GIS FUNDAMENTALS | 2

| Geodatabase – ArcGIS Pro

o Information Technology Institute | Geoinformatics Department

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01

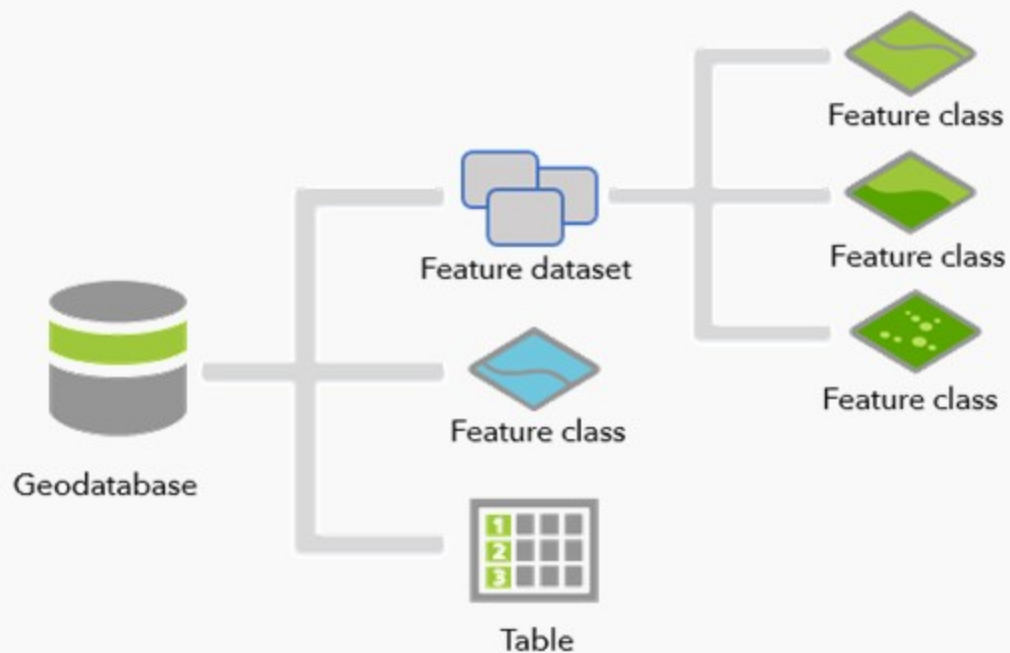## Geodatabase Definition

What is geodata?

- Geodata is an **information** about **geographic locations** that is stored in a format that can be used with a geographic information system (GIS).

- Geodata can be **stored in a database, geodatabase, shapefile, raster image, or Microsoft Excel** spreadsheet.

- Belongs to GIS files **only**

- One project can connect to **more than one** geodatabase
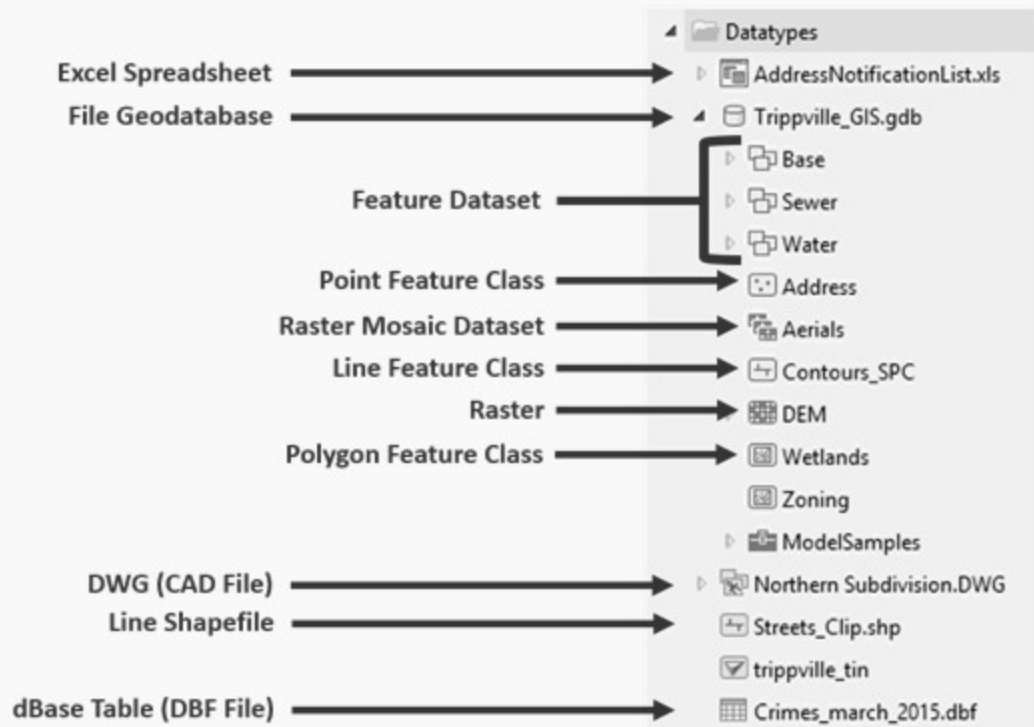
What is geodatabase?

