PostgreSQL

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PostgreSQL: Intro

- Open-source Database Management System
- Closely follows ANSI-SQL standards
- Active for 20+ years; stable
- Strong software ecosystem, support
- Big data variants (Amazon Redshift, Greenplum)
- Data types for GIS (via PostGIS)
- Frequent choice for web app backends

PostgreSQL: Installing

- Windows Installers
  - PostgreSQL.org: postgresql.org/download/windows/
    - EnterpriseDB enterprisedb.com/downloads/postgres-postgresql-downloads
    - BigSQL: openscg.com/bigsql/
- macOS:
  - Postgres.app: postgresapp.com
- Linux
  - Distribution-specific
    - e.g., Ubuntu: postgresql.org/download/linux/ubuntu/

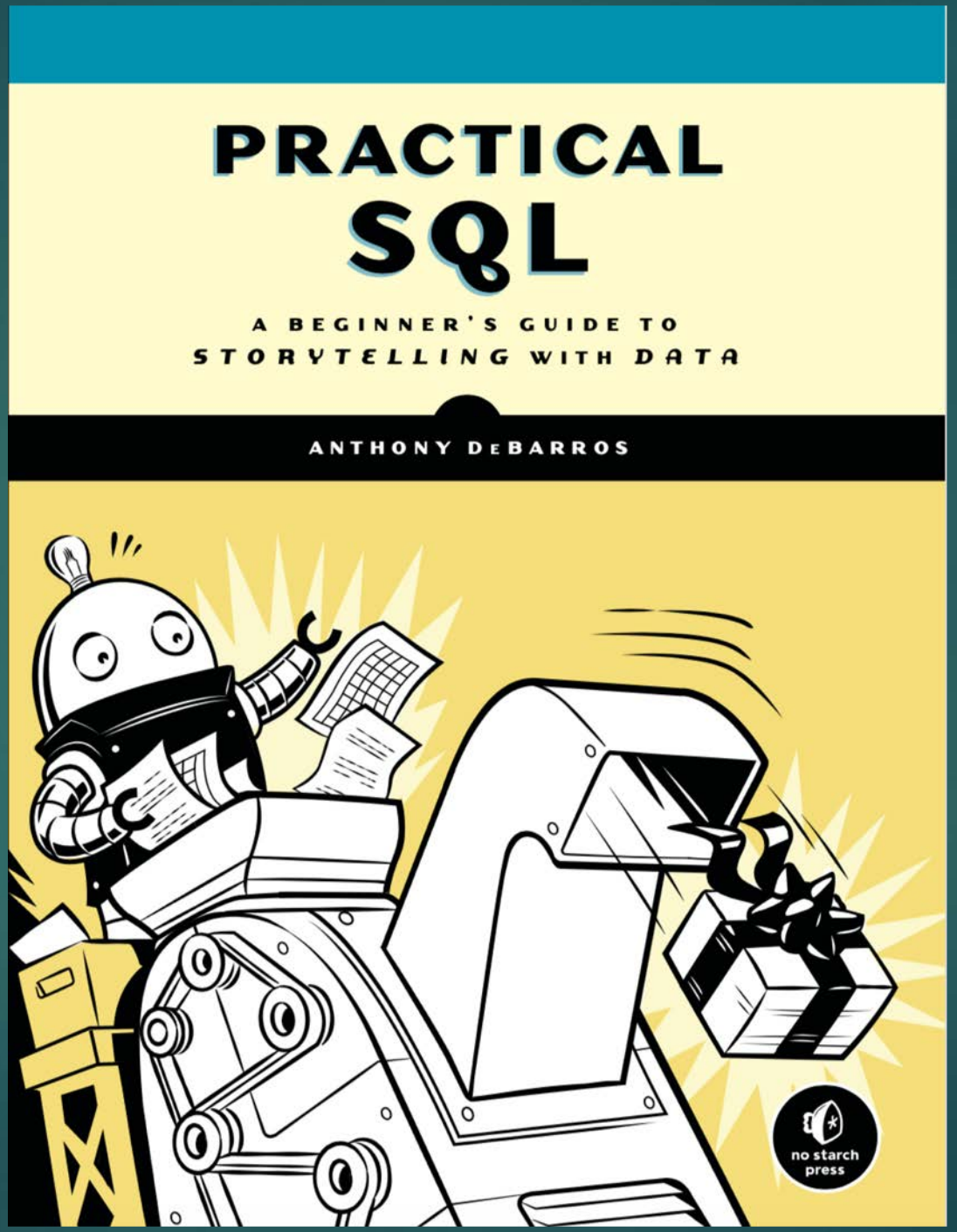
PostgreSQL: Managing

- pgAdmin: graphical UI
  - pgadmin.org
- psql: command-line tool
  - Included with PostgreSQL
- Numerous additional tools and add-ons
  - github.com/dhamaniasad/awesome-postgres/

PostgreSQL: Hands-On

Today, we'll cover:

- pgAdmin, psql and some basic queries
- Creating a function
- Spatial queries with PostGIS
- Full-text search
- Statistics functions


