



มหาวิทยาลัยราชภัฏนครปฐม



7202304

Fundamentals of Geographic Information System



Chapter 7: Data Linking and Relationships

Course: Fundamentals of GIS (QGIS-based)

Topic: Connecting spatial data with attribute data for analysis



Learning Objectives

Explain attribute tables

Understand primary and foreign keys

Perform table joins in QGIS

Apply one-to-one and one-to-many relationships

Interpret joined spatial data



Why Data Linking is Important in GIS

GIS uses multiple data sources:

- Spatial data (maps)
- Statistical data
- CSV / Excel datasets

Data linking enables spatial analysis



Types of Data in GIS



1. Spatial Data

- Point, Line, Polygon

2. Attribute Data

- Population
- Land use
- Rainfall

	ลำดับ	จังหวัด	รวมงบประมาณทั้งสิ้น
1	1	กระบี่	156,476,050
2	2	กาญจนบุรี	390,174,410
3	3	กาฬสินธุ์	74,294,880
4	4	กำแพงเพชร	85,700,815
5	5	ขอนแก่น	305,531,340
6	6	จันทบุรี	285,180,690
7	7	ฉะเชิงเทรา	108,632,590
8	8	ชลบุรี	225,949,170
9	9	ชัยนาท	32,716,400
10	10	ชัยภูมิ	200,715,450
11	11	ชุมพร	90,764,690



Attribute Tables in GIS

Contain descriptive (non-spatial) data

Fields (columns) and Records (rows)

Store numeric and text data

Each feature has one record



Primary Key

Primary Key

 District_ID	District	Population
1001 ✓	A District	15,000
1002 ✓	B District	22,000
1003 ✓	C District	19,000
1004 ✓	D District	---

Unique identifier

No duplicate values

Cannot be null

Example: District_ID



Field used to connect another table

Must match primary key values

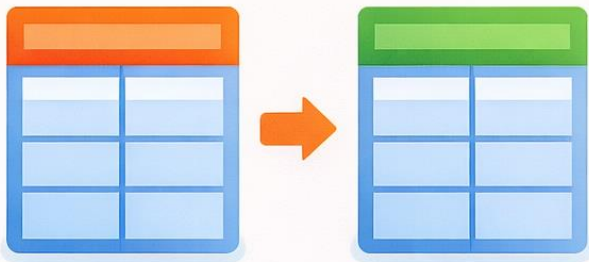
Enables table relationships

Example: District_ID in population table

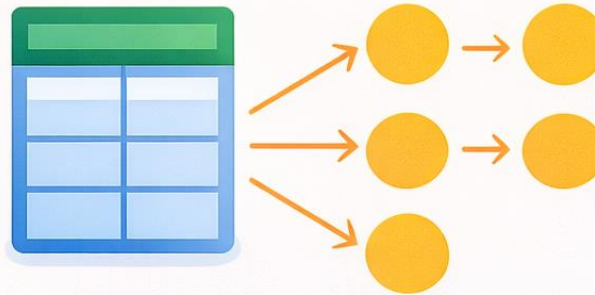


Types of Relationships

One-to-One (1:1)



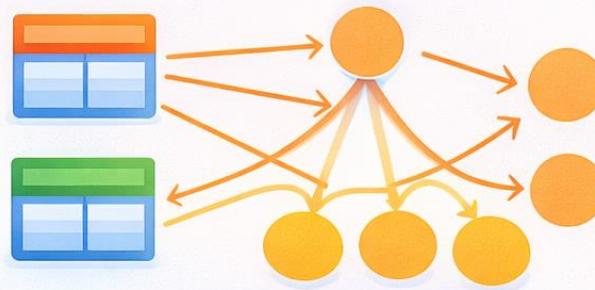
One-to-Many (1:M)



Many-to-One



Many-to-Many (conceptual)



One-to-One (1:1)

One-to-Many (1:M)

Many-to-One

Many-to-Many



What is a Table Join?

