The GIS Glossary

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This glossary will help familiarize you with terms associated with GIS and ESRI software. Select a character below to go to that point in the glossary or use the find tool from your browser.

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

A

AAT
Arc attribute table. A table containing attributes for arc coverage features. In addition to user-defined attributes, the AAT contains the from and to nodes, the left and right polygons, the length, an internal sequence number and a feature identifier. See also feature attribute table.

ACCESS directory
The system directory that LIBRARIAN uses to store the files that manage access to the library. Each library has an ACCESS directory located in the library's DATABASE directory.

accessibility
An aggregate measure of how reachable locations are from a given location. The ACCESSIBILITY command computes values for accessibility as a function of the distance between locations and an empirically derived distance decay parameter.

access rights
The privileges accorded a user for reading, writing, deleting, updating and executing files on a disk. Access rights are stated as `no access', `read only' and `read/write'.

ACODE file
An INFO data file storing arc attributes for coverages created from TIGER, DIME, IGDS and Etak files. ACODE stands for `Arc CODE'. The ACODE file is related by Cover-ID to the Arc Attribute Table (AAT) of the coverage.

address matching
A mechanism for relating two files using address as the relate item. Geographic coordinates and attributes can be transferred from one address to the other. For example, a data file containing student addresses can be matched to a street coverage that contains addresses creating a point coverage of where the students live.

ADS
1. Arc Digitizing System. A simple digitizing and editing system used to add arcs and label points to a coverage.

2. A command at the Arc: prompt that starts an ADS session.

allocation
The process of assigning arcs in a network to the closest center until the maximum impedance or resource capacity of the center is reached.

AML

ARC Macro Language. A high-level algorithmic language for generating end-user applications. Features include the ability to create on-screen menus, use and assign variables, control statement execution, and get and use map or page unit coordinates. AML includes an extensive set of commands that can be used interactively or in AML programs (macros) as well as commands that report on the status of ARC/INFO environment settings.

analysis

Analysis is the process of identifying a question or issue to be addressed, modeling the issue, investigating model results, interpreting the results, and possibly making a recommendation. See model and spatial analysis.

annotation

1. Descriptive text used to label coverage features. It is used for display, not for analysis.

2. One of the feature classes in a coverage used to label other features. Information stored for annotation includes a text string, the location at which it is displayed, and a text symbol (color, font, size, etc.) for display. See also TAT.

ANSI

American National Standards Institute is a national coordinator of voluntary standards activities, and an approval organization and clearinghouse for consensus standards in the United States. ANSI works closely with international organizations, particularly ISO, for the development and approval of international standards. While ANSI standards apply to every facet of today's world, their efforts in the area of SQL and spatial extensions to SQL are of particular interest to the GIS community.

Application program interface (API). An API is a set of system calls or routines for application programs to access services from operating systems or other programs. An API allows your program to work with other programs, possibly on other computers. API is fundamental to client/server computing. ArcView provides this service to ARC/INFO users.

arc

1. An ordered string of vertices (x,y coordinate pairs) that begin at one location and end at another. Connecting the arc's vertices creates a line. The vertices at each endpoint of an arc are called nodes.

2. A coverage feature class used to represent linear features and polygon boundaries. One line feature can contain many arcs. Arcs are topologically linked to nodes (arc-node topology) and to polygons (polygon-arc topology). The descriptive attributes of arcs are stored in the arc attribute table (AAT). See alsonode.

arc-node topology

The topological data structure ARC/INFO uses to represent connectivity between arcs and nodes. Arc-node topology supports the definition of linear feature and polygon boundaries, and supports analysis functions such as network tracing. See also topology.

archive

A preserved collection of historical information purged from an ArcStorm database.

ArcStorm

ArcStorm (ArcStorageManager) is a data storage facility and transaction manager for ARC/INFO data. ArcStorm manages a feature-oriented database that can be closely integrated with database systems supported by ARC/INFO's DATABASE INTEGRATOR.

ArcStorm database

An ArcStorm database is a collection of libraries, layers, INFO tables and external DBMS tables. Data stored in an ArcStorm database benefit from the transaction management and data archiving capabilities of ArcStorm.

ArcTools

ArcTools is a collection of ARC/INFO productivity tools implemented through anAML-based (ARC Macro Language) graphical user interface. ArcTools provides a user-friendly approach to commonly used ARC/INFO operations and functions.

area

1. A homogeneous extent of the Earth bounded by one or more arc features (polygon) or represented as a set of

polygons (region). Examples: states, counties, lakes, land-use areas, and census tracts.

2. The size of a geographic feature measured in unit squares. ARC/INFO stores an area measure for each polygon and region.

ASCII
American Standard Code for Information Interchange. A set of codes for representing alphanumeric information (e.g., a byte with a value of 77 represents a capital M). Text files, such as those created with the text editor of a computer system, are often referred to as ASCII files.

aspect
The compass direction toward which a slope faces, measured in degrees from North in a clockwise direction.

ASRG
ARC Standard Raster Graphic. Raster graphic data transformed to the Equal ARC-second Raster Chart/Map (ARC) Projection System. See SRG. ASRG (using RGB) is very similar to DMA (Defense Mapping Agency) ADRG (ARC Digitized Raster Graphic). ADRG files can be imported into ARC/INFO with the ADRGGRID command. The ASRG (using RGB) can be converted with the ADRGGRID command if it is in a true DMA ADRG format. The ASRG permits color codes, which the ADRGGRID command does not handle.

attractiveness
The property or properties of a location that create an incentive for trips to be made to that location. For example, the attractiveness of a retail store could be a function of the retail floor space, number of parking spaces, product pricing, or a combination of these factors.

attribute
1. A characteristic of a geographic feature described by numbers, characters, images and CAD drawings, typically stored in tabular format and linked to the feature by a user-assigned identifier (e.g., the attributes of a well might include depth and gallons per minute).

2. A column in a database table. See also item.

attribute table
An INFO or other tabular file containing rows and columns. In ARC/INFO, attribute tables are associated with a class of geographic features, such as wells or roads. Each row represents a geographic feature. Each column represents one attribute of a feature, with the same column representing the same attribute in each row. See also feature attribute table.

azimuth
The horizontal direction of a vector, measured clockwise in degrees of rotation from the positive y-axis, for example, degrees on a compass.

B

backup
A copy of a file, a set of files, or whole disk for safekeeping in case the original is lost or damaged.

band
One layer of a multispectral image representing data values for a specific range of the electromagnetic spectrum of reflected light or heat (e.g., ultraviolet, blue, green, red, near-infrared, infrared, thermal, radar, etc.). Also, other user-specified values derived by manipulation of original image bands. A standard color display of a multispectral image shows three bands, one each for red, green and blue. Satellite imagery such as LANDSAT TM and SPOT provide multispectral images of the Earth, some containing seven or more bands.

band separate
An image format that stores each band of data collected by multispectral satellite scanning instruments in a separate file.

bandwidth
A measure of the volume of data that can flow through a communications link. Image data tend to exist as large

data sets; thus moving image data sets from one computer to another requires high bandwidth or performance will be slowed. Also known as throughput.

base map
A map containing geographic features used for locational reference. Roads, for example, are commonly found on base maps.

base table
A table that is physically stored in the database. Compare with view.

baud rate
A measure of the speed of data transmission between computer and other devices, measured in bits per second.

bit
The smallest unit of information that a computer can store and process. A bit has two possible values, 0 or 1, which can be interpreted as YES/NO, TRUE/FALSE, or ON/OFF. See also byte.

BLOB
Binary large object. The data type of a column in an RDBMS table which can store large image or textual data as attributes.

BND
The file in a coverage or grid which contains the coverage extent.

Boolean expression
1. A type of expression that reduces to a true or false (logical) condition. A Boolean expression contains logical expressions (e.g., DEPTH > 100) and Boolean operators. A Boolean operator is a keyword that specifies how to combine simple logical expressions into complex expressions. Boolean operators negate a predicate (NOT), specify a combination of predicates (AND), or specify a list of alternative predicates (OR). For example, DEPTH > 100 AND DIAMETER > 20. See also logical selection.

border arcs
1. The arcs that create the outer edge boundary of a polygon coverage.

2. In LIBRARIAN, the tile boundary arcs that split a polygon coverage into tiles.

breakline
A linear feature that defines and controls the surface behavior of a tin in terms of smoothness and continuity. Breaklines are always maintained as linear features in a tin. Stereo-digitized features containing x,y,z values such as streams and shorelines containing an elevation attribute are often stored as breakline features.

buffer
A zone of a specified distance around coverage features. Both constant- and variable-width buffers can be generated for a set of coverage features based on each feature's attribute values. The resulting buffer zones form polygons-areas that are either inside or outside the specified buffer distance from each feature. Buffers are useful for proximity analysis (e.g., find all stream segments within 300 feet of a proposed logging area).

bug
An error in a computer program or in a piece of electronics that causes it to malfunction.

byte
A memory and data storage unit composed of contiguous bits, usually eight. For example, file sizes are measured in bytes or megabytes (one million bytes). Bytes contain values of 0 to 255 and most often represent integer numbers or ASCII characters (e.g., a byte with an ASCII value of 77 represents a capital M). A collection of bytes (often 4 or 8 bytes) represents real numbers and integers larger than 255.

C

CAD
Computer-aided design. An automated system for the design, drafting, and display of graphically oriented

information.

CAD drawing
The digital equivalent of a drawing, figure or schematic created using a CAD system. For example, a drawing file or DWG file in AutoCAD.

calibration
The process of choosing attribute values and computational parameters so that a model properly represents the real-world situation being analyzed. For example, in pathfinding and allocation, calibration generally refers to assigning or calculating appropriate values to be entered in impedance and demand items.

capacity
The maximum resource that can be assigned (allocated) to or be serviced by acenter. For example, the capacity of a school is the number of students that can be enrolled there.

Cartesian coordinate system
A two-dimensional, planar coordinate system in which x measures horizontal distance and y measures vertical distance. Each point on the plane is defined by an x,y coordinate. Relative measures of distance, area, and direction are constant throughout the Cartesian coordinate plane.

CASE
Computer-Aided Software Engineering. CASE tools are defined programming rules for applying engineering principles, methods, techniques, and concepts. These tools assist in accomplishing a definable engineering task in the software design process by automating manual activities through structured prototyping. This technique reduces customized development time, supplying consistent code sets and supporting the entire software life cycle process.

CCITT
Comité Consultatif Internationale de Télégraphique et Téléphonique (Consultative Committee on International Telephone and Telegraph). CCITT is a technical committee of the International Telecommunications Union, a United Nations organization in Geneva. It sets international communications recommendations concerning standardization of data interfaces, modems, and data networks. ARC/INFO is fully compliant with CCITT Group IV, the Standard for raster data compression. ARC/INFO supports the followingTIFF compression schemes: CCITT Group 4 for black-and-white data (read only); CCITT Group 3, one-dimensional encoding for black-and-white data; and PackBits.

CD-ROM
Compact Disk-Read Only Memory. CD-ROM is an optical media. A CD-ROM 5.25-inch disk can hold about 650 megabytes of information. The ISO 9660 standard defines the format of data held on CD-ROM.

cell
See grid cell.

center
A discrete location that has a supply of a resource or commodity. In spatial interaction, a center is consider to have attractiveness.

CGM
Computer Graphics Metafile is a graphic image exchange standard, ANSI: x3.122-1986, ISO: 8632-1986, for graphic output file format. ARC/INFO, ArcView Version 2, and PC ARC/INFO support CGM.

character
1. A letter (e.g., a, b, c, or d), digit (e.g., 1, 2, or 3), or special graphic symbol (e.g., *, |, or -) treated as a single unit of data.