PRACTICAL
SQL
A BEGINNER'S GUIDE TO
STORYTELLING WITH DATA
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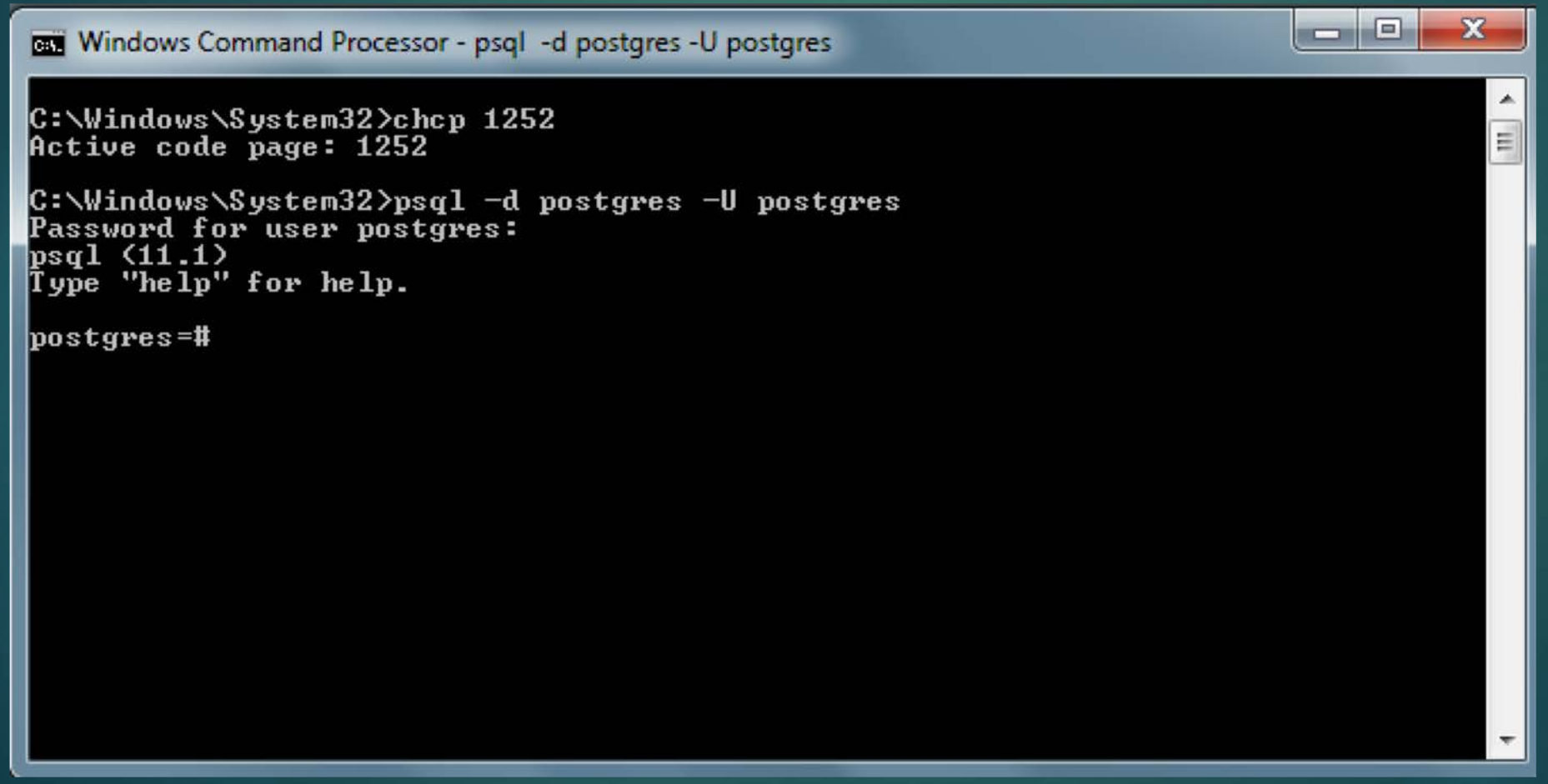
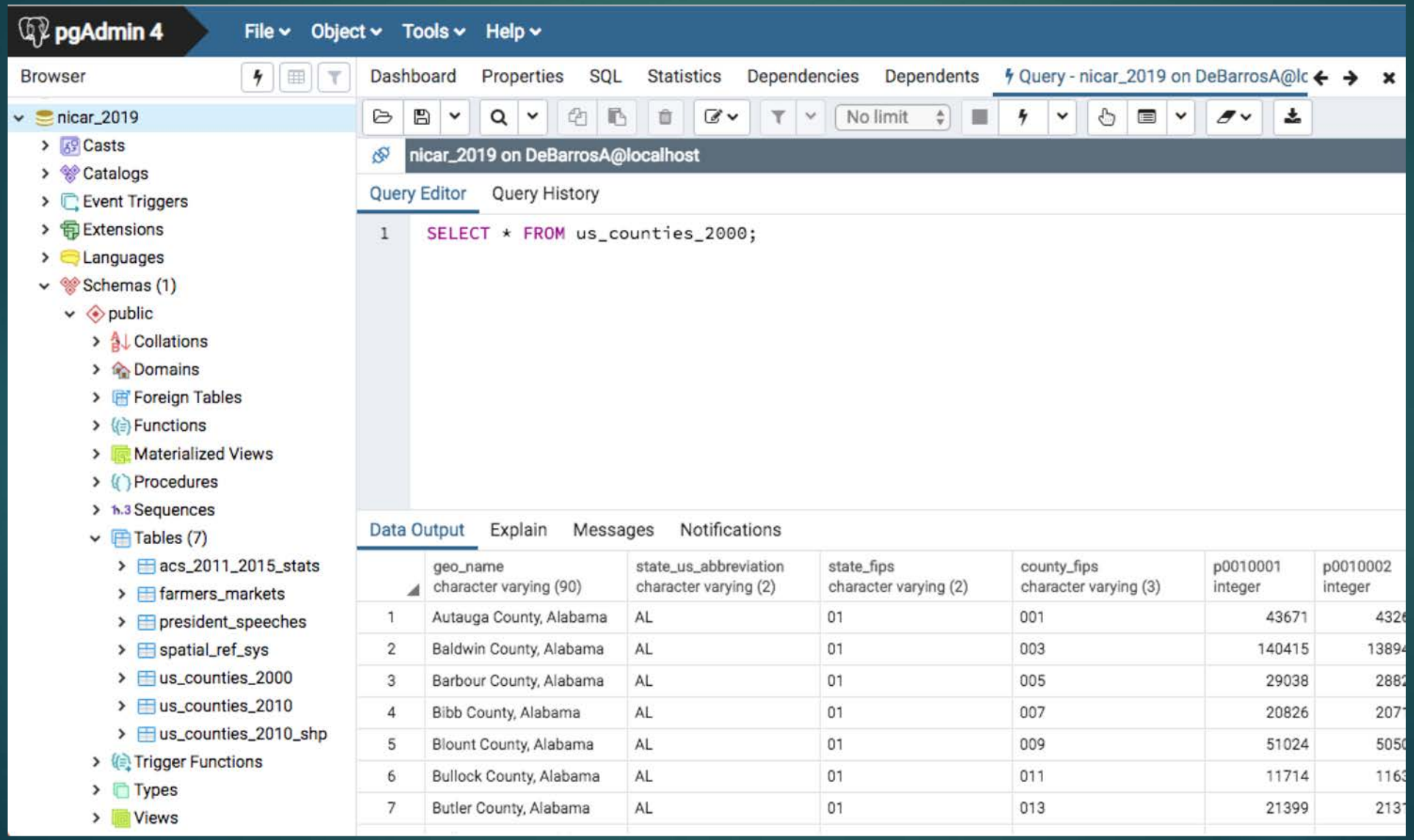
Exploring psql

