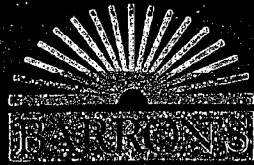


**EXHIBIT 31**

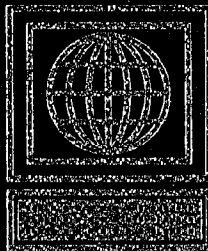


BUSINESS  
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# Dictionary of Computer and Internet Terms

Eighth Edition



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**Douglas Downing, Ph.D., Michael Covington, Ph.D., and  
Melody Mauldin Covington**

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Eighth Edition

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- recursion;
- **begin** and **end** keywords to allow grouping statements into blocks;
- the “block if” statement, of the form:
 

```

if condition then
  begin
    statements
  end
else
  begin
    statements
  end

```
- the symbol `:=` for arithmetic assignment;
- semicolons between statements, leaving the programmer free to arrange statements in any convenient layout rather than putting one statement on each line.

The key idea is that whereas a BASIC or FORTRAN program is a list of numbered instructions, an ALGOL program is a set of blocks of statements embedded within larger blocks. Thus, hierarchical design is easier to establish and follow.

But the ALGOL 60 standard did not specify statements for input and output, since these were considered machine-specific, and as a result, although much admired for its design, ALGOL 60 was not widely used in practice.

ALGOL 68 (released in 1968) is a much more abstract language with a reputation for being powerful but hard to learn. It introduced widespread use of pointer variables (called *refs*) and variant types (called *unions*). An important principle of ALGOL 68 is *orthogonality*, which means that all meaningful combinations of features are allowed. (In geometry, two things are orthogonal if they meet at right angles.)

Discontent with the complexity of ALGOL 68 led Niklaus Wirth to design first ALGOL W and then Pascal (*see* PASCAL), which almost completely replaced ALGOL in practical use. *See also* RECURSION; STRUCTURED PROGRAMMING; POINTER; VARIANT.

**algorithm** a sequence of instructions that tells how to solve a particular problem. An algorithm must be specified exactly, so that there can be no doubt about what to do next, and it must have a finite number of steps. A computer program is an algorithm written in a language that a computer can understand, but the same algorithm can be written in several different languages. An algorithm can also be a set of instructions for a person to follow.

A set of instructions is not an algorithm if it does not have a definite stopping place, or if the instructions are too vague to be followed clearly. The stopping place may be at variable points in the general procedure, but something in the procedure must determine precisely where the stopping place is for a particular case.

There are well-understood algorithms for many common computations (for example, *see* SELECTION SORT). However, some problems are so complicated that there is no known algorithm to solve them, and in other cases, the only known algorithm takes impossibly large amounts of time. *See* HEURISTIC; LIMITS OF COMPUTER POWER.

### alias

1. (Macintosh) a copy of a file icon that provides an alternate way of starting an application program or opening a file, folder, or disk. You can place the alias anywhere that's convenient — the desktop, the Apple menu, or a special folder. The title of an alias icon is in italics and displays a small arrow in the lower left corner of the icon. In Windows, an alias is called a SHORTCUT.

2. (UNIX) an alternative way of typing a command. The `alias` command creates aliases. For example, if you execute the command

```
alias dir ls -al
```

then from then on, `dir` will mean `ls -al` (the complete file listing command).

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# Stairsteps

FIGURE 7. Aliasing

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**aliasing** the appearance of false stairsteps or bands in an image, or false frequencies in digitized sound, due to interaction of the original signal with the sampling rate. *See* ANTIALIASING; SAMPLING RATE.

**align** to make things line up, either horizontally or vertically. Most drawing programs and page layout programs have specific commands to help you align objects and text. *See* Figure 8.

**allocation unit** the units of disk space that can be allocated to a file. For example, if a disk drive uses 4096-byte allocation units, the space occupied by every file will be a multiple of 4096 bytes, regardless of how small the file is. Also called CLUSTER. *See* FAT32.

**All Your Base Are Belong To Us** a phrase from a poorly translated Japanese video game (*Zero Wing*, 1989) that achieved brief but

**audit trail** a record kept by a computer program that shows how data was entered into the computer. These records are essential for ensuring the reliability of financial data processing systems.

**AUP** *see* ACCEPTABLE-USE POLICY.

**authoring software** software packages used to produce multimedia or HYPERTEXT presentations (web pages, multimedia encyclopedias, interactive displays). The authoring software provides ways of linking sounds, music, visuals, and text. An interactive presentation may have highlighted keywords, which will lead the reader to another section of the presentation. Authoring software gives the developer the necessary tools to create these hypertext links. The possibility of creating different paths through the material is what sets authoring software apart from presentation software.