Combines spatial layer and attribute table

Based on common key field

Temporary join (Layer Property-based)

Used for analysis and visualization



Open Layer Properties

Select Joins tab

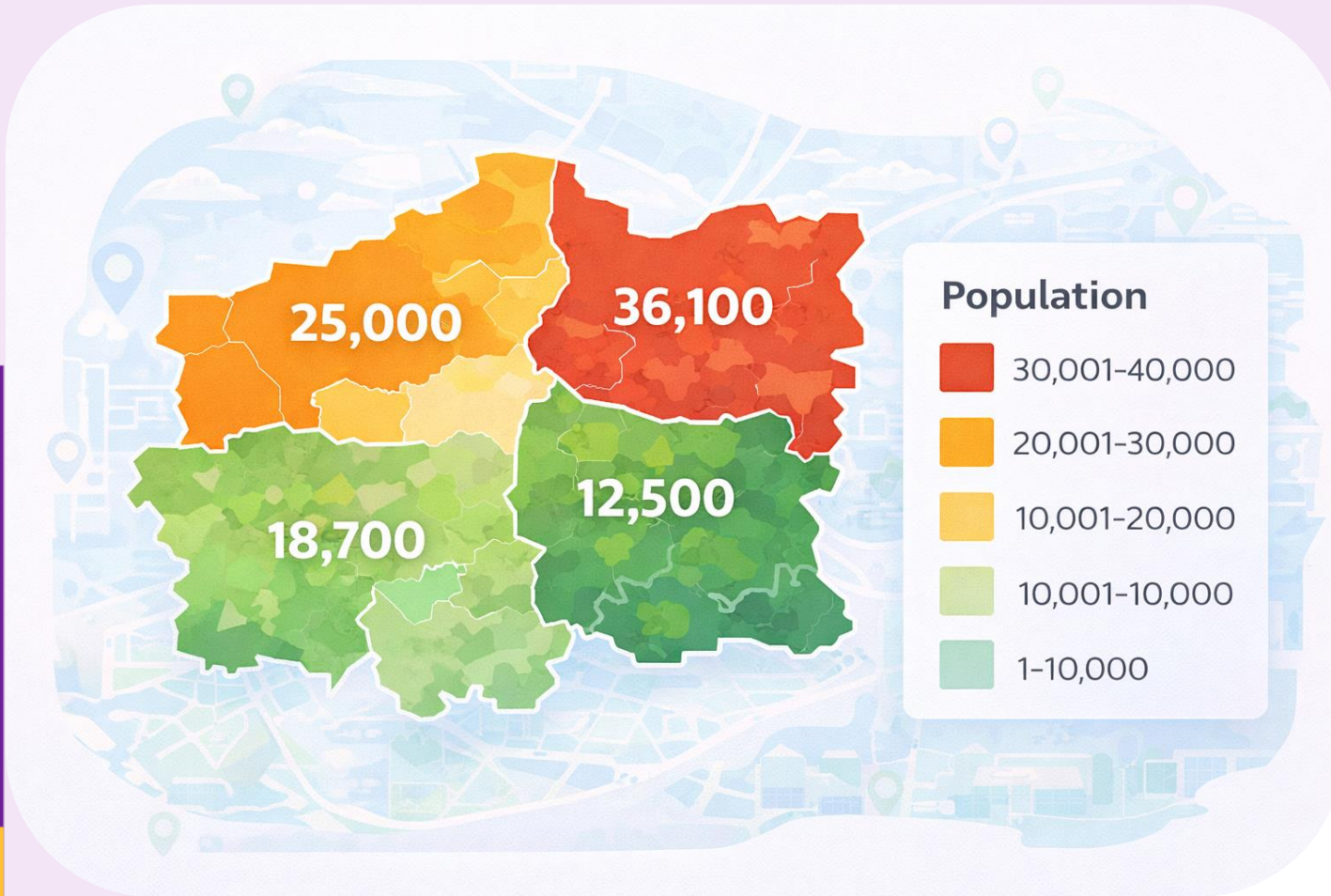
Choose Join Layer

Select Join Field and Target Field

Click Apply



Example of Table Join



District Boundary Layer

Join with Population CSV

Result:

Map with population statistics



Spatial Join

Joins data based on spatial location

Examples:

Rainfall stations → Provinces

Schools → Districts



Join vs Spatial Join

Table Join:

- Uses key field

Spatial Join:

- Uses spatial location



Linking External Data

GIS can connect to:

- CSV
- Excel
- Databases
- Open data portals



Common Join Problems

Field type mismatch

Duplicate key values

Missing records

Extra spaces in text fields



Lab Activity (60 Minutes)

Import district boundary shapefile

Import population CSV

Perform table join

Create choropleth map using joined data



Assessment Criteria

Correct join configuration

Clean key fields

Accurate visualization

Clear explanation of process



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