Delta-exam-topics-Data-Modelling

1. Conceptual Data Model

A **conceptual model** is a high-level design that shows how different entities relate to each other. It does **not** include technical details like data types or keys.

Example:
Imagine you're designing a university database. A conceptual model would include:

- **Entities**: Student, Course, Professor
- **Relationships**: A student **enrolls in** a course, a professor **teaches** a course

- ◆ Think of it as a rough sketch or blueprint of the system before adding technical details.

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2. Physical Data Model

A **physical model** is the **detailed** implementation of the database, including table structures, columns, and data types.

Example:
For a **Student** entity, the physical model may look like this in SQL:

```sql
CREATE TABLE Student (
    StudentID INT PRIMARY KEY,
    Name VARCHAR(100),
    Age INT,
```

```
    Email VARCHAR(255) UNIQUE
);
```

◆ The physical model ensures the database is optimized for **storage and performance**.

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3. Surrogate Key

A **surrogate key** is a unique, system-generated identifier (usually a number). It is **not** derived from real-world data.

Example:

- Instead of using **email** as the primary key, we use a **StudentID** (1, 2, 3…).
- If a student changes their email, it won't affect the database structure.

◆ It's useful for large databases where natural keys (like email or phone numbers) can change.

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4. ERWIN (Data Modeling Tool)

ERWIN is a tool for designing databases visually using **Entity-Relationship Diagrams (ERD)**.

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5. Softwares Used for Data Modeling

There are several tools used for **designing databases visually**:

✅ **ERWIN** → Most popular tool for ER diagrams
✅ **Microsoft Visio** → Used for conceptual designs
✅ **Lucidchart** → Web-based modeling tool
✅ **MySQL Workbench** → Used for designing and managing MySQL databases