Many of the layout and graphic design skills necessary for good desktop publishing carry over to these new media. The common thread is good communication skills. *See* ELECTRONIC PUBLISHING; WORLD WIDE WEB; WEB PAGE; HTML; PRESENTATION GRAPHICS.

**authorware** *see* AUTHORING SOFTWARE.

**autodimensioning** a CAD feature that keeps imported graphics correctly scaled as the drawing or diagram is completed.

**AUTOEXEC.BAT** in MS-DOS and early versions of Windows, a file that contains commands to be executed as the computer boots up. It is stored in the root directory of the boot disk, which is normally drive C. *See* BAT FILE.

Although AUTOEXEC.BAT can contain commands of any type, the most important ones are usually SET and PATH commands to establish the path and other environment variables. *See* PATH; ENVIRONMENT (definition 2). When new software packages are installed, they often modify AUTOEXEC.BAT; the modifications do not take effect until the computer is rebooted.

In Windows NT, 2000, XP, and their successors, the function of AUTOEXEC.BAT has been taken over by the Registry. However, if an AUTOEXEC.BAT file exists, Windows normally reads it and executes the SET and PATH commands in it. Whether this happens is controlled by the registry key *ParseAutoexec*. A separate file, AUTOEXEC.NT, is executed at the beginning of every DOS-mode program. *See also* CONFIG.SYS.

**autojoin** a feature of drawing programs that automatically joins endpoints that are within a certain distance of each other, so that you can draw a closed curve without having to come back to the exact pixel where the curve started. (*See* Figure 22.) If you are having trouble getting curves to close so you can fill them, try increasing the autojoin setting. *See* your software manual for details.

**AutoPlay** the operation that happens automatically when a CD or DVD

```
using System;
class primecheck
{
    // Sample C# program to test whether a number is prime.
    static void Main(string[] args)
    {
        int n, i, max;
        bool cont;
        string s;

        while (true)
        {
            Console.WriteLine("Type a number (0 to quit): ");
            n = Convert.ToInt32(Console.ReadLine());
            if (n==0) break;

            s = "prime";
            cont = (n > 2);
            i = 1;
            max = (int)Math.Sqrt(n); // largest divisor to try
            while (cont)
            {
                i++;
                Console.WriteLine("Trying divisor {0}",i);
                if (n % i == 0) // if n divisible by i
                {
                    s = "not prime";
                    cont = false;
                }
                else
                {
                    cont = (i < max);
                }
            }
            Console.WriteLine("{0} is {1} \n",n,s);
        }
    }
}
```

FIGURE 47. C# program

**CA** (certificate authority) an agency that issues digital certificates. *See* DIGITAL SIGNATURE.

**cable modem** a MODEM that provides computer communication over television cables (either coaxial or fiber-optic) rather than telephone lines.

### cache

1. a place where data can be stored to avoid having to read the data from a slower device such as a disk. For instance, a disk cache stores copies of frequently used disk sectors in RAM so that they can be read without accessing the disk.

The 486 and Pentium microprocessors have an internal instruction cache for program instructions that are being read in from RAM; an external cache is also used, consisting of RAM chips that are faster



than those used in the computer's main memory. *See also* L1 CACHE; L2 CACHE.

2. a set of files kept by a WEB BROWSER to avoid having to download the same material repeatedly. Most web browsers keep copies of all the web pages that you view, up to a certain limit, so that the same pages can be redisplayed quickly when you go back to them. If a web page has been changed recently, you may have to RELOAD it to see its current contents.

**cacls** (presumably: change access control lists) a powerful console-mode command in Windows 2000 and its successors for changing permissions and security attributes of files, analogous to CHMOD in UNIX. For example, the command

```
cacls myfile.txt /g "Domain Users":R
```

gives all members of the group "Domain Users" permission to read `myfile.txt`. For full documentation type:

```
cacls /?
```

The `cacls` command is used mainly in BAT files, since you can also change permissions by right-clicking on the file or folder and following the menus. *See also* PERMISSION; CHMOD.

**CAD** (Computer-Aided Design) the use of a computer for design work in fields such as engineering or architecture, with the computer's graphics capabilities substituting for work that traditionally would have been done with pencil and paper. In order to do CAD, it is necessary to have a high-resolution monitor and a software package designed for the purpose.

