Module 1–2 Summary: ER Modeling and the Relational Model

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1. Conceptual Design: Entity-Relationship (ER) Modeling

Entities represent distinguishable objects grouped into entity sets with key, composite, multivalued, or derived attributes. Weak entity sets lack a standalone key and depend on an identifying owner via a total-participation identifying relationship. Cardinality constraints ($1:1$, $1:N$, $M:N$) and participation constraints (total vs. partial) encode business rules prior to SQL implementation.

2. Relational Model & ER-to-Relational Mapping

- **Strong Entity:** Becomes a table with primary key and simple attributes.
- **Weak Entity:** Combines its partial key with the owner's primary key (`ON DELETE CASCADE`).
- **1:N Relationship:** Place the `1`-side primary key as a foreign key on the `N`-side table.
- **M:N Relationship:** Create a junction table whose primary key pairs both foreign keys (e.g., `Enrolment(SID, CID, Grade)`).