Geog480 - Principles of GIS

Database Tutorial and Hands-on

1. Connecting to the class server

   • On lab machines
     • Use openssh client (Start → All Programs → SSH Tools → XAgent)
       • ssh netid@geog480.cigi.illinois.edu
       • Enter your netid passwd when prompted
     • If using a different ssh client, use the following settings
       • hostname = geog480.cigi.illinois.edu
       • username = netid
       • port = 22
       • Enter your netid passwd when prompted

2. Connecting to a Postgres (PostGIS) database server

   • psql -U username -d database_name
     • username = geog480
     • database_name = fall14
     • Enter passwd when prompted (same as username)

   • Postgres commands
     • \l List all accessible databases
     • \c [db_name] connect to a DDB
     • \dt List all the tables in current DB
     • \? Help
     • \q Quit

3. Database operations

   NOTE: Replace the string ‘your_netid’ in all the instruction below with your actual netid.

   • Create a table
     • create table your_netid (key int, attr varchar(20), value float);

   • Insert a row
     • insert into your_netid values(1, 'attr0', 100);
     • insert into your_netid values(2, 'attr1', 101);
     • insert into your_netid values(3, 'attr1', 102);
     • insert into your_netid values(4, 'attr1', 103);

   • List contents of table
     • select * from your_netid;
     • select * from your_netid where attr='attr1';
     • select * from your_netid where key=2;
     • select key, value from your_netid limit 1;
     • Notice that the select statement allows you to view contents in the table and the where clause allows you to filter what the records you what to view

   • Update contents (rows)
- update your_netid set value=1 where key=1;
- update your_netid set value=105 where key=3;

- **Sorting**
  - select * from your_netid Order by key asc;
  - select * from your_netid Order by key desc;

- **Counting**
  - select count(*) from your_netid;
  - select count(*) from your_netid where attr like '%1';

- **Max/Min/Avg**
  - select max(value) from your_netid; select avg(value) from your_netid where attr ilike '%1%';

- **Delete Rows**
  - delete from your_netid where key=4;

- **Create a new table**
  - create table your_netid_2 (key int, attr1 varchar(20), value float);

- **Copying a CSV file (postgres specific)**
  - \COPY your_netid_2 FROM 'your_file' with CSV HEADER
  - You may use /srv/cigi/code/test.csv for your_file

- **Join your two tables**
  - **Natural join**
    - select * from your_netid natural join your_netid_2;
  - **Join**
    - select your_netid.*, your_netid_2.attr1, your_netid_2.value from your_netid
      inner join your_netid_2 on your_netid.key=your_netid_2.key;
    - Alternative method: select * from your_netid, your_netid_2 where
      your_netid.key=your_netid_2.key;
  - Compare these results with left outer join, right outer join and full outer join
    - Keywords: ‘left join’, ‘right join’, and ‘full join’

- **Drop Table**
  - DO NOT RUN this command during the hands-on session since it will delete your table
    (drop table your_netid;)