CSE 180 - Lab 1

Keys, CREATE TABLE, and referential integrity

Dev

October 5 2023, Section 2

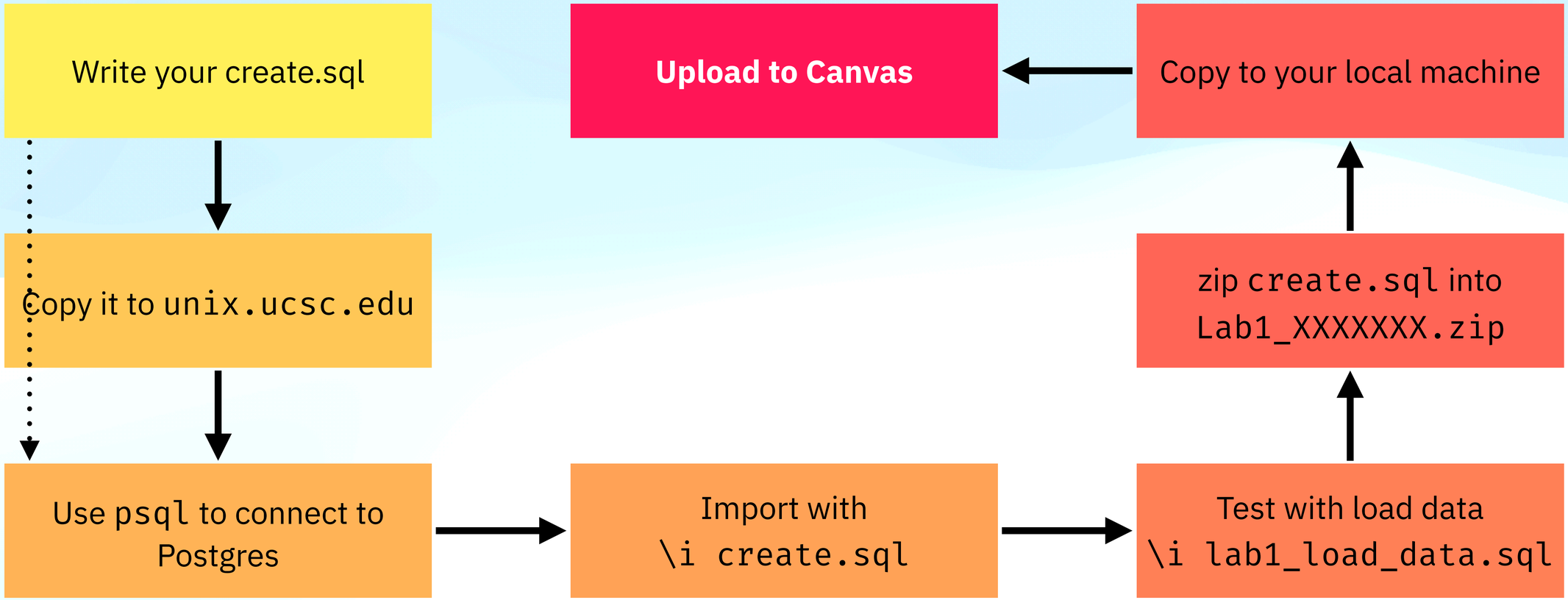
Logistics

- Lab 1 Due: Tuesday**, October 17** 11:59PM PDT on Canvas

Let’s Look At Lab 1

- Goals: Create a schema with 6 Tables
- That is it
- What to turn in?
  - Save your script as `create.sql` and an optional `README`
  - Zip it as `Lab1_XXXXXXX.zip` where (XXXXXXX is your student ID)
  - Submit to Canvas under assignment lab1.

Recommended Workflow



Tables in Lab 1

SubscriptionKinds(subscriptionMode, subscriptionInterval, rate, stillOffered)

Editions(editionDate, numArticles, numPages)

Subscribers(subscriberPhone, subscriberName, subscriberAddress)

Subscriptions(subscriberPhone, subscriptionStartDate, subscriptionMode, subscriptionInterval, paymentReceived)

Holds(subscriberPhone, subscriptionStartDate, holdStartDate, holdEndDate)

Articles(editionDate, articleNum, articleAuthor, articlePage)

ReadArticles(subscriberPhone, editionDate, articleNum, readInterval)

SQL CREATE STATEMENT

```
CREATE TABLE table_name (
    column1 datatype,
    column2 datatype,
    column3 datatype,
   …);
```

Important PostgreSQL Datatypes

- Numeric Types
  - `INTEGER` [`INT`]: Signed 4 byte integer
  - `NUMERIC (p,s)` [`DECIMAL (p,s)`]: Selectable precision numeric
    p = total digits, s = position of decimal point
- Character Types
  - `CHARACTER(n)` [`CHAR(n)`]: n characters, fixed length
  - `CHARACTER VARYING(n)` [`VARCHAR(n)`]: up to n characters
- `DATE`: calendar date (year, month, day)
- `INTERVAL`: ‘interval’ eg. ‘3 hours’ (Range from -178000000 years to 178000000 years)
- `BOOLEAN` [`BOOL`]: TRUE or FALSE

