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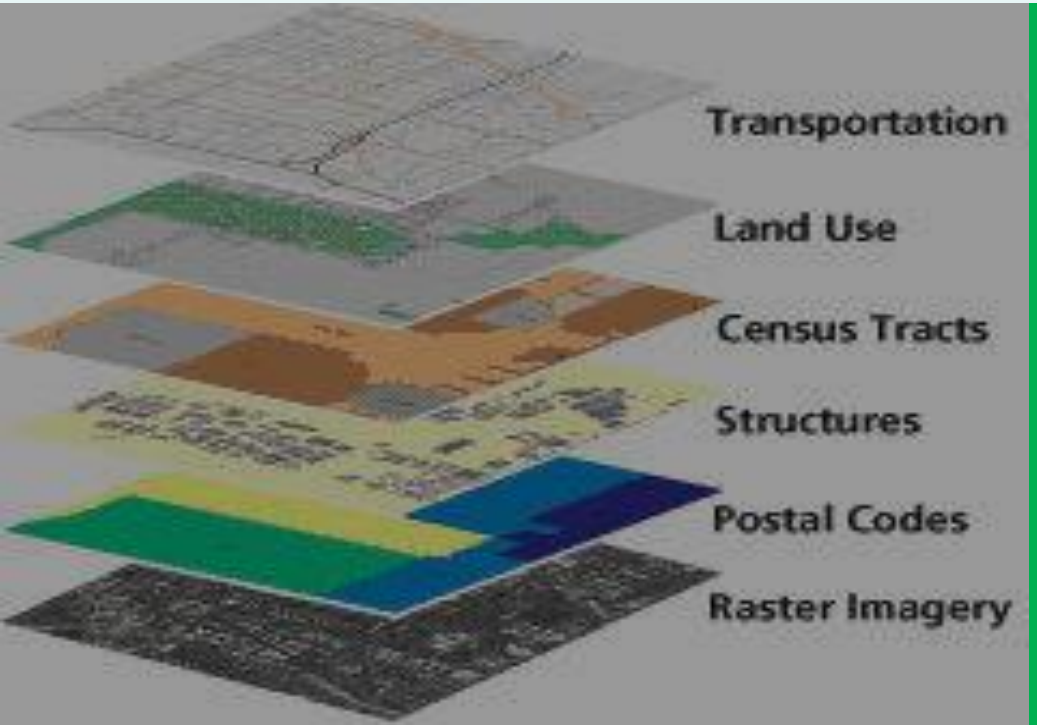


Preparation of Plans - GIS

Targets & Main Objective

- GIS

Overall Objective

Introduce students to new technology of acquiring survey data for plan preparations

Introduction to GIS.

"A geographic information system (GIS) is an information system that is designed to work with data referenced by spatial or geographic coordinates. In other words, a GIS is both a database system with specific capabilities for spatially-reference data, as well [as] a set of operations for working with data . . . In a sense, a GIS may be thought of as a higher-order map."

Jeffrey, S and John, E. (1990) Geographic Information Systems: An Introduction, Englewood Cliffs, NJ: Prentice-Hall, page 2-3:

Introduction to GIS.

A GIS is "an organized collection of computer hardware, software, geographic data, and personnel designed to efficiently capture, store, update, manipulate, analyze, and display all forms of geographically referenced information."

