

**GEOGRAPHIC INFORMATION SYSTEMS
GEOGRAPHIC INFORMATION CENTER
PO BOX 5839
MC ALLEN, TEXAS 78502-5839**

1-800-522-0139

kh@acnet.net

***** Study Guide *****

GLOSSARY OF GIS TERMS

32-Bit vs. 16-Bit vs. 8-Bit: The width of the data path used in the bus technology (see bus technology). Wider data paths allow for faster transfer of data within the computer system and result in higher performance computers.

Absolute Map Accuracy: The degree to which objects on a map are positioned at their true ground locations relative to a coordinate system, such as geographic coordinates (latitude and longitude) or State Plane Coordinate (x,y) (see Relative Map Accuracy).

Aerial Photography: Photographs of a part of the earth's surface taken by a camera mounted in an aircraft for mapping purposes. This usually consists of a series of overlapping vertical photos taken in strips which can form the basis for mapping.

Application Program: A program or piece of software that performs a task for the user, such as a spreadsheet program. This is compared to programs that run to perform a task for the computer, such as the operating system software.

Attribute: Alphanumeric (non-graphic) data related to a specific map feature (point, line or polygon). For example, parcel information linked to a specific parcel (polygon) might include the parcel owner's name and the parcel address.

Base Data: Basic level of data or features on a base map.

Base Map: A term which varies in different applications, but, in general, refers to a map that depicts the fundamental map elements, such as streets, buildings, streams, etc., which are used frequently for locational reference. It is the control document from which various other maps in a geographic information system are developed.

Boundary Survey: A product of licensed land surveyors, which depicts the property lines and corner monuments of a parcel of land relative to its abutters or neighboring properties. Sometimes referred to as a boundary plat.

Bus Technology: The type of technology used for interconnecting internal computer system components, such as the CPU and internal hard drives.

Cache Memory: Frequently used data and programs are stored in this temporary memory. Before executing a command, the CPU accesses this memory first for instructions or data.

CAD (or CADD): Acronym for Computer Aided Drafting (and Design). CAD describes software that is used to create 2- and 3-dimensional graphic elements in a computer system. Certain CAD software also allow some attribute processing, analysis, and calculation. Recent advances in CAD include modeling and animation capabilities.

Cadastre: A system that defines the legal characteristics of properties, such as ownership, title issues, value, etc.

CD-ROM (Compact Disc-Read Only Media): A removable flat circular disc (as used in the music industry) that is read using a laser optical reading device. Information is not written to this type of disc except when it is initially created. Typical storage capacity is 300 to 600 megabytes.

Central Processing Unit (CPU): A computer's main processor that is responsible for executing instructions, such as those necessary to run software.

Conformal Projection: One type of flat map which depicts figures transformed from the surface of a sphere in their original forms (shapes). There is no one type of map projection that can "project" figures from a sphere onto a flat surface without distortions in either shape or size (see Equal Area Projection).

Coordinate Systems: A framework used to define the positions (locations) of points in space either in two or three dimensions. Examples of such systems would be a spherical system, such as latitude and longitude, or a planar system, such as State Plane Coordinates (x,y).

Coverages: One of a series of data themes, such as wetlands or water lines, in a geographic information system with graphic and attribute data related to that topic.

Database Management System (DBMS): A systematic approach to creating, maintaining, accessing, reporting, and analyzing attribute (alphanumeric or text) data.

Data Dictionary: A directory of all data items in a GIS. It does not contain the actual data items, but information on the types, names and structures of the data items. It is data about the data.

Datum: In mapping, a numeric or geometric quantity which serves as a reference or base to accurately define other quantities. It most often refers to either a horizontal standard, such as a particular spheroid for referencing coordinate positions, or it refers to a vertical datum, such as mean sea level, from which elevations are referenced.

Desktop Mapping: The ability, with modern personal computer hardware and software, to produce a variety of mapping and spatial analysis products at one location. The ability to graphically manage, analyze, and present or view data.

Desktop Publishing: The ability, with modern personal computer hardware and software, to produce a variety of publisher-quality documents, reports, etc.

