OBJECTIVES

- Understand and define key terms.
- Understand/know 5 properties of relations.
- Understand each normal form level/category.
- Describe 4 potential issues when merging relations.
- Transform ERD or EERD into a set of relations.
- Use normalization to decompose a relation with anamolies into well-structured relations.

Logical Database Design - Process of transforming a ~~eere~~ conceptual data model (focused on the reqs.) into a logical data model (focused on correct expression of reqs. via technical language) that is compatible with a specific type of database technology.

Foreign Key - An attribute located in 2 relations serving as a primary key for one of those relations.

Referential Integrity

~~Relational integrity~~ Constraint - A rule maintaining consistency among 2 rows of 2 relations. States that if there is a foreign key in one relation, either its value must match the primary key of another relation or its value must be null.

- graphical display: Arrow from foreign key to associated primary key.

Properties of Relations

1. Each relation (table) has unique name.
2. Each cell/box must be atomic; only one value associated w/ each ~~attribute~~ attribute on a specific row.
3. Each row is unique/distinct.
4. Each attribute has a unique name.
5. The sequence/order of columns is insignificant.
6. The sequence of rows is insignificant.

REMOVING NON-ATOMIC ATTR.

- Add another row ~~with~~ of the same attribute but separate each value into each row

Name	Course
Jane	Calculus Chemistry

→

Name	Course
Jane	Calculus
Jane	Chemistry

Relation - A named, 2D ~~chart~~ table of data.

RELATIONAL KEYS

Primary key - An attribute that identifies each row of the table

- graphing: Underline the attribute name.

Composite Key - Primary key made of more than one attribute.

Integrity Constraints - Rules to limit acceptable values and actions.

- Maintains data accuracy & integrity.

Constraints -

Domain ~~Constraints~~ - Reqs. all values in a column to come from the same domain.

Entity Integrity - Ensures every relation has a primary key w/ valid values.

- ~~Allows null values to be assigned if info. is not known or not applicable.~~

Null - Value assigned (to an attribute) when no other value is applicable or the applicable values are unknown.

- Primary keys cannot be null.
- Non-primary key attributes can be given a null value.

CREATING RELATIONAL TABLES

- Create table defs. for each entity
  - Clarify constraints, primary keys, foreign keys, entity name's and attribute names, etc.

Well-Structured Relations...

- contain minimal redundancy.
- allows for user modification of rows w/o errors (anomalies).
- ~~Contain~~ Confine modifications to one row.

Anomaly - Errors/inconsistencies that occur when users attempt to update data in the table.

- Insertion Anomaly - Anomalies relating to the addition of data.
- Deletion Anomaly - Anomalies relating to incorrectly deleted data.
- Modification Anomaly - ~~Suppose that~~ Anomalies relating to modifying values.
  - Updating 1 row for ~~att~~ A requires you to update each row for A.