- C:\ chcp 1252
- C:\ psql –d postgres –U postgres



Exploring pgAdmin



	geo_name character varying (90)	state_us_abbreviation character varying (2)	state_fips character varying (2)	county_fips character varying (3)	p0010001 integer	p0010002 integer
1	Autauga County, Alabama	AL	01	001	43671	432
2	Baldwin County, Alabama	AL	01	003	140415	1389
3	Barbour County, Alabama	AL	01	005	29038	288
4	Bibb County, Alabama	AL	01	007	20826	207
5	Blount County, Alabama	AL	01	009	51024	505
6	Bullock County, Alabama	AL	01	011	11714	116
7	Butler County, Alabama	AL	01	013	21399	213

Exploring PostgreSQL: Basic Queries

- SELECT * FROM *table_name*;
- JOINs
- Calculations

Exploring PostgreSQL: Features!

- Creating functions
- Spatial queries with PostGIS
- Full-text search
- Stats functions

PostgreSQL: PostGIS

Spatial data types and analysis

- http://postgis.net/
- Data types: geometry and geography
- http://postgis.net/docs/manual-2.5/

PostGIS Data Types

Installing PostGIS adds five data types to your database. The two data types we'll use in the exercises are `geography` and `geometry`. Both types can store spatial data, such as the points, lines, polygons, SRIDs, and so on you just learned about, but they have important distinctions:

`geography` A data type based on a sphere, using the round-earth coordinate system (longitude and latitude). All calculations occur on the globe, taking its curvature into account. That makes the math complicated and limits the number of functions available to work with the `geography` type. But because the Earth's curvature is factored in, calculations for distance are more precise; you should use the `geography` data type when handling data that spans large areas. Also, the results from calculations on the `geography` type will be expressed in meters.

`geometry` A data type based on a plane, using the Euclidean coordinate system. Calculations occur on straight lines as opposed to along the curvature of a sphere, making calculations for geographical distance less precise than with the `geography` data type; the results of calculations are expressed in units of whichever coordinate system you've designated.

PostgreSQL: Full-Text Search

Stats: Correlation Coefficient