

# **M.Sc. Remote Sensing and GIS**

## **RT-202**

### **Geographic Information System**

#### **Unit-III**

#### **3.2 Vector Based Spatial Data Analysis – Part-I**

**MSK: Mohit Singh**

# Introduction

- Spatial analysis is a fundamental component of a GIS that allows for an in-depth study of the topological and geometric properties of a dataset or datasets. Here, we discuss the basic spatial analysis techniques for vector datasets based on-
  - Single Layer Analysis
  - Multilayer Analysis

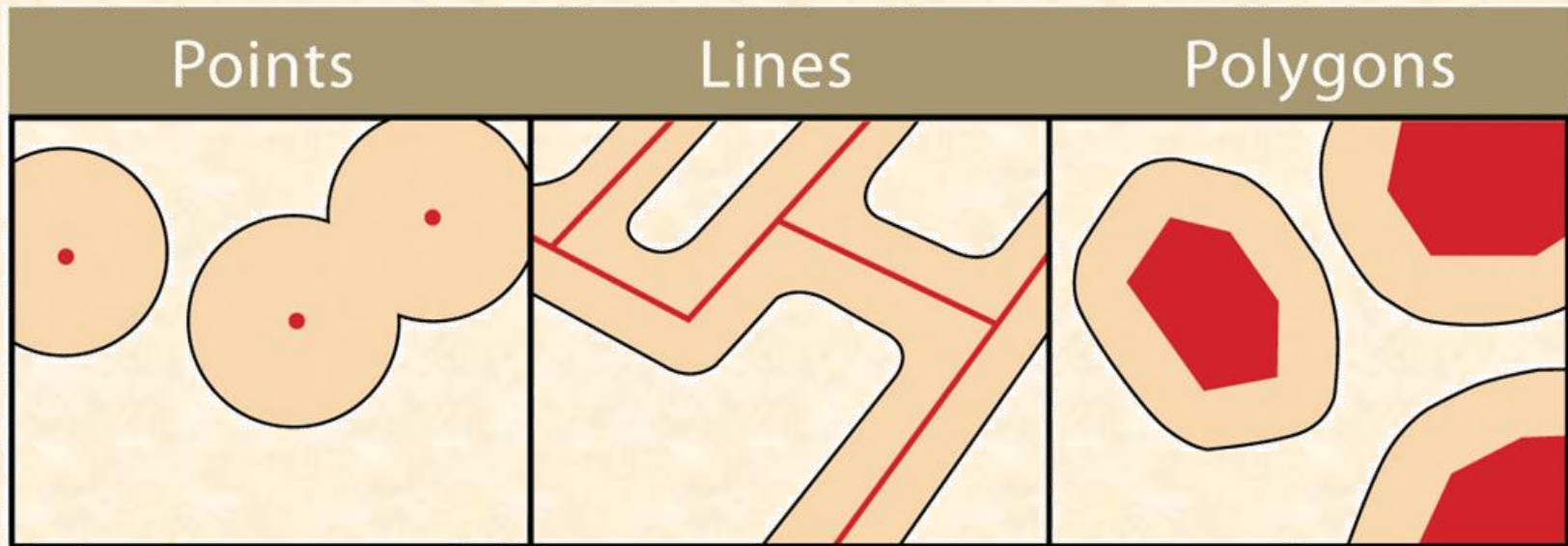
# Single Layer Analysis

- Single layer analyses are those that are undertaken on an individual feature dataset. It includes-
  - Buffering
  - Geoprocessing

# Buffering

- Buffering is the process of creating an output polygon layer containing a zone (or zones) of a specified width around an input point, line, or polygon feature. Buffers are particularly suited for determining the area of influence around features of interest.

- **Buffers** are common vector analysis tools used to address questions of proximity in a GIS and can be used on points, lines, or polygons.



