

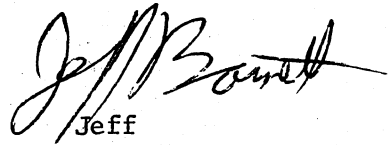
LISP

MEMORANDUM

DATE: 10-23-70
MEMO NO.: NNR

TO: Mort Bernstein
FROM: Jeff Barnett
SUBJECT:
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Recently, I have implemented an infix to LISP translator. The translator is itself a LISP Program and includes a trivial on-line editor. Syntax equations detailing the infix input are enclosed. Translation equivalents are given for the operators along with their binding strengths. The rest of the translators equivalents are not given, try intuition. If that is not unambiguous or gives confusing results, contact me. In any case, I would be interested in your comments, questions and criticisms.


Jeff

JB:sw

Attachments:

1. Syntax Conventions
2. LISP INFIX SYNTAX Definition
3. Binary Operator Definitions and Binary Strength

TO: Mort Bernstein

Attachment No. 1
10-23-70

SYNTAX CONVENTIONS

The following notations and conventions are used in the syntax equations:

$\alpha|\beta \dots |\Delta$ means an α or a β or \dots or a Δ

{ ... } meta brackets

$\$ \alpha$ means zero or more α 's supported by commas

[...] means the enclosed are optional

$\textcircled{\alpha}$ means an α . This is an escape in case α is a meta character such as "}".

Capital letter items are terminal names.

Small letter items are meta names.

TO: Mort Bernstein

Attachment No. 2
10-23-70

LISP INFIX SYNTAX DEFINITION

input = {definer|evaluation};

evaluation = expression

definer = {FUNCTION|MACRO|INSTRUCTION} | f-name | parameters | expression

f-name = variable

parameters = (\$' variable)

variable = simple-name | global-name

simple-name = identifier

global-name = identifiers:section-number

section-number = 0|1|2| ... |127

expression = operand \${operator operand}

operator = <|/|*|+|-|LAND|LOR|LXOR|LQ|LS|GQ|GR|#|@|EQUAL|
UNEQUAL|INTERSECTION|UNION|@&|IN|AND|OR|ON

operand = simple-operand | array-reference | function-use

array-reference = operand () subscript ()

subscript = expression

function-use = operand(\$'expression)

simple-operand = direct-operand | named-operand

direct-operand = variable | datum

datum = simple-datum | complex-datum

simple-datum = nil | unsigned-number | array | functional | string |
special-pointer | unspecial-pointer

nil = NIL | ()

complex-datums = quoted-s-expression

quoted-s-expression = "s-expression

named-operand = not-operand | signed-operand | recursive-operand |
lisp-operand | selector | conditional | progn | for-loop |
block | go-statement | return-statement

not-operand = {NULL | NOT} operand

signed-operand = {+ | -} operand

recursive-operand = (expression)

lisp-operand = 's-expression

selector = select | selectq

select = SELECT expression \${WHEN expression THEN expression}
[ELSE expression]

selectq = SELECTQ expression
\${WHEN {simple-datum | identifier} (\$' {simple-datum | identifier})}
THEN expression} [ELSE expression]

conditional = IF expression THEN expression [ELSE expression]

progn = Ⓛ \$'expression Ⓛ

for-loop = FOR \${ {WHILE | UNTIL | WHEN | UNLESS | TOP | BOTTOM} expression } |
{BIND bind-list} |
{variable {IN | ON | AT | NOW} expression} |
{variable ← expression} [{STEP | RESET} expression] }
DO expression

block = {BLOCK | BEGIN} \${ {label | expression | bind-statement} [;] } END

label = identifier

bind-statement = BIND bind-list

bind-list = \$' {variable [← expression] }

go-statement = GO label

return-statement = RETURN expression

TO: Mort Bernstein

Attachment No. 3
10-23-70

BINARY OPERATOR DEFINITIONS AND BINARY STRENGTH

<u>Operator</u>	<u>Hierarchy</u>		<u>Interpretation</u>
	Seen From the Left	Seen From the Right	
←	69	1	(SETQ - -) or (SETA - -)
/	65	65	(QUOTIENT - -)
*	63	63	(*TIMES - -)
+	60	60	(*PLUS - -)
-	60	60	(DIFFERENCE - -)
LAND	58	58	(*LOGAND - -)
LOR	55	55	(*LOGOR - -)
LXOR	51	51	(*LOGXOR - -)
LQ	45	45	(NOT(GREATERP - -))
LS	45	45	(LESSP - -)
GQ	45	45	(NOT(LESSP - -))
GR	45	45	(GREATERP - -)
#	41	41	(NOT(EQ - -))
=	41	41	(EQ - -)
EQUAL	41	41	(EQUAL - -)
UNEQUAL	41	41	(NOT(EQUAL - -))
INTERSECTION	35	35	(INTERSECTION - -)
UNION	32	31	(UNION - -)
@	28	27	(APPEND - -)
&	23	22	(CONS - -)
IN	17	18	(MEMBER - -)
AND	14	14	(AND - -)
OR	11	11	(OR - -)

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