Differential Leveling: The process of measuring the difference in elevation between any two points by use of a spirit level (closed glass tube) or the newer automatic level (pendulum) to maintain horizontal line of sight.

Digital Map: A computer-readable representation of a geographic area or phenomenon that can be displayed or analyzed by a digital computer. This is in contrast to an analog "paper" map.

Digitizing: A method of converting map data that is in analog form (paper or hard copy) into digital data usable by a computer (see Scanning).

Download: A term used to describe transferring digital data or information from a source, such as digital tape, to another location, such as a hard disk.

Equal Area Projection: A type of map projection which maintains figures areas but not their original shapes (see Conformal Projection and Projection).

Fiber Optic: Media based on fiber optic cables, used in communication systems and networks, that is capable of transmitting data at the highest speed possible.

Field (Item): A single attribute descriptor or characteristic of a feature. Commonly displayed as a column in an attribute table, such as a last name. This is in contrast to a record or row (see Record).

File Server: A computer that is configured to share the data on its disks with other computers across a network. A file server often has software and application programs installed on its disks that other computers access to run that software.

Floppy Drive: A device that accepts a removable disk, called a floppy disk, and reads or writes data to the disk. Floppy disks are enclosed inside a protective cover which is either 3-1/2" or 5-1/4" square. Capacities of floppy drives and floppy disks can vary, but range from 320 kilobytes to 2.2 megabytes.

Geodetic Control: A system of horizontal and/or vertical stations tied into horizontal and/or vertical datums, which are established to facilitate the location of other features on, above or below the earth's surface (see Datum).

Geographic Information System (GIS): An organized collection of computer hardware, software, geographic data and personnel designed to efficiently capture, store, update, manipulate, analyze and display all forms of geographically referenced information. Certain complex spatial operations are possible with a GIS that would be very difficult, time-consuming or impractical otherwise.

Geoid: The figure of the earth considered as a sea level surface extended continuously through the continents. It is a theoretically continuous surface that is perpendicular at every point to the direction of gravity (the plumb line) (see Datum).

Global Positioning System (GPS): A constellation of satellites originally developed by the U.S. Department of Defense as a navigation aid. It is now used by the civilian community for navigation and horizontal/vertical positioning of features.

Graphic Database: A collection of digital descriptions of map features (points, lines/arcs, areas/polygons, pixels/grid cells), symbols and annotations which can be used to generate a display. This is in contrast to an attribute database (see Attribute).

Grid Cell: One of a network of regions enclosed by uniformly spaced horizontal and vertical lines which has an associated value assigned to it (see Pixel and Raster).

Hard Drive: A device which holds a fixed disk residing permanently inside the hard drive. The disk is a flat circular plate with a magnetic coating on which data are stored magnetically in concentric circles and can vary in size (width, height and length) and capacity. The size of the disk is often referred to as its form factor. The capacity of hard drives varies greatly, from 20 megabytes to 3.5 gigabytes.

Hardware: A general term for any of the physical (mechanical and electrical) components of a computer system, such as the CPU, keyboards, hard drives, floppy drives, or printers.

Horizontal Datum: The two most common spheroidal reference surfaces in the United States used as a reference or base to accurately define horizontal positions (x,y or longitude, latitude) are the North American Datum of 1927 (NAD27) or the more recent and precise North American Datum of 1983 (NAD83) (see Datum).

Hydrography: The representation of the location and direction of flow of water bodies. In geographic information systems, it usually refers to coverages depicting various water features.

Infrastructure: Human-made systems (or built systems) that provide any or all of the normal public services to an area. Infrastructure includes such things as roads and bridges, water supply systems and electric, gas or telephone utilities.

Latitude: The angular distance of a location north or south of the equator.

Layers: A logical separation of mapped data usually representing a theme, such as roads, political boundaries, etc. Layers are all registered to one another by means of a common coordinate system.

Line Map: A map that consists of points, lines and area symbols rather than continuous tone imagery.

