CS 1555

Lecture 4

**Relational Database Model (continued)**

Properties of relations

- Relation is finite (in actual set theory, relations can be infinite)

- No duplicate tuples

- Order of tuples is not important

- Value may appear multiple times in a column

- Order of attribute values in a tuple is

- important in a list of attributes defined

- not important in a set of attributes definition

Relational schema R specifies

- Name of relation

- Attribute names Ai of R

- Domain Di (data type + format) for each attribute Ai

Data type is set of atomic data values

- No attribute is a set-valued

- No attribute is composite in the vein of arrays or linked lists

- Format specifies representation of data value

Creating a schema

- Corresponding database is at an empty state

- Initial state when database is populated

- Domain of each field is specified and enforced by DBMS when tuples are added or modified

Useful terms

- Cardinality of relation r(R): number of tuples in r(R), denoted |r(R)|

- Number of rows in a table

- Arity or degree of relation r(R): number of attributes in R, denoted |R|

- Number of attributes in a table or schema

- |R| > 0 and |r(R)| >= 0

Integrity constraints

- Intersection of data abstraction and reliability

- Structural constraints

- Key constraints: uniqueness of keys

- Entity integrity: no primary key is NULL

- Referential integrity: related to foreign keys

- Semantic constraints: come from application logic

Primary key constraint

- Set of fields where no two distinct tuples can have the same values in all key fields

- If more than one key:

- Each is called a candidate key

- One is designated as primary key – can’t be NULL

- Others designated as alternate/unique keys

- UNIQUE can take NULL values

Important to name constraints to get useful error messages

Foreign keys

- Foreign key in relation R2 is a set of attributes in R2 that forms primary key of another relation R1

- Set of fields in one relation that is used to refer to another tuple

- Attributes in foreign key and primary key have same domain