2. A data type for an attribute designating that values for the attribute will be represented using characters. For example, the character data type would be appropriate for the attribute COUNTRY, if the values assigned are like United States, Brazil, Canada, Thailand, and so on.

checkin
Checkin is the act of returning ArcStorm data which was previously checked out for update purposes. When

modified data is checked in, all locks on the data are released.

checkout
Checkout is the act of taking selected data out of an ArcStorm database into a local coverage for editing purposes. When data is checked out, it is locked to prevent updates from other users. ArcStorm data cannot be modified directly, it must first be checked out.

client/server
A software system is said to have a client/server architecture when there is a central process (server) which accepts requests from multiple user processes (clients). ArcStorm is one example of a client/server architecture within ARC/INFO.

clip
The spatial extraction of those features from one coverage that reside entirely within a boundary defined by features in another coverage (called the clip coverage)-clipping works much like a cookie cutter.

COGO
1. Abbreviation of the term COordinate GeOmetry. Land surveyors use COGO functions to enter survey data, to calculate precise locations and boundaries, to define curves, and so on.

2. The name of the ARC/INFO coordinate geometry software product.

column
The vertical dimension of a table. A column has a name and a data type applied to all values in the column.

command
A specific instruction to a computer program, issued by the user to perform a desired action.

command line interface
A software product that allows the user to type in commands at a prompt. Contrast to forms interface.

commit
To make permanent any changes made during a database transaction. Compare with roll back.

concurrency management
A database management process for maintaining consistency of the data while supporting simultaneous access by more than one user. A typical technique is to allow any number of users read access but to allow only one user to have write access. A second user wanting write access will have to wait until the first person completes their transaction.

conditional operator
A symbol or keyword specifying how to compare values. Conditional operators are used to query a database. Examples from SQL include: = (equal to) BETWEEN < (less than) LIKE > (greater than) CONTAINING

conflation
A set of functions and procedures that aligns the arcs of one coverage with those of another and then transfers the attributes of one to the other. Alignment precedes the transfer of attributes and is most commonly performed by rubber-sheeting operations.

connectivity
The topological identification of connected arcs by recording the from- and to-node for each arc. Arcs that share a common node are connected. See also arc-node topology.

constraints
Limits imposed on a model. For example, in an interaction model, specifying that the number of trips generated from an origin to all destinations cannot exceed the origin's production capacity.

contiguity
The topological identification of adjacent polygons by recording the left and right polygons of each arc. See also polygon-arc topology.

continuous data
A surface for which each location has a specified or derivable value. Typically represented by a tin or lattice (e.g., surface elevation).

contour
A line connecting points of equal surface value.

contour interval
The difference in surface values between contours.

coordinate
A set of numbers that designate location in a given reference system, such as x,y in a planar coordinate system or an x,y,z in a three-dimensional coordinate system. Coordinates represent locations on the Earth's surface relative to other locations. See also vector and Cartesian coordinate system.

coordinate geometry
See COGO.

coordinate system
A reference system used to measure horizontal and vertical distances on a planimetric map. A coordinate system is usually defined by a map projection, a spheroid of reference, a datum, one or more standard parallels, a central meridian, and possible shifts in the x- and y-directions to locate x,y positions of point, line, and area features. In ARC/INFO, a system with units and characteristics defined by a map projection. A common coordinate system is used to spatially register geographic data for the same area.

Cover#
A unique sequence number automatically generated by ARC/INFO for each coverage feature. This internal number is used to directly access features and to describe topological relationships between coverage features. It is often referred to as the `record number'.

Cover-ID
An integer identifier, assigned by the user, to relate geographic features and corresponding attribute data. Cover-ID is an item found in feature attribute tables, with `Cover' replaced by the coverage name (e.g., for a soils coverage, the Cover-ID would be SOILS-ID). Feature-ID and User-ID are synonymous terms to Cover-ID.

coverage
1. A digital version of a map forming the basic unit of vector data storage in ARC/INFO. A coverage stores geographic features as primary features (such as arcs, nodes, polygons, and label points) and secondary features (such as tics, map extent, links, and annotation). Associated feature attribute tables describe and store attributes of the geographic features.

2. A set of thematically associated data considered as a unit. A coverage usually represents a single theme such as soils, streams, roads, or land use.

coverage extent
The coordinates defining the minimum bounding rectangle (i.e., xmin,ymin and xmax,ymax) of a coverage or grid. All coordinates for the coverage or grid fall within this boundary. In ARCPLOT and ARCEDIT, map extent is often set from the coverage extent. See also BND.

coverage units
The units (e.g., feet, meters, inches) of the coordinate system in which a coverage is stored.

cross-tile indexing
A method used to index features that cross tile boundaries. Features that cross tile boundaries are stored as one or more features in each tile instead of as a single feature.

CSSM
The Content Standards for Spatial Metadata. A document produced by the Federal Geographic Data Committee (FGDC) that describes spatial metadata.

cursor

1. A graphic pointer used with a mouse to point to a location on a terminal screen.

2. An internal pointer to a record in a table which provides a mechanism for processing a selected set of records. The cursor is moved one by one through the set while operations such as display, query and update are performed.

cycle

1. In pathfinding, a cycle is a path or tour beginning and ending at the same node.

2. In tracing, a cycle is a set of arcs forming a closed polygon. Upstream and downstream directionality are undefinable in a cycle.

D

DAL

Data Access Language. Apple's former standard to allow applications to communicate with relational databases. DAL is middleware on a network. It is a program installed on the database server to provide a common SQL access for all database servers on a network. Apple has licensed this technology to Independence Technologies, Inc.

dangle length

Minimum length allowed for dangling arcs during the CLEAN process. CLEAN removes dangling arcs that are shorter than the dangle length.

dangling arc

An arc having the same polygon on both its left and right sides and having at least one node that does not connect to any other arc. It often identifies where a polygon does not close properly (e.g., undershoot), where arcs don't connect properly, or where an arc was digitized past its intersection with another arc (i.e., overshoot). A dangling arc is not always an error. For example, dangling arcs can represent cul-de-sacs in street centerline maps. See also dangling node.

dangling node

The endpoint of a dangling arc not connected to another arc.

data access security

Measures taken to control system users' ability to view or modify data. These measures can include logical views of data and explicit access rights by group or individual users. See also access rights.

database

A logical collection of interrelated information, managed and stored as a unit, usually on some form of mass-storage system such as magnetic tape or disk. A GIS database includes data about the spatial location and shape of geographic features recorded as points, lines, areas, pixels, grid cells, or tins, as well as their attributes.

database design

The formal process of analyzing facts about the real world into a structured database model. Database design is characterized by the following phases: requirement analysis, logical design and physical design.

DATABASE directory

The same as the Library Reference workspace. It is the system directory that LIBRARIAN uses to manage information about a map library. Each map library has one database directory named DATABASE.

data conversion

The translation of data from one format to another. ARC/INFO supports data conversion from many geographic data formats such as DLG, TIGER, DXF, and DEM.

data dictionary

A catalog of all data held in a database, or a list of items giving data names and structures. Also referred to as DD/D for data dictionary/directory. Commercial RDBMSs have online data dictionaries stored in special tables called system tables.

data integrity
Maintenance of data values according to data model and data type. For example, to maintain integrity, numeric columns will not accept alphabetic data. See referential integrity.

data model
1. The result of the conceptual design process. A generalized, user-defined view of the data related to applications.

2. A formal method of describing the behavior of the real-world entities. A fully developed data model specifies entity classes, relationships between entities, integrity rules and operations on the entities.

3. ARC/INFO coverages and grids use a georelational data model, a hybrid data model that combines spatial data (in coverages or grids) and attribute data (in tables). Other data models used in ARC/INFO include tins, images, and grid.

data set
A named collection of logically related data items arranged in a prescribed manner.

data type
The characteristic of columns and variables that defines what types of data values they can store. Examples include character, floating point and integer.

DATABASE INTEGRATOR (DBI)
ARC/INFO software's link to relational database management systems (RDBMS). DBI enables ARC/INFO users to access existing commercial databases and take advantage of the power and capabilities of the RDBMS.

database lock
Locking is a mechanism by which database systems can prevent conflicting access to data when multiple users are making requests to the data. See also persistent lock.

database management system (DBMS)
A set of computer programs for organizing the information in a database. A DBMS supports the structuring of the database in a standard format and provides tools for data input, verification, storage, retrieval, query, and manipulation.

datum
A set of parameters and control points used to accurately define the three-dimensional shape of the Earth (e.g., as a spheroid). The datum is the basis for a planar coordinate system. For example, the North American Datum for 1983 (NAD83) is the datum for map projections and coordinates within the United States and throughout North America.

DBI
See DATABASE INTEGRATOR.

DBMS
See database management system.

DBMS table
See attribute table.

DCW
"Digital Chart of the World." The first 1:1,000,000-scale digital basemap of the world. The DCW contains topologically based vector data digitized from the U.S. Defense Mapping Agency's Operational Navigation Charts.

DDE
Dynamic Data Exchange. An IAC protocol developed by Microsoft for Windows-based applications. DDE allows one application to send messages to, and get information from, other applications in Windows. This is specific to Windows only (RPC, Remote Procedure Calls, is used in the UNIX environment). DDE is supported in ArcView Version 2 for the exchange of data with other business applications without having to convert the data or leave ArcView. (See IAC.)

DDL
Data definition language. SQL statements that can be used either interactively or within programming language source code to define databases and their components.

DEM
See digital elevation model.

demand
1. In allocation, the potential for using a portion of the supply of a resource or commodity.

2. In spatial interaction, demand is the measure of the need for a particular type of service or goods that generates a trip to a destination. For example, the demand for a gallon of milk may generate a trip to a grocery store.

denormalization
The process of restructuring a normalized data model to accommodate operational constraints or system limitations.

densify
A process of adding vertices to an arc at specified distances, without altering the arc's shape. Compare withspline and grain tolerance.

descriptive data
Tabular data describing the characteristics of geographic features. Can include numbers, text, images, and CAD drawings about features. ARC/INFO stores descriptive data in feature attribute tables and in related tables. Also referred to as attribute data.

destination
In spatial interaction, the location of the end of a trip. For example, a shop or an office where a consumer or a worker is going. Destinations are represented as centers in a network coverage, as points in a point coverage, and as label points in a polygon coverage.

digital elevation model
1. A digital representation of a continuous variable over a two- dimensional surface by a regular array of z values referenced to a common datum. Digital elevation models are typically used to represent terrain relief. Also referred to as `digital terrain model' (DTM).

2. An elevation database for elevation data by map sheet from the National Mapping Division of the U.S. Geological Survey (USGS).

3. The format of the USGS digital elevation data sets.

DGM
Digital Geospatial Metadata. DGM was approved in June 1994 by the Federal Geographic Data Committee (FGDC). DGM describes the specifications for the content, quality, condition, and other characteristics of metadata (data about data). The standard provides a common set of terminology and definitions for the documentation of geospatial data. DGM establishes the names of data elements and groups of data elements to be used for these purposes, definitions of these data elements and groups, and information about the values that are to be provided for the data elements.

DIGEST
The Digital Geographic Information Exchange Standard is produced under authority of NATO's Digital Geographic Information Working Group. DIGEST is a standard for digital geographic information which will enable interoperability and compatibility among national and multinational systems and users. DIGEST is composed of standards for two digital geographic formats: ARC Standard Raster Graphic (ASRG) and vector relational format (VRF). ASRG is very similar to ADRG and can be imported into ARC/INFO as an ADRG file with the ADRGGRID command. The ARC/INFO VPFIMPORT and VPFEXPORT convertors will process the VRF data.

digital terrain model
See digital elevation model.

digitize
1. To encode geographic features in digital form as x,y coordinates.

