

SQL

# SQL Introduction

Standard language for querying and manipulating data

Structured Query Language

# SQL

- Data Definition Language (DDL)
  - Create/alter/delete tables and their attributes
  - Following lectures...
- Data Manipulation Language (DML)
  - Query one or more tables – discussed next !
  - Insert/delete/modify tuples in tables

Table name

Attribute names

# Tables in SQL

Product

PName	Price	Category	Manufacturer
Gizmo	\$19.99	Gadgets	GizmoWorks
Powergizmo	\$29.99	Gadgets	GizmoWorks
SingleTouch	\$149.99	Photography	Canon
MultiTouch	\$203.99	Household	Hitachi

Tuples or rows

# Steps in Table Creation

1. Identify data types for attributes
2. Identify columns that can and cannot be null
3. Identify columns that must be unique (candidate keys)
4. Identify primary key–foreign key mates
5. Determine default values
6. Identify constraints on columns (domain specifications)
7. Create the table and associated indexes

# Tables Explained

- The *schema* of a table is the table name and its attributes:

Product(PName, Price, Category, Manufacturer)

- A *key* is an attribute whose values are unique;  
we underline a key

Product(PName, Price, Category, Manufacturer)

# Data Types in SQL

- Atomic types:
  - Characters: CHAR(20), VARCHAR(50)
  - Numbers: INT, BIGINT, SMALLINT, FLOAT
  - Others: MONEY, DATETIME, ...
- Every attribute must have an atomic type
  - Hence tables are flat
  - Why ?

# Tables Explained

- A tuple = a record
  - Restriction: all attributes are of atomic type
- A table = a set of tuples
  - Like a list...
  - ...but it is unordered:  
no **first()**, no **next()**, no **last()**.



# SQL Query

Basic form: (plus many many more bells and whistles)

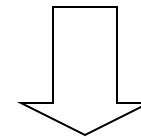
<pre>SELECT &lt;attributes&gt; FROM   &lt;one or more relations&gt;</pre>
---

# Simple SQL Query

Product

PName	Price	Category	Manufacturer
Gizmo	\$19.99	Gadgets	GizmoWorks
Powergizmo	\$29.99	Gadgets	GizmoWorks
SingleTouch	\$149.99	Photography	Canon
MultiTouch	\$203.99	Household	Hitachi

```
SELECT *  
FROM Product
```



PName	Price	Category	Manufacturer
Gizmo	\$19.99	Gadgets	GizmoWorks
Powergizmo	\$29.99	Gadgets	GizmoWorks
SingleTouch	\$149.99	Photography	Canon
MultiTouch	\$203.99	Household	Hitachi