

**week 1**

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**COURSE INTRODUCTION  
&  
COURSE OVERVIEW**

# topics of the week

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- ❑ **Instructor introduction**
- ❑ **Students' introductions**
- ❑ **Course logistics**
- ❑ **Course objectives**
- ❑ **Definition of GIS**
- ❑ **The story of GIS**

# introductions

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- ❑ **Who am I?**
- ❑ **Who are you? What dept/year?**
- ❑ **Why are you here?**
- ❑ **What do you expect from this class?**
- ❑ **Your computer/GIS experience?**
- ❑ **Do you have any questions?**

# Course logistics

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- **Weekly schedule**
  - **Monday 3rd & 4th period – Lectures and Demos, Quizzes**
    - Matherly Hall, 0016
  - **Wednesday 4<sup>th</sup> period – Exercises and Homework review**
    - Matherly Hall, 0016
- **Course website** <http://plaza.ufl.edu/juna/urp4273>
- **Course Syllabus** <http://plaza.ufl.edu/juna/urp4273/syllabus.html>

# video clips - GIS

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- ❑ [Geospatial Revolution – 5 min](#)
- ❑ [Interactive City - 6 min](#)
- ❑ [Happy Maps – 7 min](#)
- ❑ [AYFEED Project](#)

# Course objectives

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- ❑ **Ensure understanding of fundamental principles of Geographic Information Systems (GIS)**
- ❑ **Ensure understanding of Spatial Data analysis techniques and concepts**
- ❑ **Get up to speed with ESRI product ArcGIS 10\* (ArcView, ArcEditor, ArcInfo)**
- ❑ **Apply GIS to solve a community problem in an independent group project**

# Definition of GIS

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- ❑ **A computer system, capable of storing and using data that describe places on the earth's surface.**
- ❑ **A computerized system for the collection, storage, manipulation, analysis, and output of information that is spatially referenced. What sets it apart from all other types of information systems is its reliance on spatial referencing as the organizing framework and its ability to perform geographic analysis.**

# Other definitions of GIS

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## **Toolbox-based definition**

‘an information technology which stores, analyses, and displays both spatial and non-spatial data (Parker, ’88)

## **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)

## **Organization-based definition**

‘an institutional entity, reflecting an organizational structure that integrates technology with a database, expertise and continuing financial support over time’ (Carter, 1989)

‘a decision support system involving the integration of spatially referenced data in a problem solving environment’ (Cowen, 1988)



# from data to products - formats

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- ❑ What are Information Systems?
- ❑ Information Systems and GIS
- ❑ Why GIS?

# from data – to products

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- ❑ What is Data?
- ❑ What is Information?
- ❑ What is Evidence?
- ❑ What is Knowledge?
- ❑ What are Products?

