

  
System/370  
MVS, VM/CMS

# Manipulation of Data-List Structures

Interactive user language  
LISP compiler  
Storage management

Installed User  
Program

IBM Internally  
Developed  
Program

## Manipulation of Data-List Structures

LISP/370 is a programming language that efficiently processes large amounts of structured symbolic data objects such as lists (LISP is derived from List Processing) and is designed to be used on the IBM System/370. LISP/370 is an extended dialect that is based on classical LISP concepts. The original intent of LISP was to provide a system that could operate on symbolic data. LISP is a language that is based on mathematical logic. Much of LISP/370 was implemented using the LISP/370 language itself.

Currently, LISP is utilized in many areas of computer science research. In addition, a major portion of artificial intelligence research is being done using LISP. Examples of application areas where LISP is being used are:

- General problem solving
- Theorem proving
- Computational linguistics
- Game playing
- Pattern recognition
- Robotics

LISP/370 is well suited for highly complex symbolic manipulation problems and where a powerful notation for defining and transforming data structures is required.

### Highlights

- Automatic storage management
- Easy definition of recursive functions
- Conversational execution/debugging features
- Interpreter to directly evaluate symbolic expressions
- LISP compiler

### Overview

LISP is a programming system that is tailored to process lists of symbolic data instead of operating primarily on numeric data. In many programming languages, like FORTRAN, the basic form of data is an integer or floating point number, whereas in LISP the basic data structure is an individual abstract symbol, called an atom. These atoms can be combined into lists, lists containing lists, etc. LISP provides a powerful notation for operating on these lists.

The LISP language is unique. The major difference from most other software systems is in LISP's ability to create a recursive programming environment. A simple operation will take an expression of the data language and, leaving it intact, extend it to be an applicable function in the programming language. Simply stated, data structures or lists, at one instant, can be treated as data to be processed, then these same lists, unchanged, can be processed as executable LISP code; hence, the term recursive programming (distinguished from recursive program). This is a very powerful concept and has found wide acceptance for work in the previously mentioned application areas. Take, for example, an English

language sentence. It can be broken down to its basic elements and these elements can then describe an action to be completed or executed. There is provision for a LISP/370 interpreter and also for a LISP/370 compiler. With this announcement, IBM now provides a LISP system for the System/370.

LISP/370 provides the user with the following features:

- Basic functions
- Basic macros
- List functions
- String functions
- Vector functions
- State handling and supervisory functions
- I/O functions
- Arithmetic functions
- Property list and OBLIST functions
- Definition functions
- Debugging features
- Compiler and LISP assembly program

LISP/370, in addition, features infinite precision arithmetic, a wide variety of data types and an exceptionally modular implementation. LISP/370 further offers sophisticated state-saving operations that facilitate the implementation of advanced experimental control structures such as backtracking and coroutines.

### Specified operating environment

#### *Programming considerations*

LISP/370 is written to be used in a standard System/370 environment. OS Assembler H (5734-AS1) is a prerequisite for assembling LISP/370 source. Nothing special is done to the operating system to accommodate LISP/370. A minimum virtual storage size of two megabytes is recommended.

For the MVS environment, LISP/370 was tested under MVS Release 3.7. For the VM/370 environment, VM/370 Release 3, PLC 12 and CMS Version 14 were used.

Subsequent versions or releases of the above IBM program offerings may impair the functioning of this IUP.

#### *System considerations*

For MVS:

The supporting host operating system is OS/VS2. The minimum configuration is any that can support MVS running TSO.

For VM/CMS:

The supporting host operating system is VM/370. The minimum configuration is any that can support VM running CMS.

#### **Installation tasks**

For TSO:

There are nine files for MVS TSO. The files can be recovered using the standard MVS utilities IEBGENER and IEBUPDTE.

For VM/CMS:

There are four files for VM/CMS. The first of the four files contains the necessary utility program for loading the CMS version.

### Education

Seminars and workshops in support of the program are conducted based on sufficient demand on dates and at locations best suited to the needs of IBM's customers. Customers should advise their IBM representative of educational requirements for this program.

### Program services

Central Service will be provided until May 18, 1980. Enter "\*\*\*" and this date under the Central Service column of the Supplement to Agreement for IBM Licensed Programs.

Documentation concerning errors in this program may be submitted to:

IBM Corporation  
B/O 129  
7700 Second Avenue  
Detroit, MI 48202  
Attn: Mr. A. E. Polcha

During this period only, IBM, through the program author(s), will without additional charge send corrections to the customer reporting the problem and/or issue, through the Program Information Department (PID), corrected code or notice of availability of corrected code. However, IBM does not guarantee service results or represent or warrant that all errors will be corrected. Any on-site program service or assistance will be provided at a charge.

### Ordering information

This IUP and its associated documentation are scheduled for availability beginning May 19, 1978. Contact your local IBM Branch Office to order this program.

### Basic material

#### *Unlicensed documentation*

One copy of the Program Description/Operations Manual (SH20-2076)

#### *Licensed documentation*

None

#### *Licensed machine-readable material*

One copy of the machine-readable material containing source code. When ordering the Basic Material, select one of the following Specify Numbers:

<i>Specify Number</i>	<i>Track/ Density</i>	<i>Description</i>	<i>User/Volume Requirement</i>
9029	9/1600	Magnetic tape	None
9031	9/6250	Magnetic tape	None

Orders will be scheduled for shipment from the Program Information Department (PID) the Friday of the week following AAS order entry unless a later scheduled date is requested, provided these dates are not prior to May 19, 1978.

### Charges

Monthly charges for the Installed User Program are waived after the payment of twenty-four (24) consecutive monthly charges. The Designated Machine Type is a System/370.

<i>Type</i>	<i>Program Number/AAS</i>	<i>Monthly Charge</i>
5796	PKL	\$1500.00

Installation license does not apply.

Monthly charges shown above are provided for information and are subject to change in accordance with the terms of the *Agreement for IBM Licensed Programs (Z120-2800)*.

### Charges for additional copies of documentation

#### *Unlicensed documentation*

Program Description/Operations Manual. Order from Mechanicsburg.

<i>Order Number</i>	<i>Selling Price/Copy</i>
SH20-2076	\$13.50

#### *General documentation*

Availability Notice. Order from Mechanicsburg, no charge to customer.

#### *Order Number*

G320-6061

In World Trade countries, local prices and schedules are available from IBM WTC Branch Offices.

### Testing period

The test period for this program is one (1) month.

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