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contents. In practice this may be difficult even with the assistance of dump analysis software.

3. To take a dump (defs. 1 or 2).

dump check A copy of the contents of all the workspace associated with a job or process. If the job or process subsequently fails, it can be restarted at the point at which the dump check was taken. Note that the status of peripheral devices allocated to the job or process must be considered as constituting part of its workspace.

dump point *See* checkpoint.

duplex (full duplex) Involving or denoting a connection between two endpoints, either physical or logical, over which data may travel in both directions simultaneously. *See also* half duplex, simplex, return channel.

duty cycle For pulsed or square-wave signals, the ratio of pulse duration to pulse spacing, often expressed as a percentage. A square wave signal normally has a 50% duty cycle, i.e. pulse duration is equal to the time between pulses.

DX-2 An X.25-based *public packet network of Japan. It first became operational in 1979.

dyadic Having two operands.

dyadic operation (binary operation) defined on a set S. A function from the domain $S \times S$ into S itself. Many of the everyday arithmetic and algebraic operations are dyadic, e.g. the addition of two integers, the union of two sets, and the conjunction of two Boolean expressions. Although basically functions, dyadic operations are usually represented using an infix notation, as in

$$3 + 4,\ U \cup V,\ P \wedge Q$$

A symbol, such as $\circ$, can be used to represent a generalized dyadic operation.

When the set is finite, *Cayley tables and sometimes *truth tables are used to define the meaning of the operation.

Dyck language A concept used in *formal language theory. Let Σ be the alphabet

$$\{a_1, \ldots, a_n, b_1, \ldots, b_n\}$$

The Dyck language over Σ is the set of all strings that can be reduced to the empty string Λ by "cancellations" of the form

$$a_i b_i \rightarrow \Lambda$$

For example,

$$\Sigma = \{(,)\}$$

gives the Dyck language of all balanced parenthesis strings. An important theorem characterizes the *context-free languages as those representable as the homomorphic image (*see* homomorphism) of the intersection of a Dyck language and a *regular language.

dynamic Capable of changing or of being changed. With reference to operating systems, the implication is that the system is capable of changing while it continues to run. As an example, the total amount of memory available may be defined by the contents of a word within the operating system. If this word can be altered without stopping the system and reloading a fresh copy of the operating system, then it is possible to alter dynamically the total amount of memory on the system.

With reference to programming, the adjective is applied to operations that take place while a program is running, as compared with those that take place during the compilation phase. For example, dynamic arrays are allocated space while the program is running.

Compare static.

dynamic allocation An allocation that is made dynamically, i.e. while the system is running, rather than statically at the time of first initiating the system.

dynamic data structure A data structure whose organizational characteristics may change during its lifetime. The adaptability afforded by such structures, e.g. linked lists, is often at the expense of decreased efficiency in accessing elements of the structure. Two main features distinguish dynamic structures from *static data struc-

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