

GENERAL DESCRIPTION OF LOTIP AND ITS USAGE

LOTIP is a Data-Base Management System; a language of Data-Base creating, alternating and queries; a language of textual information processing.

LOTIP's software package contains translators and interactive interpreters for Lotip languages, a time-measuring simulator for Lotip Data-Base, etc. Also provided an extension of PL/I for conceptual programming.

LOTIP D.B.M.S. creates and operates a LOTIP D.B. LOTIP D.B. is a new type of a relational/sci-theoretical Data-Base. One of the main principles of its design is naturality.

The logical structure of a LOTIP D.B. is very close to the semantic structure of the reality.

The elementary unit of information is a fact.

In reality - information is a collection of facts, interrelated between them, rules of inference, semantic and mnemonic conventions etc. Facts are specified about certain items or groups of items. Facts may be structured and unstructured. Structured facts are of the following types:

1. Categorizing an element, i.e. specifying that it belongs to a category or a set, e.g. in the fact "Israel is a country" - Israel is stated to belong to the category "country". The fact "He drives" categorizing "him" by "driven".
2. Relating two or more elements (Relation is viewed as a collection of pairs or series of elements.) e.g. the fact "Israel is in Asia" relates Israel to Asia by the relation "IN". Non-structured facts usually assign some values to some attributes of an item: "The book costs 5\$" assigns the value 5\$ to the attribute "costs" of the book.
(The difference between attributes-values and relations is not principal, but has semantic importance, and causes difference in physical representation).

Rules of inference are rules by which a human can connect some fact to other, imply some fact from other, use some facts to find another. A human does this intuitively on a small amount of data, using semantic meaning of information. Some inferences are implied by dependence of categories of items (e.g. if the sun is a star then it shines, it is hot, etc...), by known to us properties of relations, e.g. if Jerusalem is in Israel and Israel is in Asia - then Jerusalem is in Asia.

(That is because "in" is a transitive relation. Other main types of relations are: reflexive, relation of equivalence etc...).

More sophisticated inferences are represented by explicit or implicit axioms.

An example of semantic and mnemonic conventions is synonymy and homonymy. Things are given names. A thing may have several names - these names are called synonyms - we recognize the object however it is called. Different things may have the same name - homonyms - the correct object may be recognized "by context".

The logical-semantic structure of information in reality was described above. We assume that in this way information is intuitively understood and processed by a human. The same logical structure was applied to LOTIP Data-Base. Such representation has following advantages: The human and the computer use the same concepts and same point of view of data, so there is no need for someone dealing with the Data-Base to have another approach to information rather than his intuitive one. There is no need to understand and treat different data representations, and the computer needs not transform different representations.

Also it is believed that most problems which a human can intuitively solve on small amount of data, the computer will be able to solve on large amounts as well, provided it is able to use methods and representation analogous to those of human. Naturalness of language of contact between the user and the computer is a great advantage, in addition to the aforementioned naturalness of computer's view of the information.

A human represents to himself the information of a reality in form of human's language (English, Hebrew or other). The syntactic structure of the language corresponds with the semantic structure of information defined above, and the human has certain intuitive rules for finding facts of the described types in sentences, e.g. in the sentence "3 is a prime and divides 9" there are two elementary facts: 3 is categorized by "prime", and the relation "divides" is stated between 3 and 9. LOTIP processes human's statement in the same way. (LOTIP recognizes most of common syntactic structures of human's information language. There is no program, and probably never will be, that recognizes all the syntactic structures).

LOTIP provides several languages of contacts between user and the Data-Base.

LOTIP/CONV. is sufficient for all the operations with D.B., except defining special non-standard processes of the Data-Base.

This language is very close to user's everyday natural language, though restricted a little syntactically.

LOTIP/CONV. is used both for batch transmission of information between user and the computer, and for interactive (on-line conversation) contacts between them.

The contact to the D.B. in all levels is done in natural language, so no special education is required of contacting persons, no skilling, knowledge of Data-Base organisation or knowledge of programming, and also no technical work such as coding or formatting. LOTIP D.B.M.S. provides interpreters for LOTIP/CONV. The version used presently is English language version. Hebrew language version is in last stages of preparation. Later, other human's languages will be supported.

LOTIP/CONV. has several sub-languages. All of them may be used in the same session of contacts between user and LOTIP D.B.M.S. (Automatic switches from one sub-language to another are provided, being invoked by user's instruction). They are:

- (1) Language of definition of the logical structure of the Data-Base being created. This is used by the person responsible for the Data-Base. The same language may be used later for changing the structure.
- (2) Language of entering information into Data-Base.
- (3) Language of queries.
- (4) Language of instructions: DB management, security control, etc.

LOTIP/I - is a programming language designed to:

- ** Define and perform special sophisticated processes on a LOTIP D.B., including special outputs of information such as report issuance.
- * Serves as information transmitter between LOTIP D.B. and user's programs that are not a part of LOTIP D.B.M.S. So that user's programs can use the information of the Data-Base and enter information into it.

LOTIP/I is an extension of PL/I. It contains all the instructions and options of PL/I, and in addition - many that PL/I does not include.

LOTIP/I is easily learned, understood and used.

It may be used by any programmer, but unlike LOTIP/CONV some programmer's education is needed in order to use it.

It should be outlined that LOTIP D.B. is ^(data)independent and dynamically changeable. Changability has two aspects: Dynamic changability of data in D.B. (Most Data-Bases possess this ability), and dynamic changability of principal logical structure of the Data-Base (e.g. adding new categories, new relations, new attributes, etc.). In most Data-Bases, structure changes, if possible, need a great amount of human and computer work, but in LOTIP are immediate.

LOTIP enables any non-professional person to create, exploit and control a Data-Base.

It automatically makes logical conclusions and implicates information.

It permits dynamic changes and non-standard requirements; the users are independent on the structure of Data-Base. Also it provides security of information.