# video clips – data to information

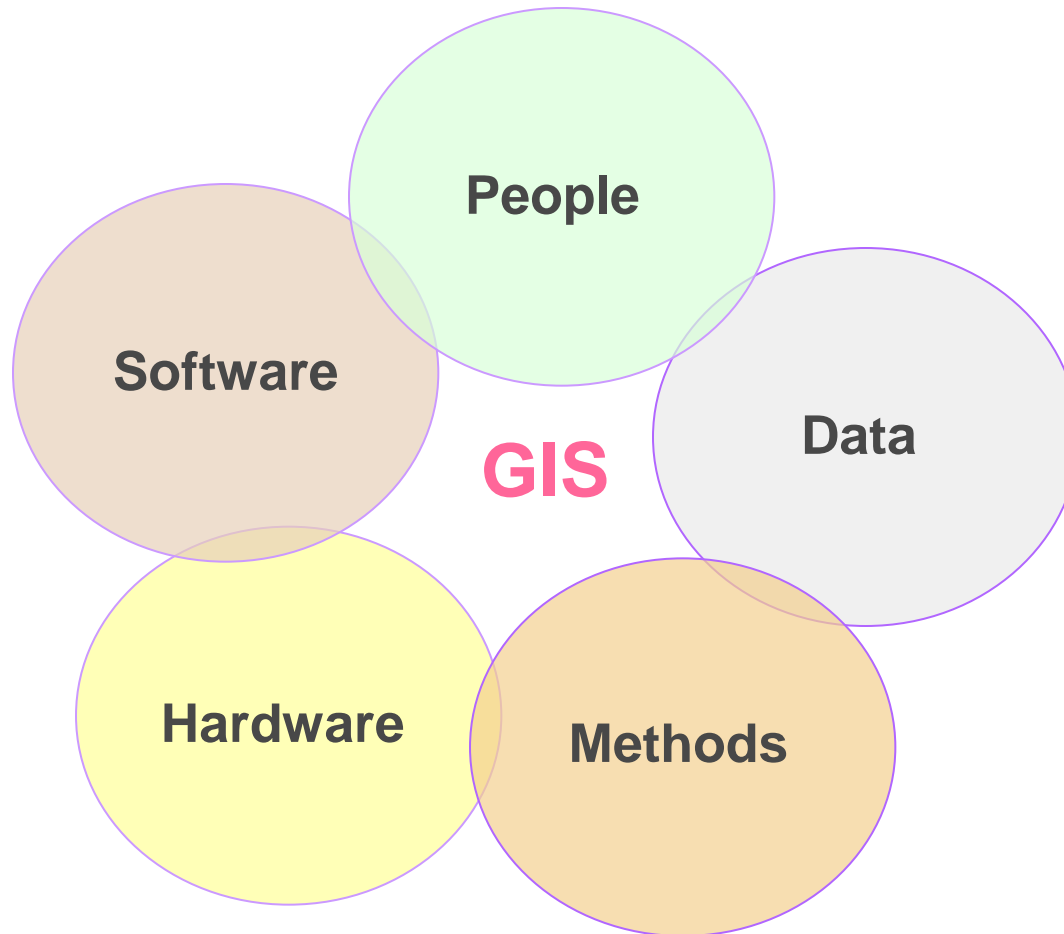
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- ❑ Data Visualization – 9 min
- ❑ Facebook Data – 5 min
- ❑ Geodesign – 5 min (7:28 – 12:28)

# Components of GIS

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**GIS is an integration of five components**



# Hardware

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

# Software

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- ❑ **GIS Software**
- ❑ **Database Software**
- ❑ **OS Software**
- ❑ **Network Software**

# Data

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- ❑ **Vector Data**
- ❑ **Raster Data**
- ❑ **Image Data**
- ❑ **Attribute Data**

# People

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- ❑ **GIS Professionals**

- ❑ Managers, Coordinators
- ❑ Database and Applications Developers
- ❑ Technicians and Cartographers

- ❑ **Non GIS Professionals**

- ❑ Executives, decision makers of all levels
- ❑ End users, professionals
- ❑ General consumers, society

- ❑ **Other – GIS and Non GIS Professionals**

- ❑ Scientists, researchers



# Methods

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- ❑ **Guidelines**
- ❑ **Specifications**
- ❑ **Standards**
- ❑ **Procedures, protocols**
- ❑ **Policies** (legal, ethical, technical, etc)

[BBC Horizon 2014 – 2015 Documentary – Inside the Dark Web](#)  
(10:15 – 12:45)

# But why GIS?

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- ❑ **Solves problems for better decisions**
- ❑ **Answers questions** What? Where? Why? What If?
- ❑ **Finds patterns and trends**
- ❑ **Shows content and context**
- ❑ **Measures and integrates parts, sees the whole**
- ❑ **It is a visual language**

# Questions a GIS can answer

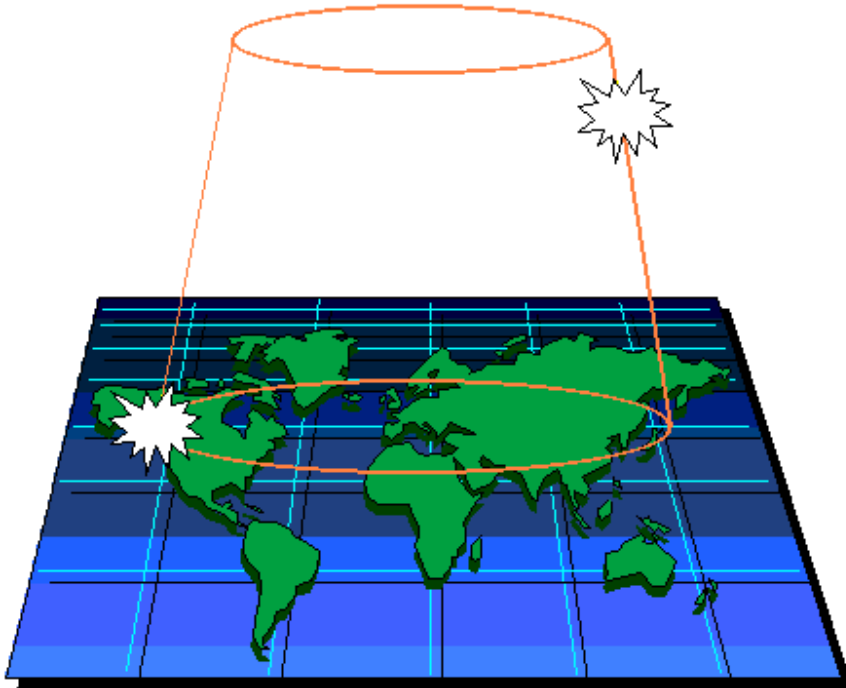
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- **Location:** “*What is at?*”
- **Condition:** “*Where is it?*”
- **Trends:** “*What has happened since?*”
- **Patterns:** “*What spatial patterns exist?*”
- **Modeling:** “*What if?*”

