EXHIBIT F

A Dictionary of Information Technology and Computer Science

Second Edition

'Handy, neatly presented and above all concise, Gunton's IT reference should fit nicely between the OED and Roget's Thesaurus....'

Micro Decision (of the first edition)

Tony Gunton

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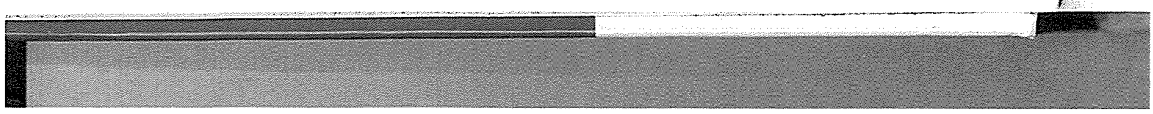

hashing algorithm An algorithm used to derive an address within a specified range from a key value. A hashing algorithm is used with a random file to determine the address of the block in which a given record should be stored.

Hayes-compatible Describes modems that conform to a standard set by a leading US manufacturer of low-cost modems. The standard specifies the control messages that a computer can send to the modem, such as to instruct it to dial a number, and how it responds to those messages. Hayes-compatible modems are widely used with personal computers.

HDLC Abbreviation of *high-level data link control.*

HDX Abbreviation of *half-duplex.*

head crash When the read/write head of a disk drive touches the recording surface. As a result data recorded on the disk will be lost and the disk drive itself may be seriously damaged.

head end The operational centre of a cable television service.

header A data record that precedes a set of detail records. It will normally contain data common to the set. In an order record, for example, the header would contain the identity of the customer, delivery date, and so on, and would be followed by detail records for each line in the order.

header label A special block written at the beginning of a tape reel which identifies the information recorded on it. It contains the name of the file, its generation number, reel number, retention period, and the date when the file was first written. This information is checked by the operating system before a tape is used to verify that it is the one that a program requires. The operating system also checks that the retention period has expired before allowing a tape to be over-written.

heap An area of computer memory, space in which can be allocated and released on demand from programs. It is normally used to hold data structures that vary in size while a program is running.
See also *stack.*

help function See *help screen.*

help key See *help screen.*

help screen Instructions or advice on how to use the current application, displayed on the screen when the user asks for help, such as by pressing the help key (a function key

register A component that a processor uses to hold data which has special properties for use during arithmetic or logical operations. Registers are normally the same length as the word length of the processor, or sometimes two words long. Computer systems may either have a number of general-purpose registers, addressed by the software as register 0, register 1, etc., or a number of specialised registers with symbolic names (A register, I register, etc.) each capable of particular functions, such as carrying out precision arithmetic or recording the results of tests and comparisons.

relation (1) In the relational model of database structure, a two-dimensional table – the basic format in which information is stored.

(2) For network or hierarchical models, a named association among sets of entities.

relational database management system (RDBMS) A database management system based on the relational model. This claim is often made (particularly for personal computer packages) principally on the grounds that the data is treated as a series of two-dimensional tables, known as relations. Stricter criteria would require also that algebraic operations, such as JOIN or PROJECT, could be used to manipulate the data and to create new tables based on various combinations of the original tables.

More detail *cost-based optimiser*; *referential integrity*; *two-phase commit.*

relational model A model for the structure of a database that treats the data as a series of two-dimensional tables (called relations) that can be manipulated using mathematical operations. The model was first defined in a paper by E. F. ('Ted') Codd of IBM, published in 1970.

A particular database based on the relational model is defined formally using mathematically-based rules which indicate precisely which tables should be included. This process is known as normalisation, and the resulting tables are said to be in third normal form. Data in third normal form is conceptually simple and can easily be updated without the risk of creating anomalies such as exists with more complex models of database structure, such as the widely-used network model.

Although conceptualised as a series of tables, formally a relational database is a mathematical set and can be manipulated by Boolean operations like AND, OR and NOT, or by algebraic operations such as JOIN (linking two tables to produce a third) or PROJECT (excerpt columns from one or more tables and use them to produce a new table). These features make the relational model highly flexible, and thus helpful for end-users wishing to retrieve and analyze data. By contrast, it is less helpful for computer specialists undertaking business analysis, since the tables must be translated into another form (such as by using the entity model) before the data can be depicted graphically. Databases constructed in terms of the relational model tend also to be relatively inefficient in their use of computer power.

Compare *hierarchical model*; *network model.*