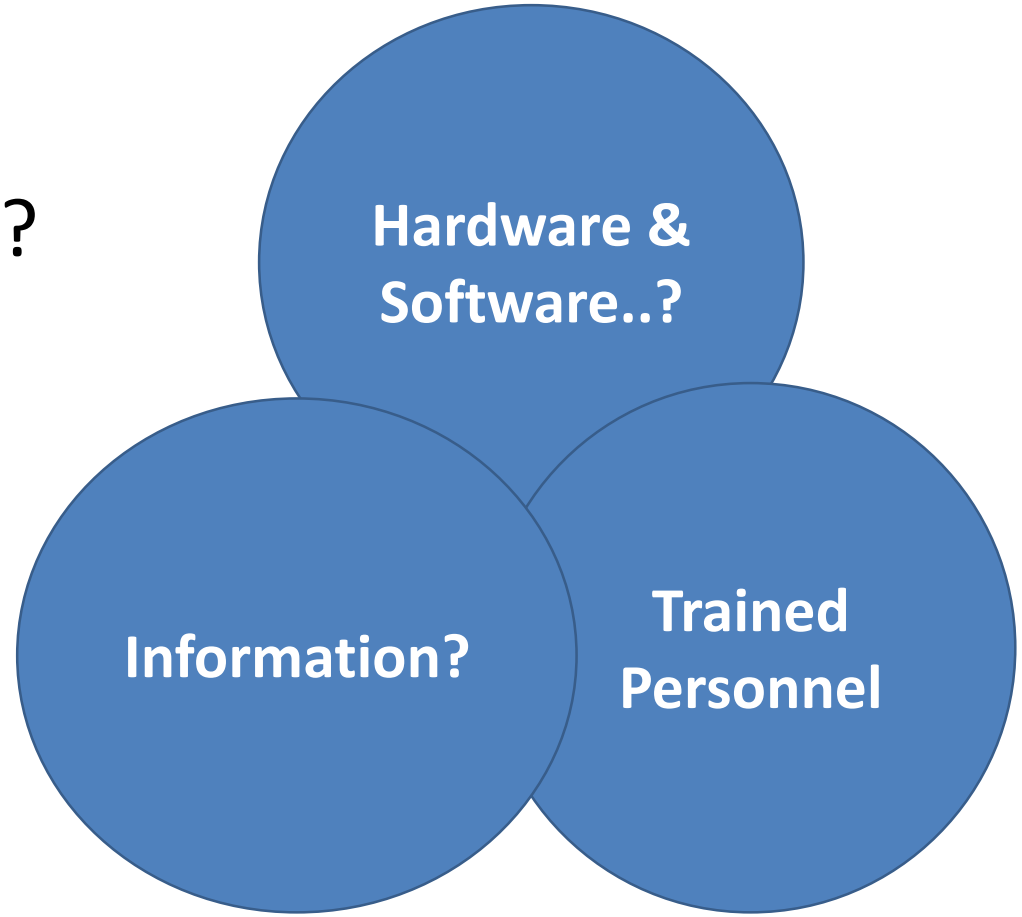
ESRI (1990) Understanding GIS: The ARC/INFO Method Redlands, CA, page 1-2

GIS Elements

Hardware....?

Software...?

Information..?



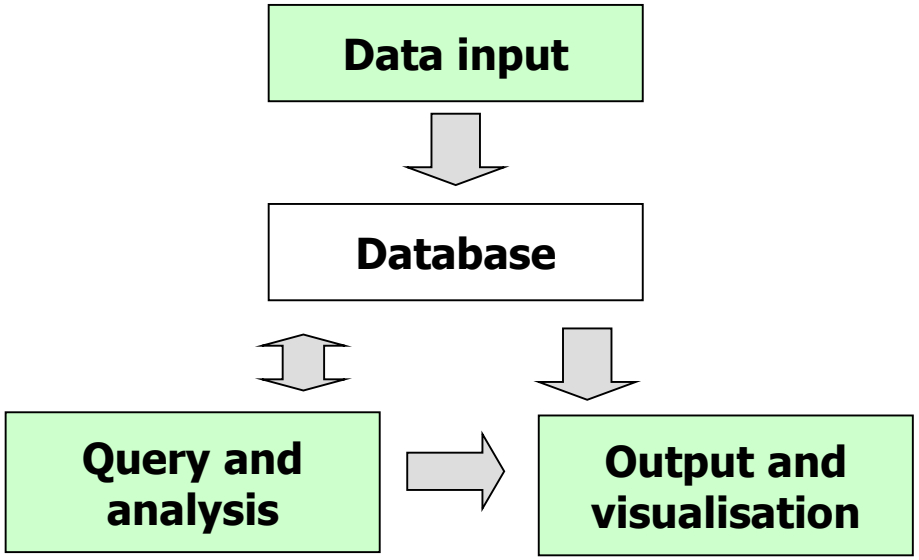
Spatial Data Sources/Input

There are several data sources/methods used for entering spatial data into a GIS, including:

