

CS422 Principles of Database Systems

Schema Definitions and Constraints

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Create Table Schema

```
CREATE TABLE table (  
    name type [DEFAULT value] [column_constraints],  
    ...  
    [table_constraints]  
);
```

Data Types

- ◆ char(n), varchar(n), text
- ◆ int, smallint, bigint
- ◆ real, float
- ◆ numeric(n,m), decimal(n,m)
- ◆ serial
- ◆ boolean
- ◆ date, time, timestamp

Constraints

- ◆ Column constraints
 - unique
 - primary key
 - references
 - not null
- ◆ Table constraints
 - unique
 - primary key
 - foreign key ... references

Checks

```
create table test1 (  
    a1 int check ( a1 > 10 ),  
    a2 int,  
    check (a2 > a1)  
);
```

- ◆ Attribute-based check (column constraint)
 - Checks that involve only one column
- ◆ Tuple-based check (table constraint)
 - Checks that involve multiple columns

Another Check Example

```
CREATE TABLE Sells (  
    bar CHAR(20),  
    beer CHAR(20) CHECK ( beer IN  
        (SELECT name FROM Beers)),  
    price REAL CHECK ( price <= 5.00 )  
);
```

- ◆ Simulate foreign key constraint with CHECK
- ◆ Just doesn't work as well

Assertions

- ◆ Checks that involve multiple tables

```
CREATE ASSERTION <name>  
CHECK ( <condition> );
```

Assertion Examples

```
CREATE ASSERTION FewBar CHECK (  
  (SELECT COUNT(*) FROM Bars) <=   
  (SELECT COUNT(*) FROM Drinkers)  
);
```

```
CREATE ASSERTION Fk CHECK (  
  NOT EXIST (  
    (select beer from sells)  
    except  
    (select beer from beers)  
  )  
);
```

PostgreSQL Limitations

- ◆ No subqueries in CHECK
- ◆ No ASSERTION

Constraint Name

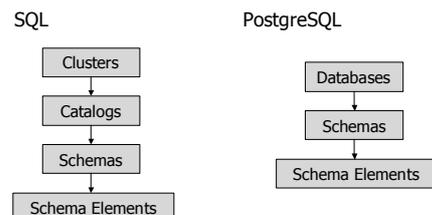
```
create table test2 (  
  a1 int constraint test1_pk primary key,  
  a2 int constraint test1_k1 unique,  
  a3 int,  
  a4 int,  
  constraint test1_k2 check (a3 > a4)  
);
```

Change or Drop Table

- ◆ ALTER TABLE
 - add/remove column
 - add/remove constraints
 - change table/column name
 - ...
- ◆ DROP TABLE

Create Database Schema

```
CREATE SCHEMA schema;
```



Why Use Schema?

- ◆ Name space
 - companyA.test1 is different from cysun.test1
- ◆ Organize related tables together
 - put all the "test" tables under a *test* schema
- ◆ Manage access privileges

PostgreSQL Schema-related Commands ...

- ◆ Create schema
 - create schema *schema_name*;
- ◆ List all schemas in current database
 - \dn
- ◆ Create tables in a schema
 - create *schema_name.table_name*
- ◆ List all tables in a schema
 - \dt *schema_name.**

... PostgreSQL Schema-related Commands

- ◆ Show current search path
 - show search_path;
- ◆ Change search path
 - set search_path to *schema1,schema2*;
- ◆ Drop a schema
 - drop *schema_name* [cascade];

Special Schemas

- ◆ public
- ◆ information_schema