Lecture 2
Principles of Geographical Information Systems I- GEO 362

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Website for – assignments and lecture presentations

- www.franzy.yolasite.com
- Pick up Lecture Notes...

Definitions and Concepts of GIS

- Toolbox Definition
- Database Definition
- Organisation Definition
- Diverse Users of GISs

Toolbox Definition

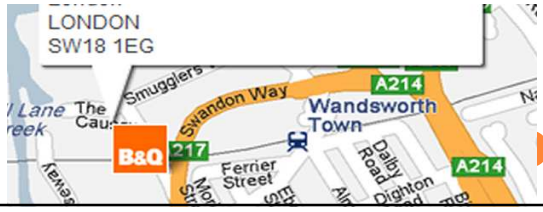
- 'a powerful set of tools for collecting, storing, retrieving at will, transforming and displaying **spatial data** from the real world' (Burrough 1986).

Database definition

- 'a database system in which most of the data are spatially indexed, and upon which a set of procedures operated in order to answer queries about spatial entities in the database' (Smith *et al. 1987*).

Organisational definition of GIS

- 'an automated set of functions that provides professionals with advanced capabilities for the storage, retrieval, manipulation and display of geographically located data' (Ozemoy, Smith, and Sicherman 1981).



COMPONENTS OF GIS

A working GIS integrates five key components: -

- Hardware
- Software
- Data
- People
- Methods

COMPONENTS OF GIS- HARDWARE

- Hardware
  - Monitor
  - Keyboard
  - Important parts as
    - Data Input
    - Visualisation of data
  - Essential that we can see what we put in GI System.

COMPONENTS OF GIS- HARDWARE

- CPU(Central Processing Unit)
  - RAM (2GB)
  - Storage (300GB- 1 TB)
  - Mother Board (Processors) 1.99 GHz
- A good CPU is required for most GIS operations
  - Size of data
  - Geographical data is special
  - Query times

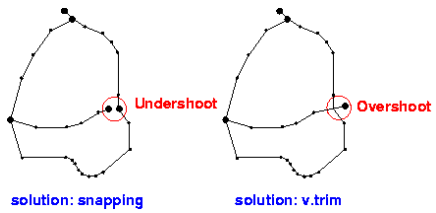
COMPONENTS OF GIS- HARDWARE

- Digitizer
- A digitizer board is a flat board used for vectorisation of any hard copy map.
- Creates a vector data
- i.e. Points, lines and polygons

x,y coordinates.

DIGITISING

- Digitising is the transformation of information from analog format, such as a paper map, to digital format, so that it can be stored and displayed with a computer.
- Point Mode
- Stream Mode
- Onscreen digitising
- Errors- Undershoots and Overshoots



NOTES WHEN DIGITISING

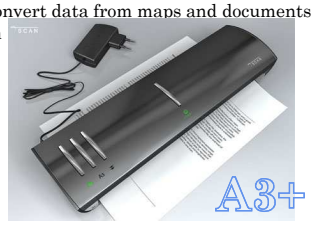
- For what purpose will the data be used?
- What coordinate system will be used for the project
- What is the accuracy of the layers to be associated? If it is significantly different, the layers may not match.
- What is the accuracy of the map being used?
- Each time you digitise, digitise as much as possible. This will make your technique more consistent.
- For more consistency, only one person should work on a given digitising project.

NOTES WHEN DIGITISING

- If the source consists of multiple maps, select common reference points that coincide on all connecting sheets.
- Failure to do this could result in digitised data from different data sheets not matching.
- If possible, include attributes while digitising, as this will save time later.
- Will it be merged with a larger database?

COMPONENTS OF GIS- HARDWARE

- scanner - convert data from maps and documents into digital form



- and other device for retrieving spatial data

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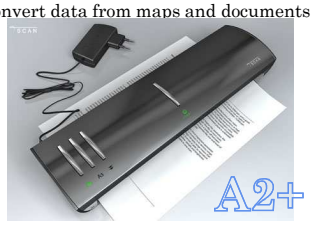

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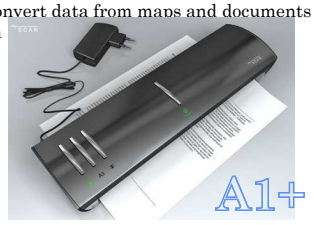

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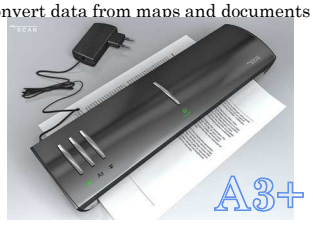


- and other device for retrieving spatial data

COMPONENTS OF GIS- HARDWARE

- scanner - convert data from maps and documents into digital form
- Raster format made of..
- Picture elements
- Or pixels

- and other device for retrieving spatial data

COMPONENTS OF GIS- HARDWARE

- A plotter is a printer that prints on larger formats of paper or other print material. E.g. A0(1189 x 841 mm), A1(841 x 594 mm)

COMPONENTS OF GIS- SOFTWARE

- GIS software includes the programs and the user interface for driving the hardware
- software is essential to
  - Generate
  - Store
  - Analyze
  - manipulate and
  - display geographic information

COMPONENTS OF GIS- SOFTWARE

- Good GIS software
  - user friendly,
  - functionalities,
  - compatible,
  - updatability,
  - documentation,
  - cost-effective
- ArcGIS, MapInfo,

DATA

- Data is the most important component of a GIS
- *why?*
- Geographic data and related tabular data can be collected in house
- Compiled to custom specifications
- or purchased from a commercial data provider

DATA ATTRIBUTES CAUSE DATA RELATES HAS CERTAIN PROPERTIES DEPENDING ON WHAT IS BEING MEASURED

DATA

- The different types of data attributes are:
- Nominal -identify or distinguish one entity from another.
  - Example Place names, street names
  - makes no sense to apply arithmetic operations to them
- Ordinal
  - Data that can be put in classes
  - Example soil classes

DATA

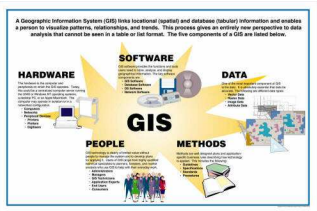
- Interval and Ratio
  - Temperature is interval
  - Weight is ratio
- Try
- Stock exchange- GSE, LSE 100 or Hang Seng……?
- What are typical values? Stock indices -0.24 pt, 1.01 pt etc
- No absolute value, Not nominal not ordinal……

PEOPLE

- GIS users range from technical specialists,
- who design and maintain the system,
- to those who use it to help them perform their everyday work.

PEOPLE

- GIS technology has limited value without the people who make and use it(so called brain ware).
- People who work with GIS-Prime business asset



METHODS

- A successful GIS operates according to a well designed implementation plan and business rules, which are the models and operating practices unique to each organization.
- KFC- Franchise was more about acquiring real estate than burgers!

Questions