Linking Fields: Used in a database management system to develop or connect various columns of data (items or fields) in the attribute database for review or analysis. For example, linking parcels over 50 acres in size with owner names.

Local Area Network (LAN): A communications system that connects computers within a limited geographic area, such as one building or group of buildings.

Longitude: The angle between the plane of a meridian and the plane of an initial meridian arbitrarily chosen (the Greenwich Prime Meridian). In the United States, this angle is commonly measured as the angle west of the Prime Meridian.

Map Accuracy: A measure of the maximum errors permitted in horizontal positions and elevations shown on maps. In the United States, the most common standards are the "American Society for Photogrammetry and Remote Sensing" (ASPRS) standards and the "American Society of Civil Engineers" (ASCE) standards.

Map Scale: The relationship existing between a distance on a map and the corresponding distance on the earth. A scale of 1 inch = 2000 feet can also be expressed as 1:24,000 (i.e., 1 inch on the map to 24,000 inches on the earth).

Map Separates: Map elements on different layers, either digitally or on some medium, each of which depict various types of information, such as roads, water surfaces, buildings, property lines, etc. Also known as overlays or flaps. Several separates may comprise one map.

Meridian: A line on the earth's surface which follows the shortest distance from pole to pole.

Monumentation: In surveying and mapping, this usually refers to physical objects on the earth's surface, the positions (x,y and/or z) of which are known or are established.

Mouse: A hand-held pointing device which allows a user to provide input to the computer by pointing at menu selections or by drawing as one would do with a pen. A mouse is typically palm-sized and contains up to three buttons.

Multimedia: In a geographic data context, the ability to reference and retrieve different forms of data, such as hard copy vector or raster maps, reports, tabular databases, photographs, audio records, video records, etc.

Municipal Information System (MIS): A type of GIS that focuses specifically on issues of concern to municipal governance.

Natural Features: In mapping, this term usually refers to features which are not human-made, such as streams, vegetation, geology, and topography.

Needs Assessment Survey: Sometimes referred to as a user needs or requirements analysis, this is a strategic planning tool for implementing a GIS. It provides a comprehensive assessment of the analytical capabilities and products required by potential system users.

Networks: High-speed communication systems for connecting computers, allowing users to share data and software from one computer to another.

New Hampshire State Plane Coordinate System: One of the plane-rectangular coordinate systems established by the Federal Government (one or more zones for each state), which is used for defining positions of points on, above or below the earth's surface in terms of x and y coordinates directly related to geographic (latitude and longitude) coordinates. Legally recognized in RSA.

North American Datum (NAD): There are two North American Datums: North American Datum of 1927 (NAD 27) and North American Datum of 1983 (NAD 83). Both are geodetic reference systems, but each is based on different measurements. NAD 27 incorporated all horizontal geodetic surveys completed up to 1927. NAD 83 updated NAD 27 with current measurements using radio astronomy and satellite observations. NAD 83 positions are consistent with satellite location systems (see GPS, Datum, Horizontal Datum).

Operating System: The collection of software and firmware programs that make the computer system's hardware usable, allowing users access to storage devices, input and output devices, and allowing the running of application programs.

Orthophotography: An aerial photograph in which the distortions due to camera tilt and topographic relief have been removed. An orthophotograph has consistent scale throughout and can be used as a map.

Peripheral: An internal or external computer hardware device that provides the CPU with additional storage or functional capability. Disk drives, tape drives and printers are examples of peripherals.

Personal Computer: (PC) A general term for a class of computers that, typically, are average performance, single-user systems. Over the last dozen years, these computers have been IBM-PC compatible systems running the Microsoft Disk Operating System (MS-DOS).

Photogrammetry: The science or art of obtaining reliable measurements by photography. For GIS applications, aerial photogrammetry often provides the foundation to develop base maps.

Pixel : One picture element. Often used synonymously with a raster or grid cell. The smallest discrete element which makes up an image (see Grid Cell and Raster).

Planimetric: In mapping, refers to spatial data that do not include topographic or relief data.

Plotter: An electronic device used to produce output of spatial digital data on "hard copy" media (plots), such as paper or mylar.