# Content and Context

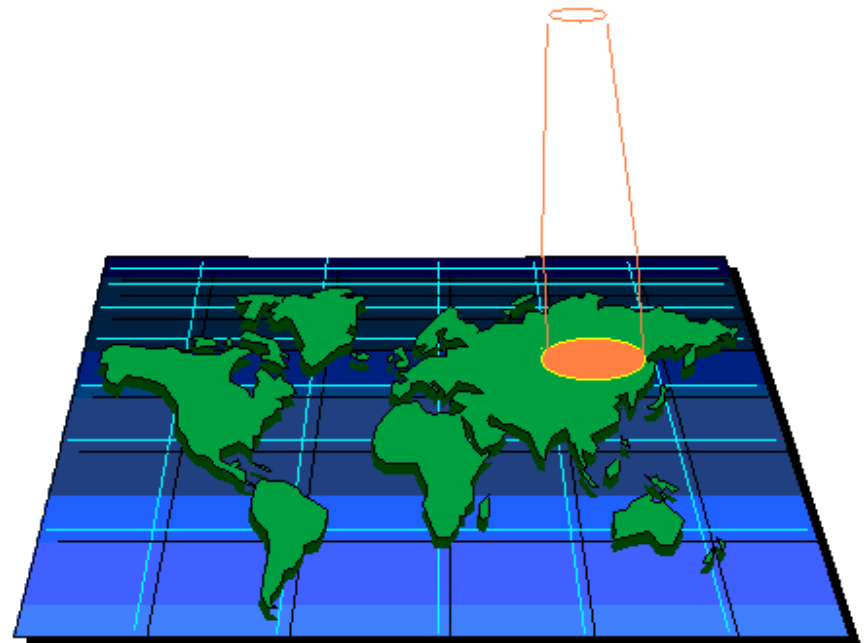
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Seeing the Whole - Context