2. The process of using a digitizer to encode the locations of geographic features by converting their map positions to a series of x,y coordinates stored in computer files. Pushing a digitizer button records an x,y coordinate. A digitized line is created by recording a series of x,y coordinates.

digitizer
1. A device that consists of a table and a cursor with crosshairs and keys used to digitize geographic features.

2. Title of the person who uses a digitizing device.

digitizing
See digitize.

DIME
See GBF/DIME.

directed network
A network in which each arc has an associated direction of flow. Direction of flow can be determined by arc direction (e.g., each arc is digitized so that it is oriented downstream), a value in an item in the AAT, or through the use of a selection file.

directory
A computer term identifying a location on a disk containing a set of data files and other directories (subdirectories). Operating systems use directories to organize data. The location of a directory is specified with a pathname.

discrete data
Geographic features containing boundaries: point, line or area boundaries.

disk
A storage medium consisting of a spinning disk coated with a magnetic material for recording digital information.

diskette
An inexpensive, low-capacity storage medium, usually measuring 3.5 inches in diameter, often referred to as a floppy disk.

dissolve
The process of removing boundaries between adjacent polygons that have the same values for a specified attribute.

distance-decay function
In spatial interaction, the mathematical representation of the effect of distance on the accessibility and number of interactions between locations. It can be either a power or an exponential function.

DLG
1. Digital Line Graph files from the U.S. Geological Survey (USGS), including data from the base map categories such as transportation, hydrography, contours, and public land survey boundaries.

2. The digital format standards published by USGS for exchanging cartographic data files and in which the USGS delivers Digital Line Graph data sets.

DML
Data manipulation language. SQL statements that can be used either interactively or within programming language source code to access and retrieve data stored in a database management system.

domain
In a database, the set of allowed values for a table column, for example all positive integers.

double precision

Refers to a high level of coordinate accuracy based on the possible number of significant digits that can be stored for each coordinate. ARC/INFO data sets can be stored in either single- or double-precision coordinates. Double-precision coverages store up to 15 significant digits per coordinate (typically, 13 to 14 significant digits), retaining the accuracy of much less than one meter at a global extent. See also single precision.

downstream
In tracing, downstream is the direction along the arcs that is the same as the direction of flow. Direction of flow is determined by a user-defined convention. See also directed network.

drape
A perspective or panoramic rendering of two-dimensional features superimposed on a surface.

DTM
Digital terrain model. See digital elevation model.

DXF
Data Exchange Format. A format for storing vector data in ASCII or binary files. Used by AutoCAD and other CAD software for data interchange. DXF files are convertible to ARC/INFO coverages.

dynamic segmentation
The process of computing the locations of events on linear features at run time based on event tables for which distance measures are available. Route-system features and event-handling commands provide the dynamic segmentation capability within ARC/INFO.

E

edge matching
An editing procedure to ensure that all features that cross adjacent map sheets have the same edge locations. Links are used when matching features in adjacent coverages.

edit
To correct errors within, or modify, a computer file, a geographic data set, or a tabular file containing attribute data.

embedded SQL
SQL statements that are embedded in a host language program.

entity
A collection of objects (persons, places, things) described by the same attributes. Entities are identified during the conceptual design phase of database and application design.

entity relationship diagram
A graphical representation of the entities and the relationships between them. Entity relationship diagrams are a useful medium to achieve a common understanding of data among users and application developers.

environment
A set of parameters defining various display, editing, and data manipulation conditions that remain active during a session until explicitly changed by the user. For example, the drawing environment in ARCEDIT might be `arcs on, labels off, annotation.streets on'.

EOS
The Earth Observation Satellite. An effort to study the earth as a system while tracking long-term changes on a global scale. EOS, a mission of the National Aeronautics and Space Administration (NASA), will produce petabytes (1,000 terabytes) of satellite image data and also large-scale data sets (terabytes [1,000 gigabytes] a day) to be manipulated and analyzed.

equation item
An arithmetic expression used in place of an item name in an ARC/INFO command. For example, to list feature areas, a user could specify LIST AREA; to list areas in acres instead of square feet, a user could specify LIST AREA / 43560.

Ethernet
A network protocol defining a specific implementation of the Physical and Data Link Layers in the OSI model (IEEE 802.3). Ethernet is a local area network, using a bus topology, that provides reliable high-speed communications (maximum of 10 million bits per second) in a limited geographic area (e.g., office complex, university complex).

Equator
The parallel of reference 0 north or south.

event
A geographic feature occurring on or along a linear feature. There are three event types: linear, continuous, and point. For example, a left lane closure on route I-10 from the 1.5 to 2.1 mileposts is a linear event. A continuous event is a linear event where the start position of a segment is the same as the end position of its preceding event, such as for speed limits. A point event occurs at a point along a route, for example, an accident at milepost 6.3 on route I-10. In ARC/INFO, an event is defined in terms of a route and measures along the route. See also route-system.

event source
This is a name assigned by the user to reference a DBMS table containing event data for use with the dynamic segmentation commands. This is similar to the relate name. See also relate.

extended character set
Extended character sets support languages which require 8-bit characters or double-byte characters, such as Chinese and French. Compare with POSIX character set.

external file
INFO stores data in files within a database. However, database information can be stored in files outside of the database. These files are referred to as external files. For example, feature attribute tables are stored as external INFO data files maintained in the coverage directory.

external polygon
See universe polygon.

F

feature attribute table
A table used to store attribute information for a specific coverage feature class. ARC/INFO maintains the first several items of these tables. Feature attribute tables supported for coverages include:

.PAT for polygons or points .AAT for arcs .NAT for nodes .RAT for routes .SEC for sections .PAT for regions .TAT for annotation (text) where is the coverage name.

FDDI
Fiber Distributed Data Interface is a media access (transmission) control-level protocol with token-ring architecture, a communication bandwidth of 100 Mbps and supported on a fiber network medium. To provide required ARC/INFO communications, the workstation network communications software must include TCP/IP and NFS communication protocols, which the UNIX operating system provides. Packaging of TCP/IP communications for FDDI transmission is supported by a network interface card at the sending and receiving station, and this packaging is transparent to ARC/INFO applications and data.

feature class
1. A classification describing the format of geographic features and supporting data in a coverage. Coverage feature classes for representing geographic features include point, arc, node, route-system, route, section, polygon and region. One or more coverage features are used to model geographic features; for example, arcs and nodes can be used to model linear features such as street centerlines. The tic, annotation, link, and boundary feature classes provide supporting data for coverage data management and viewing.

2. The conceptual representation of a geographic feature. When referring to geographic features, feature classes include point, line, area, and surface.

Feature-ID
Synonymous term for Cover-ID and User-ID.

feature selection by attribute
See logical selection.

FGCC
Federal Geodetic Control Committee: a standards committee concerned with accuracy levels in geodetic control. Within the United States, coordinate control is based on the National Geodetic Survey's published control points and is a basis for collecting data. Data collected using these basic coordinate points can be read by ARC/INFO.

FGDC
The United States Federal Geographic Data Committee. Composed of representatives of several federal agencies and GIS vendors, the FGDC has the lead role in defining spatial metadata standards, which it describes in the Content Standards for Spatial Metadata (see CSSM, DGM, and SDTS.

field
In a database, another term for column.

field data collector
An electronic device that collects and stores observation information from survey instruments. Two types of devices are available: one records x,y,z coordinates using a satellite-based global positioning system (GPS), and the other device records distance and bearing ARC/INFO GENERATE is often used to convert GPS coordinates while ARC/INFO COGO has a FIELDDATA conversion program.

file
A set of related information that a computer can access by a unique name (e.g., a text file, a data file, a DLG file). Files are the logical units managed on disk by the computer's operating system. Files may be stored on tapes or disks.

file transfer
The process of copying data from one computer to another or one DBMS to another.

FIPS
The Federal Information Processing Standards. FIPS deals with a wide range of computer system components including the components of most GISs: hardware, storage media, data files, codes, interfaces, data transmission, networking, data management, documentation, programming languages, software engineering, performance, security, and so forth. FIPS 173 is the precursor to the SDTS (Spatial Data Transfer Standard), which includes standardized definitions for a variety of digital mapping terms, addressing federal requirements for accuracy. FIPS provides a U. S. government standard state and country identification code; standards approved for use by U.S. government agencies. FIPS 152-2 includes POSIX.1 Compliance.

font
A logical set of related patterns representing text characters or point symbols. Courier, Helvetica and Times are three types of font.

foreign key
One or more table attributes that can uniquely identify a record in another table. A foreign key is the primary key of another table. Foreign key-primary key relationships define a relational join. See also relate.

format
The pattern into which data are systematically arranged for use on a computer. A file format is the specific design of how information is organized in the file. For example, ARC/INFO has specific, proprietary formats used to store coverages. DLG, DEM, and TIGER are geographic data sets with different file formats.

forms interface
A graphic user interface characterized by user-controlled movement of a cursor from one data field to another. Contrast to command line interface.

from-node
Of an arc's two endpoints, the one first digitized.

functional surface
A surface representation which stores a single z value (as opposed to multiple z values) for any given x,y location. TIN represents data as functional surfaces. Functional surfaces are also referred to as 2.5-dimensional surfaces.

fuzzy tolerance
The fuzzy tolerance is an extremely small distance used to resolve inexact intersection locations due to limited arithmetic precision of computers. It defines the resolution of a coverage resulting from the CLEAN operation or a topological overlay operation such as UNION, INTERSECT, or CLIP.

G

gazetteer
A work of geographic reference that supplies place name and location information. When a place name is known, a gazetteer can provide the coordinates of the place. Most atlases contain gazetteers. Well-known digital gazetteers are the USGS Geographic Names Information System (GNIS) and the gazetteer in the Digital Chart of the World (DCW). In ARCINFO the gazetteer spatial index is done as a grid of alpha and numeric references which is converted into a polygon coverage. Places (points or polygons) are then overlaid with this grid, then sorted alphabetically. This produces a list of place names sorted both alphabetically and by reference grid number.

GBF/DIME
For the 1980 census, the U.S. Census Bureau produced Geographic Base Files (GBF) and Dual Independent Map Encoding (DIME) files, containing census geographic statistical codes and coordinates of line segments for most metropolitan areas. DIME files provide a schematic map of a city's streets, address ranges, and geostatistical codes relating to the Census Bureau's tabular statistical data. DIME was replaced by TIGER for the 1990 Census.

generalization
In general, reducing the number of points used to represent a line. In ARC/INFO, the process of removing vertices from arcs according to a specified tolerance.

geocode
The process of identifying the coordinates of a location given its address. For example, an address can be matched against a TIGER street network to determine the location of a home. Also referred to as address geocoding.

geographic data
The locations and descriptions of geographic features. The composite of spatial data and descriptive data.

geographic database
A collection of spatial data and related descriptive data organized for efficient storage and retrieval by many users.

geographic data set
One of seven geographic data types supported by ARC/INFO. Geographic data sets in ARC/INFO include coverages, grids, DBMS tables, tins, images, lattices, and CAD drawings.

geographic feature
A user-defined geographic phenomenon that can be modeled or represented using geographic data sets in ARC/INFO. Examples of geographic features include streets, sewer lines, manhole covers, accidents, lot lines, and parcels.

geographic information system
See GIS.

geometry
Geometry deals with the measures and properties of points, lines and surfaces. In ARC/INFO, geometry is used to represent the spatial component of geographic features.

georeference
To establish the relationship between page coordinates on a planar map and known real-world coordinates.

georelational model
A geographic data model that represents geographic features as an interrelated set of spatial and descriptive data. The georelational model is the fundamental data model used in ARC/INFO.

GIRAS
Geographic Information Retrieval and Analysis data files from the U.S. Geological Survey. GIRAS files contain land use/land cover information for areas in the United States, including attributes for land use, land cover, political units, hydrologic units, census and county subdivisions, federal landownership and state landownership. These data sets are available to the public in both map and digital form.

