Basic Concepts

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Storing Data

- Data is only stored so that it can be retrieved
- To retrieve data users need to know what to ask for
- They need a mental picture of the data and a language to describe it

Tables

- Store all data
- Are a set of similar Rows
- Are a set of different Columns

Columns

- All Rows in a Table have the same Columns in the same Order
- Each Column of a Table has a fixed Domain
- A Column of a Row is Atomic

Terminology

File	Table	Relation
Record	Row	Tuple
Field	Column	Attribute

Identifying Things

- Tables and Columns have Names
- Rows have Keys
- Tables and Columns are Static
- Rows are Dynamic

Keys

- A Key is a value that identifies a Row within a Table uniquely
- Every Table has a Key Column or Columns

Primary Keys

- A Table may have more than one column or group of columns that could be the key
- One Identifying Column or Column Group is used as the Primary Key
- Any others are Candidate Keys

Designing A Database

- Decide on what Tables you need
- Give them Names
- Give them Columns with Names and Domains
- Pick the Primary Key for each Table

Picking the Primary Key

- Single column, natural keys are best
- Avoid artificial / generated keys if you can
- Avoid multiple column keys if you can
- The Domain of a single Column Primary Key is a Primary Domain

The Entity Integrity Constraint

- No component of a Primary Key may be Null
- Null means undefined

Foreign Keys

- A Key from one table can appear in another table
- A column (or groups of columns) appears in two tables with the same domain in each; in one it is the Primary Key in the other a Foreign Key

The Referential Integrity Constraint

Foreign key values must either be null or contain a value which also appears as a primary key