Patterns  
Linkages  
Trends

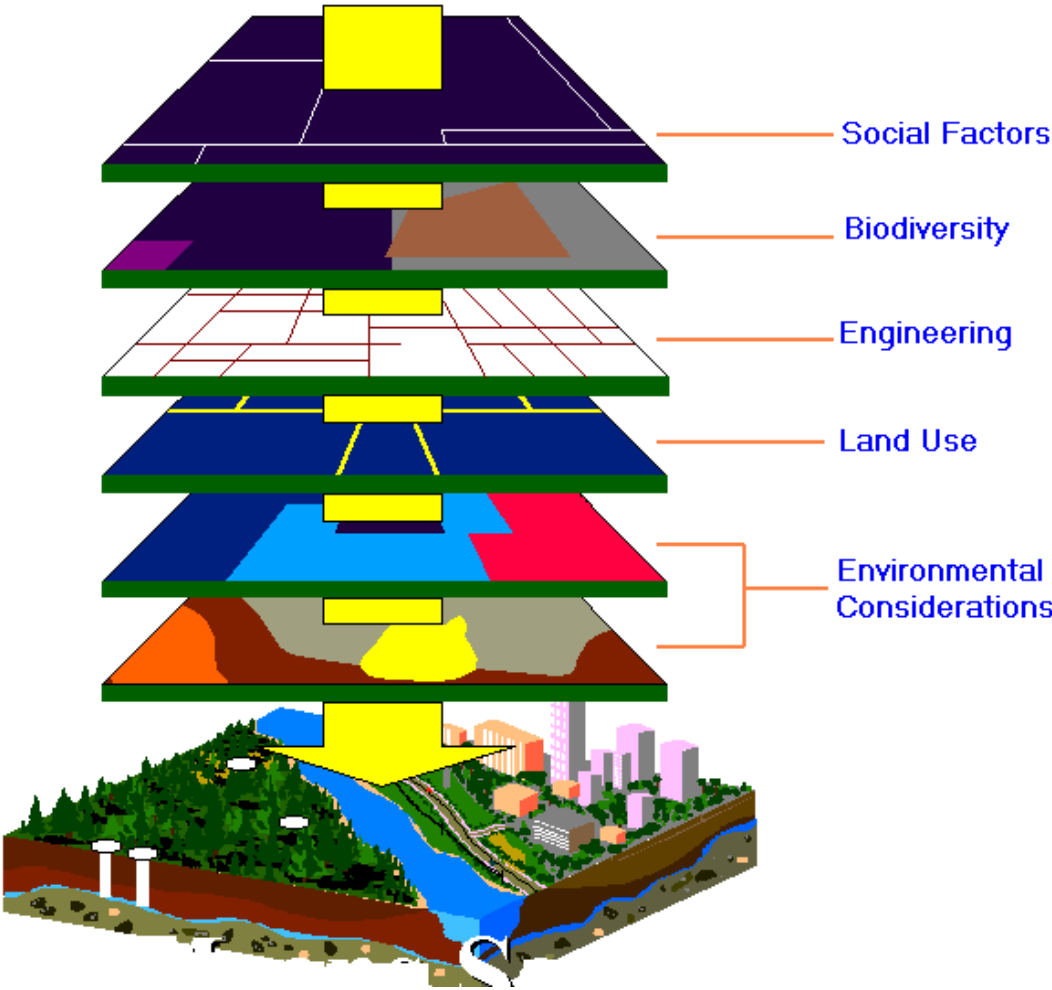
Managing Places - Content



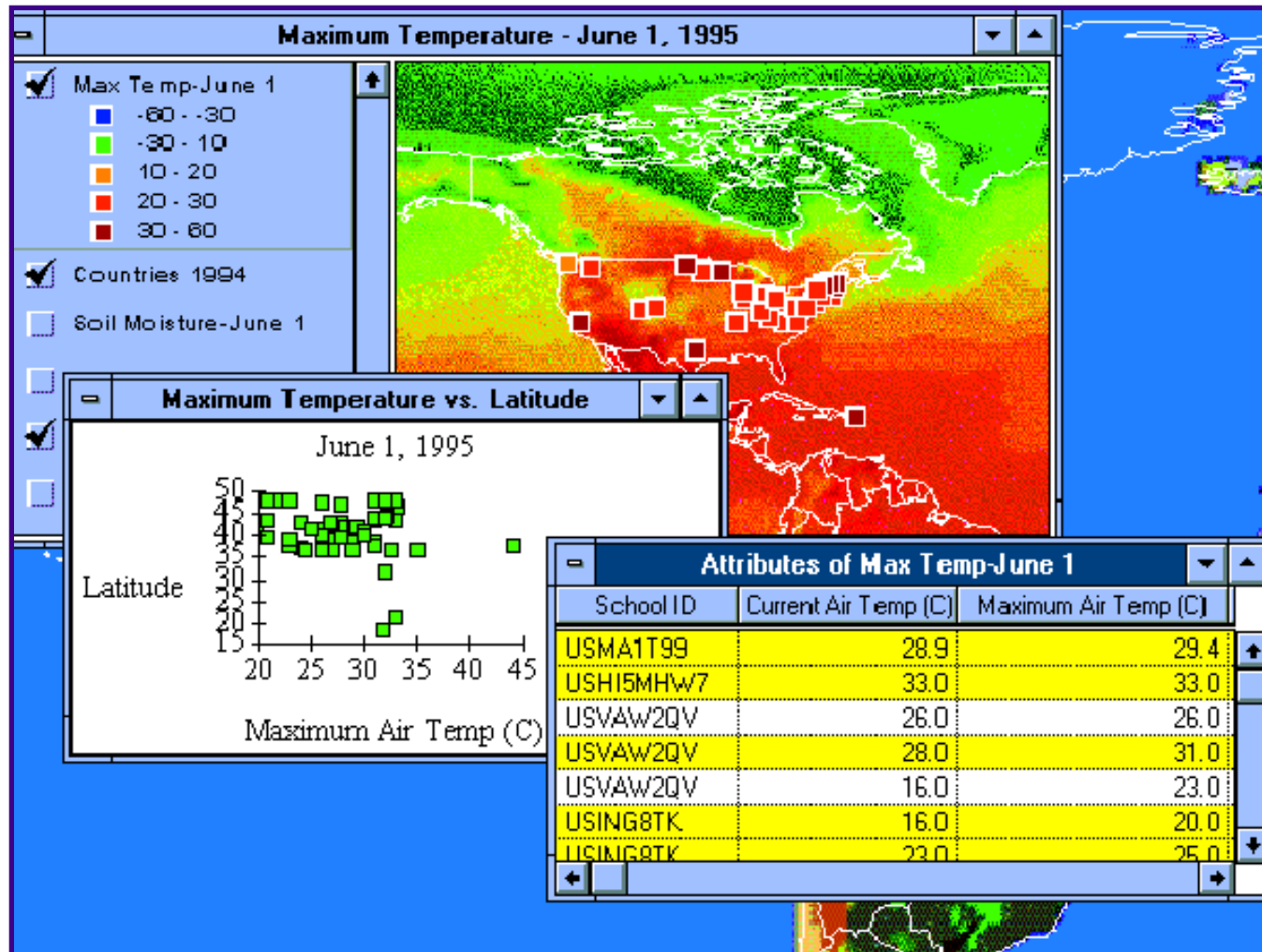
Watersheds  
Communities  
Neighborhoods  
Ecosystems

