



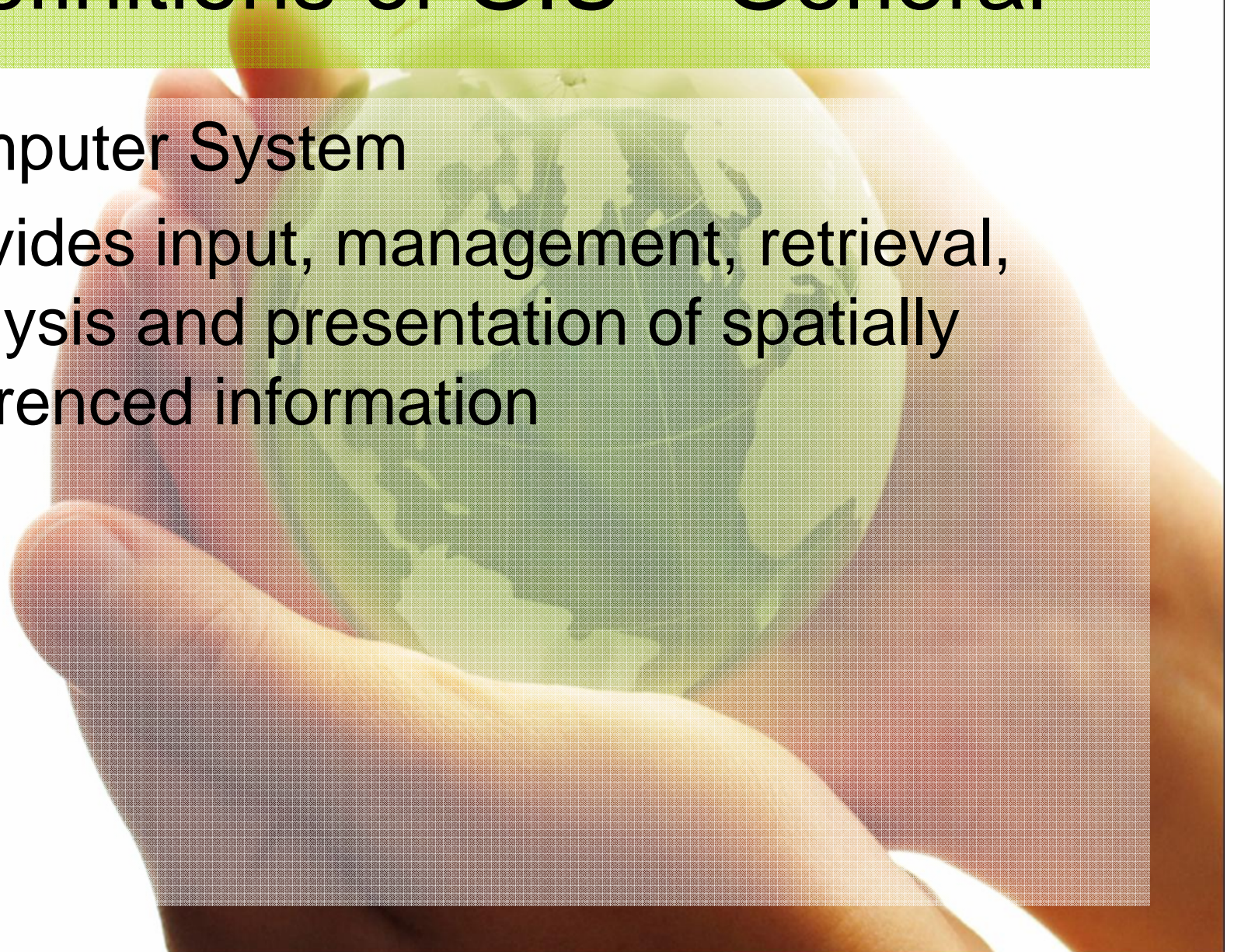
# Geographical Information Systems – Week1

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# Definitions of GIS – General

- Computer System
- Provides input, management, retrieval, analysis and presentation of spatially referenced information



