form.

DBMS has to provide some uniform method to store data in tabular form.

RDBMS supports distributed databases.

RDBMS is designed to handle large amount of data it supports many users.

RDBMS supports distributed databases.

RDBMS is meant to be for small organization and small data it supports many users.

Example of DBMS are MySQL, PostgreSQL, etc.

Example of RDBMS are Oracle, MySQL, PostgreSQL, etc.

## Types of DBMS architecture

### DBMS Architecture

1 - tier Architecture

2 - tier Architecture

3 - tier Architecture

1 - tier Architecture

In this architecture the database resides in the server side for the user to access it makes the user available to use it.

Any changes done here will directly affect the database itself if it doesn't have any changes done on the database itself.

The 1-tier architecture is used for development of local applications where programmer can directly communicate with database for quick response.

### 2 - tier Architecture

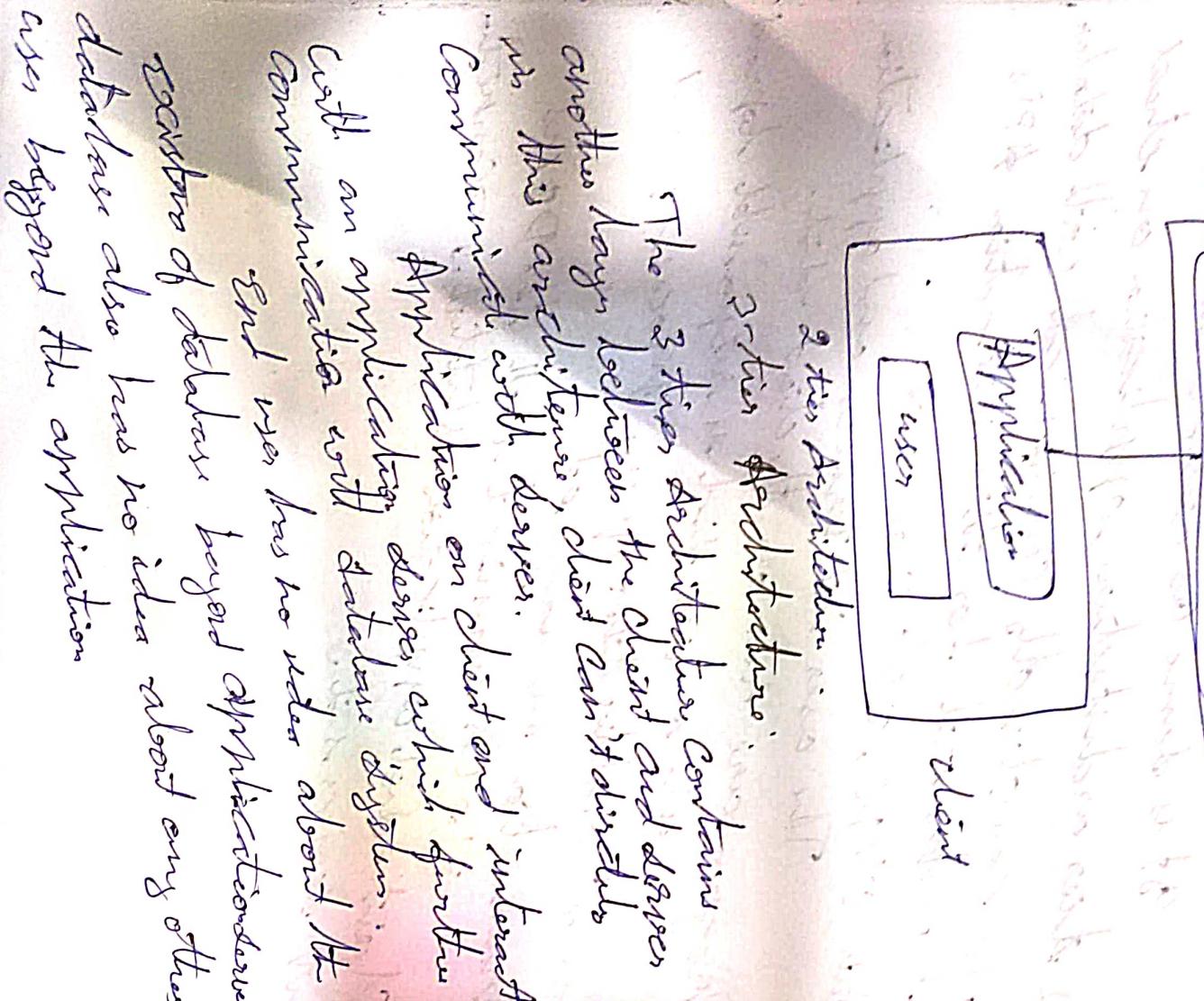
It is done as their client - side in tier architecture application on client side communicates with database side for this interaction APIs like JDBC, TDBC are used. The user interacts and application side runs on the client side.