# Integrates Parts

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# Visual Language



# The story of GIS

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- ❑ **Prehistory of GIS**
- ❑ **Genesis of GIS**
- ❑ **Chronology of its evolution**
- ❑ **Fields of application**
- ❑ **A global snapshot into GIS**

# Prehistory of GIS

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## Ancient GIS

- 11<sup>th</sup> century, Angkor Wat temple, Khmer Empire, NW Cambodia

## Modern GIS – 20<sup>th</sup> century

- 1912 Manning - MA, Düsseldorf – Germany
- 1960 Dr. Roger Tomlinson – Canada – CGIS – first industry scale computer based GIS – GIS term coined
- 1965 – Harvard Laboratory for Computer Graphics and Spatial Analysis
- 1969 Ian McHarg's overlay techniques
- 1975 – Jack Dangermond – FAO, UNESCO, ISSC



# Genesis of GIS – its existential reason

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## **Born from a conjunction of conditions:**

- ❑ **Not from Academic Inquiry**
- ❑ **From Growing Societal Need for Geographic Information**
- ❑ **From Advancements in Technology**
- ❑ **From Support from private sector vision**
- ❑ **From Support from Government foresight**

# Chronology of its evolution

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## ❑ GIS Eras

- ❑ 1960s – Pioneer Age
- ❑ 1970s – Research & Development Age
- ❑ 1980s – Implementation & Vendor Age
- ❑ 1990s – Client Applications Age
- ❑ 2000s – Local & Global Network Age

## ❑ Eras of Influence

- ❑ 1960s – Space & Information Age
- ❑ 1960s-1970s – Environmental Age
- ❑ 1980s – Environmental Regulation Age
- ❑ 1990s-2000s – Global Age

