Conceptual - Entities, Attributes, Relationships.

Relational Data Model - Tables, Columns, Rows (informal).

Tables - Relations.
Columns - Attributes.
Rows - Tuples.

Relations, Attributes, Tuples, Domains.

Domain - values of an attribute.

Logical definition of a domain.
- department_names -> four character codes from the following list {"CSCI", "JOUR", "POLY"}
- String data type.

dname - Attribute.
dom(dname) = department_names.

Subset of cartesion product of attributes of R.

dom(A1) x dom(A2) x ... dom(An)

|D| - total number of values in domain D.

Relation

- Relation Schema - ordered list of attributes.
  - R(A1, A2, ..., An}
  - Arity (degree) of a relation schema R - number of attributes of R (for above, degree = n).

STUDENT(Name, Phone_number, Dob)

Intension*

Relation state r - r(R)
r - set of n tuples.
r = {t1, t2, ..., tm}

NULL values - don't exist, or unknown.

Assertion(s) -
STUENT(Name, Phone_number, Dob)

t = {t1}
t1 = <"Addison", 4064545343, 04/25/1996>
t2 = <"Abby", 4064545344, 04/25/2003>

Tuple
- t - ordered set of values v = {v1, v2, ..., vn}

Where does the value v1 have to be valid for?
Answer: It has to be in the set dom(A1) or in general vi has to be in the set of dom(Ai).

SK = {Name, Phone_number_Dob}

t1[SK] = <"Addison", 4064545343, 04/25/1996>

t2[SK] = <"Abby", 4064545344, 04/25/2003>

- Domain Constraints
- Key Constraints

Superkey - subset of attributes which is unique for two tuples.
t1, t2 two tupled in Relation state r(R)
t1[SK] != t2[SK]
SK - biggest subset of attributes (all of them).

key K is a mimimal superkey of r(R)

removing an attribute A from K and have a new subset of attributes K' that is not a superkey K is a key!

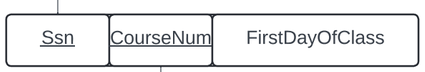
Relational Model Constraints
- model based (implicit constraints) - i.e. domain constraints.
- schema based constraints (explicit) constraints - use DDL to specify these (Data definition language).
- application based (semantic) constraints - enforced at the database application layer, business rules or business logic.

Candidate key - each superkey of a relation schema R.
We choose one of these such keys to be a primary key (arbitrary).

Primary key - used to uniquely identify tuples.

A university has students. Students are uniquely identified by their Ssn and/or Student identifier. Name, Date and date of birth must also be recorded. *Student Id's are assigned on the first day of classes. Every student has a student mentor, of which I need to know their Dob so I can send them a birthday wish.*

Relationship Type.



Entity Integrity Constraint

The primary key cannot be NULL.

Referential Integrity Constraints.

Foreign key.

Relation Schema - fairly static.
Relation State - constantly evolving (each state current state).