# Definitions of GIS

- “A powerful set of tools for the collection, storing, retrieving at will, transforming and displaying of spatial data from the real world and for a particular set of purposes.”  
(Peter A. Burroughs)
- “A GIS is an Information System that is designed to work with data referenced by spatial or geographic coordinates.”  
(Jack Estes and Jeff Star)

# Geographic Information Science

- GISc is a new interdisciplinary field built out of the use and theory of GIS
- Includes fields on study like Digital Cartography, Remote Sensing, Geomatics etc.
- Geomatics – the discipline of gathering, storing, processing and delivering of geographic information

# Assignment #1 – Disciplines Using GIS

**Team up with a neighbour ([www.esri.com](http://www.esri.com))**

(Assignment #1)



- Count the number of disciplines that use GIS
- Which disciplines relate directly with urban planning and landscape architecture?
- Identify the disciplines that relate to the planning of landscapes
- Save your answers in a word document and drop it in the FOL drop box (include your names, date, and title)

# Components of a GIS

## Computer Hardware

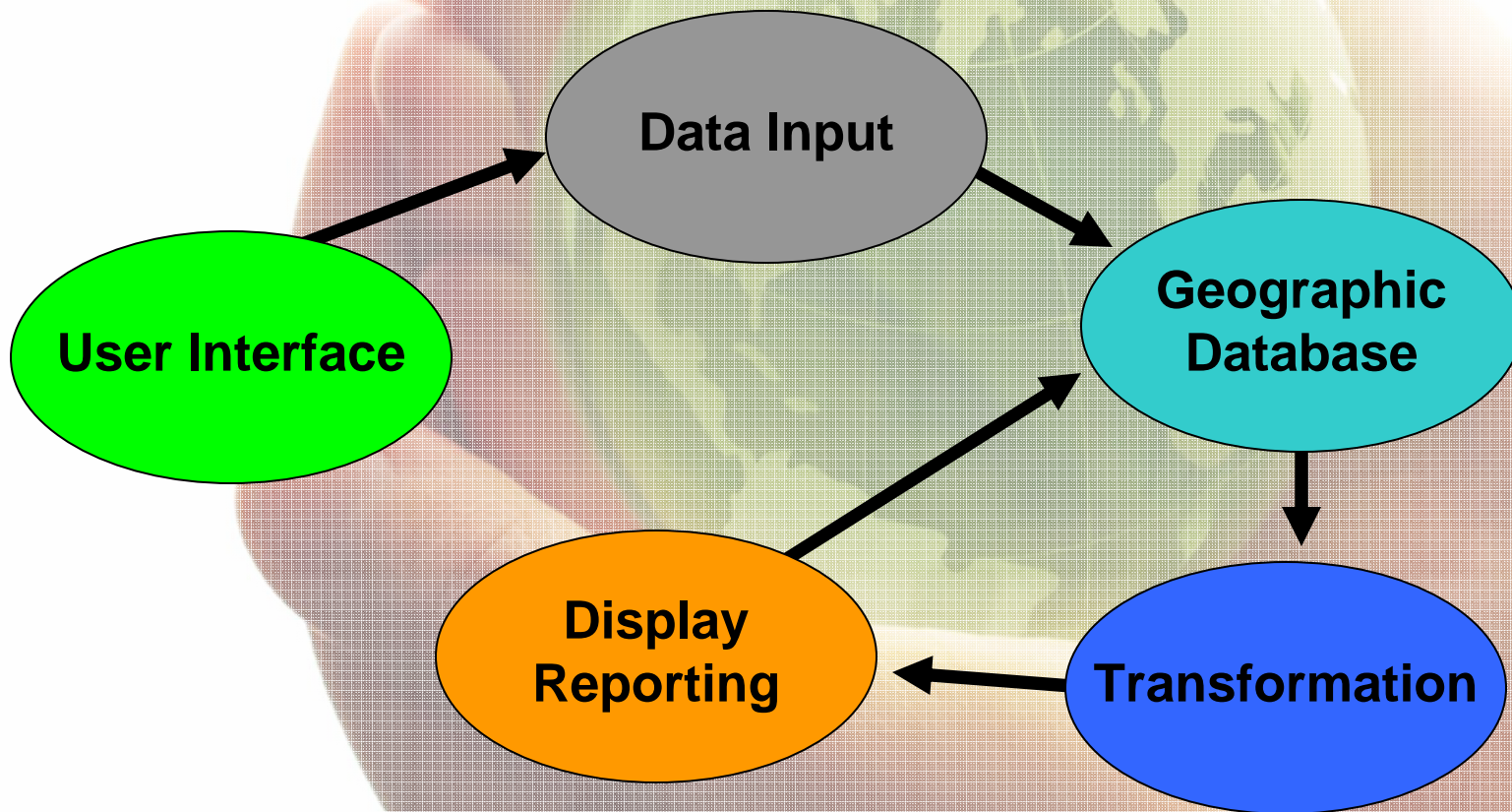
- ***Input*** - keyboard, mouse, scanner digitizer
- ***Output*** - monitor, printer, plotter
- ***Storage*** - hard drive, dvd-rom, network