GIS
Geographic information system. 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.

GOSIP
Government Open System Interconnection Protocols are U.S. government procurement specifications for OSI protocols (see OSI). The government has mandated that all federal agencies standardize on the OSI model and implement OSI-based systems for GOSIP. Most vendors (Sun, IBM, HP, DEC, etc.) have either complied or are working toward compliance.

global positioning system
A system of satellites and receiving devices used to compute positions on the Earth. GPS is used in navigation, and its precision supports cadastral surveying.

GPS
See global positioning system.

grain tolerance
A parameter controlling the number of vertices and the distance between them on arcs representing curves. The smaller the grain tolerance, the closer vertices can be. Unlike densify tolerance, grain tolerance can affect the shape of curves.

graphical user interface (GUI)
A graphical method of controlling how a user interacts with a computer to perform various tasks. Instead of issuing commands at a prompt, the user performs desired tasks by using a mouse to choose from `a dashboard' of options presented on the display screen. These are in the form of pictorial buttons (icons) and lists. Some GUI tools are dynamic and the user must manipulate a graphical object on the screen to invoke a function; for example, moving a slider bar to set a parameter value (e.g., setting the scale of a map).

graphics display terminal
A computer terminal used to view and manipulate graphic information. It can also be used for graphic selection (e.g., identifying a feature on the display), digitizing and editing.

graphics page
That area on the graphics display device reserved for map display, or simulating the plotter page area. Page units are typically in centimeters or inches instead of real-world coordinates such as meters or feet. Maps are composed on the graphics page.

GRASS
Geographical Resource Analysis Support System. A public-domain raster GIS modeling product of the U.S. Army Corp of Engineers' Construction Engineering Research Laboratory (USACERL).

gravity model
A methodology used in the geography, engineering and social sciences to model the behavior of populations. The underlying assumption of the gravity model is that the influence of populations on one another is inversely proportional to the distance between them. This approach is analogous to the view of gravitational attraction from Newtonian physics.

GRID
A fully integrated grid (cell-based) geoprocessing system for use with ARC/INFO. GRID supports a Map

Algebra spatial language that allows sophisticated spatial modeling and analysis.

grid
A geographic data model representing information as an array of equally sized square cells arranged in rows and columns. Each grid cell is referenced by its geographic x,y location. See also raster and grid cell.

grid cell
A discretely uniform unit that represents a portion of the Earth, such as a square meter or square mile. Each grid cell has a value that corresponds to the feature or characteristic at that site, such as a soil type, census tract, or vegetation class. Additional values of the cell can be stored in a value attribute table (VAT).

GUI
See graphical user interface.

H

hardware
The physical components of a computer system-the computer, plotters, printers, terminals, digitizers, and so on.

heuristic
A computational method that uses trial and error methods to approximate a solution for computationally difficult problems.

historical view
In ArcStorm, a snapshot of the state of a given data source at a given time. In an historical view, the database is not modified, and no data is created locally, it is simply a `read-only' view of the past.

history
A mechanism in ArcStorm to enable the tracking of changes made to a data source. This enables the creation of historical views and supports `rolling back' the data to a previous period in time.

hub
A transportation hub is a node in a network that can be used to channel goods from origins to destinations. Hubs are used at strategic locations in a network to reduce transportation costs.

I

IAC
Interapplication communication. The capability of one computer program to communicate with another program. With IAC, two (or more) programs can execute simultaneously, share data, and make requests of each other. ARC/INFO Version 7 and ArcView Version 2 support IAC. IAC tools in AML (ARC Macro Language) support real-time GIS, a network GIS process server, interoperability, and open integration between ARC/INFO and other applications. In a client/server environment the command references on the client side are IACCONNECT, IACDISCONNECT, and IACREQUEST; on the server side are IACOPEN, IACCLOSE, and &IACRETURN.

identity
The topological overlay of a coverage (input) with a polygon coverage (identity). For each feature in the input coverage, the intersection with identity features is determined, creating new features of the same feature class as the input coverage. For example, a road (input coverage, arc feature class) passing through two counties (identity coverage) would be split into two arc features, each with the attributes of the road and the county it passes through. Compare with intersect and union.

identity link
A coverage link whose from-location is the same as its to-location. Used to control rubber sheeting and adjustment operations. Identity links act as nails to hold down the point location during adjustment. See also link.

IEEE

Institute of Electrical and Electronics Engineers. IEEE Standard 1003.1-1990 (aka POSIX.1) defines C program interfaces for the operating system that enable source code portability beyond the ANSI C definition (see POSIX). ARC/INFO and ArcView are fully compatible with network protocols that support IEEE 802.5, FDDI and X.25 transport standards.

IGDS

Interactive Graphics Design Software. Intergraph IGDS file formats can be converted to and from ARC/INFO coverages.

IGES

Initial Graphics Exchange Specification (IGES) is a common data format used for transfer of CAD data. IGES files can be converted to and from ARC/INFO coverages.

image

A graphic representation or description of a scene, typically produced by an optical or electronic device. Common examples include remotely sensed data (e.g., satellite data), scanned data, and photographs. An image is stored as a raster data set of binary or integer values that represent the intensity of reflected light, heat, or other range of values on the electromagnetic spectrum.

image catalog

An organized set of spatially referenced, possibly overlapping, images that can be accessed as one logical image. An image catalog is a group of images on disk, each referenced by a record in an INFO data file. At a minimum, items in the data file include the image pathname and the bounding coordinates xmin,ymin and xmax,ymax.

image integrator

A collection of image management and display tools in ARC/INFO that allows vector and raster data to be displayed concurrently. Image integrator commands georeference images to real-world coordinates, display images, and manage image catalogs.

impedance

The amount of resistance (or cost) required to traverse a line from its origin node to its destination node or to make a turn (i.e., move from one arc through a node onto another arc). Resistance may be a measure of travel distance, time, speed of travel times the length, and so on. Higher impedance indicates more resistance to movement, with 0 indicating no cost. Often, a negative impedance value indicates a barrier. Impedance is used in network routing and allocation. An optimum path in a network is the path of least resistance (or lowest impedance).

index

Special data structure used in a database to speed searching for records in tables or spatial features in geographic data sets.

ARC/INFO supports both spatial and attribute indexes. See also item indexing, cross-tile indexing and spatial indexing.

index coverage

The polygon coverage that describes, and is used as a spatial index for, the tile structure of a layer. Each polygon in an index coverage corresponds to a tile.

INFO

A tabular DBMS used by ARC/INFO to store and manipulate feature attribute tables and other related tables.

INFO database

The contents of a set of INFO data files, feature attribute tables, and related files stored in each ARC/INFO workspace under a subdirectory named INFO. This subdirectory contains all feature attribute tables for the set of coverages contained in the workspace.

INFORMIX

A relational database management system to which ARC/INFO has access through the DATABASE INTEGRATOR.

INGRES

A relational database management system to which ARC/INFO has access through the DATABASE INTEGRATOR.

integer
A number without a decimal (0, 1, 25, 173, 1032, etc.). Integer values can be less than, equal to, or greater than zero.

interaction
Interaction is a measure of the estimated number of trips that will be generated between origins and destinations for a particular activity. Interactions depend upon the properties of the origin to generate a trip, the property of the destination to attract a trip and the cost of traveling between them.

interaction matrix
A generated INFO file containing the number of interactions occurring between a set of origins and destinations. The interaction matrix can be analyzed to make trade-area maps.

inter-application communication (IAC)
A technology that enables software applications on remote or local machines to communicate with each other. IAC makes it possible to develop applications that seamlessly integrate the capabilities of a number of programs by providing a way for external applications to request services of ARC/INFO and for an AML application to exploit the capabilities of other applications.

interface
For data communication, a hardware and software link that connects two computer systems, or a computer and its peripherals.

internal number
See Cover#.

Internet
An international consortium of wide area networks that operate using a standard set of addresses allowing machine-to-machine connectivity on a global scale. The Internet is an outgrowth of a Defense Advanced Research Projects Agency (DARPA) research project in the early 1970s to provide connectivity between scientists running computer simulations in different locations. Additional regional, private, and public networks have joined the Internet over time. At this point there are over two million computers that now have direct access to the resources on the Internet. ESRI operates a discussion group on the Internet called ESRI-L. ESRI-L is open to the general public and is available to any Internet subscriber. It was established to give ARC/INFO users a way to exchange technical questions and information.

interpolation
The estimation of z values of a surface at an unsampled point based on the known z values of surrounding points.

intersect
The topological integration of two spatial data sets that preserves features that fall within the area common to both input data sets. See also identity and union.

ISDN
Integrated Services Digital Network, provides WAN (see WAN) combined transmission of analog and digital services. ISDN is offered as a Basic Rate Service on either one or two channels for WAN services of either 64 kbps or 128 Kbps. ISDN services are available from a long-distance telephone company.

ISO
The International Organization for Standardization. A worldwide federation of national standards bodies (e.g., ANSI from the U.S.) that develops international standards. A Technical Committee (ISO/TC211) is developing international Geographic Information/Geomatics standards. Among many other computing standards, ISO maintains an SQL standard and is developing an extended version, SQL3, which will support queries on geographic data sets.

ISO 8211
The third of three parts of the SDTS (see SDTS) that specifies data transfer implementation (i.e., encoding method). ISO 8211 is a general-purpose, media-independent interchange standard whose variable length records

may be written on any medium that is able to accept them, including communications lines.

ISO 9000
Established in 1987, ISO 9000 is an international set of five related standards for qualification of global quality assurance and quality control standards. Adherence is accomplished through an application process for ISO 9000 certification in company standards for inspecting production processes, updating records, maintaining equipment, training employees and handling customer relations. The governing international consortium is recognized worldwide.

ISO 9660
Volume and file structure of CD-ROM for Information Interchange. A standard for the organization of data on CD-ROM media established by the International Standards Organization.

isoline
A line on a surface connecting points of equal value.

item
A column of information in an attribute table, for example, a single attribute of a record in an INFO data file.

item indexing
A means of accelerating logical queries and tabular `relates' by creating an index on an item in a database table.

ITUM
Integrated Terrain Unit Mapping is an example of integrated data management. It is the process of adjusting terrain unit boundaries so that there is increased coincidence between the boundaries and occurrences of interdependent terrain variables such as hydrography, geology, physiography, soils and vegetation units.

J

join
See relational join.

L

label point
See point.

LAN
Local area network. Computer data communications technology that connects computers at the same site. Computers and terminals on a LAN can freely share data and peripheral devices, such as printers and plotters. LANs are composed of cabling and special data communications hardware and software.

Landsat
A series of satellites that produce images of the earth. The Landsat remote sensing satellite program was developed by NASA (National Aeronautics and Space Administration). Landsat data are provided in .BIL (band interleaved by line) or .BIP (band interleaved by pixel) formats. BIL and BIP are supported by ARC/INFO and ArcView.

latitude-longitude
A spherical reference system used to measure locations on the Earth's surface. Latitude and longitude are angles measured from the Earth's center to locations on the Earth's surface. Latitude measures angles in a north-south direction. Longitude measures angles in the east-west direction.

lattice
A surface representation that uses a rectangular array of mesh points spaced at a constant sampling interval in the x and y directions relative to a common origin. A lattice is stored as a grid, but represents the value of the surface only at the mesh points rather than the value of the entire cell.

layer
A thematic set of spatial data described and stored in an ArcStorm database or a LIBRARIAN map library. Layers organize a database or map library by subject matter (e.g., soils, roads, and wells). Conceptually, layers in a database or map library environment are exactly like coverages. See also ArcStorm database and map library.

layer index
See cross-tile indexing.

least-cost path
The path, among possibly many, between two points which has the lowest traversal cost, where cost is a function of time, distance, or other user-defined factors. See also impedance.

left-right topology
The topological data structure ARC/INFO uses to represent contiguity between polygons. Left-right supports analysis functions such as adjacency. See also topology.

legend
1. The reference area on a map that lists and explains the colors, symbols, line patterns, shadings, and annotation used on the map. The legend often includes the scale, origin, orientation, and other map information.