Programs are run on the client side responsible to send the requests and transaction management.

To communicate with the DBMS transaction establishes connection between client side application and database side.

## Database system

server.



2 tier Architecture:

3 tier Architecture contains another layer between the client and server. In this architecture client can interact with server.

Application on client and interact with database system.

With an application with database system.

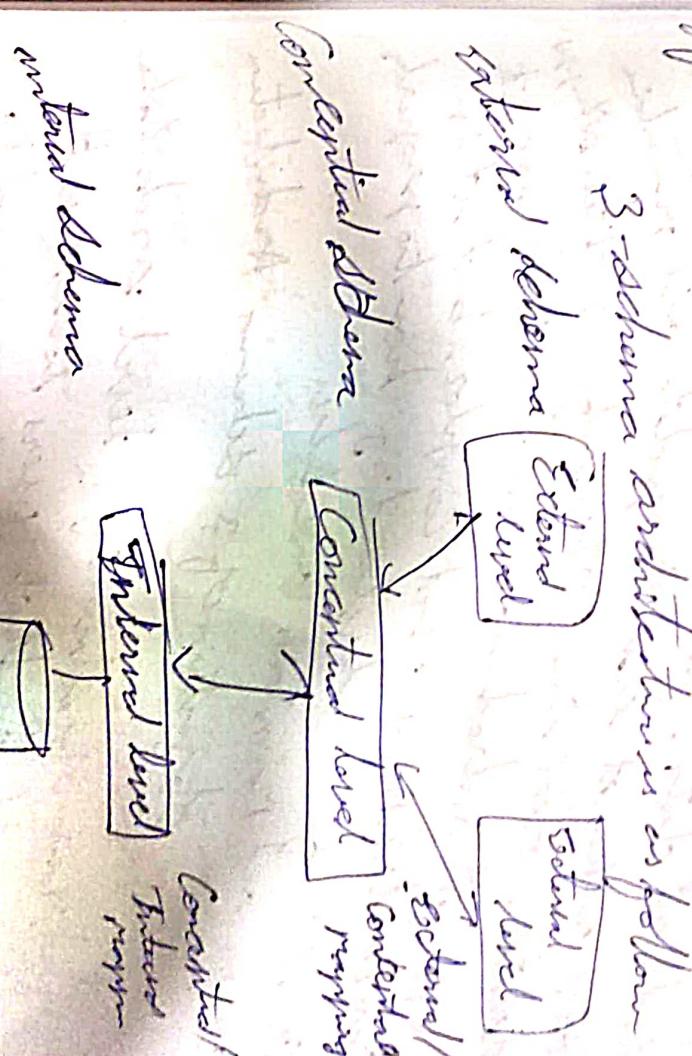
But user has no idea about it.

But user has no idea about any other existence of database beyond application.

Database also has no idea about any other database also has no idea about any other database beyond the application.

The 3 tier architecture is used in case of large web application.

3-schema architecture is as follow



Normalization:

This is process of organizing a database to minimize redundancy and dependency by breaking down complex tables into smaller, more manageable ones. It's important to understand

normalization because it helps you create efficient and scalable databases, reduces data inconsistency and duplication, and makes it easier to update and maintain databases over time. This info is often skipped over in introductory material because it can be technical and complex, but it is crucial for understanding how to properly design and maintain a database.

### Objectives of 3 Schema Architecture

Main objective of 3 level architecture is to enable multiple users to access the same data with a personalized view while storing them.