

GEOGRAPHICAL INFORMATION SYSTEMS

Introduction to GIS

by

Ngahzaifa Ab Ghani, PhD
Faculty of Computer Systems & Software Engineering

zaifa@ump.edu.my



CHAPTER OUTCOMES

- By the end of this chapter, students should be able to:
 - ✓ Explain what GIS is, and why does it matter?
 - ✓ Give examples of GIS applications
 - ✓ Outline the characteristics and components of GIS
 - ✓ Describe how the real world is represented in GIS

CONTENTS

- What is GIS ?
- Questions GIS can answer
- Brief history about GIS
- Main components in GIS

What is GIS?

- GIS → computer-based system that allows us to capture/collect, store, analyse and display geospatial data.
- Spatial data → any data that has direct/indirect reference to a specific location
- Geospatial data → geographically referenced data that describes both location and characteristic of each spatial feature.

Why does GIS matter?

- It provides visual interpretation of events and data
- It helps us to store and organize spatial data effectively
- It helps us make decision based on real fact
- It makes it easier for spatial data to be accessed and viewed

Main components of GIS



DATA



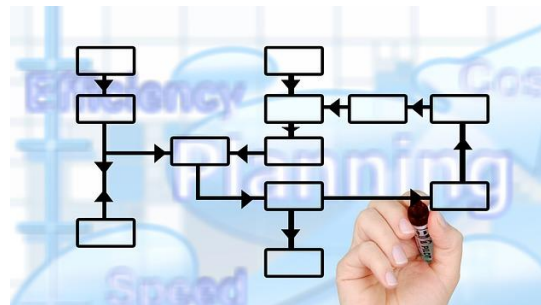
SOFTWARE



HARDWARE



CONNECTIONS



METHODS/PROCEDURES



PEOPLE

Source of pictures: pixabay.com



By Ngahzaifa Ab Ghani

Communitising Technology

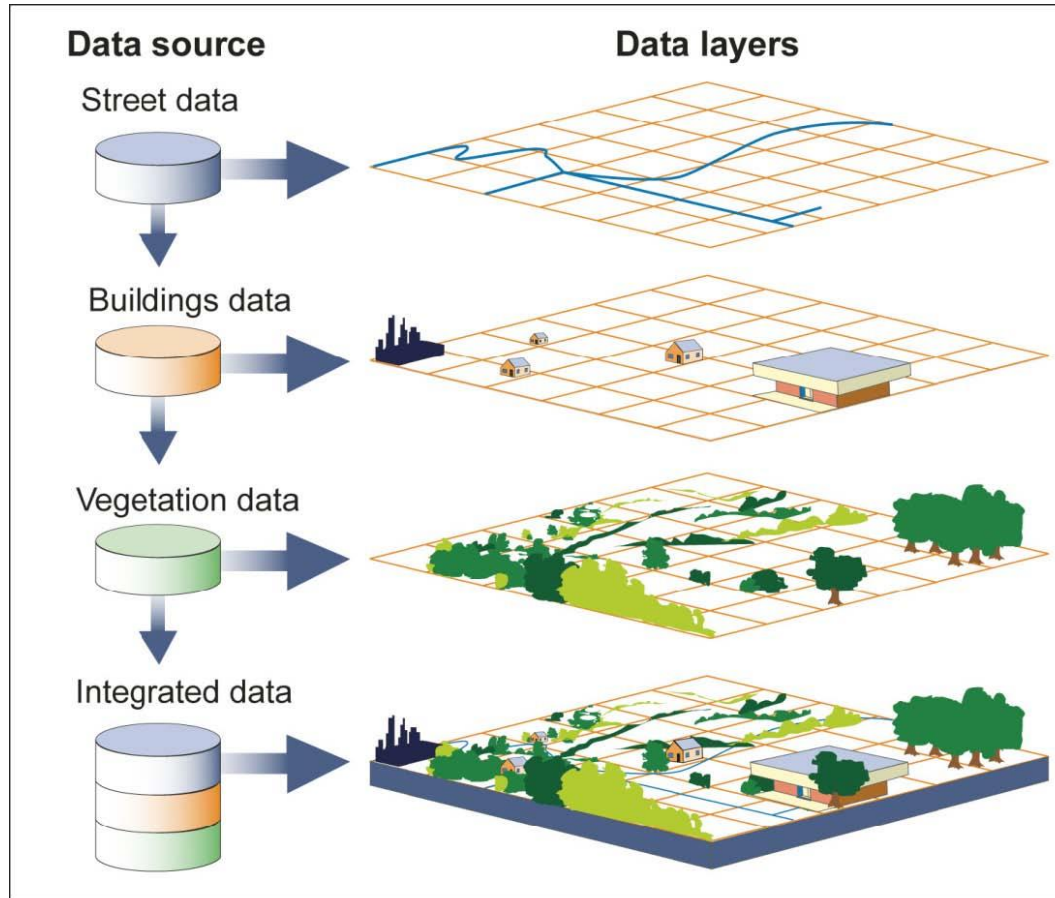
Questions GIS can answer

- Location
 - Where is the nearest public parking space?
- Patterns
 - Where do high concentrations of students live in Kuantan?
- Trends
 - How are patterns of development in a town changing over time?
- Conditions
 - Where can I find a playschool for my kid that is within 5km from my workplace and accessible by public transport?

Examples of Geographical Problems

- **Government:** Where to locate public facilities (e.g schools, hospitals, fire stations, and police stations)?
- **Transportation:** Where to build new road to reduce traffic congestion during peak hour at Place A?
- **Commercial:** Where to build new shops/supermarkets that make most effective services/profits?
- **Travelers:** Where am I and how can I travel from KLIA to Bukit Gambang Resort City?
- **Park management:** Where to locate camping spots that provides the best experience for campers with the minimum impact on the environment?