In order to draw a building, for example, it is necessary to enter the plans by using a graphical input device, such as a mouse or graphics tablet. There are several advantages to having the plans in the computer:

1. The computer can automatically calculate dimensions. In fact, the ability to calculate dimensions is the biggest difference between CAD programs and ordinary draw programs.
2. Changes can be made easily (e.g., adding a new wall).
3. Repetitive structures can be added easily.
4. The image can be enlarged to obtain a close-up view of a particular part, or it can be shrunk to make it possible to obtain an overall view. If the CAD program has three-dimensional capability, the image can be rotated to view it from many different perspectives. (*See* THREE-DIMENSIONAL GRAPHICS.) For example, the Boeing 777 airplane, first rolled out in 1994, was designed entirely on computers. Previous airplanes had been designed the traditional way with paper drawings, and then a full-scale mock-up had to be constructed to make sure that the parts would fit together in reality as they did on paper. CAD made this extra work unnecessary.

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## D

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**DAC, D/A converter** *see* DIGITAL-TO-ANALOG CONVERTER.

**daemon** (under UNIX) a program that runs continuously in the background, or is activated by a particular event. The word *daemon* is Greek for “spirit” or “soul.”

**dagger** the character †, sometimes used to mark footnotes. *See also* FOOTNOTE. Also called an OBELISK or LONG CROSS.

**daisy-chain** to connect devices together in sequence with cables. For example, if four devices A, B, C, and D are daisy-chained, there will be a cable from A to B, a cable from B to C, and a cable from C to D.

**daisywheel printer** a printer that uses a rotating plastic wheel as a type element. Daisywheel printers were often used with microcomputers in the early 1980s. They printed high-quality text, but they were relatively slow and could not print graphics.

**dash** (—) a punctuation mark similar to a hyphen, but longer. On a typewriter, a dash is typed as two hyphens.

Proportional-pitch type often includes one or more kinds of dashes, such as an em dash (—), which is as wide as the height of the font, and an en dash (–), which is two-thirds as wide as the em dash. Normally, the em dash joins sentences and the en dash joins numbers (as in “1995–98”).

**data** information. The word was originally the plural of *datum*, which means “a single fact,” but it is now used as a collective singular. Data processing is the act of using data for making calculations or decisions.

**database** a collection of data stored on a computer storage medium, such as a disk, that can be used for more than one purpose. For example, a firm that maintains a database containing information on its employees will be able to use the same data for payroll, personnel, and other purposes. *See* DATABASE MANAGEMENT.

**database management** the task of storing data in a database and retrieving information from that data. There are three aspects of database management: entering data, modifying or updating data, and presenting output reports. Many mainframe computers are used by businesses for database management purposes. Several software packages are available for database management on microcomputers, such as dBASE and Microsoft Access, and some data management capabilities are provided with spreadsheets such as Lotus 1-2-3 and Excel. Some examples of database applications include maintaining employee lists and preparing payrolls; maintaining parts order lists and keeping



FIGURE 248. Serif (on a letter)

**serif** the short finishing strokes of the letterforms in a roman typeface, present in I F A and absent in I F A (Figure 248). It is thought that the horizontal nature of serifs helps guide the reader's eye along the line of type. *Contrast* SANS-SERIF. *See also* TYPEFACE.

**server** a computer that provides services to another computer (called the *client*). On multitasking machines, a process that provides services to another process is sometimes called a server. For specific examples, *see* FILE SERVER; X SERVER; DDE; WEB SERVER.

**server-side application** a computer program that runs on a network server rather than on the client PC. For instance, Java servlets are server-side applications; when you view a web page that contains a servlet, the computation is done on the server rather than on your PC. *Contrast* CLIENT-SIDE APPLICATION.

**service** in Windows, a program that runs continuously, unseen by the user, such as a Web or FTP server, or a program with a more mundane function such as updating the system clock; the equivalent of a UNIX DAEMON.

**service bureau** a business that provides services to computer users, such as high-quality color printing, disk format conversions, or the like.

**service provider** a company that provides computer or networking services to customers. *See also* ACCESS PROVIDER; INTERNET.

**servlet** a Java program that runs on a web server. By contrast, an applet is a Java program running on a web browser client. Servlets provide some advantages over writing CGI scripts for the server: (1) a developer writing the applet in Java can use the same language for the server side of the process; (2) the servlet can run as a thread, not requiring a new CGI process to be restarted with each client request; and (3) the servlet runs in a SANDBOX where it is prevented from doing damage to the server system.

### session

1. a period of time during which a person is using a particular computer service, such as a connection to the Internet.
2. an occasion upon which data is written to a recordable CD-ROM. Multisession CDs have had data written to them more than once.