# Geoprocessing

- Geoprocessing is a suite of tools provided by many geographic information system (GIS) software packages that allow the user to automate many of the mundane tasks associated with manipulating GIS data.
- Geoprocessing usually involves the input of one or more feature datasets, followed by a spatially explicit analysis, and resulting in an output feature dataset.

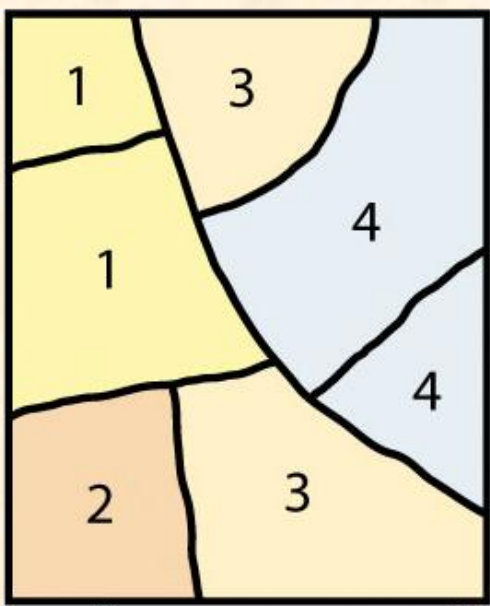
- Geoprocessing is a loaded term in the field of GIS. The term can (and should) be widely applied to any attempt to manipulate GIS data. The most common geoprocessing operations are:
  - Dissolve
  - Append
  - Select
  - Merge

- **Dissolve**

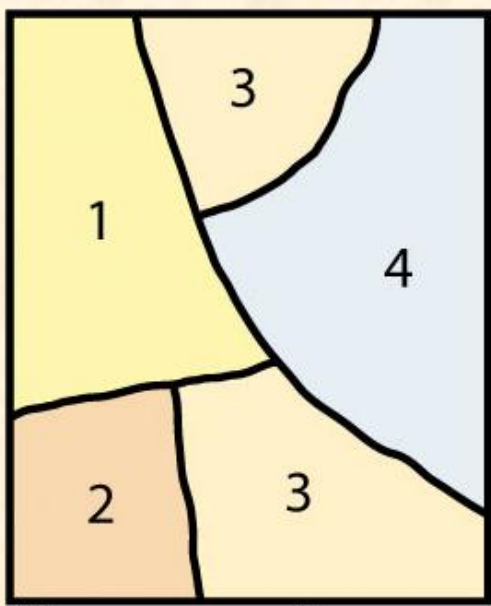
- The dissolve tool automatically combines all adjacent features with the same attribute values. The result is an output layer with the same extent as the original but without all of the unnecessary, intervening line segments. The dissolved output layer is much easier to visually interpret when the map is classified according to the dissolved field.



# Dissolve



A.

