SNS COLLEGE OF ENGINEERING

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DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING(IoT and Cybersecurity Including BCT)

COURSE NAME : 19SB504 DATABASE MANAGEMENT SYSTEMS

III YEAR / V SEMESTER

Unit III-**E-R Diagram models and NORMAL FORMS**

Topic :Dependencies

DEPENDENCY

- Dependencies refer to relationships or associations between different elements or components of a database.
- These dependencies are essential to understanding the structure, integrity, and management of a database.

TYPES OF DEPENDENCIES IN DBMS

- **Functional Dependency**
- **Transitive Dependency**
- **Multivalued Dependency**
- **Partial Dependency**
- **Key Dependency**
- **Join Dependency**
- **Inclusion Dependency**

Functional Dependency

- Functional dependencies describe the relationship between attributes (columns) in a relational database.
- In a functional dependency, the value of one attribute determines the value of another.
- For example, if you have a database table with attributes for "Employee ID" and "Employee Name," the "Employee ID" functionally determines the "Employee Name."

Example

Here's a sample representation of the "Employees" table with data:

EmployeeID	EmployeeName	Department	Salary
101	Alice	HR	55000
102	Bob	IT	60000
103	Carol	IT	60000
104	David	Sales	48000

In this example:

The functional dependency "EmployeeID → EmployeeName" means that if you know the EmployeeID (e.g., 101), you can determine the EmployeeName (Alice).

Transitive Dependency (attribute to attribute)

- A transitive dependency is a type of functional dependency where a attribute depends on another attribute through a chain of dependencies.
- For example, if "Employee Name" depends on "Employee ID" and "Department" depends on "Employee ID," then "Department" has a transitive dependency on "Employee Name."

Suppose we have the following data in the "Employees" table:

EmployeeID	EmployeeName	Department	ManagerID
101	Alice	HR	201
102	Bob	IT	201
201	Carol	Finance	301
301	David	Finance	NULL

Multivalued Dependency (table attribute to another table attribute)

- Multivalued dependencies occur when an attribute in a datab depends on another attribute, and both attributes have multiple val associated with them.
- This often involves relationships between tables. For example, if you have tables for "Employees" and "Projects," a multivalued dependency might arise if one employee can work on multiple projects, and one project can have multiple employees.

Suppose we have the following data in the "Students" table:

StudentID	StudentName	CoursesEnrolled
101	Alice	Math, Physics
102	Bob	Chemistry, History
103	Carol	Physics, English
104	David	History, English

In this scenario, "CoursesEnrolled" is a multivalued attribute because it contains multiple values for each student. For example:

StudentID 101 (Alice) is enrolled in both "Math" and "Physics."

StudentID 102 (Bob) is enrolled in both "Chemistry" and "History."

Partial Dependency

- Partial dependency occurs when an attribute depends on only part o multi-valued attribute.
- It can lead to data redundancy and anomalies in a relational database. Normalization techniques are applied to resolve partial dependencies.

- Consider a relational database for tracking information about students and their courses. We have two tables, "Students" and "Courses," with the following attributes:

Example:

Students Table:

- StudentID (Primary Key)
- StudentName
- Major

Courses Table:

- CourseID (Primary Key)
- CourseName
- StudentID (Foreign Key)

- Students Table:

StudentID	StudentName	Major
101	Alice	Computer Science
102	Bob	Engineering
103	Carol	Biology

Courses Table:

CourseID	CourseName	StudentID
1	Math	101
2	Physics	102
3	Chemistry	101
4	History	103
5	English	102

For example, if we record that StudentID 101 is associated with the course "Math," it's evident that the "StudentName" for StudentID 101 is "Alice" (partial dependency).

Thank You.....