**Chapter2 Assignment Stock 10:**

**Picture: Table Diagram.**

**A screenshot of a computer

Description automatically generated with medium confidence**

**Write 360 degree note on Normalization:**

**1. Normalization: Add one more question to the template. What is 1Nf? 2NF? 3NF? Explain with example so that even a child can understand.**

**What is Normalization:** Denormalized or Initial data in table contain more than one values, different columns for same kind of data or repeat values in different rows. To reduce that data redundancy, we separate data in different tables and connect them using primary and foreign keys. The process of separating data in different tables and linking them is called normalization.

**Why** **Normalization**: Normalization reduces redundancy and improves data integrity. While normalization seems time and storage consuming, it, improves database performance and improves data storage. It eliminates Insertion, Update and Deletion Anomalies.

Normalization can be done in different forms which is call normal forms:

**First Normal form (1NF):**

The first normal form (1NF) states that each attribute in the relation is atomic.

To satisfy the first normal form, make sure that there is only one value in each cell and only one column for same kind of data. If there is more than one values in a cell, then separate each value in different rows with other corresponding attributes.

**Why 1NF**: It allows to create many rows without having to add new columns and helps improve search and short queries.

**Second Normal Form (2NF):** When a table is already in 1NF, and no attribute is partially dependent on any non-prime attribute, the table is in 2NF. A table to be in 2 NF, all attributes/columns must be dependent on only the primary key.

**Why 2NF:** It improves redundancy more effectively, improves flexibility in database design, improves data organization in database.

STUD\_NO COURSE\_NO COURSE\_FEE

1 C1 1000

2 C2 1500

1 C4 2000

Note: Course\_Fee is partially dependent on Course\_No

**Third Normal Form(3NF):** If a table is in 2NF and there is no transitive dependency; meaning no non-prime attributes/column is dependent on any non-prime attribute/column, then it is in 3NF.

**Why 3NF:** It eliminated update anomaly and improvs data integrity.

student\_id subject\_id marks exam\_name total\_marks

1 10 25 Practical 30

2 15 55 Theories 60

Note: Student\_Id and Subject\_Id are composite primary key. The total\_marks is transitively dependent on exam\_name.

**2. Primary Key (related terms: Foreign Key, Candidate Key, Surrogate Key, Unique Key)**

**What is PK:** Any column that uniquely identifies each record can be a primary key. It must contain unique value for each record, cannot be null, its value cannot be deleted, and a table can have only one PK.

**Why is PK:** Primary key prevents duplication, helps update/delete specific record, ensures row-level accessibility, and helps set up relationship between tables.

**3. Foreign Key (related terms: Primary Key, Candidate Key, Surrogate Key, Unique Key)**

Columns in a table that are primary key in another table are Foreign Key.

Foreign key is used to reference data in another table. It also called reference key. It can be null, can contain duplicate value, a table can contain many FK, can be deleted from child table.

**4. Candidate Key (related terms: Primary Key, Foreign Key, Surrogate Key, Unique Key)**

A column that can be candidate to be a PK is a Candidate key. It also called super key and a table can have more than one candidate key. It uniquely identifies each record in a table, it contains unique values, its not null.

**5. Constraint (related terms: Primary Key, Foreign Key, Check, Default, unique, NULL/NOT NULL)**

Constraints are used to limit what data or data types can be inserted, updated, or deleted. It ensures accuracy and reliability of data. There are two types of constraints, table level and column level constraints. Table level constraints apply to whole table and column level apply to only a columns or selected columns. Following are few common constraints

NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, CHECK, DEFAULT, CREATE INDEX