How real world is represented by GIS



Source: GAO.

Source of picture: <https://commons.wikimedia.org>



By Ngahzaifa Ab Ghani

Examples of GIS applications

Finding direction from KLIA to Mid Valley ...

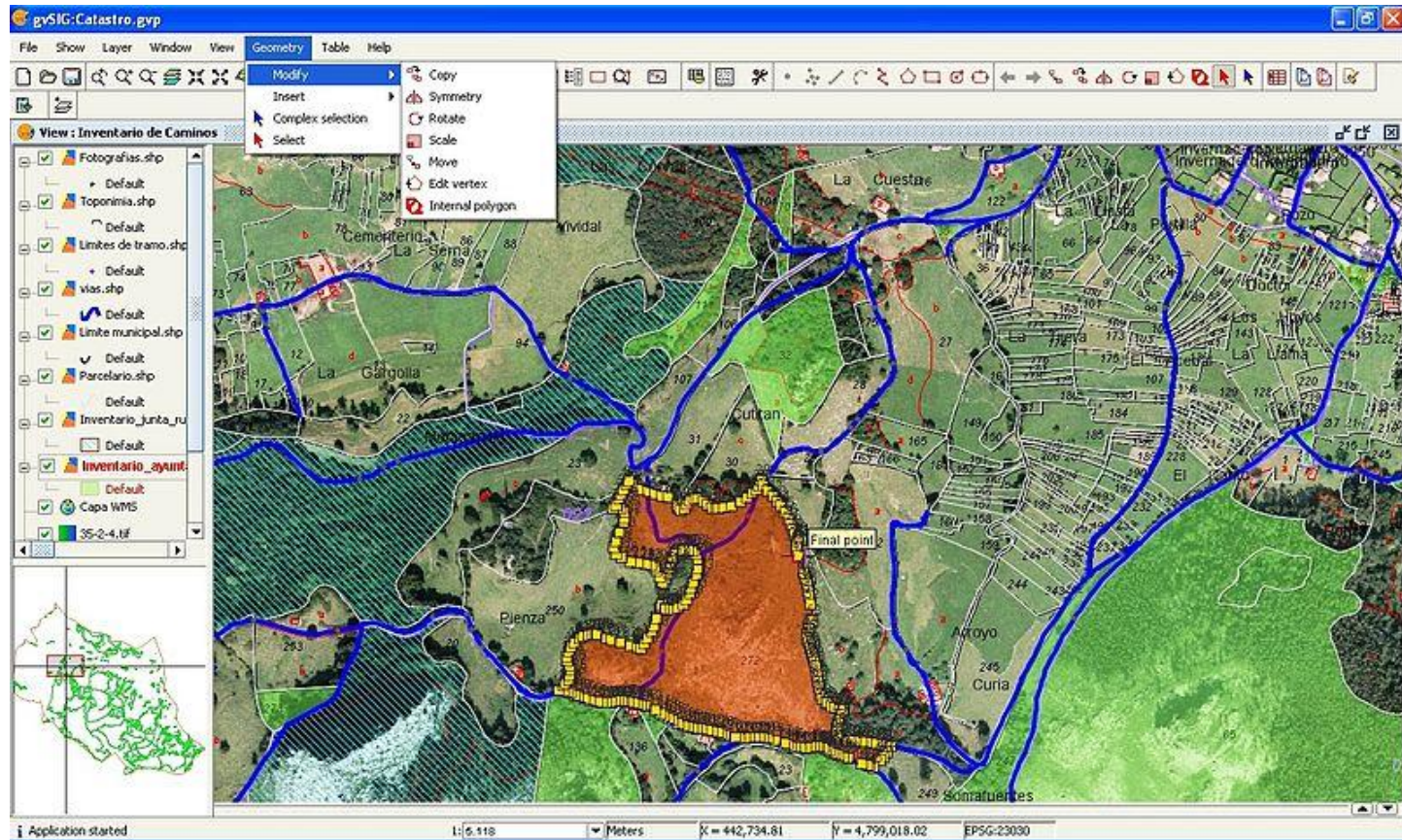
The screenshot shows the Google Maps interface with a search for "Kuala Lumpur International Airport Klia Selangor Malaysia". The destination is set to "Mid Valley City, Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur, Malaysia". The starting point is marked as "Universiti Malaysia". The map displays a blue route starting from the university, heading northwest on "Lingkungan Budi", then turning left onto "Lingkungan Budi", then right onto "Lengkok Pantai Baharu", then right onto "Jalan Pantai Baru", then onto "Lebuhraya Persekutuan", and finally exiting to continue straight.

Driving directions to Mid Valley City, Kuala Lumpur, Wilayah Persekutuan Kuala Lumpur, Malaysia

1. Head northwest toward Lingkungan Budi 180 m
2. Turn left onto Lingkungan Budi 1.4 km
3. Slight right to stay on Lingkungan Budi 750 m
4. Slight right onto Lengkok Pantai Baharu 21 m
5. Turn right toward Jalan Pantai Baru 170 m
6. Continue straight onto Jalan Pantai Baru 280 m
7. Take the ramp onto Lebuhraya Persekutuan 900 m
8. Take the exit 400 m
9. Continue straight

Examples of GIS applications

Boundaries of different areas...



Source of picture: <https://commons.wikimedia.org>



By: Emilio Gómez Fernández



By Nghazifa Ab Ghani

Communitising Technology

Think GIS way...

**What are other
GIS applications
that you could
relate to your
daily life?**



Source of picture: pixabay.com



By Ngahzaifa Ab Ghani

Communitising Technology