# Components of a GIS

## Computer Software

- Refers to programs and instructions that make the machine do something
- ***Operating Systems*** – Windows, Linux, Unix, Mac OS
- ***Software Programs***– ArcGIS, Manifold, AutoCAD Map, MapInfo, GRASS

# Components of a GIS





# Components of a GIS

## Data

- ***Geospatial Data***

- Vector: Points, Lines, Polygons
- Raster: Imagery, Cell-based maps

- ***Tabular***

- Relational Database Management System (RDBMS)

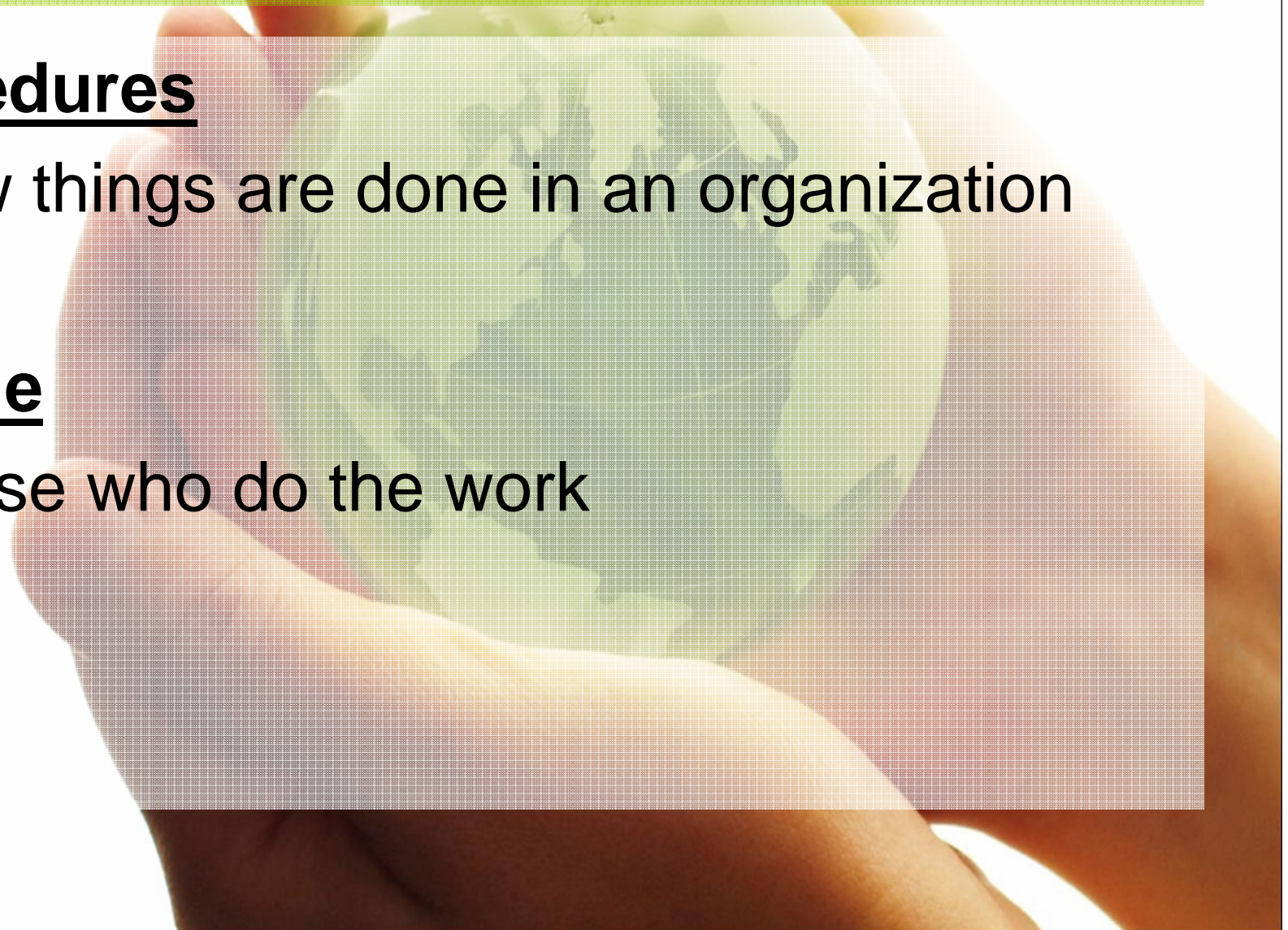
# Components of a GIS

## Procedures

- How things are done in an organization

## People

- Those who do the work



# Components of a GIS

A Geographic Information System (GIS) links locational (spatial) and database (tabular) information and enables a person to visualize patterns, relationships, and trends. This process gives an entirely new perspective to data analysis that cannot be seen in a table or list format. The five components of a GIS are listed below.

## HARDWARE

The hardware is the computer and peripherals on which the GIS operates. Today, this could be a centralized computer server running the UNIX or Windows NT operating systems, a desktop PC, or an Apple Macintosh. The computer may operate in isolation or in a networked configuration.

- Computers
- Networks
- Peripheral Devices
  - Printers
  - Plotters
  - Digitizers



## SOFTWARE

GIS software provides the functions and tools users need to store, analyze, and display geographical information. The key software components are

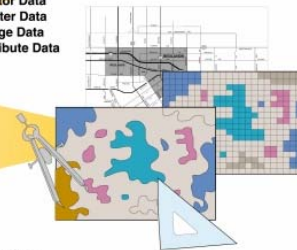
- GIS Software
- Database Software
- OS Software
- Network Software



## DATA

One of the most important component of GIS is the data. It is absolutely essential that data be accurate. The following are different data types:

- Vector Data
- Raster Data
- Image Data
- Attribute Data



# GIS

## PEOPLE

GIS technology is clearly of limited value without people to manage the system and to develop plans for applying it. Users of GIS range from highly qualified technical specialists to planners, foresters, and market analysts who use GIS to help with their everyday work.

- Administrators
- Managers
- GIS Technicians
- Application Experts
- End Users
- Consumers