- The geodatabase (a database or file structure used primarily to store, query, and manipulate **spatial data**).

- Through the geodatabase, you can **import different datasets** from various sources and use them in your GIS analysis.

Geodatabase Components

Geodatabase Components

Excel Spreadsheet ➔ ▷ 🖼 AddressNotificationList.xls

File Geodatabase ➔ ▿ 🗄 Trippville_GIS.gdb

- ▷ 🗗 Base
- Feature Dataset ➔ ▷ 🗗 Sewer
- ▷ 🗗 Water

Point Feature Class ➔ 🔲 Address

Raster Mosaic Dataset ➔ 🖼 Aerials

Line Feature Class ➔ 🔲 Contours_SPC

Raster ➔ 🔲 DEM

Polygon Feature Class ➔ 🔲 Wetlands

🔲 Zoning

▷ 🖼 ModelSamples

DWG (CAD File) ➔ ▷ 🔲 Northern Subdivision.DWG

Line Shapefile ➔ 🔲 Streets_Clip.shp

🔲 trippville_tin

dBase Table (DBF File) ➔ ▦ Crimes_march_2015.dbf

Pause ➔

Feature Class **VS** Layer

Has the physical data
and locate inside
database

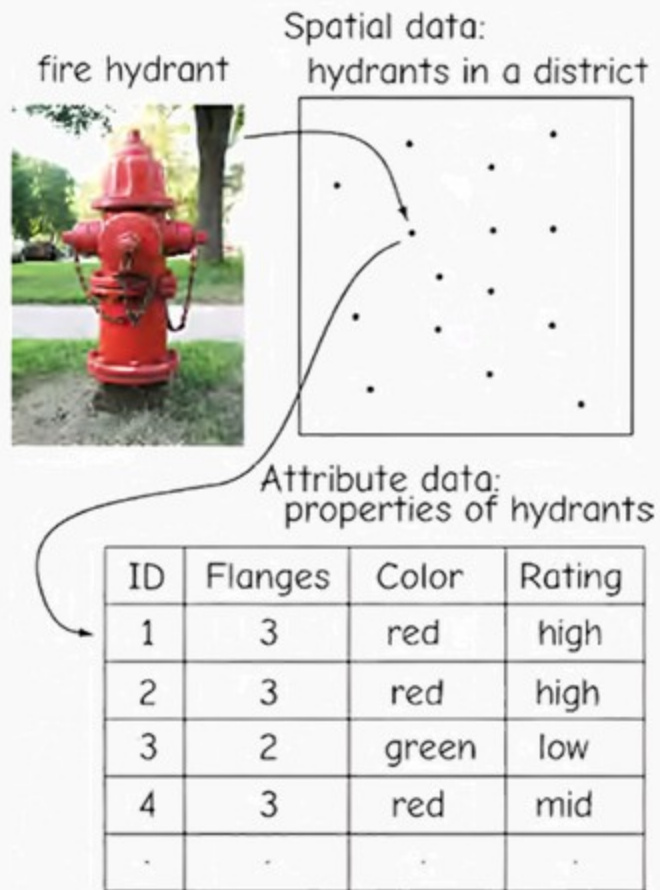If you delete it from the
catalog, you will miss the
layer and the data

Visualization of
the feature class

If you delete it
from the contents,
you will **NOT** miss
the data

Feature Class

- Feature class is a **vector** GIS file format when you're constructing Geodatabase.

fire hydrant

Spatial data: hydrants in a district

Attribute data: properties of hydrants

ID	Flanges	Color	Rating
1	3	red	high
2	3	red	high
3	2	green	low
4	3	red	mid
.	.	.	.

