What is GIS?

- A GIS is a computer-based technology and methodology for collecting, managing, manipulating, analyzing, modeling, and presenting spatially referenced data and the attribute data for a wide range of applications.
Relational Data Structure of GIS

- View: Spatial data (maps, airphotos, satellite images, photographs, GPS, etc.)
- Table: Attribute data
- Chart: Use charts to represent both spatial and attribute data
- Layout: Display view, table, chart, images, etc. as graphic elements on the screen or print.
- Script: Programming.
- See Project: Data Structure
GIS Application in Targeted Marketing

- **Project:** Find trading areas for a book store in Denver, Texas for mass mailing advertisement to potential customers.

- **Criteria for the trading areas:**
  A. In the tracts with larger population.
  B. In the tracts with larger owner occupancy.
  C. In the tracts with larger population with college degree.
  D. The tracts must be within 8 miles from the store.

- See Project: Targeted Marketing.
GIS Application in Public Administration: Find the nearest ambulance to an accident

- Project: 911 call on an automobile accident.
- Problems to solve: (1) Find the nearest hospital with ambulance service. (2) Find quickest route from the hospital to the accident scene.
- See project: Find the nearest ambulance to an accident.
GIS Application in Civil Engineering: 3D Analysis of Chemical Contaminant Level of Water Table

- **Project:** Analyze chemical contaminant level of water table, water quality of wells in the region, and relationship between chemical contaminant level of water table and industry on the terrain surface.

- **See ArcView 3D project.**
GIS Application in Homeland Security

- Please see the CD show.
Conclusions on GIS Applications

- GIS is a powerful computer technology to manage and analyze spatial data and their attribute data.
- Any discipline, as long as it uses locational data, may be assisted by GIS.
GIS Career Opportunities

- GIS manager, GIS programmer, GIS specialist, GIS operator, GIS coordinator, etc.
- Careers preferring GIS skill: Biologist, engineers, archeologist, planner, etc.
The essential process of a GIS

- Data collection
- Data preprocessing
- Data management
- Data manipulation, analysis, and modeling
- Product generation and presentation
Four components of a GIS

- **GIS hardware:** (1) Data input: Digitizer, scanner, keyboard, CD-ROM or RW or DVD, tape readers, GPS, CAD, Internet, etc. (2) Data processing: CPU, monitor, etc. (3) Data output: Printer, plotter, CD, DVD, digital tape, internet, etc.

- **GIS software:** (1) ArcInfo (vector based). (2) ArcView. (3) ArcGis. (4) MapInfo. (5) Idrisi (raster based).

- **Data:** (1) Spatial data. (2) Attribute data.

- **People or liveware.**
ArcGis

1. ArcGIS Desktop software: (1) Three parts of ArcGis Desktop software: ArcMap (central application for all map-based tasks), ArcCatalog (organize and manage GIS data), ArcToolBox (GIS tools). (2) Three levels of functionality of ArcGis Desktop: ArcView, ArcEditor, ArcInfo.

2. ArcSDE gateway: Manage geodatabases in a database management system (DBMS).

3. ArcIms software: Internet-based GIS for distributing data and services
Questions, Comments, and Suggestions?