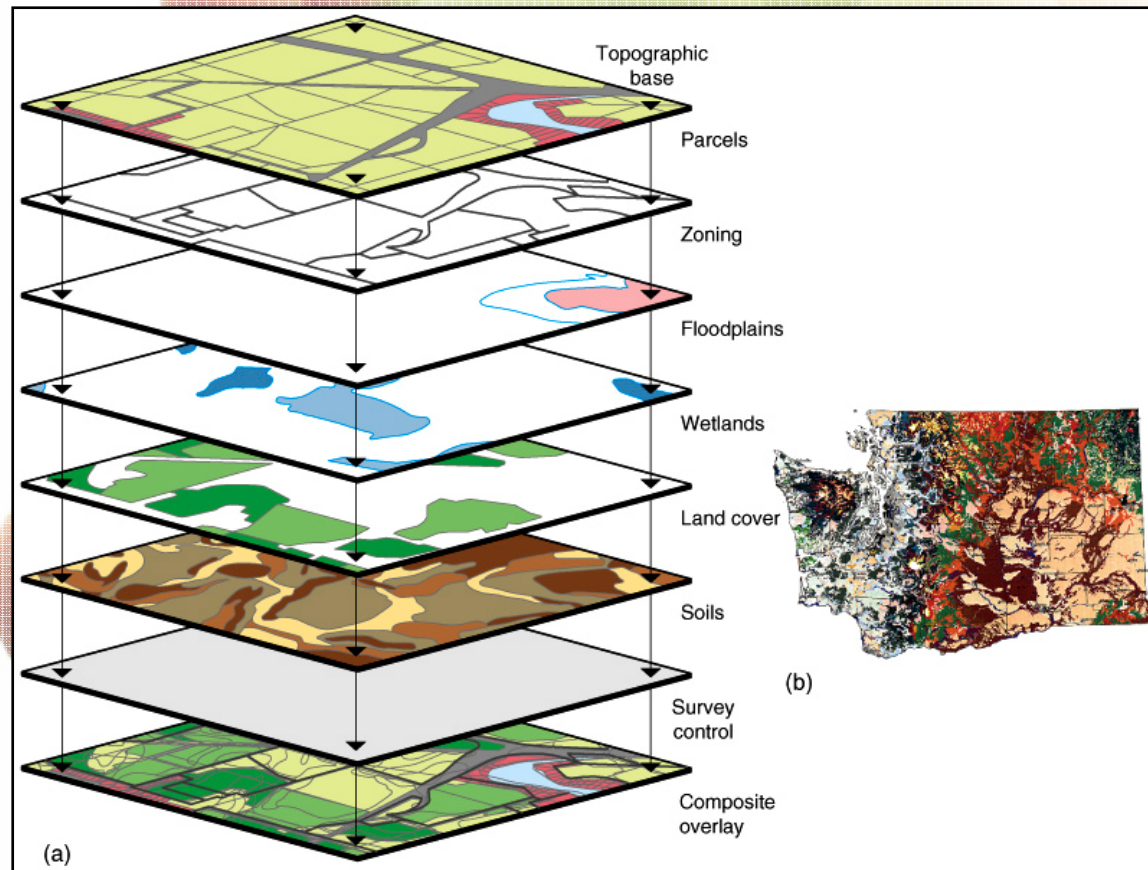
## METHODS

Methods are well designed plans and application-specific business rules describing how technology is applied. This includes the following:

- Guidelines
- Specifications
- Standards
- Procedures



# Components of a GIS



# History of GIS

## Cartography is Very Old

- Mesopotamia – 5000 year old maps on clay tablets
- 3000 years ago first topographic maps from Hu-nan Province, China

## GIS Originates from Thematic Cartography

# History of GIS

## Thematic Maps

- Contain information about a specific subject of a them
- Examples: land use, soils, political units, street types
- Many Planners and Landscape Architects used a method of map overlay using manual techniques (Ian McHarq's "Design with Nature", 1969)

# Solution Mask

## Overlaid Layers

- 4 maps or layers of unsuitable areas were overlaid
- Any areas not covered were deemed suitable
- Areas blacked out with one to four layers were unsuitable

# Computer Cartography

- Came about in the 1960's
- Simply a method to input, output and annotate (note features using text)
- No analysis at this point
- Canadian Geographic Information System (CGIS) was the 1<sup>st</sup> GIS for Land Information (Dr. Rogers Tomlinson 1964)



# GIS Progressing

- Odyssey GIS 1<sup>st</sup> with arc-node data structure
- Many GIS software companies vying for market share – 1980's. Most GIS systems were on UNIX workstations
- Lower cost powerful PC's brought GIS to desktops

# GIS – Past 10 years and Now

- User Interface development improves ease-of-use
- Cost of software declines
- Power of PC and network technology accelerates
- Advent of Internet GIS
- Over 1 million licensed users
- 6.9 Billion \$ in annual software and services