Layer

- Feature layers are **how ArcGIS Pro represents feature classes.**
- Feature layers can use data from any source that provides **point, polyline, polygon (vector feature data).**

Point Multipoint Polyline Polygon Multipatch

Feature Layer
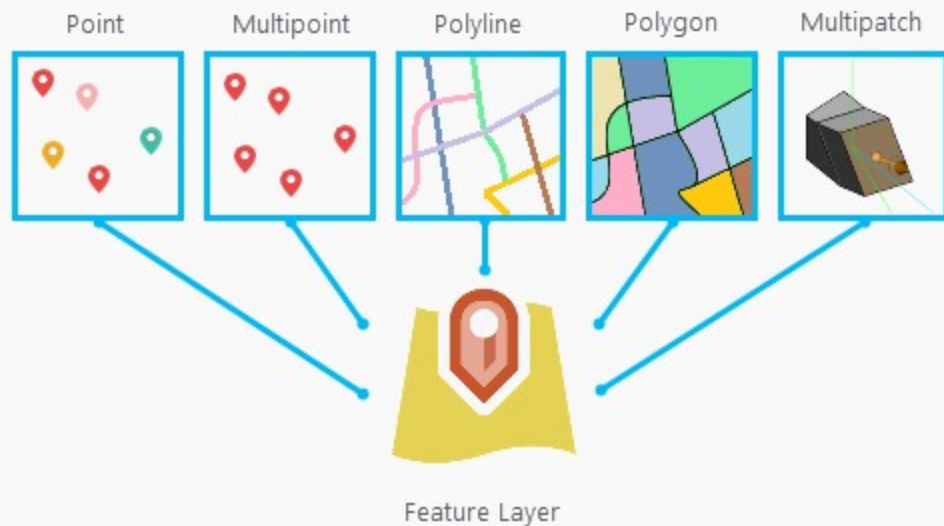
Layer Properties

- Visibility
- Symbology
- Selection
- Definition Query

Layer Properties: Counties   ✕

| General |
| Metadata |
| **Source** |
| Elevation |
| Selection |
| Display |
| Cache |
| Definition Query |
| Time |
| Range |
| Indexes |
| Joins |
| Relates |
| Page Query |

⌄ **Data Source**   Set Data Source...

Data Type	File Geodatabase Feature Class
Database	C:\Projects\DMP_Geodatabase.gdb
Feature Class	CountyPolygons
Alias	CountyPolygons
Feature Type	Simple
Geometry Type	Polygon
Coordinates have Z value	No
Coordinates have M value	No
Attachments	No Attachments
Feature Binning	Disabled
Vertical Units	Foot_US

› **Extent**

⌄ **Spatial Reference**

Projected Coordinate System	NAD 1983 StatePlane Kentucky FIPS 1600 (US Feet)
Projection	Lambert Conformal Conic
WKID	3089
Previous WKID	102763
Authority	EPSG
Linear Unit	US Survey Feet (0.30480060960012192)
False Easting	4921250.0
False Northing	3280833.333333333
Central Meridian	-85.75
Standard Parallel 1	37.083333333333334

OK   Cancel

Pause

Shape File

File-based Data

Name

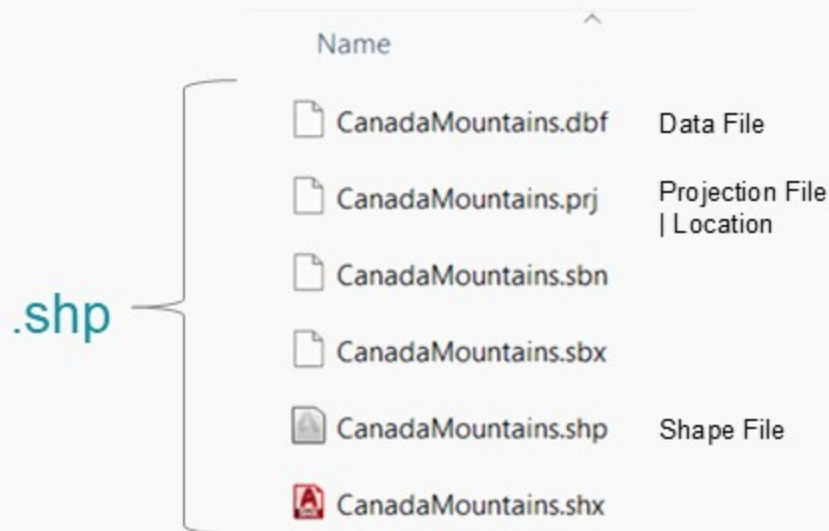|	
CanadaMountains.dbf	Data File
CanadaMountains.prj	Projection File | Location
CanadaMountains.sbn	
CanadaMountains.sbx	
CanadaMountains.shp	Shape File
CanadaMountains.shx	