Prime Meridian : The initial meridian or longitude 0 degree (Greenwich Meridian), which creates the plane from which an angle is measured to establish the longitude of a point (see Longitude).

Projection: A mathematical model that transforms the locations of features on the earth's surface onto a 2-dimensional map surface (see Conformal Projection and Equal Area Projection).

Query or Database Query: The retrieval and display of data from a database about one or more features, such as a parcel, its size, owner, value and location or address.

Random Access Memory (RAM): Computer memory that can be both read and written to, and can be accessed in a random fashion, as compared to a sequential fashion, such as tape access. This is the memory typically used to store the instructions necessary to run a software program.

Raster Data: One method of storing, representing or displaying spatial data in digital form. It consists of using cell data (not necessarily square) arranged in a regular grid pattern in which each unit (pixel or cell) within the grid is assigned an identifying value based on its characteristics (see Vector).

Record: In an attribute table this would consist of a single "row" of descriptors for one feature in contrast to an item or field or column which consists of a single attribute descriptor.

Relational Database: A database structure composed of more than one flat file (2-dimensional arrays) that can be transformed to form new combinations because of relations between the data in the records, in contrast to hierarchical and network database structures.

Relative Map Accuracy: The accuracy of map elements in relation to a local survey network that is not tied to the earth's geoid. The positions are accurate only within a certain geographic area covered by the local survey network (see Absolute Map Accuracy).

Resolution: A measure of the accuracy or detail of a graphic display expressed as dots per inch, pixels per line, line per millimeter, etc.

Satellite Imagery: Digital data obtained from sensors carried in satellites. It includes collecting data both in the visible and non-visible portions of the electromagnetic spectrum. One system is the multi-spectral scanner carried in Landsat satellites.

Scanner: An optical device that recognizes dark and light dots on a surface, and converts this recognition, by means of a grid array, into a digital file. It can be used to convert "paper maps" to digital maps, but generally requires additional computer-aided manipulation and manual editing to produce digital data in proper formats.

Software: A general term for any of the programs that are run on a computer and that perform particular tasks. Software is typically read on the hard drive (installed), and run from there. General categories of software include database and spreadsheet software.

Spatial: Refers to features or phenomena distributed in space and, thus, having physical, measurable dimensions.

State Plane Coordinate System: A system of plane-rectangular coordinates established by the federal government. The system is used for defining positions of points on, above, or below the earth's surface in terms of x and y values directly related to geographic (latitude and longitude) coordinates. One or more zones exist for each state in the US (see New Hampshire State Plane Coordinate System).

Tabular Database: Attribute data arranged in row (records) and column (item) format.

Thematic Map: A map that displays the spatial distribution of a single attribute or a specific topic, such as property assessments, soil types, or crime locations.

Topography: The relief, elevation or shape of the earth in a given area.

Topology: The explicit definition of how map features represented by points, lines and areas are related. Specifically, issues of connectivity and adjacency of features are accounted for.

Trigonometric Leveling: The determination of differences of elevation by trigonometric means using observed vertical angles and measured or computed horizontal distances.

UNIX: An operating system currently in use in the workstation environment. Features of UNIX include the ability to run many processes simultaneously, allowing multiple users to use a computer running this operating system at one time, and the inherent ability to function on a network.

Vector Data: One method of storing, representing or displaying spatial data in digital form. It consists of using coordinate pairs (x,y) to represent locations on the earth. Features can take the form of single points, lines, arcs or closed lines (polygons) (see Raster).

Vertical Datum: A quantity which serves as a reference to accurately define vertical positions. In the United States, two predominant reference surfaces for elevation are the National Geodetic Vertical Datum of 1929 (NGVD 29) and the more recent and more precise North American Vertical Datum of 1988 (see Datum).

Wide Area Network (WAN): A communication system that connects computers across a wide geographic area, such as across a state or between countries.

Workstation: A term used to refer to a class of computers that is typically high performance, single to several user systems and that often includes both high-resolution graphics and the ability to function within a network.