2. The symbol key used to interpret a map.

LIBRARIAN
A set of software tools to manage and access large geographic data sets in a map library. LIBRARIAN commands create and define a map library, move data in and out of a library, query the data in a map library, and display the results of a query.

library
A collection of spatially related ArcStorm or LIBRARIAN layers. A library has a spatial extent which applies to all layers in the library.

line
1. A set of ordered coordinates that represents the shape of geographic features too narrow to be displayed as an area at the given scale (e.g., contours, street centerlines, or streams), or linear features with no area (e.g., state and county boundary lines).

2. A single arc in a coverage.

3. A line on a map (e.g., a neatline).

line-in-polygon
A spatial operation in which arcs in one coverage are overlaid with polygons of another coverage to determine which arcs, or portions of arcs, are contained within the polygons. Polygon attributes are associated with corresponding arcs in the resulting line coverage.

line symbol
A symbol for drawing coverage arcs.

linear event
See event.

linear feature
A geographic feature that can be represented by a line or set of lines. For example, rivers, roads within a pizza delivery area, and electric and telecommunication networks are all linear features. Linear features are represented in ARC/INFO by arcs or by the route-system feature class.

link
A coverage feature class; links are two-point segments that represent from- and to-locations for the rubber sheeting adjustment process.

literal

A string, a number, or a date which directly represents a constant value. `XYZ123', `1234' and `6/10/57' are examples of a string literal, a numeric literal and a date literal, respectively.

local area network
See LAN.

log file
A coverage or workspace history file containing a list of all commands used to operate on a coverage or all commands used in the workspace.

logical connector
One of the reserved words AND, OR and XOR used to build complex logical expressions in a query.

logical expression
A combination of items, system items, system variables, literals and arithmetic logical operators from which a value of TRUE or FALSE is derived; for example,

$RECNO LE $NUM1 HRS-WRKD * HRLY-WAGE GE 600 AND $MONTH EQ 5 $NUM1 LE 100

logical operator
Another term for Boolean operator. See Boolean expression.

logical selection
The process of selecting a subset of features from a coverage using logical expression that operates on the attributes of coverage features (e.g., AREA GT 16000). Only those features whose attributes meet the criteria are selected. Also known as feature selection by attribute.

long transaction
Long transactions support applications where changes to a database might span several days, weeks or months and may involve several sessions. Many planning and design activities, such as subdivision development, require long transactions.

longitude
See latitude-longitude.

lookup table
1. A special tabular data file containing additional attributes for features stored in an associated feature attribute table. The table can be an external attribute table or an INFO table that describes coverage features.

2. A special lookup table in which numeric item values are classified into categories. For example, well depth can be recorded explicitly in the feature attribute table, but displayed and used as a set of classes, such as 0 to 250 feet, 251 to 500 feet, and so on. An INFO lookup table contains at least two items: the relate item and an item named either SYMBOL or LABEL.

M

macro
A text file containing a sequence of commands that can be executed as one command. Macros can be built to perform frequently used, as well as complex, operations. The ARC Macro Language (AML) is used to create macros for ARC/INFO.

many-to-one relate
A relate in which many records in one table are related to a single record in another table.

map
An abstract representation of the physical features of a portion of the Earth's surface graphically displayed on a planar surface. Maps display signs, symbols, and spatial relationships among the features. They typically emphasize, generalize, and omit certain features from the display to meet design objectives (e.g., railroad features might be included in a transportation map but omitted from a highway map).

map extent

1. The rectangular limits (xmin,ymin and xmax,ymax) of the area of the Earth's surface displayed using ARC/INFO. Map extent is specified in the coordinate system of the coverage or other geographic data set used. Typically, the extent of the geographic database (or a portion of it defined by a zoomed-in view) defines the map extent for display.

2. The geographic extent of a geographic data set specified by the minimum bounding rectangle (i.e., xmin,ymin and xmax,ymax).

map library

An organized, uniformly defined collection of spatial data partitioned by layers and tiles into component parts called map sections. A map library organizes geographic data spatially as a set of tiles and thematically as a set of layers. The data in a map library are indexed by location for optimal spatial access. A map library organizes coverages spatially by tiles and thematically by layer.

map limits

The rectangular area on the graphics page in which geographic features are displayed. All geographic data are drawn within the map limits, and none outside the map limits. Map titles and legends can be drawn outside the map limits.

map projection

A mathematical model that transforms the locations of features on the Earth's surface to locations on a two-dimensional surface. Because the Earth is three-dimensional, some method must be used to depict a map in two dimensions. Some projections preserve shape; others preserve accuracy of area, distance, or direction. See also coordinate system.

Map projections project the Earth's surface onto a flat plane. However, any such representation distorts some parameter of the Earth's surface be it distance, area, shape, or direction.

map query

The process of selecting information from a GIS by asking spatial or logical questions of the geographic data. Spatial query is the process of selecting features based on location or spatial relationship (e.g., select all features within 300 feet of another; point at a set of features to select them). Logical query is the process of selecting features whose attributes meet specific logical criteria (e.g., select all polygons whose value for AREA is greater than 10,000 or select all streets whose name is `Main St.'). Once selected, additional operations can be performed, such as drawing them, listing their attributes or summarizing attribute values.

map scale

The reduction needed to display a representation of the Earth's surface on a map. A statement of a measure on the map and the equivalent measure on the Earth's surface, often expressed as a representative fraction of distance, such as 1:24,000 (one unit of distance on the map represents 24,000 of the same units of distance on the Earth). Map scale can also be expressed as a statement of equivalence using different units; for example, 1 inch = 1 mile or 1 inch = 2,000 feet.

map section

The unit of data storage in a map library. A map section is the data for one layer in one tile of a map library. Map sections are implemented as ARC/INFO coverages. See also map library, layer and tile.

map-to-page transformation

The process of positioning and scaling a map on a graphic page. It controls how coverage coordinates are transformed into graphics on the display screen or plotter page. (Coverages are not maps; they contain the unscaled coordinates that ARC/INFO uses to draw maps.)

map units

The coordinate units in which a geographic data set (e.g., a coverage) is stored in ARC/INFO. Map units can be inches, centimeters, feet, meters, or decimal degrees.

marker symbol

A symbol used to represent a point location such as an airport.

mass point

Irregularly distributed sample points, each with an x,y location and a z value, which are used as the basic elements to build a tin. Each mass point has important, yet equal, significance in terms defining the tin surface. Ideally, the location of each mass point is intelligently chosen to capture important variations in the surface's morphology.

MDI

Multiple Document Interface was developed by Microsoft, with menus, buttons, tools, and windows called documents. ArcView is based on the MDI standard, including multiple document types: Project View, Table, Layout, Chart, and Scripts. Documents can be organized and manipulated in a variety of standard ways: tiled, cascaded, iconified, resized, or closed.

meridian

A line running vertically from the north pole to the south pole along which all locations have the same longitude. The Prime Meridian (0) runs through Greenwich, England. From the Prime Meridian, measures of longitude are negative to the west and positive to the east up to 180, halfway around the globe.

mesh point

One sample point in the array of sample points in a lattice. Each mesh point is located at a constant sampling interval in the x and y directions relative to a common origin, and contains the z value for the surface at that location. Mesh points outside the surface, or which represent holes in the surface, are assigned anull value.

minimum bounding rectangle

A rectangle, oriented to the x and y axes, which bounds a geographic feature or a geographic data set. It is specified by two coordinates: xmin,ymin and xmax,ymax. For example, the BND defines a minimum bounding rectangle for a coverage.

minimum mapping units

For a given map scale, the size or dimension below which a long narrow feature is represented as a line and a small area as a point. For example, streams and rivers will be represented as lines if their width is less than .10 inch, and polygons smaller than .125 inch on a side will be represented as a point.

model

A representation of reality used to simulate a process, understand a situation, predict an outcome, or analyze a problem. A model is structured as a set of rules and procedures, including spatial modeling tools available in a geographic information system (GIS). See also spatial modeling, data model, analysis and spatial analysis.

modeling

See model.

moment

The moment is the time when all the tasks associated with a transaction have completed. A feature's creation, deletion or update date is set to the transaction's moment.

morphology

The form and structure of a surface. In tins, the morphology of a surface is defined by the sample points and breakline features used to build the tin. Breaklines, when properly located at locations of significant change in surface behavior, play a major role in defining surface morphology. In lattices, the morphology of a surface cannot be directly represented by sample points and linear features; it must be implied from the mesh point z values.

Mosaic

Software used to access resources on the Internet. The Mosaic project has been conducted by the National Center for Supercomputing Applications (NCSA) in Illinois to provide a single front-end or user interface to many information services. The goal is to present the query to, and results from, each of these different information resources in a similar way to minimize the number of "systems" one must be familiar with to successfully navigate the Internet. Mosaic relies on the existence of servers; it does not serve information of its own. Mosaic client software exists for X Windows, Macintosh, and Microsoft Windows. Computers must be connected to the Internet to use Mosaic.

mouse

A hand-controlled hardware device for interacting with a computer terminal or entering data from a digitizer. A

mouse is used to make selections and position the cursor to fields in computer forms when interacting with graphical user interfaces. A digitizer mouse is used to trace features and enter x,y coordinates of features.

MSS
Multispectral scanner. An instrument on some satellites used for imaging the earth. An MSS image will have data recorded by the scanner from three or more bands of the electromagnetic spectrum. ARC/INFO can read multispectal images in various formats.

N

NAT
Arc attribute table. A table containing attributes for node coverage features. For each node, the NAT contains a reference to one of the arcs it connects to, an internal node sequence number and node feature identifier. See also feature attribute table.

native mode usage
A statement syntax entered in ARC/INFO in the language of an external system. Inclusion of an SQL WHERE clause in an ARC/INFO native mode SQL selection operation, or the declaration of a DBMSCURSOR are examples of native mode SQL usage.

NBS
National Bureau of Standards, now known as NIST (see NIST).

neatline
A border line commonly drawn around the extent of a map.

network
1. An interconnected set of arcs representing possible paths for the movement of resources from one location to another.

2. A coverage representing linear features containing arcs or a route-system. Also known as network coverage.

3. When referring to computer hardware systems, a local area network (LAN) or a wide area network (WAN).

NETWORK
The ARC/INFO software product that performs address matching/ geocoding, allocation, routing, and pathfinding across linear networks.

network coverage
In ARC/INFO, a line coverage on which network tools such as PATH and ALLOCATE can operate.

network element
The components of a network in ARC/INFO, including network links and network nodes, of which there are three types: stops, centers, and turns.

network link
Network links are interconnected linear entities which represent the conduits for transportation (e.g., vehicles, fluids, electricity) and communication networks, for example, highways and electrical transmission lines. In ARC/INFO, links are represented as arcs with attributes stored in the AAT.

network node
Network nodes are the endpoints and connecting points of network links, for example, intersections and interchanges of a road network, the confluence of streams in a hydrologic network, or switches in a power grid. In ARC/INFO, network nodes are used to model stops, centers, and turns. Network nodes are represented as nodes, with attributes stored in an NAT.

networking protocols
A networking protocol is software that provides a communication gateway (link) allowing the exchange of data between various networking systems. Protocols are a fixed set of rules used to specify the format of an exchange

of data.