.shp

- Created by **ESRI**
- File based **not exists** in geodatabase
- Very Important and common on spatial data
- Can be used in **all GIS software**

1- Exploring Shapefile

Canada Mountains

ArcGIS Interface

- **NAVIGATION**

  - Zoom

  - Bookmarks

  - Go TO XY

- **LAYER**

  - Basemap

- **SELECTION**

  - Select

  - Clear Selection

- **Inquiry**

  - Measure

  - Locate

Pause

02

Dealing with Data

Accessing Data

Add Folder Connection

Catalog ➔ Folder ➔ Add Folder Connection

Add Database

Catalog ➔ Database ➔ Add database

Attribute Table ➔ The physical data

2- Exploring Database
Yellowstone park in united states

Yellowstone_06.gdb

➔Drag: Boundary – Roads – Campsites
➔Just Exploring

Geographic Data Resources

Collection

Ready to use

Need Processing

Geographic Data Resources

| 01 | 02 | 03 | 04 | 05 | 06 | 07 |

Living Atlas
- Free & Paid data
- Organizations Data

Esri Data and Maps
- Selling Data

Public Agencies
- Central Agency for Public Mobilization and Statistics
- Ministry of Planning

ArcGIS Online
- Cloud-based data
- Cloud Computing

Open Source
- OpenStreetMap
- volunteers Information (Users-Organizations)

Commercial & Non-Commercial Vendors
- Selling Data

Civil Visits
- Surveys
- Interviews

Attribute Table

- Attribute tables are composed of **rows and columns**

- Rows are commonly known as records, and columns as fields.

- Each field can store a specific type of data, such as **number**, **date**, or **text**.

- Rows and columns intersect to form cells that contain a specific **value** for one field in a **record**.
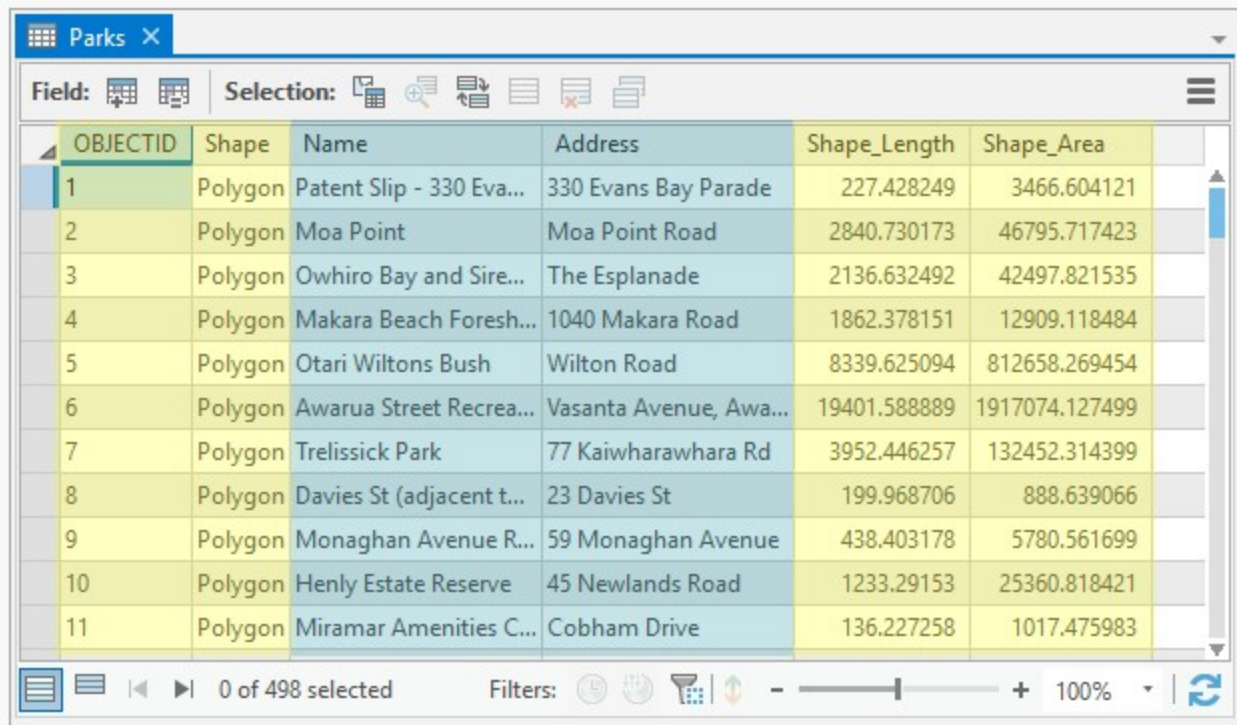
Attribute Table