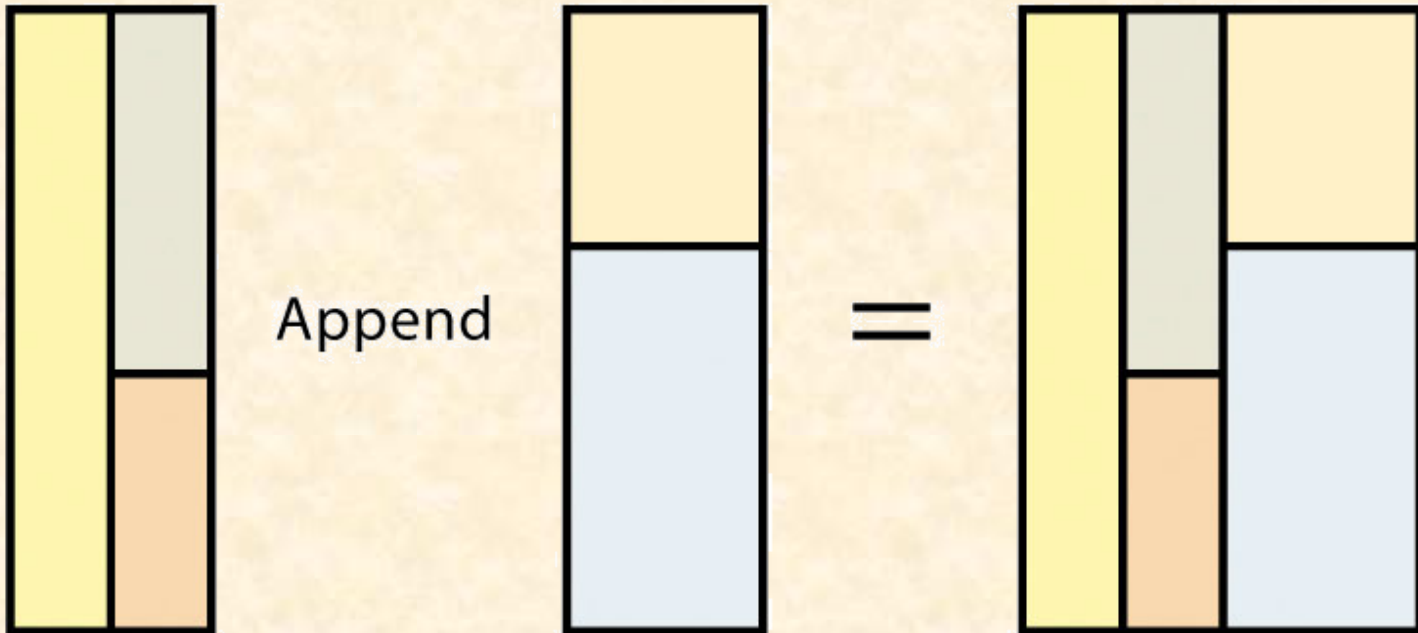


B.

- **Append**

- The append operation creates an output polygon layer by combining the spatial extent of two or more layers.
- Therefore, it is often useful to perform a dissolve after the use of the append tool to remove these potentially unnecessary dividing lines. Append is frequently used to mosaic data layers.

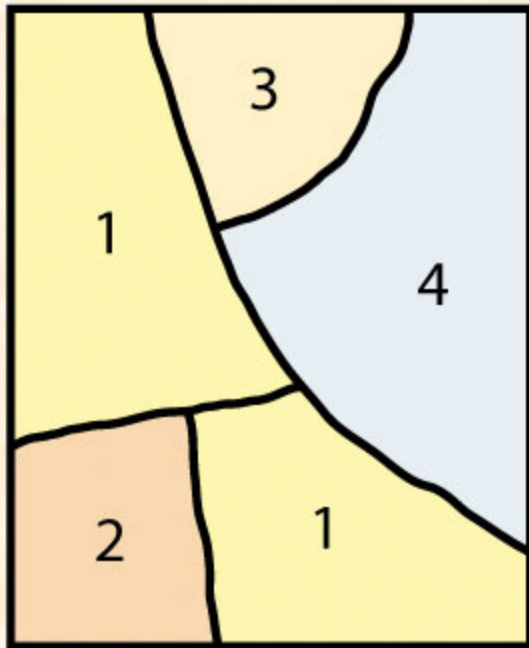
# Append



- **Select**

- The select operation creates an output layer based on a user-defined query that selects particular features from the input layer.
- The output layer contains only those features that are selected during the query. For example, a city planner may choose to perform a select on all areas that are zoned “residential” so he or she can quickly assess which areas in town are suitable for a proposed housing development.

Select



A.



B.

- **Merge**

- The merge operation combines features within a point, line, or polygon layer into a single feature with identical attribute information. Often, the original features will have different values for a given attribute.
- In this case, the first attribute encountered is carried over into the attribute table, and the remaining attributes are lost.
- This operation is particularly useful when polygons are found to be unintentionally overlapping. Merge will conveniently combine these features into a single entity.