NFS
The Network File System (NFS) protocol allows a given computer to access a disk on another computer over a network in a transparent fashion. The hard disk can be accessed just as easily as if it were local to the user's machine. To get access to a disk across a network, the disk must be NFS mounted on the user's local machine. See your system administrator for such operations.

NIST
National Institute of Standards & Technology is the agency that produces the Federal Information Processing Standards (FIPS) for all U.S.A. government agencies except the Department of Defense.

NMAS
National map accuracy standards are specifications of accuracy standards for well-defined map points on published maps that are specified by the U.S. Geological Survey and revised by the U.S. Bureau of the Budget.

node
1. The beginning and ending locations of an arc. A node is topologically linked to all arcs that meet at the node. See also network node.

2. In graph theory, the location at which three or more lines connect.

3. The three corner points of each triangle in a tin. Every sample point input to a tin becomes a node in the triangulation. A triangle node is topologically linked to all triangles that meet at the node.

node match tolerance
The minimum radial distance within which two nodes will be joined (matched) to form one node.

normalization
A conceptual database design task that involves applying data dependency to a data model to avoid data inconsistencies by prohibiting redundancy.

NTF
National Transfer Format (British Standard BS 7567). NTF is an exchange format that permits the transfer of vector data with five different levels of complexity. NTF is the format used by the British Ordinance Survey.

null value
The absence of a value. If a particular column of a row in a table is null, that means there is no value stored. Null is not the same as blank or zero.

O

OCR
Optical Character Recognition is the automatic recognition and interpretation of text.

ODBC
Open Database Communication. A standard API (application program interface) used to communicate with database management systems, developed by Microsoft, and incorporated in ArcView Version 2. ArcView supports ODBC for DBMSs on the Microsoft Windows platform.

OGC
The Open GIS Consortium, a group composed of software vendors, academics, government agencies, consultants and software integrators, dedicated to open systems geoprocessing. Their first project is to develop an open geodata interoperability specification (OGIS).

OGIS
The Open Geodata Interoperability Specification being developed by OGC to support interoperability of GIS systems in a heterogenous computing environment.

OLE

Object Linking and Embedding developed by Microsoft. Allows objects from one application to be embedded within another (e.g., taking an Excel spreadsheet and putting it into a Word document). ArcView Version 2 does not support the still evolving OLE standard. Instead, it supports DDE (see DDE). OLE support is planned for future releases of ArcView.

OMG

The Object Management Group is a computing industry collaboration to promote object-oriented interoperability among heterogeneous computing environments. They continue to develop specifications which address the many aspects of this problem, the most popular of which is the Common Object Request Broker Architecture (CORBA).

one-to-many

A relate in which one record in a table is related to many records in another table.

OPEN LOOK

A graphical user interface (GUI) for the X Window system developed by AT&T (Open Look) and Sun Microsystems (OPEN LOOK). (See also OSF/Motif).

online access

Direct access to data that does not involve file transfer.

optical disk

A digital data storage technology that uses optical media to store information. Optical disks are slower, but store more data and cost less per unit of stored data than magnetic disks. Several optical platters can be installed in a single device called a jukebox. Optical disks are used when very large amounts of data need to be stored.

operating system

Computer software designed to allow communication between the computer and the user. The operating system controls the flow of data, the application of other programs, the organization and management of files, and the display of information.

ORACLE

A relational database management system to which ARC/INFO has access through the DATABASE INTEGRATOR.

OS

See operating system.

OSF

The Open Software Foundation is an international consortium that promotes the standardization of the UNIX operating system.

OSF/MOTIF

An industry-standard graphical user interface developed by the Open Software Foundation for the UNIX workstation environment.

OSI

Open Systems Interconnect, a seven-layer hierarchical reference interface and communications model sponsored by ISO, 1984, known as the OSI Reference Model: layer 7--applications, layer 6--presentations, 5--session, 4--transport, 3--network, 2--data link, 1--physical. This model is incorporated at the operating system level. The OSI model is used to develop interfaces and integrate two dissimilar systems (i.e., PCs and UNIX or UNIX and mainframes).

origin

1. The reference location for a planar coordinate system, usually represented by the values 0,0.

2. The place where a trip starts. This is usually the home for most consumers. For a population group, an origin could be a census tract or a city. Origins are represented as nodes in a network coverage, as points in a point coverage, and as label points in a polygon coverage.

overlay

See topological overlay.

overshoot
That portion of an arc digitized past its intersection with another arc. See also dangling arc.

P

page extent
Defines a rectangular portion of the graphics page to be displayed.

pan
To move the viewing window up, down, or sideways to display areas in a geographic data set which, at the current viewing scale, lie outside the viewing window. See also zoom.

parallel
1. A property of two or more lines that is separated at all points by the same distance.

2. A horizontal line encircling the Earth at a constant latitude. The Equator is a parallel whose latitude is 0. Measures of latitude range from 0 to 90 north of the Equator and from 0 to -90 to the south.

PAT
Point attribute table or polygon attribute table. A coverage can have either a point attribute table or a polygon attribute table, but not both. In addition to user-defined attributes, a PAT contains data on area and perimeter of a polygon (values are 0 for points), an internal sequence number and feature identifier.

The PAT is also used for regions. The same attributes are maintained, however, the name of the attribute table is PAT, where is the name of the region for which attributes are stored. One polygon and many region attribute tables can be stored in the same coverage. See feature attribute table.

path
An ordered set of network links and network nodes which connects an origin to a destination (center).

pathfinding
The process of finding a path between an origin and destination, which usually involves determining a least-cost path.

pathname
The path to a file or directory located on a disk. Pathnames are always specific to the computer operating system.

Paul Revere tour
A traveling salesman tour in which the start is different from the ending stop. The name is derived from American history, after the famous ride of Paul Revere.

peak
A point around which all slopes are negative (i.e., downward).

peripheral device
A hardware device not part of the central computer (e.g., digitizers, plotters, and printers).

persistent lock
A long-term database lock required when users wish to maintain a consistent view of their data while doing modifications over a long transaction.

petabyte
A measure of data size. One petabyte is equivalent to 1,000 terabytes.

pit
A point around which all slopes are positive (i.e., upward).

pixel

A contraction of the words picture element. The smallest unit of information in an image or raster map. Referred to as a cell in an image or grid.

point

1. A single x,y coordinate that represents a geographic feature too small to be displayed as a line or area; for example, the location of a mountain peak or a building location on a small-scale map.

2. A coverage feature class used to represent point features or to identify polygons. It is not possible to have point and polygon features in the same coverage. When representing point features, the x,y location of the label point describes the location of the feature. When identifying polygons, the label point can be located anywhere within the polygon. Attributes for points are stored in a PAT.

point-in-polygon

A topological overlay procedure which determines the spatial coincidence of points and polygons. Points are assigned the attributes of the polygons within which they fall.

point event

See event.

polygon

A coverage feature class used to represent areas. A polygon is defined by the arcs that make up its boundary and a point inside its boundary for identification. Polygons have attributes (PAT) that describe the geographic feature they represent.

polygon-arc topology

The topological data structure ARC/INFO uses to represent connectivity between arcs to form polygons. Polygon-arc topology supports the definition of polygons and analysis functions such astopological overlay. See also topology.

polygon overlay

A topological overlay procedure which determines the spatial coincidence of two sets of polygon features and creates a new set of polygons based on identity, intersect, or union.

POSIX character set

POSIX character sets support languages which only require 7-bit characters (such as US English). See also extended character set.

POSIX 1003.1A

A revision to the POSIX 1003.1 standard that defines a set of standard operating system interfaces and an environment for application programs written in C.

POSIX 1003.4a

Defines thread support to facilitate writing multitasking operations, particularly server applications.

PostScript

PostScript is a page-description computer language developed, marketed, and trademarked by Adobe Systems, Inc. PostScript is supported on most LaserWriter printers. PostScript is particularly useful in computerized typesetting applications and desktop publishing with graphics. PostScript files can be plotted on non-PostScript plotting devices by means of Raster Image Processor (RIP) software.

precision

Refers to the number of significant digits used to store numbers, and in particular, coordinate values. Precision is important for accurate feature representation, analysis and mapping. ARC/INFO supportssingle precision and double precision.

preliminary topology

Refers to incomplete region topology. Region topology defines region-arc and region-polygon relationships. A topological region has both the region-arc relationship and the region-polygon relationship. A preliminary region has the region-arc relationship but not the region-polygon relationship. In other words, preliminary regions have no polygon topology.

primary key
One or more attributes whose values uniquely identify a row in a database table. See also foreign key.

production
The property of an origin which produces a trip for a particular activity. This is usually a function of the population at the origin. For example, a household production for two adults and one child might be one trip per week for groceries, two trips per day for work, three trips per six months to see a dentist, and so on. Interactions between an origin and a center are estimated bases on how much of an origin's production will be attracted to a particular center.

profile
A vertical sectional view of a surface derived by sampling surface values along a section line.

projection
See map projection.

projection file
1. A coverage file that stores the parameters for the map projection and coordinate system of a geographic data set (e.g., a coverage).

2. A text file containing input and output projection parameters that can be used to convert a geographic data file from one coordinate system to another.

proximal tolerance
The minimum distance in ground units separating all point locations on the horizontal plane. If two or more points are found within the proximal tolerance distance of each other, only the first point read is passed for further processing.

pseudo node
A node where two, and only two, arcs intersect, or a single arc that connects with itself.

Q

quadrangle (quad)
See topographic map.

quadtree
A spatial index which recursively decomposes a data set (e.g., image) into square cells of different sizes until each cell has a homogeneous value. Quadtrees are often used for storing raster data. See also spatial indexing.

query
See map query.

R

raster
A cellular data structure composed of rows and columns for storing images. Groups of cells with the same value represent features. See also grid.

RAT
See route attribute table.

RDBMS
Relational database management system. A database management system with the ability to access data organized in tabular files that can be related to each other by a common field (item). An RDBMS has the capability to recombine the data items from different files, providing powerful tools for data usage. See also relate.

real numbers

Decimal numbers (e.g., 3.1417, 0.25, 1.8992, 6.0).

record
1. In an attribute table, a single `row' of thematic descriptors. In SQL terms, a record is analogous to a tuple.

2. A logical unit of data in a file. For example, there is one record in the ARC file for each arc in a coverage.

rectification
The process by which an image or grid is converted from image coordinates to real-world coordinates. Rectification typically involves rotation and scaling of grid cells, and thus requires resampling of values.

referential integrity
The capability to ensure that changes to one table that affect other tables are transmitted to those other tables. For example, a table will not be given a foreign key value that does not exist as a primary key in another table.

region
A coverage feature class used to represent a spatial feature as one or more polygons. Many regions can be defined in a single coverage. Regions have attributes (PAT) that describe the geographic feature they represent.

registered table
A DBMS table which is part of an ArcStorm database is said to be `registered' with the database.

relate
An operation that establishes a temporary connection between corresponding records in two tables using an item common to both (i.e., relate key). Each record in one table is connected to those records in the other table that share the same value for the common item. Compare with relational join.

relate key
The common set of columns used to relate two attribute tables. See also relate, primary key and foreign key.

relation
See table.

relational database
A method of structuring data as collections of tables that are logically associated to each other by shared attributes. Any data element can be found in a relation by knowing the name of the table, the attribute (column) name, and the value of the primary key. See also relate, relate key, and relational join.

relational join
The operation of relating and physically merging two attribute tables using their common item.

remote sensing
Acquiring information about an object without contacting it physically. Methods include aerial photography, radar, and satellite imaging.

resampling
The process of reducing image data set size by representing a group of pixels with a single pixel. Thus, pixel count is lowered, individual pixel size is increased, and overall image geographic extent is retained. Resampled images are "coarse" and have less information than the images from which they are taken. Conversely, this process can also be executed in the reverse. In ARC/INFO, the GRID function RESAMPLE supports resampling of raster data using Cubic Convolution, Bilinear Interpolation, Nearest Neighbor Assignment, and custom "Nearest Data" assignment methods.

resolution
1. Resolution is the accuracy at which a given map scale can depict the location and shape of geographic features. The larger the map scale, the higher the possible resolution. As map scale decreases, resolution diminishes and feature boundaries must be smoothed, simplified, or not shown at all. For example, small areas may have to be represented as points.