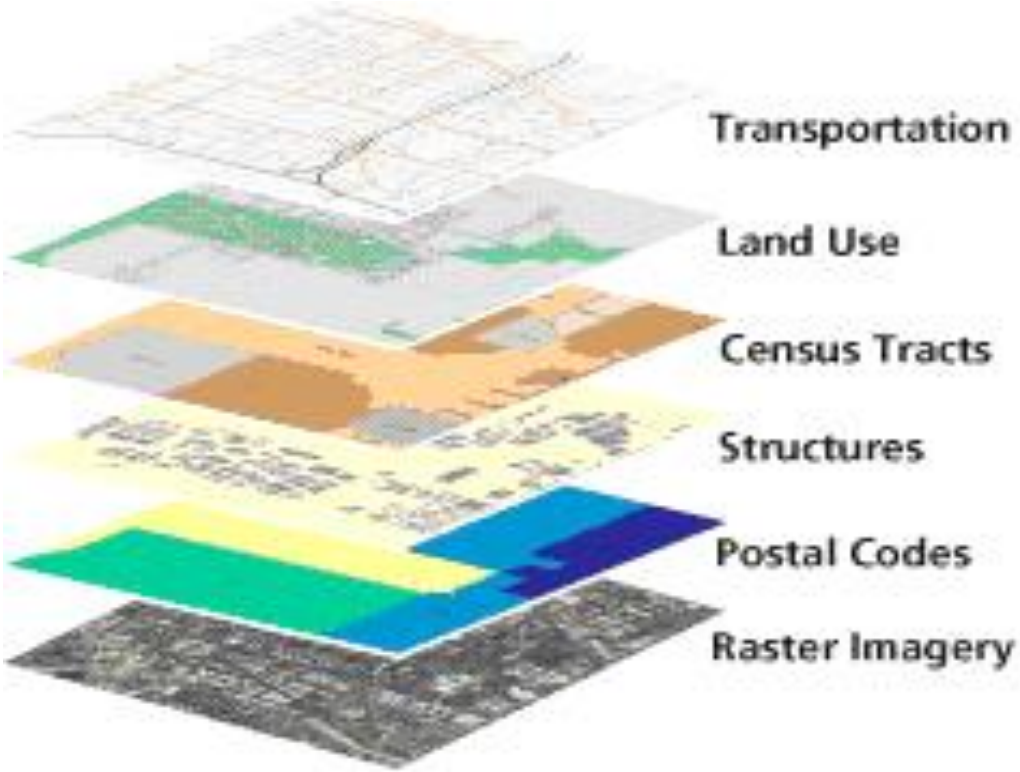
- manual digitizing and scanning of analogue maps
- image data input and conversion to a GIS
- direct data entry including global positioning systems (GPS)
- transfer of data from existing digital sources

Software Architecture & Functionality of a GIS

- GIS in a wider sense consists of
  - software, hardware, data, people and organisation
  - in narrow sense, only of software and hardware
- Hence, GIS consists of modules for spatial data
  - input, storage, analysis, display, and output
  - all modules should exist for system to be called GIS



GIS Thematic Layers & Datasets



- **Data sets can represent the following information:**
  - **Raw measurements (such as satellite imagery)**
  - **Compiled and interpreted information**
  - **Data derived using geoprocessing operations for analysis and modeling**

Presentation & Visualisation

Maps

- ***Map scale***

  Map scale is the relationship existence between distance on a map and the corresponding distance on the earth.

- ***Map projections***

  Map projections are a mathematical model for converting locations on the earth's surface from spherical to planar coordinates, allowing flat maps to depict three-dimensional features.

Presentation & Visualisation

Map detail

- It is natural to equate detail with accuracy. However, when we talk about the level of detail on a map, we are referring to the quantity of geographic information shown. Map accuracy, on the other hand, is a statement of the quality of this information.

Presentation & Visualisation

Map accuracy

- The accuracy of a map is not dependent on the map's scale. Instead, it depends on the accuracy of the original data used to compile the map, how accurately this source data has been transferred onto the map, and the resolution at which the map is printed or displayed.
- The accuracy of the maps you create with ArcView depends primarily on the quality of the coordinate data in your spatial database.

Application/Uses of GIS

GIS enables you to perform several levels of analysis. At its lowest level, GIS enables you to inventory the location of resources on the landscape. At the next level, you can analyze relationships among various features. Modelling is the highest level of analysis. Because GIS provides a spatial reference for the data being evaluated, it is a powerful tool for modelling events and scenarios that have occurred or could occur.

Application/Uses of GIS

The following examples are some of the most common uses of GIS in Mining:

- Inventory of where infrastructure projects, sites of special interest, conservation areas and so on are located
- Identification of what type of resources is located where, along with slope, aspect, elevation, and the presence of water
- Effect of environmental disasters on the landscape, e.g., erosion patterns after a mining, flow of water after dam construction
- Analysis of transportation routes and networks
- Analysis of optimum placement for telephone, data, and power lines
- Modelling "what-if" scenarios for strategic and tactical training, e.g., evacuation routes and plans in case of natural disaster

End!

Questions?