



# *What is GIS?*

Scott Bell  
GIS Institute



# Outline

- The roots of GIS

- Geography, Information, System

- Learning Outcomes

- Distinguish between Geography and GIS
  - Describe advantages and limitations of taking a formal and quantitative view of the world





# What is GIS?

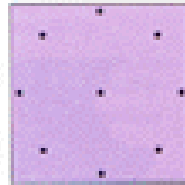
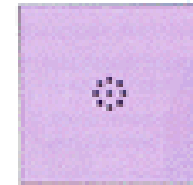
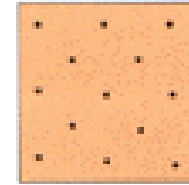
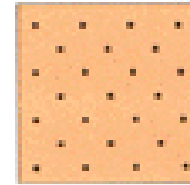
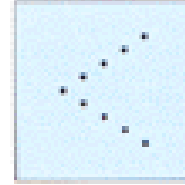
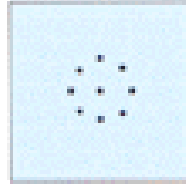
- Roots of GIS
  - Geography, Information, System
- Geography: A discipline focused on the spatial arrangement of features (human and non-human) on and near the Earth's surface
- Information: facts about known reality
- System: a whole composed of parts based on rules and definitions

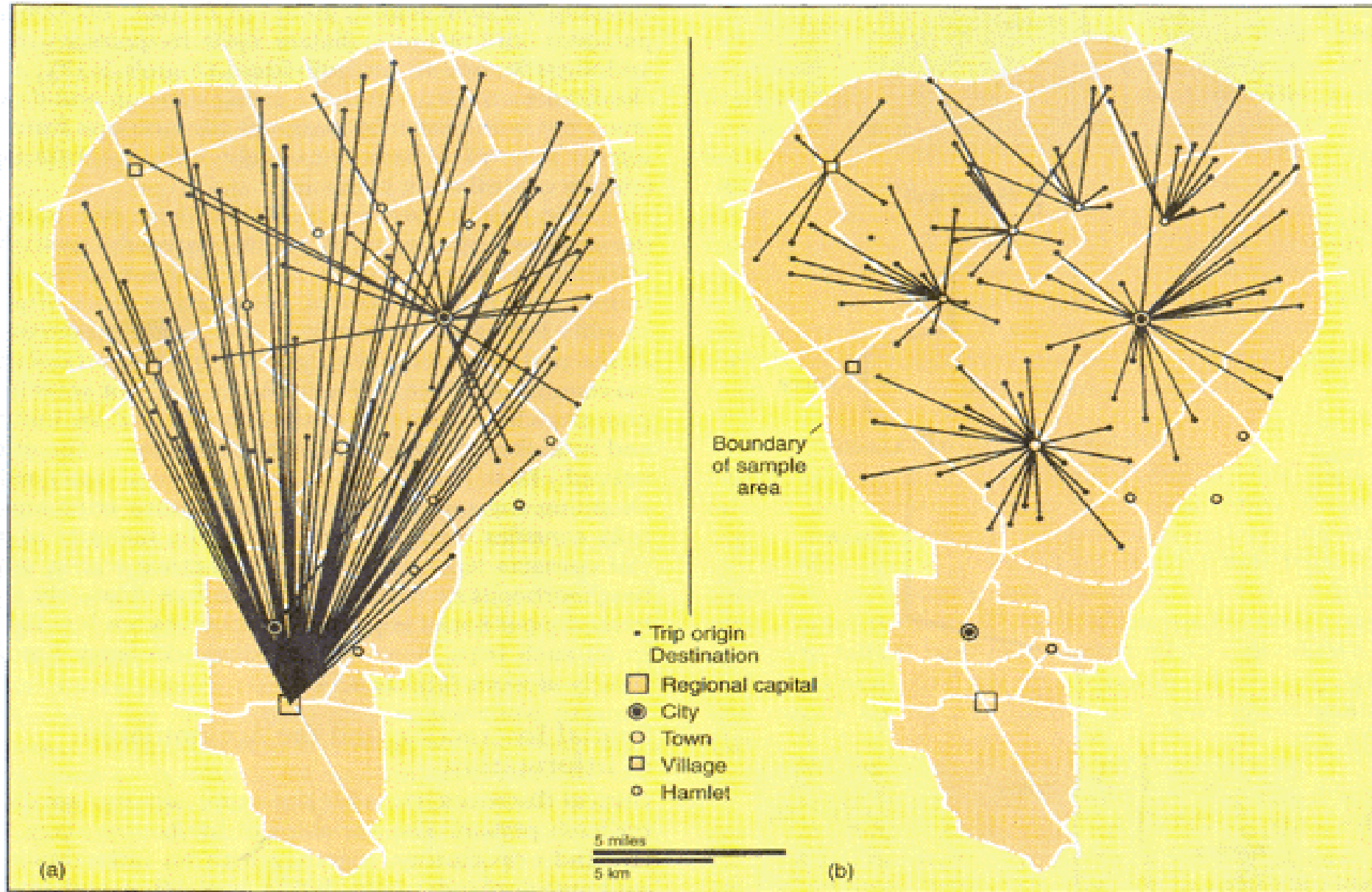




# Geographic Concepts

- Spatial arrangements
  - Distributions, networks, areas
- Spatial relationships
  - Distance, direction, correlation
- Spatial processes
  - Flows, forces, movement
- Processes that alter spatial arrangements
  - Energy
- Scale







