Tables

Announcements

Recursive Art Contest
Fall 2015

Joining Tables

Reminder: John the Patriotic Dog Breeder

```
CREATE TABLE parents AS
SELECT "abraham" AS parent, "barack" AS child UNION
SELECT "abraham"          , "clinton"         UNION
SELECT "delano"           , "herbert"         UNION
SELECT "fillmore"         , "abraham"         UNION
SELECT "fillmore"         , "delano"          UNION
SELECT "fillmore"         , "grover"          UNION
SELECT "eisenhower"       , "fillmore";
```

Parents:

Parent	Child
abraham	barack
abraham	clinton
delano	herbert
fillmore	abraham
fillmore	delano
fillmore	grover
eisenhower	fillmore

Joining Two Tables

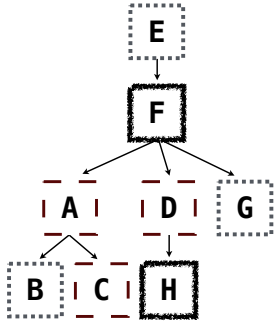
Two tables **A** & **B** are joined by a comma to yield all combos of a row from **A** & a row from **B**

```
CREATE TABLE dogs AS
  SELECT "abraham" AS name, "long" AS fur UNION
  SELECT "barack"         , "short"       UNION
  SELECT "clinton"        , "long"        UNION
  SELECT "delano"         , "long"        UNION
  SELECT "eisenhower"     , "short"       UNION
  SELECT "fillmore"       , "curly"       UNION
  SELECT "grover"         , "short"       UNION
  SELECT "herbert"        , "curly";

CREATE TABLE parents AS
  SELECT "abraham" AS parent, "barack" AS child UNION
  SELECT "abraham"          , "clinton"         UNION
  ...;
```

Select the parents of curly-furred dogs

```
SELECT parent FROM parents, dogs
              WHERE child = name AND fur = "curly";
```



(Demo)

Aliases and Dot Expressions

Joining a Table with Itself

Two tables may share a column name; dot expressions and aliases disambiguate column values

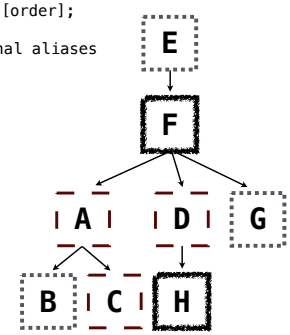
```
SELECT [columns] FROM [table] WHERE [condition] ORDER BY [order];
```

[table] is a comma-separated list of table names with optional aliases

Select all pairs of siblings

```
SELECT a.child AS first, b.child AS second
  FROM parents AS a, parents AS b
  WHERE a.parent = b.parent AND a.child < b.child;
```

first	second
barack	clinton
abraham	delano
abraham	grover
delano	grover



Example: Grandparents

Which select statement evaluates to all grandparent, grandchild pairs?

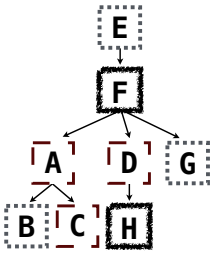
1.
```
SELECT a.grandparent, b.child FROM parents AS a, parents AS b
                              WHERE b.parent = a.child;
```

2.
```
SELECT a.parent, b.child FROM parents AS a, parents AS b
                         WHERE a.parent = b.child;
```

3.
```
SELECT a.parent, b.child FROM parents AS a, parents AS b
                         WHERE b.parent = a.child;
```

4.
```
SELECT a.grandparent, b.child FROM parents AS a, parents AS b
                              WHERE a.parent = b.child;
```

5. None of the above



Joining Multiple Tables

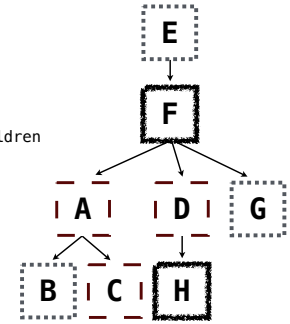
Multiple tables can be joined to yield all combinations of rows from each

```
CREATE TABLE grandparents AS
  SELECT a.parent AS grandog, b.child AS granpup
    FROM parents AS a, parents AS b
    WHERE b.parent = a.child;
```

Select all grandparents with the same fur as their grandchildren

Which tables need to be joined together?

```
SELECT grandog FROM grandparents, dogs AS c, dogs AS d
               WHERE grandog = c.name AND
                     granpup = d.name AND
                     c.fur = d.fur;
```



Example: Dog Triples

Fall 2014 Quiz Question (Slightly Modified)

Write a SQL query that selects all possible combinations of three different dogs with the same fur and lists each triple in *inverse* alphabetical order

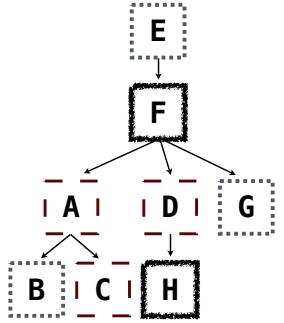
```
CREATE TABLE dogs AS
  SELECT "abraham" AS name, "long" AS fur UNION
  SELECT "barack"         , "short"       UNION
  ...;

CREATE TABLE parents AS
  SELECT "abraham" AS parent, "barack" AS child UNION
  SELECT "abraham"          , "clinton"         UNION
  ...;
```

Expected output:

```
delano|clinton|abraham
grover|eisenhower|barack
```

(Demo)



Numerical Expressions

Numerical Expressions

Expressions can contain function calls and arithmetic operators

```
                [expression] AS [name], [expression] AS [name], ...
        SELECT [columns] FROM [table] WHERE [expression] ORDER BY [expression];
```

Combine values: +, −, ∗, /, %, and, or

Transform values: abs, round, not, −

Compare values: <, <=, >, >=, <>, !=, =

(Demo)

String Expressions

String Expressions

String values can be combined to form longer strings

```
sqlite> SELECT "hello," || " world";
hello, world
```

Basic string manipulation is built into SQL, but differs from Python

```
sqlite> CREATE TABLE phrase AS SELECT "hello, world" AS s;
sqlite> SELECT substr(s, 4, 2) || substr(s, instr(s, " ")+1, 1) FROM phrase;
low
```

Strings can be used to represent structured values, but doing so is rarely a good idea

```
sqlite> CREATE TABLE lists AS SELECT "one" AS car, "two,three,four" AS cdr;
sqlite> SELECT substr(cdr, 1, instr(cdr, ",")-1) AS cadr FROM lists;
two
```

(Demo)