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REPORT No. 4384

INTERLISP MAINTENANCE: FINAL REPORT

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ALICE K. HARTLEY

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1. INTRODUCTION

Interlisp is an exceedingly powerful programming environment that makes it possible to implement large, complex systems in a very short time. Interlisp has been in use by the ARPA community since 1969, and is currently heavily used at seven ARPA sites: BBN, SRI, USC-ISI, SUMEX-AIM, SU-AI, USC-ECL, and Xerox Parc.

The Interlisp Maintenance contract covers the following tasks:

1. Maintenance of the system level portion of INTERLISP, including tracking down and fixing bugs, modifying and improving existing features in response to the needs of the ARPA community, and keeping up with hardware and operating system changes.
2. Documentation of the system level portions of INTERLISP for inclusion in the INTERLISP manual; edited by Warren Teitelman at Xerox Parc.
3. Release of new systems to the ARPA community, *and*
4. Installation of INTERLISP in the National Software Works.

2. WORK PERFORMED

2.1 First Quarter: 14 April 78 - 14 July 78

- o Added the facility SUPERDRIBBLE. DRIBBLE allows one to save on a file a transcript of an interactive session. SUPERDRIBBLE includes all the line editing characters in the file. This was in response to a request from Teitelman at Parc.
- o Changed the functions BKSYSBUF and BKLINBUF to return their given arguments.
- o Changed SETQ to evaluate extra arguments. Requested by Teitelman at Parc for improvement of CLISP.
- o Changed the function MINFS to reject absurdly small arguments which could confuse the garbage collector.
- o Modified the interpreter to disallow the binding of T and NIL, and to disallow binding of non-literal atoms.
- o Modified the compiler to forbid binding NIL and T.
- o Modified the function READTABLEP to be more exact.
- o Improved right margin checking in PRINT.
- o In response to a request from Balzer at ISI, changed the unbinding procedure to occur in the reverse order of binding. Thus, if a function or PROG binds the same variable twice, the state on exit will be restored to the state on entry.
- o Fixed a bug in "opening" strings for reading.
- o Fixed a bug in the function DATE.
- o Modified the compiler to use the function TYPENAME rather than NTYP when compiling user data types.
- o Modified LAP to agree with some changes made by Parc in the flags that determine whether a function being compiled or loaded is to be redefined or put on the property list.

- o Fixed a bug in the compiler having to do with GO.
- o Released version 119 of Interlisp.
- o Fixed a bug in the printing of floating point numbers.
- o Installed Interlisp in the National Software Works with no problem except slowness.
- o In cooperation with Masinter at Parc, installed major changes to the hash array functions and garbage collector for increased efficiency and to permit the function MAPHASH to work correctly even if a garbage collection occurs during the process.
- o Changed the initial value of SYSHASHARRAY to NIL to save space for users who do not use the feature.
- o Assisted Warren Teitelman at Xerox Parc with documentation of system level portions of Interlisp for the new Interlisp manual, published in October 1978.
- o Fixed a bug in the function SYSIN, and changed the error message to more accurately reflect the problem, if any.
- o Disabled terminal interrupts during the function MAKESYS to avoid potential catastrophic state.
- o Fixed a potential interrupt problem in the function RELSTK.
- o Installed additional internal state indicators (Blips) in the interpreter for DWIM.
- o Fixed a bug in the spaghetti stack/stack overflow code that was causing serious problems for users at ISI.
- o Fixed a bug in the function STRPOS that could cause it to loop.
- o Fixed a bug in the compiler having to do with non-local GO's.
- o Fixed the compiler so that the arithmetic functions IPLUS, ITIMES, LOGOR, LOGXOR, LOGAND, FPLUS, and FTIMES return the correct value if given no arguments.

- o Increased the number of swapping forks to 4. Repaired the error detection when all forks are full.
- o Increased the emergency stack region because the amount of stack required for the break package to function has increased.
- o Released version 121 of Interlisp.

2.2 Second Quarter: 15 July - 14 October 1978

- o Modified the compiler to print an error message if an attempt to bind or set a non-literal atom is encountered.
- o Modified the compiler to print a warning message if the function SETQ is given too many arguments.
- o In response to a request from Kaplan at Parc, changed PRINT to normalize floating point numbers before printing.
- o Fixed a bug in string creation and garbage collection which occasionally resulted in an incorrect string.
- o Added the ability for the user to supply the function which the low level BACKTRACE will use to print argument values.
- o Added new stack functions SETALINK and SETCLINK which allow the user to modify the stack structure. These functions check for, and disallow the creation of circularities on the stack.
- o In cooperation with Masinter at Parc, installed changes to allow the user extremely detailed control over the messages printed by the garbage collector.
- o Added the function BOUNDP so that the test for whether or not a variable is bound can be performed independent of how "boundness" is indicated in a particular implementation of Interlisp.

- o Cleaned up the code and documented SINGLEFILEINDEX and MULTIFILEINDEX for the Interlisp manual.
- o Cleaned up the code and documented NEWMAL for the Interlisp manual.
- o Documented DATEFORMAT for the Interlisp manual.

2.3 Third Quarter: 15 October 78 - 14 January 79

- o Released version 127 of Interlisp to the ARPA community.
- o Modified so that the "standard" floating point format is used in functions such as PACK and UNPACK.
- o Provided the user access to the subroutines that create atoms so that functions such as USERNAME can create atoms efficiently.
- o Added a function, EOFP, to test whether the end of a file has been reached.
- o Modified the way PROG1 evaluates its arguments to allow DWIM to work more effectively.
- o Added the function SELECT and added to the compiler the ability to compile it efficiently.
- o Modified EDITA as required by changes made elsewhere in the system.
- o Fixed a bug in the block library definition of LENGTH.
- o Modified the functions USERNAME and HOSTNAME to optionally return an atom instead of a string.
- o Fixed two bugs in the EXEC package.
- o Fixed a bug in SINGLEFILEINDEX.

2.4 Fourth Quarter: 15 January - 14 April 79

- o Added the function TIGHTGC which allows the user to affect the garbage collection algorithm such that address space is allocated to a data type only when required.
- o Fixed GETFILEPTR and SETFILEPTR to give the correct error messages when given an illegal argument.
- o Added a variable, TERPICNT, to count the number of lines printed.
- o Fixed a compiler bug concerning a problem with non-local GO's in block compiled code.
- o Fixed a bug having to do with stack overflow during garbage collection.
- o Replaced all occurrences of GETP with GETPROP in the compiler for consistency with the Interlisp manual.
- o Modified the compiler to allow the user to provide the function which expands macros. This is particularly useful for DWIM.
- o Modified the compiler to print a warning message when a substitution macro is provided with too many arguments.
- o Designed and implemented all the modifications and new functions required for the conversion to Release 3 (and 4) of Tops-20.
- o Released versions 128 and 129 of Interlisp to the ARPA community.