2. Distance between sample points in a lattice.

3. Size of the smallest feature that can be represented in a surface.

4. The number of points in x and y in a grid or lattice (e.g., the resolution of a U.S. Geological Survey one-degree DEM is 1201 x 1201 mesh points).

restore
To return a database to a previous state by undoing all changes made since the given time. ArcStorm provides a restore mechanism.

RMS error
Root mean square error. A measure calculated when registering a map to a digitizer, indicating the discrepancy between known point locations and their digitized locations. The lower the RMS error, the more accurate the digitizing or transformation. See also tic.

roll back
To cancel any changes to a database made during the current transaction. Compare with commit.

route
A feature class in ARC/INFO that is part of the route-system data model used to represent linear features. Routes are based on an arc coverage and are defined as an ordered set of sections. Because sections represent the portion of an arc used in a route, routes do not have to begin or end at nodes. The route attribute table (RAT) stores route attributes. See also route-system and route measure.

route attribute table (RAT)
Route attribute table. An RAT stores route attributes. There is one RAT for each route-system in a coverage. In addition to user-defined attributes, an RAT contains a sequence number and feature identifier for each route. See also route-system, section, SEC, and feature attribute table.

route measure
A location along a route, defined as a measure from a start point, where measures include distance, time, milepost, address range. Measures are useful for locating events along a route. There may be more than one start or end within a route, in which case, the measures may not be unique within a route-system. For example, there are many places that are within a one-minute response time from a fire station.

route-system
A collection of routes representing separate instances of a common linear entity, for example, all school bus routes in a city. A single line coverage can contain many route-systems, differentiated by name. For example, a road coverage can contain a bus route-system, a highway route-system and a pizza delivery route-system. Both an RAT and an SEC exist for each route-system. See also event.

row
1. A record in an attribute table. The horizontal dimension of a table composed of a set of columns containing one data item each.

2. A horizontal group of cells in a grid, or pixels in an image.

RPC
A Remote Procedure Call (RPC) is a communication mechanism which allows one UNIX process to communicate with another UNIX process. These communicating processes can be on different computers over a network. ArcStorm servers and clients use RPCs to communicate with each other.

rubber sheeting
A procedure to adjust coverage features in a nonuniform manner. Links representing from- and to-locations are used to define the adjustment.

run-length encoding
A data compression technique for storing raster or gridded data. Run-length encoding stores data by row. If two or more adjacent cells in a row have the same value, the `run' is recorded, as opposed to recording an individual value for each cell. The more adjacent columns having the same value, the greater the compression.

S

satellite image
A picture of the earth taken from an earth-orbital satellite. Satellite images may be produced photographically or by on-board scanners (e.g., MSS).

scale
See map scale.

scale bar
A map element that shows the map scale graphically.

scanning
The process of capturing data in raster format with a device called a scanner. Some scanners also use software to convert raster data to vector data.

scratch file
A temporary file holding intermediate data during an operation, such as when calculating arc intersections, or building feature topology.

SDTS/TVP
Spatial Data Transfer Standard/Topological Vector Profile. A United States Federal standard designed to support the transfer of different types of geographic and cartographic spatial data. This standard specifies a structure and content for spatially referenced data in order to facilitate data transfer between dissimilar spatial database systems. TVP addresses a wide variety of vector data types, models, and structures, as well as associated attribute data. Also known as Federal Information Processing Standard (FIPS) 173.

SEC
Section table for the section feature class in a coverage. The SEC holds attributes about sections. In addition to user-defined attributes, the SEC contains information on both the route number and arc number to which the section belongs, the starting and ending positions expressed as percentages of the arc length, starting and ending positions expressed as measures along the route, an internal sequence number and a section feature identifier. See also feature attribute table.

section
A feature class in ARC/INFO that is a component of the route-system data model used to implement routes. They form the infrastructure of route-systems much like arcs form the infrastructure of polygons. Sections are the arcs, or portions of arcs, used to define each route. See also SEC.

section line
A line on a surface defining the position of a profile.

selection coverage
A coverage whose area overlaps that of a map library. It identifies the area to extract data from, or insert data into, a map library.

setuid
A process which can set its effective user to super-user (root). That is, although any user can run the process, the process can then execute operations which require root privileges. One example of a setuid process is the ArcStorm wservice process.

shade symbol
A pattern used to shade polygons in ARC/INFO. Shade symbol patterns include crosshatch, repeating, and solid fill.

SIF
Standard interchange format, a spatial data exchange format. A standard or neutral format used to move graphics files between computer systems.

single precision
Refers to a level of coordinate accuracy based on the number of significant digits that can be stored for each

coordinate. Single-precision numbers store up to 7 significant digits for each coordinate, retaining a precision of 5 meters in an extent of 1,000,000 meters. ARC/INFO data sets can be stored as either single- or double-precision coordinates. See also double precision.

sliver polygon
A small areal feature commonly occurring along the borders of polygons following the topological overlay of two or more coverages.

slope
A measure of change in surface value over distance, expressed in degrees or as a percentage. For example, a rise of 2 meters over a distance of 100 meters describes a 2% slope with an angle of 1.15. Mathematically, slope is referred to as the first derivative of the surface.

SNA
Systems network architecture. Networking protocol popular in IBM environments.

snapping
The process of moving a feature to coincide exactly with coordinates of another feature within a specified snapping distance, or tolerance.

soundex
A phonetic spelling (up to six characters) of a street name, used for address matching. Each of the 26 letters in the English alphabet are replaced with a letter in the soundex equivalent:

English: A B C D E F G H I J K L M N O P Q R S T U V W X Y Z
Soundex: A B C D A B C H A C C L M M A B C R C D A B W C A C

Where possible, geocoding uses a soundex equivalent of street names for faster processing. During geocoding, initial candidate street names are found using soundex, then real names are compared and verified. See also geocode.

spatial analysis
The process of modeling, examining, and interpreting model results. Spatial analysis is useful for evaluating suitability and capability, for estimating and predicting, and for interpreting and understanding. There are four traditional types of spatial analysis: topological overlay and contiguity analysis, surface analysis, linear analysis, and raster analysis.

spatial data
Information about the location and shape of, and relationships among, geographic features, usually stored as coordinates and topology.

spatial feature
See geographic feature.

spatial indexing
A means of accelerating coverage drawing, spatial selection, and feature identification by generating feature-based indexes for one or more feature classes of a coverage.

spatial interaction
An analytical technique that estimates the number of interactions occurring between an origin and destination locations. The number of interactions is based on the properties of the origin to produce a trip (production), the destination's attractiveness and the impedance of the link between the two locations. The goal of spatial interaction modeling is to be able to model and predict the number of interactions occurring between populations for a particular type of activity such as retailing.

spatial modeling
Analytical procedures applied with a GIS. There are three categories of spatial modeling functions that can be applied to geographic features within a GIS: (1) geometric models, such as calculating the Euclidean distance between features, generating buffers, calculating areas and perimeters, and so on; (2) coincidence models, such as topological overlay; and (3) adjacency models (pathfinding, redistricting, and allocation). All three model categories support operations on spatial data such as points, lines, polygons, tins, and grids. Functions are

organized in a sequence of steps to derive the desired information for analysis. See also model and analysis.

spatial order
An index assigned to features based on their relative closeness in two-dimensional space.

spatial query
See map query.

spike
1. An overshoot line created erroneously by a scanner and its rasterizing software.

2. An anomalous data point that protrudes above or below an interpolated surface representing the distribution of the value of an attribute over an area.

spline
A mathematical curve used to smoothly represent spatial variation. A spline operation inserts vertices to create a curve in an arc. See also grain tolerance and densify.

SQL
Structured Query Language. A syntax for defining and manipulating data from a relational database. Developed by IBM in the 1970s, it has become an industry standard for query languages in most relational database management systems.

SQL/MM
An international standards effort, sponsored by ISO to extend SQL to support multimedia applications, including access and manipulation of geographic data.

SRG
Standardized raster graphic, a digital representation of a map or chart, which is captured by automatic digitization (scanning), stored on a digital storage media, and displayed on a raster screen or raster plotter; obtained by a regular scan of a paper map or chart or repromat. It consists of a raster data set of RGB intensities or colour (sic) codes.

station file
An AML file containing commands needed to establish the environment for graphic display and graphic input. Typically, station files contain commands that define the DISPLAY device, the AML &TERMINAL device, the type of DIGITIZER, if any, and the method to be used for COORDINATE input.

stop
Stops are locations visited in a path or tour; they may represent customers on a delivery route or cities in a highway system. Stops and stop attributes are maintained in INFO files referred to as stops files.

stop impedance
The time it takes for a stop transfer to occur. This is used to compute the impedance of a path or tour.

stop transfer
The number of things or packages transferred at a stop. This is used to find the total number of transfers on a path or tour.

string
A series of alphanumeric characters of any length enclosed by quotes.

subclass
A special feature class in a coverage which allows many features of the same class to be defined. Annotation, region, route-system, and section are types of subclasses. For example, a road coverage may have three route-systems stored as subclasses for mail delivery, street cleaning, and garbage pickup.

supply
The availability of services or goods at centers. An example of a type of supply is the availability of milk at grocery stores, cars at a car dealer, or the number of movie screens at a theater.

surface

A geographic phenomenon represented as a set of continuous data, such as elevation or air temperature over an area. A clear or sharp break in values of the phenomenon (breaklines) indicates a significant change in the structure of the phenomenon (e.g., a cliff), not a change in geographic feature. Surfaces can be represented by models built from regularly or irregularly spaced sample points on the surface. See also surface model.

surface model
Digital abstraction or approximation of a surface. Because a surface contains an infinite number of points, some subset of points must be used to represent the surface. Each model contains a formalized data structure, rules, and x,y,z point measurements that can be used to represent a surface. The TIN software package supports two data models for representing surfaces: lattice and tin.

SYBASE
A relational database management system to which ARC/INFO has access through the DATABASE INTEGRATOR.

symbol
A graphic pattern used to represent a feature. For example, line symbols represent arc features; marker symbols, points; shades symbols, polygons; and text symbols, annotation. Many characteristics define symbols, including color, size, angle, and pattern. See also text symbol, marker symbol, shade symbol, and line symbol.

symbol environment
Defines the types of map symbols and their characteristics during a graphic display session in ARC/INFO. There are four types of active map symbols: line, marker, shade, and text.

system tables
Tables which contain information about a database, such as the data dictionary and database transactions.

T

table
A set of data elements that has a horizontal dimension (rows) and a vertical dimension (columns) in a relational database system. A table has a specified number of columns but can have any number of rows. A table is often called a relation. Rows stored in a table are structurally equivalent to records from flat files in that they must not contain repeating fields.

TAT
Text attribute table for an annotation subclass in a coverage. In addition to user-defined attributes, the TAT contains a sequence number and text feature identifier. See also feature attribute table.

TCP/IP
The Transmission Control Protocol (TCP) is a communication protocol layered above the Protocol (IP). These are low-level communication protocols which allow computers to send and receive data.

template
1. A coverage containing common feature boundaries, such as land-water boundaries, for use as a starting place in automating other coverages. Templates save time and increase the precision of topological overlays.

