Queries

Overview

The basis of a GIS (Geographic Information System) is geospatial feature data that is linked to a database. Records in the database are linked to a feature such as a point, line, polygon, or raster cell. For example, a parcels database can have attribute data that lists the owner, the address, and the value of the property.

Either the geospatial features or the database can be queried to find a subset of particular interest. In some cases, you may want to bring in all the data in a certain geographic area by drawing a rectangle or a circle on the base map. This is a type of location-based query. In other cases, you may want to find a specific subset of a data layer, such as all parcels with value greater than a certain amount. These are called property-based queries. The following illustration shows an empty grid on the left, a location-based query in the center, and a property-based query on the right.

Objectives

After completing this lesson, students will be able to:

- Discuss the different types of queries.
- Perform spatial queries from feature sources.
- Perform data queries from feature sources.
- Combine queries.

Exercises

The following exercises are provided in a step-by-step format in this lesson:

1. Perform a Spatial Query
2. Perform a Data Query
3. Perform a Compound Query

About Queries

A query is a method to find specific data based on criteria. In GIS, you can query the geospatial property, or location, of a feature, or you can query the linked database of the data layer to find the data that fits the criteria. Queries are organized in a specific fashion using an underlying language called SQL (Structured Query Language). Criteria detail specific conditions about the desired subset; for example, an attribute must be greater than a value, or the features must lie within a specified rectangle.

Examples of criteria for a location-based query are “find the points inside of this polygon,” or “find the parcels that are within 250 feet of the centerline of this road.” An example of a criterion for an attribute- or property-based query is “find the parcels that have a value greater than $250,000.” Either type of query results in a selected subset of the data layer. The following illustration displays the result of a query.

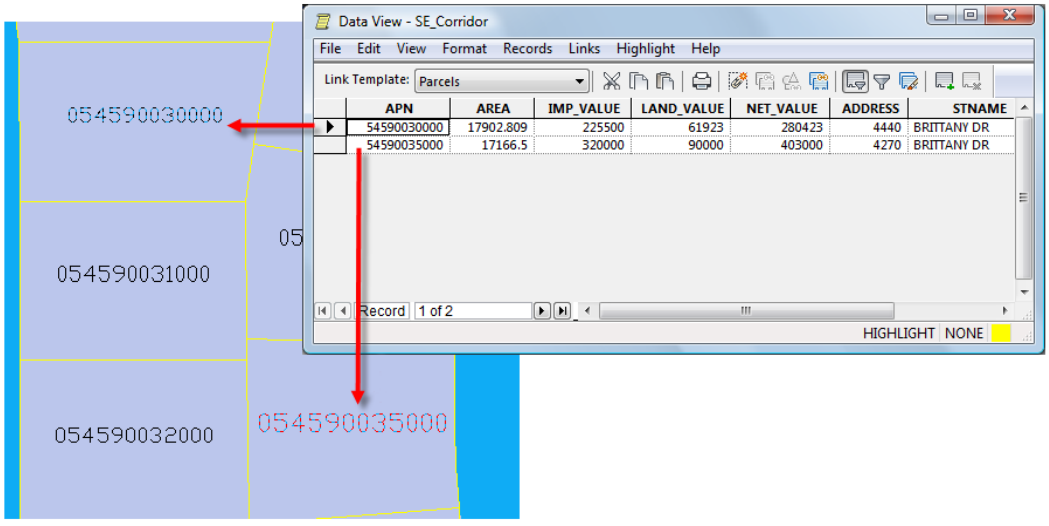
Queries can also be put together into a compound query. The compound query can use binary operators such as AND and OR to logically sequence the compound query. If two conditions are linked with AND, then both conditions must be true for the feature to be placed in the subset. If two conditions are linked with OR, then if either condition is true, the feature is placed in the subset. The Create Query dialog box contains many options for building simple or compound queries.

