

# DBMS

## Assignment

Name : R. N. Durga Prasad

VTU : 87974

Sub : Database Management System .

(3) ~~Reg. No.~~ Reg. code : 10211CA207

~~Faculty Name~~ Faculty Name : Thivya Lakshmi

## Unit-IV

Normalization and its various types of Normalization.

Normalization:

Definition:

Normalization is a process in Database Management System used to organize data efficiently by removing redundancy and ensuring data integrity.

Types of Normalization:

1. First Normal Form(1NF):

A table is in 1NF if:

Each cell contains only atomic values

Each record is unique.

Example:-

If a column has multiple phone numbers. Separate them into different rows or a new table.

2. Second Normal Form(2NF):

→ It is already in 1NF.

→ All non-~~readu~~ key attributes are fully functionally dependent on the primary key.

Example:-

Remove columns that depend on part of a composite key and place them in a separate table.

Third Normal form(3NF):-

- It is already in 2NF
- There is no transitive dependency.

Example:-

If Student → Department and Departments → HOD, remove HOD from student table and create a separate table for Department

4. Boyce - Codd

Normal form (BCNF):-

- A stronger version of 3NF
- A table is in BCNF if:
  - for every functional dependency  $(X \rightarrow Y)$ , X is used a super key.

Used to handle anomalies not covered by 3NF.

5. fourth Normal form(4NF)

- A table is 4NF if:
- it is in BCNF

• It has no multi-valued dependency

6. fifth Normal form(5NF)!

• A table is in 5NF if.

• It is in 4NF

• If removes join

not implied by dependencies that are  
Candidate Key

## Unit-IV

Any:- Explain about Deadlock and its handling?

Deadlock:-

Definition:

A Deadlock is a situation in an operating system where two or more processes are waiting for resources held by each other, and none of them can proceed.

Conditions for Deadlock:

A deadlock occurs if all four of these conditions hold simultaneously.

① Mutual exclusion:

At least one resource must be held in a non-shareable mode.

② Hold and wait:

A process holding a resource is waiting for another resource.

③ No preemptions:

Resources cannot be forcibly taken from a process.

④ Circular wait:

A circular chain of processes exists, where each is waiting for a resource held by the next process.

## Deadlock Handling Methods:-

### 1. Deadlock Prevention:

- Ensures that at least one of the four deadlock conditions never holds.

Ex:- Don't allow "hold and wait" → process must request all resources at once.

### 2. Deadlock Avoidance:

→ uses algorithms to decide whether to grant a resource request.

→ The system checks if the state will remain safe before allocating resources.

### 3. Deadlock Detection and Recovery:-

The system allows deadlocks to occur but detects it later using detection algorithms then recovers by:

- Terminating one or more processes.
- Prompting resources.

### 4. Deadlock Ignorance:

The system ignores the problem completely.

## Unit-II

Explain about RAID storage and its types.

RAID storage.

Definition:-

RAID (Redundant Array of Independent Disks) is a data storage technology that combines multiple physical hard devices into a single logical unit to improve performance, data reliability, and fault tolerance.

Types of RAID:-

1. RAID 0 - Striping

Data is split across multiple disks.

Advantages:- High performance, fast read.

Disadvantages:- No fault tolerance.

2. RAID 1 - Mirroring

Data is duplicated on two or more disk.

Advantages:- High reliability; if one disk fails, data is safe.

Disadvantages:- Expensive

3. RAID 5 - Block level striping with parity

Data and parity are distributed across and

Advantages:-

Good performance and fault tolerance.

Disadvantages:-

Slower write performance due to parity calculation.

4. RAID 6 - Double Parity:

- Similar to RAID 5 but with two parity blocks.

Advantages: Can Survive the failure of two disks

Disadvantages: More complex and slower write.

5. RAID 10 - Mirroring + striping

- Combines RAID1 and RAID0

Advantages:-

High speed and high reliability

Disadvantages:

Requires at least 4 disks and is costly.