2. A map template containing neatlines, North arrow, logos, and other cartographic map elements for a common map series.

3. An empty tabular data file containing only item definitions.

Terabyte, TB
A measure of data size. A terabyte of data is equivalent to 1,000 gigabytes of data or 1,000,000 megabytes of data. One petabyte equals 1,000 terabytes. Computer unit, 10^{12} bytes.

terminal
A device, usually a display monitor and a keyboard, used to communicate with the computer.

text symbol
A text style defined by font, size, character spacing, color, and so on, used to label maps and coverage features in ARC/INFO.

Thiessen polygons
Polygons whose boundaries define the area that is closest to each point relative to all other points. Thiessen polygons are generated from a set of points. They are mathematically defined by the perpendicular bisectors of the lines between all points. A tin structure is used to create Thiessen polygons.

theme
A user-defined perspective on a coverage, grid, tin or image geographic data set specified, if applicable, by a coverage name and feature class or data set name, attributes of interest, a data classification scheme, and theme-specific symbology for drawing.

thematic data
See descriptive data.

tic
Registration or geographic control points for a coverage representing known locations on the Earth's surface. Tics allow all coverage features to be recorded in a common coordinate system (e.g., Universal Transverse Mercator [UTM] meters or State Plane feet). Tics are used to register map sheets when they are mounted on a digitizer and to transform the coordinates of a coverage (e.g., from digitizer units [inches] to UTM meters).

TIC file
The coverage file used to store tic coordinates and tic IDs for a coverage.

tic match tolerance
The maximum distance allowed between an existing tic and a tic being digitized. If this distance is exceeded, the digitizing error is considered unacceptable and the map must be registered over again. The tic match tolerance is used to ensure a low RMS error during map registration on a digitizer.

TIFF
Tagged interchange (image) file format. An industry-standard raster data format. TIFF supports black-and-white, gray-scale, pseudocolor, and true-color images, all of which can be stored in a compressed or uncompressed format. TIFF is commonly used in desktop publishing and serves as an interface to numerous scanners and graphic arts packages. (See CCITT.)

TIGER
The Topologically Integrated Geographic Encoding and Referencing data format used by the U.S. Census Bureau to support census programs and surveys. It was used for the 1990 census. TIGER files contain street address ranges along lines and census tract/block boundaries. This descriptive data can be used to associate address information and census/demographic data with coverage features.

tile
The spatial unit by which geographic data is organized, subdivided, and stored in a map library. Tiles subdivide the area covered by a map library and organize the library data by location (e.g., counties might be the tiles in a statewide database). A tile can be a regular, geometric shape (e.g., a map sheet), or an irregular shape, such as a county boundary. See also LIBRARIAN.

tin
Triangulated irregular network. A surface representation derived from irregularly spaced sample points and breakline features. The tin data set includes topological relationships between points and their neighboring triangles. Each sample point has an x,y coordinate and a surface, or z-value. These points are connected by edges to form a set of nonoverlapping triangles used to represent the surface. Tins are also called irregular triangular mesh or irregular triangular surface model.

TIN
The ARC/INFO software product used for surface representation, modeling, and display.

TOL file
A coverage file that contains processing tolerances (fuzzy, tic match, dangle length) and editing tolerances (weed,

grain, edit distance, snap distance, and nodesnap distance). ARC/INFO uses TOL file values as defaults in many automation, editing, and processing operations.

to-node
Of an arc's two endpoints, the one last digitized. See also from-node.

topographic map
1. A map containing contours indicating lines of equal surface elevation (relief), often referred to as topo maps.

2. Often used to refer to a map sheet published by the U.S. Geological Survey in the 7.5-minute quadrangle series or the 15-minute quadrangle series.

topological overlay
An analysis procedure for determining the spatial coincidence of geographic features. ARC/INFO supports overlay among and between all feature classes. See also identity, intersect and union.

topology
The spatial relationships between connecting or adjacent coverage features (e.g., arcs, nodes, polygons, and points). For example, the topology of an arc includes its from- and to-nodes, and its left and right polygons. Topological relationships are built from simple elements into complex elements: points (simplest elements), arcs (sets of connected points), areas (sets of connected arcs), and routes (sets of sections, which are arcs or portions of arcs). Redundant data (coordinates) are eliminated because an arc may represent a linear feature, part of the boundary of an area feature, or both. Topology is useful in GIS because many spatial modeling operations don't require coordinates, only topological information. For example, to find an optimal path between two points requires a list of the arcs that connect to each other and the cost to traverse each arc in each direction. Coordinates are only needed for drawing the path after it is calculated.

tour
A tour is a minimum-impedance path that starts at an origin, visits a number of stops and returns to the origin visiting the stops only once. This is the solution to the traveling salesman problem. ARC/INFO provides a heuristic solution to the traveling salesman problem by ordering the stops and then finding the least-cost path which visits them.

tracing
The process of determining which portions of a network connect.

trade-area map
A map showing the region from which a store derives a certain percentage of its revenues. Trade-area maps can be made from the information contained in an interaction matrix.

transaction
A logical unit of work performed on a database. A transaction can be terminated by either making permanent or rolling back all updates.

transformation
The process that converts coordinates from one coordinate system to another through translation, rotation, and scaling. ARC/INFO supports these transformations: similarity, affine, piecewise linear, projective, NADCON datum adjustment using minimum-derived curvature transformation, and a polynomial transformation to warp grids and images.

traveling salesman problem
This is a classic tour problem in which a hypothetical salesman must find the most efficient sequence of destinations in his territory, stopping only once at each.

trusted login
A user is said to have a trusted login to another computer when that user is not prompted for a password when accessing the remote computer.

tuple
A row in a relational table; synonymous with record, observation.

turn
A turn represents a transition from one network link to another at a network node. Turns represent relationships between network links rather than an abstraction of some real-world physical entity. The properties of a turn are stored in a turntable.

turn impedance
The impedance or cost of making a turn at a network node. A turn impedance for making a left turn can be different from that of a right turn or a U-turn at a node.

turntable
An INFO file containing the turn impedances between pairs of network links. There can be sixteen possible turn impedances between four network links meeting at a node (i.e., left, right, straight, and U-turn for each of the four network links).

triangulated irregular network
See tin.

U

undershoot
An arc that does not extend far enough to intersect another arc. See also dangling arc.

union
A topological overlay of two polygonal spatial data sets which preserves features that fall within the spatial extent of either input data set; that is, all features from both coverages are retained. See also intersect and identity.

universe polygon
The first record in a polygon attribute table. It represents the area beyond the outer boundary of the coverage. It's the only polygon that never has a label point, and so has a User-ID value of 0. Its area equals the negative sum of all the polygons in the coverage. Also referred to as the external polygon.

upstream
In tracing, upstream is the direction along the arcs that is against the direction of flow. Direction of flow is determined by a user-defined convention. See directed network.

User-ID
Synonymous term for Cover-ID and feature-ID.

USGS DEM
A digital elevation model produced by the Survey Branch of the United States Department of the Interior, consisting of a regular array of elevations referenced in the Universal Transverse Mercator (UTM) coordinate system. These data correspond to the standard 1:24,000-scale 7.5 x 7.5-minute quadrangles or 1:250,000 one-degree map sheets. Elevations are in meters or feet referenced to mean sea level.

USNMAS
U.S. National Map Accuracy Standards: Accuracy standards for published maps in English units defining measurements for horizontal and vertical accuracy. It is described in absolute terms; however, it is not described in statistical terms and some inconsistencies have been noted, thereby making it unusable for engineering mapping (large-scale mapping), and is not convenient to use in conjunction with mapping from space (remote sensing).

V

value attribute table (VAT)
Value attribute table. A table containing attributes for a grid. In addition to user-defined attributes, the VAT contains the values assigned to cells in the grid and a count of the cells with those values.

vector

A coordinate-based data structure commonly used to represent linear geographic features. Each linear feature is represented as an ordered list of vertices. Traditional vector data structures include double-digitized polygons and arc-node models.

vertex
One of a set of ordered x,y coordinates that constitutes a line.

virtual table
See view.

view
A logical table whose data are not physically stored. You define a view to access a subset of the columns stored in a row, access a set of columns stored in different rows, or avoid creating a redundant copy of data that is already stored.

VPF
Vector product format is a digital geographic vector-based format used by the U.S. Defense Mapping Agency for the distribution of its vector data sets. ARC/INFO includes a bidirectional VPF translator.

VRF
Vector relational format. A relational model-based format very similar to the DMA VPF (Defense Mapping Agency Vector Product Format).

W

WAIS
Wide-Area Information Server. A client/server software system that provides sophisticated indexing of files based on all words in each file and provides scoring and "relevance feedback" of documents to its client. The client then selects which file or files to retrieve from the server from a list of file or document titles, ranked by a score assigned by the software. Searching can include Boolean constructs and access to structured information systems (like databases) through its compliance with ANSI standard Z39.50. WAIS is addressed at the operating system level.

WAN
Wide area network. Computer data communications technology that connects computers at remote sites. WANs are composed of special data communications hardware and software and usually operate across public or dedicated telephone networks.

watch file
A text file that records all nongraphic input and output during an ARC/INFO session. Watch files can be edited and converted to AML programs.

weed tolerance
The minimum allowable distance between any two vertices along an arc. Weed tolerance is a parameter that can be set before adding arc features. When adding new arcs, if an input vertex is within the weed distance of the last vertex, it is disregarded. When weeding existing arcs, it is the tolerance used by the Douglas-Peucker algorithm. Nodes are always retained. The proximity of vertices on one arc to vertices on another arc within the tolerance does not cause them to be weeded; this is controlled by the proximal tolerance.

workspace
A directory containing geographic data sets for use with ARC/INFO. A workspace contains an INFO directory for the feature attribute tables. ARC/INFO workspaces have three primary uses: as a user work area, to store all the map sections for each tile in a map library, and as automation workspaces to store all the versions of a single coverage as it progresses through the coverage automation process.

World Wide Web
Developed by the European Laboratory for Particle Physics (CERN)

(WWW)
Consortium in Switzerland as a distributed hypermedia server. It allows one to prepare electronic documents that

are composites of, or pointers to, many different files of potentially different types scattered across the world. It employs a hypertext markup language (html) to create the documents it serves and to follow "links" known as Universal Resource Locators (URLs) to fetch the document from elsewhere on the Internet. A WWW server does not provide search capabilities, rather it provides explicit linkage between files on the Internet using hypertext. This allows one to organize information in a particular way, but, unless the links exist, does not permit the discovery of other information that was not associated by the author. WWW can be accessed by Mosaic (see Mosaic).

X

X Windows
A system developed at MIT that allows applications to be displayed in windows and shared among different workstations and terminals. Available on all UNIX operating systems supported by ARC/INFO and ArcView. ARC/INFO and ArcView are X Windows-based applications. ARC/INFO or ArcView can be run on any X-compliant terminal or X Station on all supported UNIX platforms or on any PC or Macintosh through emulation software.

X Windows/Motif
ARC/INFO and ArcView operate in the X Windows/Motif environment on all supported UNIX workstation platforms.

X.25
CCITT recommendation/ISC standard for wide area networks.

X.400
ISO standard for electronic mail.

X-Open Consortium
An association of American and European vendors formed in 1984 to promote open systems.

XPG3
An X/Open software standard for UNIX Operating Systems. IBM provides a cshell variable named PSALLOC to make AIX XPG3-compliant, resulting in adding more swap space on disk, protects ARC/INFO from an outside application bug-induced crash, and increases application performance.

Z

Z39.50
An ANSI protocol standard for WAN (wide area network) information query and exchange to share library referencing requests via distributed electronic access to information.

z-value
The value of a surface at a particular x,y location (e.g., elevation). Often referred to as spot values or spot elevations.

zoom
To enlarge and display greater detail of a portion of a geographic data set.