IT

Unit-4

1) What are the measure of query cost?

Ans:
- Cost of query is measured to evaluate how much resource usage and time it will take to execute.
- Execution time is how long it takes to run the query from start to finish.
- Input / output cost measures how much data needs to be read from or written to storage to execute the query.
- ~~Memory Usage measures how much the computers temporary workspace (RAM)~~
- Memory usage - amount of memory required during the query execution. This includes memory for sorting, joining tables or sorting intermediate results.
- In distributed databases, Network cost associated with data transfer over the network.

2) Explain 1st, 2nd, 3rd normal form with example?

⟹ ① 1st normal form:
- basic level of normalization.
- each table cell should contain only a single value.
- each column should have a unique name.
- 1st normal form helps to eliminate duplicate data & simplify queries.

Ex:

ID	Name	courses
1	A	C1, C2
2	B	C3
3	C	C2, C3

⟹

ID	Name	course
1	A	C1
1	A	C2
2	B	C3
3	C	C2
3	C	C3

(ii) 2nd Normal form:

- Ensure the table is in 1NF
- all non-key columns are fully dependent on the primary key.
- This means that each column should be directly related to the primary key, & Not to other columns.

Ex:

STUD_NO	COURSE-NO	COURSE-FEE
1	C1	1000
2	C2	1500
1	C4	2000
4	C3	1000
4	C1	1000
2	C5	2000

Table 1

STUD-NO	COURSE-NO
1	C1
2	C2
1	C4
4	C3
4	C1

Table 2

COURSE-NO	COURSE-FEE
C1	1000
C2	1500
C3	1000
C4	2000
C5	2000

(iii) 3rd Normal form:

- 3NF builds on 2NF
- by requiring that all non-key attributes are independent of each other.
- This means that each column should be directly related to the primary key, and not to any other columns in the same table.

③ What do you mean by normalization ? Explain different anomalies.

⟶ **Normalization :**

- is the process of organizing data in a database to minimize redundancy and improve data integrity.
- It involves dividing a database into two or more tables and defining relationships between the tables.
- goal is to ensure that each piece of data is stored in only one place & that the data dependencies are logical & efficient.

• Types of Anomalies:

(i) **Update Anomaly :**

- Occurs when data is duplicated in multiple places.
- If you need to update the data.
- you must update it everywhere it's duplicated.

e.g : Changing a department's location requires updating all employees in that department. missing one update causes inconsistent data.

(ii) **Insert Anomaly :**

- occurs when you cannot insert data into the database due to missing other data.

e.g : can't add a new department without adding an employee to that department.

(iii) Delete Anomaly:
- Deleting data unintentionally removes other important data.

e.g: Deleting an employee might also delete the department information if it's the only employee in that department.

Q. (4) Compare BCNF and 3NF.

3NF	BCNF
i) 3NF stands for third Normal form	i) BCNF stands for Boyce Codd Normal form.
ii) It is less stronger than BCNF.	ii) It is comparatively more stronger than 3NF.
iii) In 3NF, functional dependencies are already in 1NF & 2NF.	iii) In BCNF, functional dependencies are already in 1NF, 2NF & 3NF.
iv) redundancy is high	iv) redundancy is low.
v) easier to achieve	v) difficult to achieve.
vi) Lossless decomposition can be achieved by 3NF	vi) Lossless decomposition is hard to achieve in BCNF.