# Geography

- Exploration of geographic phenomena
  - Modern day explorers of already discovered places
- Space vs. Place





# Information

- Can come in many forms
  - Text, numbers, pictures, lists and tables, sounds, maps and images, movies, animation, models
- These forms can represent almost anything
  - locations, quantities, identities, time, emotions, attitudes, etc.





# Value of Information

- Information is the basis for knowledge
  - Experience (and other modes or acquisition) exposes us to information
  - Exposure to information, along with understanding, leads to knowledge
  - Knowledge is the basis for problem solving (which at some point in history meant survival)

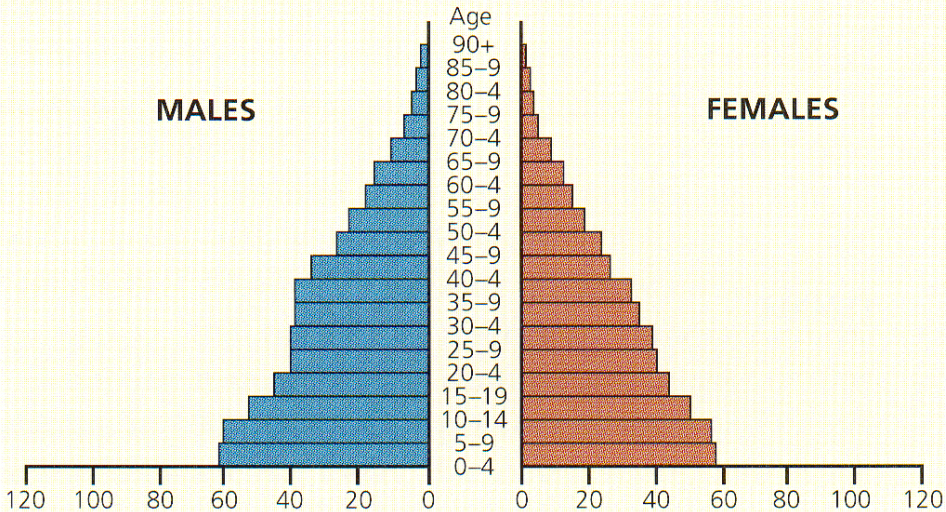




1921

MALES

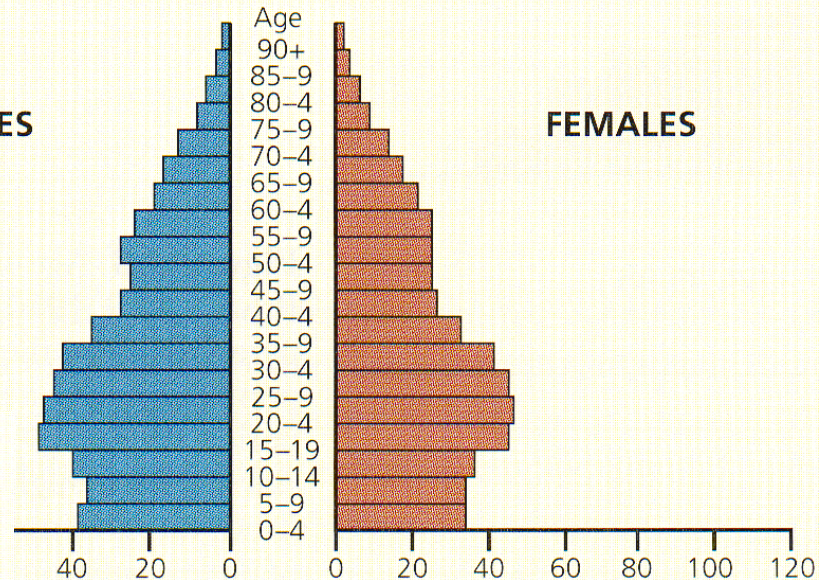
FEMALES



1981

MALES

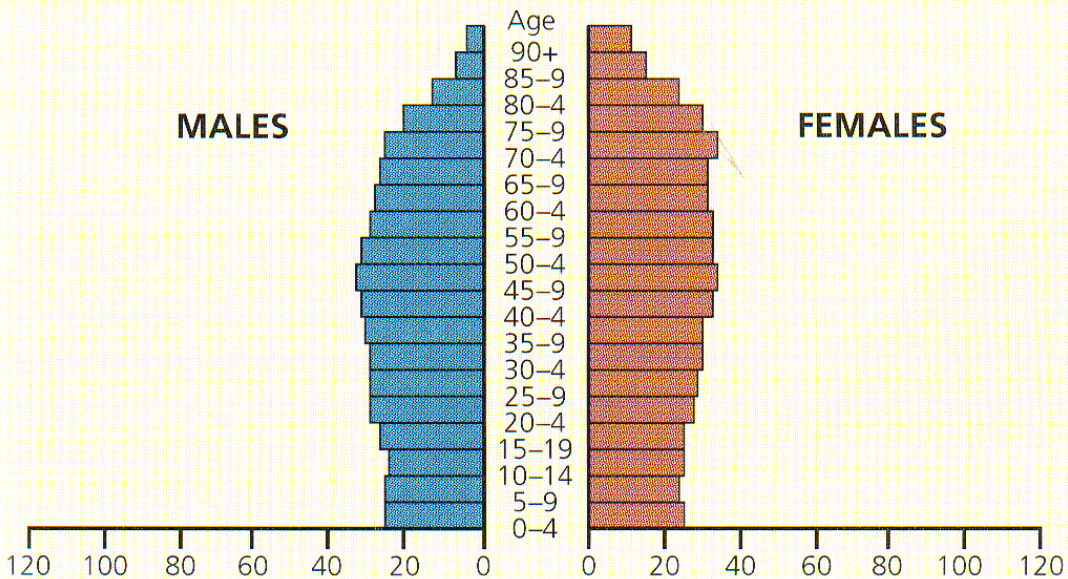
FEMALES



2036

MALES

FEMALES







# System for Integrating Information

- System: a whole composed of parts (in an orderly arrangement) based on some scheme or plan
  - Not associated with a simple composition
- Information System (informal)
  - Provides the baseline for sharing and combining information
  - Not necessarily digital





# Formal Information Systems

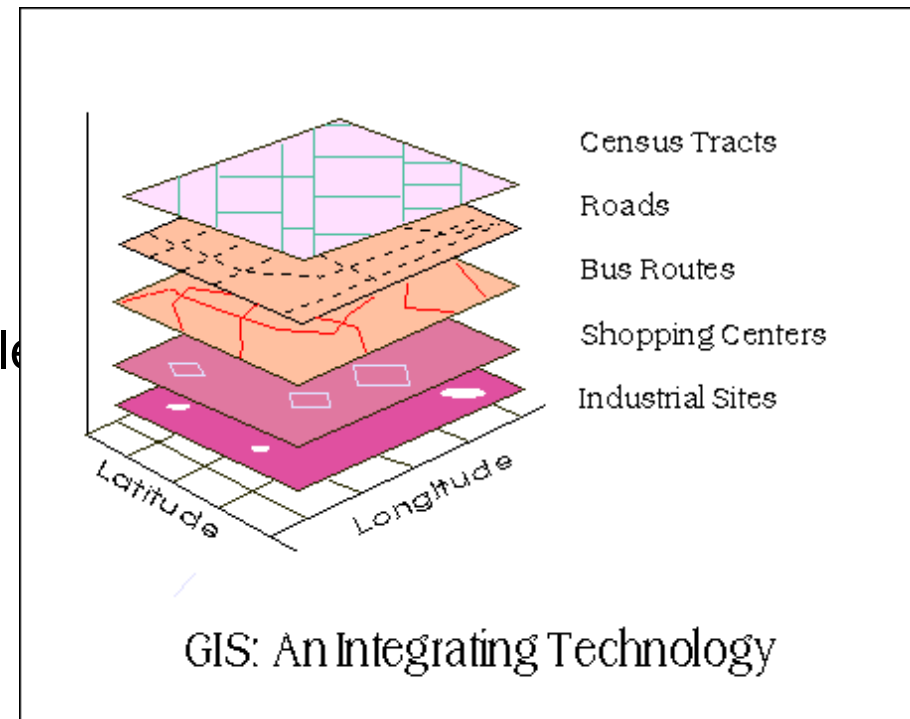
- Integration of information in a digital system
  - Provides formal rules for entry, storage, editing, relating, querying, and presenting information
  - While most of above could be done by hand, a computing environment makes it easier and faster (if you learn the language)
  - Benefits outweigh the drawbacks
- Drawbacks
  - Traditionally difficult to incorporate qualitative, fuzzy, affective information





# Geographic Information Systems

- Formal structure for *dealing with* geographic information
- Generic and Specific technology
- GIS as an application
  - hardware, data, software and people needed to solve a problem
- GIS as software
  - Developer specific (i.e. Microsoft, Oracle, ESRI)





# Essential Elements of GIS

- Location, Location, Location
  - Coordinate Systems
    - Global Absolute vs Other (local, regional, personal, etc.)
  - Models of Earth
    - Geodetic Datums
    - Globes
    - Maps
  - Models of Reality
    - Data Models





# GIS Software

- Spatially explicit commands and functionality
  - Display, edit, change, transform, measure (distances, areas, volumes), and combine
  - Manage, compare, judge, analyze, decide, predict, etc.
- The user combines their knowledge, with existing data, using generic hardware running GIS software
  - Can range from free to very expensive
  - Can focus on a subset of GIS functions or can cover the breadth of possible functions