Divided to 2 types of data:

- **User Defined**

- **Automatically Generated**

Data Types

◆ **Numbers, text, dates, BLOBs, raster**

Binary
Large
Objects

ADDRESS	STORIES	ACRES	SOLD	PRICE	IMAGE
22 Oleander Street	2	1.25	12/15/1995	350,000	<Raster>
Text	Short	Float	Date	Long	Raster

- You can store numbers in one of four data types (**Short integers**, **Long integers**, **Floats**, **Doubles**)

- Choose the data type that takes up the least storage space required.

Map Layout

- To share your work as a **printed** map, **poster**, or **PDF** file, you need to make a layout.

- A layout is a composition of one or more maps, along with supporting elements, such as a title, a legend, and descriptive text.

GIS File Formats

.gdb	.lyr	.shp	.Kml	JeoJSON	.Csv, .txt

.lyr — Esri Layer File – For Exporting Layers

.Kml — Keyhole Markup Language - The default Google Earth geospatial format

.Csv, .txt — Text Files (notepad) | Excel sheets
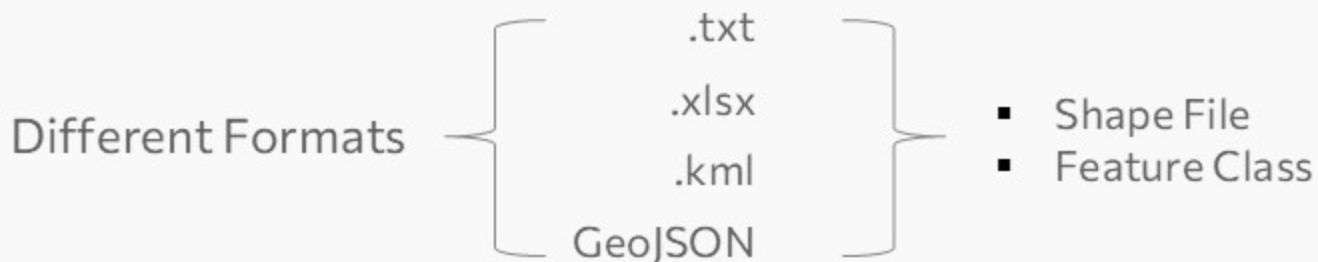
.gdb — Esri File Geodatabase

.shp — Shapefile - the feature geometry

JeoJSON — For encoding geographic data structures - **Online web** mapping applications

03

CONVERSION

How to deal with the data which aren't read with GIS?

Different Formats

.txt

.xlsx

.kml

GeoJSON
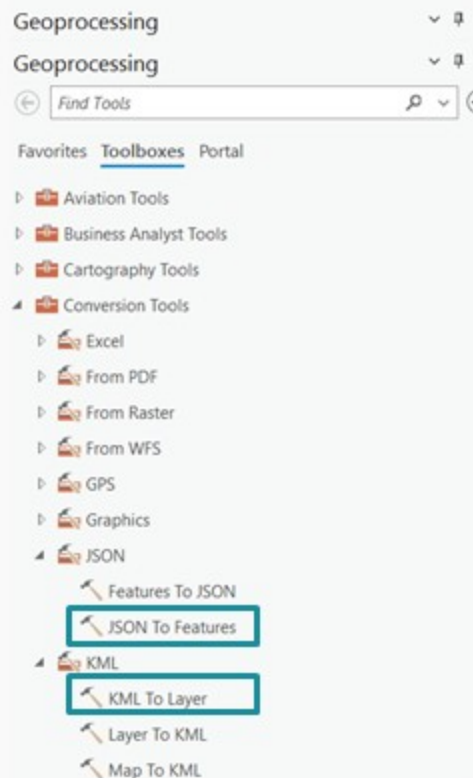
- Shape File
- Feature Class

Conversion

Pause

Conversion

Converting from Non-Spatial Data to Spatial Data

- Step 1. Add the Non-spatial file to GIS
- Step.2 Convert it to Layer (Spatial Data)

  - ➢ Way 1. Display XY Data (Content)
  - ➢ Way 2. Add XY Point data (Layer Menu)

Feature class
Or
Shapefile

Pause

Conversion

➤ Way 3. KML to layer

➤   JSON to Feature

3- .XLSX to GIS

Visualize your city Attractions on a Map

4- Homework

GIS Fundamentals_Assignement 1

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