NORMALISATION

BY LOGADEEP

PROBLEM STATEMENT

The task is to normalize the given employee table by applying normalization steps up to 3.5NF. This will eliminate redundancy, improve data integrity, and optimize the database structure.

INTRODUCTION TO NORMALIZATION

- The process of organizing data in a database to reduce redundancy and improve data integrity.
- It involves breaking down large tables into smaller, related tables and applying normal forms to ensure efficient data storage.

INITIAL TABLE

EID	NAME	AGE	SALARY	BASIC	HRA	TA	DA	PF	DESIGNATION	DEPARTMENT	HOD
1	john	30	50000	20000	5000	2000	3000	1000	Manager	HR	Alice
2	Alice	28	45000	18000	4500	1500	2500	1200	Analyst	IT	Bob
3	Bob	35	60000	25000	6000	3000	4000	1500	Developer	IT	Bob

1NF

- The table must have atomic values (no multi-valued attributes or repeating groups).
- Each record must be unique (no duplicate rows)

- The table is already in 1NF because there are no repeating groups.

2NF

- The table must be in 1NF.
- No partial dependencies: Every non-key attribute must depend on the entire primary key.

Identifying Partial Dependencies:

- In the initial table, BASIC, HRA, TA, DA, and PF depend on SALARY, not directly on EID.
- DESIGNATION and DEPARTMENT depend on EID, but SALARY depends on EID in the context of salary-related components.

AFTER APPLYING 2NF

EMPLOYEE TABLE

EID (PK)	NAME	AGE	SALARY (FK)	DESIGNATION (FK)
1	John	30	50000	Manager
2	Alice	28	45000	Analyst
3	Bob	35	60000	Developer

SALARY TABLE

SALARY (PK)	BASIC	HRA	TA	DA	PF
50000	20000	5000	2000	3000	1000
45000	18000	4500	1500	2500	1200
60000	25000	6000	3000	4000	1500

3NF

- The table must be in 2NF.
- No transitive dependencies: Non-key attributes should not depend on other non-key attributes.

Identifying Transitive Dependencies:

- DESIGNATION → DEPARTMENT (A specific designation may correspond to a specific department, for example, a "Manager" works in the "HR" department).
- DEPARTMENT → HOD (A specific department has a unique HOD, for example, HR department has Alice as HOD).

DESIGNATION TABLE

DESIGNATION (PK)	DEPARTMENT (FK)	HOD (FK)
Manager	HR	Alice
Analyst	IT	Bob
Developer	IT	Bob

DEPARTMENT TABLE

DEPARTMENT (PK)	HOD (FK)
HR	Alice
IT	Bob

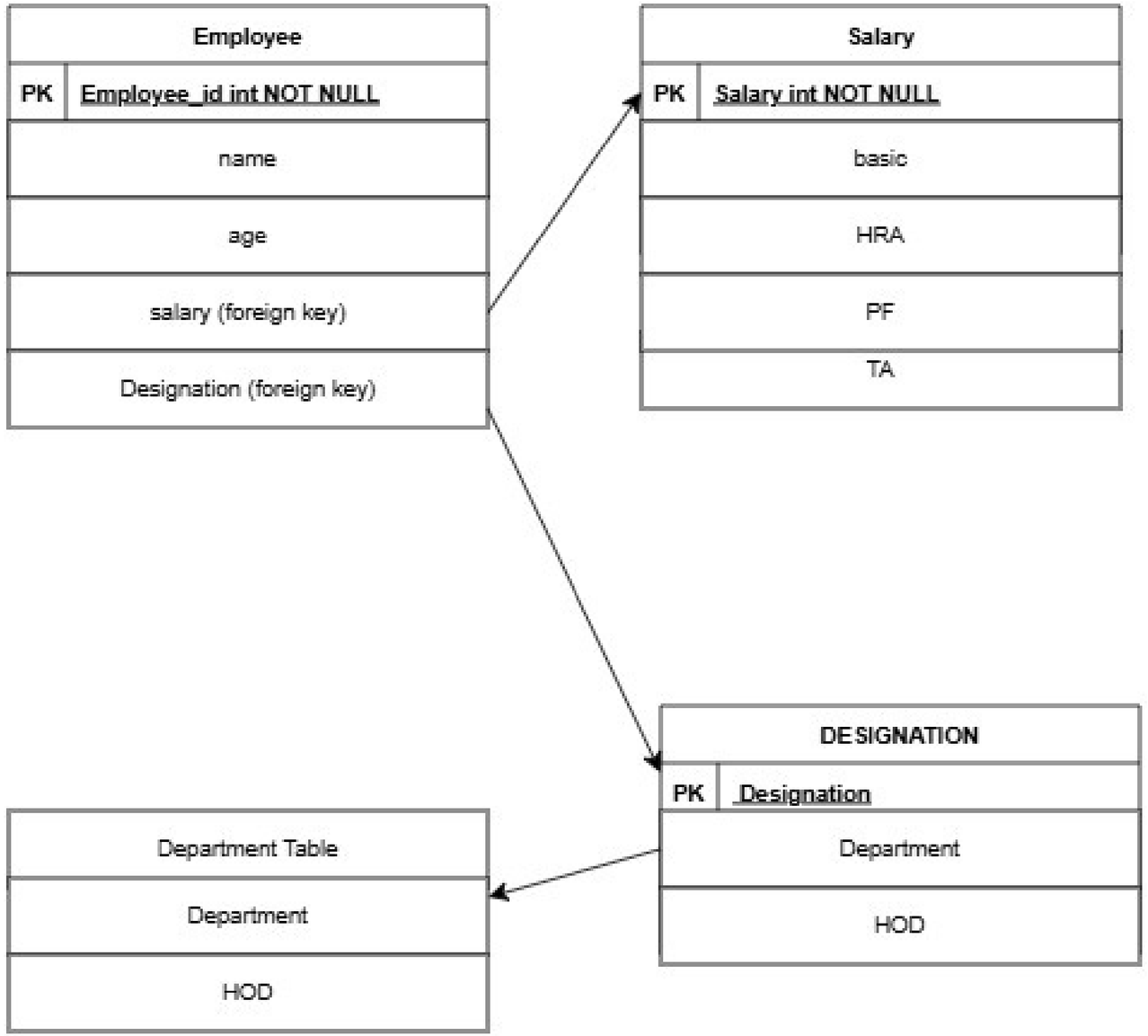
3.5NF

BCNF Rules:

- The table must be in 3NF.
- For every functional dependency (X → Y), X must be a superkey.

Identifying Issues in 3NF:

- In the Designation Table, DESIGNATION → DEPARTMENT, but DESIGNATION is not a superkey. It violates BCNF because DESIGNATION is determining DEPARTMENT.


Employee
PK
Employee_id int NOT NULL
name
age
salary (foreign key)
Designation (foreign key)
Salary
PK
Salary int NOT NULL
basic
HRA
PF
TA
DESIGNATION
PK
Designation
Department
HOD
Department Table
Department
HOD

THANK YOU