# Areas of application

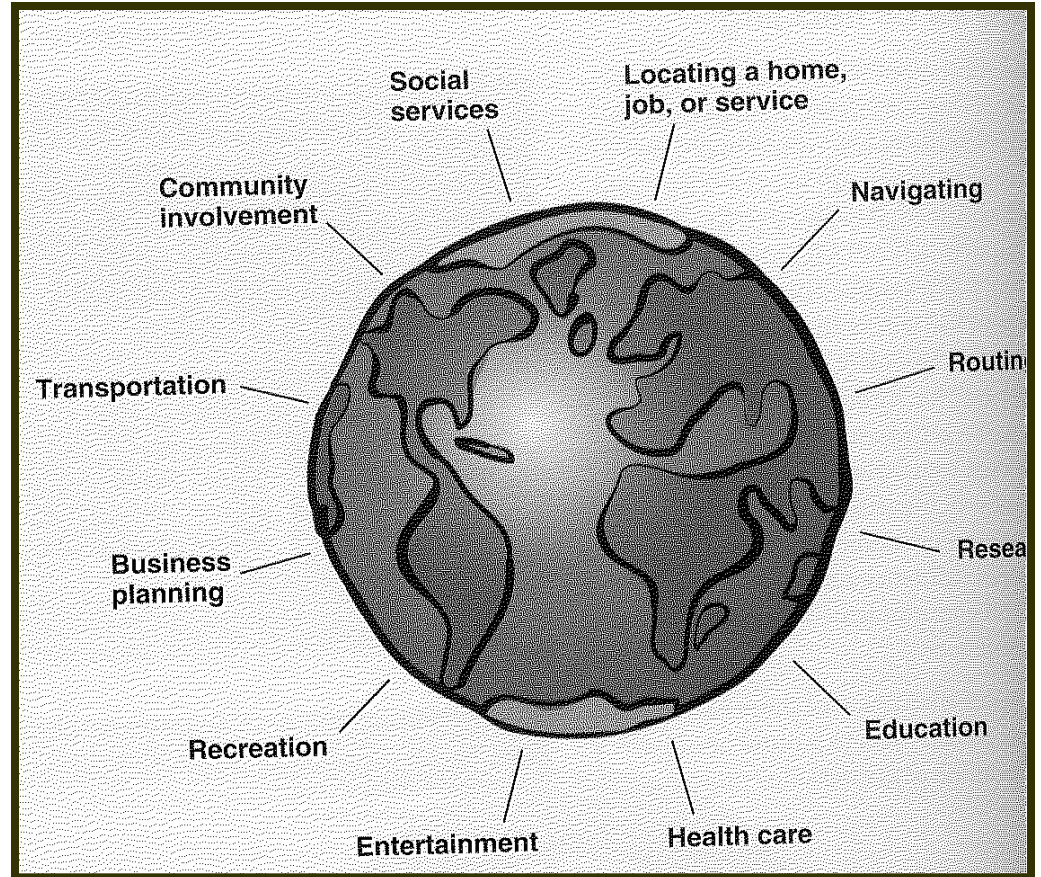
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- ❑ **Government**
  - ❑ Taxation, Census, Planning, Libraries, Banking
- ❑ **Environmental/Natural Resources**
  - ❑ Agriculture, Wildlife, Water, Air, Lands, Oil, Geology, etc.
- ❑ **Cultural Resources**
  - ❑ Historic Preservation, Archaeology
- ❑ **Infrastructure**
  - ❑ Transportation, Engineering networks
- ❑ **Human Services**
  - ❑ Health, Social Services, Education, Employment
- ❑ **Other**
  - ❑ Economic Development, Emergency Management, etc.

# GIS in everyday life

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- ❑ GIS and the Internet
- ❑ Societal GIS
- ❑ Google Maps
- ❑ Google Earth
- ❑ Virtual Earth
- ❑ MapQuest
- ❑ Open Street Map



# But – what is it?

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- ❑ **Is it a Tool?**
- ❑ **Is it a Technology?**
- ❑ **Is it a Discipline?**
- ❑ **Is it a Science?**
- ❑ **Else?**

# Who is using GIS?

Africa



Austria



Canada



Portugal

# Goal

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**Create a Global Spatial Data Infrastructure**

**[www.gsdi.org](http://www.gsdi.org)**

# The GIS community

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- ❑ The GIS community includes not just software and data, but journals, conferences, educational programs, organizations, societies, technical and political forums, and so, so much more.
  
- ❑ Some important organizations that currently shape the future of GIS globally
  - ❑ Open Geospatial Consortium: [www.opengeospatial.org](http://www.opengeospatial.org)
  - ❑ Open Source Geospatial Foundation: [www.osgeo.org](http://www.osgeo.org)
  - ❑ University Consortium for Geographic Information Science: [www.ucgis.org](http://www.ucgis.org)
  - ❑ Global Spatial Data Infrastructures (GSDI) association: [www.gsdi.org](http://www.gsdi.org)
  - ❑ Urban and Regional Information Systems Association: [www.urisa.org](http://www.urisa.org)
  - ❑ GIS Certification Institute: [www.gisci.org](http://www.gisci.org)
  - ❑ GISCorps: [www.giscorps.org](http://www.giscorps.org)
  - ❑ International Institute for Geo-Information and Earth Science
  - ❑ International Society for Digital Earth
  - ❑ European Commission Joint Research Center
  - ❑ Several Major Agencies of the United Nations
  - ❑ Federal Geographic Data Committee: <http://www.fgdc.gov/>