About Filters

A filter uses a query to restrict the viewable data. A spatial filter can be used when importing data from another file format. You can specify (or limit) the area into which incoming objects are imported. A filter can also be applied based on the value of an attribute. For example, the data layer of all counties in the U.S. could be filtered for the counties in the Commonwealth of Virginia.

Filters are useful because geospatial data layers can often cover larger areas, or they may contain more data than necessary for a project. It is common to require only a subset or section of the data available. Using a filter can help you improve performance when working with large sets of feature data.

A spatial filter can be used to display only records that are linked to features selected in the drawing. When a spatial filter is applied, the Data View displays only those records that are linked to selected objects in the drawing, as shown in the following illustration.



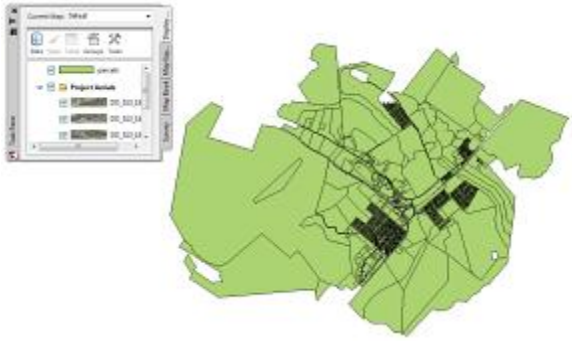
Key Terms

Query	A query is a method to find specific data based on criteria. In GIS, you can query the geospatial property, or location, of a feature, or you can query the linked database of the data layer to find the data that fits the criteria.
SQL	Structured Query Language
Location-Based Query	A query based on the spatial attribute of a layer.
Property-Based Query	A query based on values of a property (attribute) in a layer's database.
Filter	A filter uses a query to restrict the viewable data.
Compound query	A compound query links two or more query criteria using binary operators such as AND and OR to logically sequence the criteria.

Exercise 1: Perform a Spatial Query

In this exercise, students perform a spatial query to display the data required for the project.

At the end of this exercise, the drawing displays as shown.

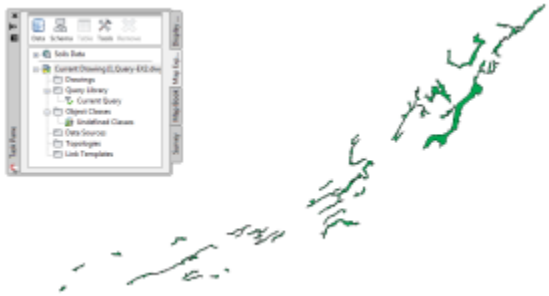


For this exercise, open …*I_Query-EX1.dwg (M_Query-EX1.dwg).*

Exercise 2: Perform a Data Query

In this exercise, students perform a data query to display the data based on a specific attribute.

At the end of this exercise, the drawing displays as shown.



For this exercise, open …*I_Query-EX2.dwg (M_Query-EX2.dwg).*

If students have changed to the Tool-based Geospatial workspace and opened the Task Pane, skip to step 3.

Exercise 3: Perform a Compound Query

In this exercise, students perform a compound query to display specific data.

At the end of this exercise, the drawing displays as shown.

For this exercise, open …*I_Query-EX3.dwg (M_Query –EX3.dwg).*

If students have changed to the Tool-based Geospatial workspace and opened the Task Pane, skip to step 3.

Assessment

Challenge Exercise

Instructors provide a master or challenge exercise for students to do based on this lesson.

Questions

1. What is the underlying computer language of database queries?
2. Which type of query would use the value in the database for a criterion?
3. Which type of query would use an area in the drawing as a type of criteria?

Answers

1. SQL, Structured Query Language.
2. A property-based query.
3. A location-based query.

Lesson Summary

In this lesson, students learned how to create different types of queries. Students used a spatial query to display parcels within a range of aerial images. Students used a property-based query to display only certain soil types. Finally, students developed a compound query using both location-based and property-based criteria.