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Credits

Preface

Guide to the Dictionary

A Dictionary of Computing

Computer Graphics (Feature)

The Anatomy of an Internet A

Object-oriented Programming

Quantum Computing (Feature)

SQL (Feature)

XML (Feature)

Appendices

Generic Domain Names

Country-Code Domain Na

File Extensions

Character Set

Greek Alphabet

Chronology

Useful Web Sites

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BSP tree

58

*Bézier patch is defined by *Bézier curves. Given a characteristic polygon defined by vertices r_{ij} , $i = 0, 1, \dots, p$, $j = 0, 1, \dots, q$, the B-spline patch is defined by

$$r(u, v) = \sum_{i=0}^p \sum_{j=0}^q r_{ij} B_{p,i+1}(u) B_{q,j+1}(v)$$

where B is the B-spline basis function of degree p .

BSP tree Short for binary space-partitioning tree.

B+ tree See B-TREE.

B-tree (or b-tree) 1. (balanced multiway search tree) of *degree n (≥ 2). A *multiway search tree of degree n in which the root node has degree ≥ 2 , every nonterminal node other than the root has degree k , where

$$n/2 \leq k \leq n$$

and every leaf node occurs at the same level. Originally defined by R. Beyer and E. McCreight, the data structure provides an efficient dynamic retrieval device.

An extension to a B-tree is a **B+ tree**, which is used as a primary index to an *indexed file. It comprises two parts: a sequential index containing an entry for every record in the file, and a B-tree acting as a multilevel index to the sequential index entries. B+ trees are used in *VSAM. 2. A binary tree with no nodes of degree one.

BTron See TRON.

bubble jet A type of *inkjet printer.

bubble memory See MAGNETIC BUBBLE MEMORY.

bubble sort (exchange selection) A form of *sorting by exchanging that simply interchanges pairs of elements that are out of order in a sequence of passes through the file, until no such pairs exist. The method is not competitive with *straight insertion.

bucket 1. A subdivision of a *data file, serving as the unit within which records are located. Buckets are specially used in connection with *hashing techniques, and with indexing techniques (see INDEX) where index entries point to groups of records. In these circumstances, hashing or indexing will yield the address of the start of the bucket; the location for storage or retrieval within the bucket will then be found by searching. 2. A capacitor whose electric charge is used as a form of dynamic *RAM. A

fully charged bucket, or **full bucket**, is equivalent to a logic 1; an uncharged or **empty bucket** is equivalent to a logic 0. The charge may be passed through an array of capacitors and associated electronics, which together form a **bucket brigade**.

bucket sort An external sort in which the records to be sorted are grouped in some way, and each group stored in a distinct *bucket. Different buckets will probably be stored on different storage devices. If searching is to be performed on the data, then each bucket should contain records with the same hash value (see HASHING). In this way all the records that might contain the required key may be fetched from the external memory at once.

buddy system A method of implementing a *memory management system. The available memory is partitioned into blocks whose sizes are always exact powers of two. A request for m bytes of memory is satisfied by allocating a block of size 2^{p+1} where

$$2^p < m \leq 2^{p+1}$$

If no block of this size is available then a larger block is subdivided, more than once if necessary, until a block of the required size is generated. When memory is freed it is combined with a free adjacent block (if one exists) to produce a larger block, always preserving the condition that block sizes are exact powers of two.

buffer 1. A temporary memory for data, normally used to accommodate the difference in the rate at which two devices can handle data during a transfer. The buffer may be built into a peripheral device, such as a printer or disk drive, or may be part of the system's main memory. See BUFFERING. 2. A means of maintaining a short but varying length of magnetic tape between the reels and the *capstan and head area of a tape transport, in order that the acceleration of the tape at the reels need not be as great as that of the tape at the capstan. Streaming tape transports and many types of cartridge drives do not use buffers and are therefore limited to lower accelerations of the tape in the area of the head and (if there is one) capstan. 3. Any circuit or device that is put between two others to smooth changes in rate or level or allow asynchronous operation. For example, line *drivers can be used to isolate (or buffer) two sets of data lines.

59

buffering A programming technique to compensate for the slow and possible rate at which a peripheral device produces or consumes data. If the device communicates directly with the program, the program is constrained to run in synchronism with the device; buffering allows the program and device to operate independently. Consider a program sending data to a slow device. A memory area (the *buffer) is set aside for communication: the program places data in the buffer at its own rate while the device takes data from the buffer at its own rate. Although the device may be slow, the program does not have to stop unless the buffer fills up; at the same time the device runs at full speed unless the buffer empties. A similar technique is used for input. See also DOUBLE BUFFERING.

buffer overflow A common type of vulnerability where a program does not check the quantity of input before reading it into a fixed length *array or *buffer. In some cases the excess input will be discarded, but in other programming language does not enforce bounds of the array then memory locations adjacent to the array may be overwritten, placing their correct values. In the worst case this may allow the *program counter to be altered, directing the computer to execute code placed in the buffer by the attacker.

buffer register A storage location of a device for the temporary storage of information during the process of writing to or reading from main memory. It generally has a capacity equivalent to one byte or one word.

bug An error in a program or system. The word is usually used to mean a localization or implementation error rather than, say, an error introduced at the requirements or system design stage. See also DEBUGGING.

bug seeding See SEEDING.

bulk memory Another name for base storage.

bulletin board system (BBS) A *teleferencing system that allowed its users to post notices that they wished seen by other users on a variety of topics, to read notices left by previous users, and to *download software and information for use on their own systems. Bulletin boards were forerunners of such Internet facilities