https://www.postgresql.org/docs/9.5/datatype.html

Primary Keys

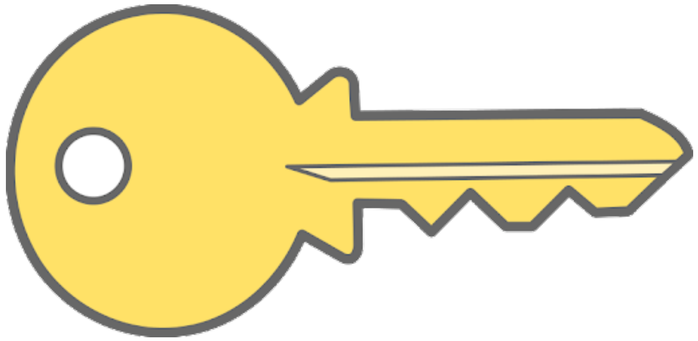
- Primary keys are a column, or a set of columns that are *unique identifiers* for all the rows in the table
- Primary keys can have individual columns with repeated values, but the whole tuples cannot be repeated
- Defining a primary key ensures that the databases can perform additional tasks like indexing and constraints (more on that later)
- Tables can have *at most* one primary key (enforced), every table *should* have a primary key (not enforced)

https://www.postgresql.org/docs/9.5/ddl-constraints.html

Specifying A PRIMARY KEY

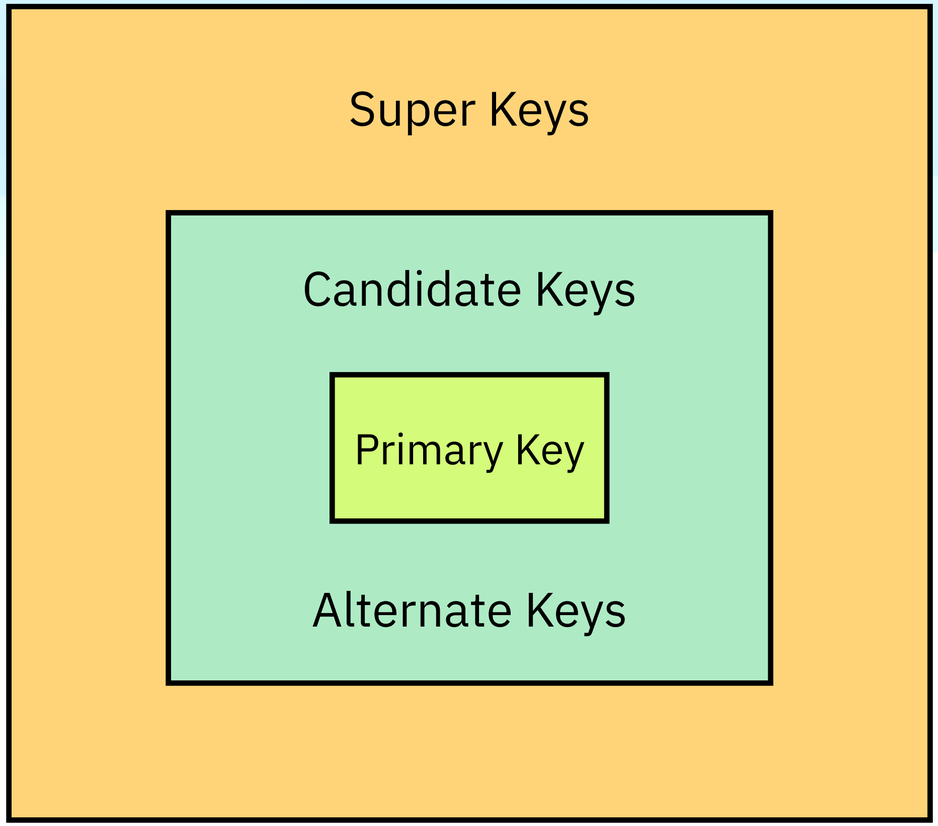
```
CREATE TABLE Beers (
  beer VARCHAR(30),
  manf VARCHAR(50),
  PRIMARY KEY (beer)
);
```

```
CREATE TABLE Beers (
  beer VARCHAR(30) PRIMARY KEY,
  manf VARCHAR(50),
);
```



Primary Key, Super Key, Key, Candidate Key...

- Candidate Key: Minimal set of attributes that can uniquely identify a tuple
  eg: Student ID, email, phone number
- Super Key: Set of attributes that can uniquely identify a tuple
  eg: (Student ID, Name)
- Primary Key: A chosen candidate key
  eg: Student ID
- Alternate Key: Non Primary candidate keys
  eg: email, phone number
- Foreign Key: Reference to a different table



Foreign Keys

- Foreign keys specify that values in a column (or a group of columns), must match values in another table
- Maintain *referential integrity* between tables
- For example, a student enrolled in CSE180 *must exist* in UCSC Students table

Creating a table with FOREIGN KEY

```
CREATE TABLE Sells (
  bar VARCHAR(30),
  beer VARCHAR(30),
  price REAL,
  PRIMARY KEY (bar, beer),
  FOREIGN KEY (bar) REFERENCES Bars,
  FOREIGN KEY (beer) REFERENCES Beers
);
```

```
CREATE TABLE Sells (
  bar VARCHAR(30) REFERENCES Bars,
  beer VARCHAR(30) REFERENCES Beers,
  price REAL,
  PRIMARY KEY (bar, beer),
);
```

CREATE TABLE examples

- Demo using Beer Creates

Loading Data

- Import lab1_load_data.sql
- Output:

```
dpuranda=# \i lab1_load_data.sql
COPY 8
COPY 6
COPY 6
COPY 6
COPY 9
COPY 4
```

SELECT statement

- Retrieves rows from zero or more tables
- All tables in FROM are computed upon
- Conditions under WHERE are looked for
- Other operators such as WITH, HAVING, GROUPBY will be explored later in the course

https://www.postgresql.org/docs/9.5/sql-select.html

SELECT Statement examples

```
SELECT * FROM Bars;

SELECT * FROM Sells WHERE price < 8;

SELECT beer FROM Sells WHERE price < 8 AND bar='The Red Room';
```