File created: 9-Jun-2021 22:50:15 **{DSK}<Users>kaplan>Local>medley3.5>git-medley>sources>APRINT.;11**

changes to: (VARS APRINTCOMS)

previous date: 10-May-2021 15:46:22 {DSK}<Users>kaplan>Local>medley3.5>git-medley>sources>APRINT.;10

Read Table: INTERLISP

Package: INTERLISP

Format: XCCS

```
;;
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(RPAQQ APRINTCOMS
       [(COMS                                                   ; User-level print functions
              (FNS PRIN1 PRIN2 PRIN3 PRIN4 PRINT PRINTCCODE \PRINTCCODE PRINTLEVEL RADIX SPACES TERPRI FRESHLINE
                   DEFPRINT LINELENGTH))
        (INITVARS (PLVLFILEFLG NIL)
               (\LINELENGTH 82)
               (\FLOATFORMAT T)
               (PRXFLG NIL)
               (*PRINT-BASE* 10)
               (*READ-BASE* 10)
               (*PRINT-RADIX* NIL)
               (*PRINT-ESCAPE* T)
               (*PRINT-CASE* ':UPCASE)
               (*PRINT-GENSYM* T)
               (*PRINT-LEVEL* NIL)
               (*PRINT-LENGTH* NIL)
               (*PRINT-PRETTY* NIL)
               (*PRINT-CIRCLE* NIL)
               (*PRINT-ARRAY* NIL)
               (*PRINT-CIRCLE-HASHTABLE* NIL)
               (*PACKAGE* NIL)
               (*KEYWORD-PACKAGE* NIL)
               (*INTERLISP-PRIN1-CASE* ':UPCASE)
               (\DEFPRINTFNS NIL))
        (COMS                                                   ; PRINT internals
              (FNS PRINT-CIRCLE-LOOKUP PRINT-CIRCLE-LABEL-P PRINT-CIRCLE-SCAN PRINT-CIRCLE-ENTER)
              (FNS \PRINDATUM \PRINT-USING-DEFPRINT \PRINT-USING-ADDRESS \ELIDE.PRINT.ELEMENT
                   \ELIDE.ELEMENT.CHAR \ELIDE.PRINT.TAIL \ELIDE.TAIL.STRING \CKPOSBOUT \CKPOSSOUT \CONVERTNUMBER
                   \LITPRIN \LITPRIN.INTERNAL \SYMBOL.ESCAPE.COUNT \NUMERIC.PNAMEP \PRINSTACKP \PRINTADDR
                   \PRINSTRING \SOUT)
              (DECLARE%: EVAL@COMPILE DONTCOPY (MACROS .FILELINELENGTH.)
                     (FUNCTIONS \PRINDATUM-LISTP)
                     (EXPORT (MACROS .SPACECHECK. \CHECKRADIX)))
              (FNS \INVALID.RADIX)
              (SPECVARS \THISFILELINELENGTH))
        (COMS                                                   ; Internal printing
              (FNS \MAPPNAME \MAPPNAME.INTERNAL PNAMESTREAMP)
              (DECLARE%: DONTCOPY (RESOURCES \MAPPNAMESTREAM)
                     (MACROS PNAMESTREAMP))
              (INITRESOURCES \MAPPNAMESTREAM)
              [INITVARS (\PNAMEDEVICE (NCREATE 'FDEV (\GETDEVICEFROMHOSTNAME 'NULL T]
              (GLOBALVARS \PNAMEDEVICE))
        (COMS                                                   ; Obsolete
              (FNS \MAPCHARS))
        (DECLARE%: EVAL@COMPILE DOCOPY (ADDVARS (SYSSPECVARS *PRINT-BASE* *READ-BASE* *PRINT-RADIX*
                                                       *PRINT-ESCAPE* *PRINT-CASE* *PRINT-GENSYM* *PRINT-LEVEL*
                                                       *PRINT-LENGTH* *PRINT-PRETTY* *PRINT-CIRCLE*
                                                       *PRINT-ARRAY* *PACKAGE*)))
        (COMS                                                   ; PRINTNUM and friends
              (FNS PRINTNUM FLTFMT \CHECKFLTFMT PRINTNUM-TO-STRING)
              (MACROS NUMFORMATCODE)
              (INITVARS (NILNUMPRINTFLG)))
        (LOCALVARS . T)
        (GLOBALVARS \LINELENGTH \FLOATFORMAT PRXFLG \DEFPRINTFNS)
        (DECLARE%: DONTEVAL@LOAD DOEVAL@COMPILE DONTCOPY COMPILERVARS (ADDVARS (NLAMA)
                                                                             (NLAML)
                                                                             (LAMA])

;; User-level print functions

(DEFINEQ

(PRIN1
  [LAMBDA (X FILE)                                              (* bvm%: "29-Sep-86 23:59")

;;; Like PRIN2 but no escaping.  Also implies no radix qualifiers, although Common Lisp separates *PRINT-RADIX* from *PRINT-ESCAPE* -- might
;;; want to bind *PRINT-RADIX* to (AND (fetch (READTABLEP COMMONLISP) of *READTABLE*) *PRINT-RADIX*)

    (LET* [(STRM (\GETSTREAM FILE 'OUTPUT))
           (OBEY-PRINT-LEVEL (OR (ffetch (READTABLEP COMMONLISP) of (\DTEST *READTABLE* 'READTABLEP))
                                 (OR (\OUTTERMP STRM)
                                     PLVLFILEFLG]
          (LET ((*PRINT-ESCAPE* NIL)
                (*PRINT-RADIX* NIL)
                (*PRINT-LEVEL* (AND OBEY-PRINT-LEVEL *PRINT-LEVEL*))
                (*PRINT-LENGTH* (AND OBEY-PRINT-LEVEL *PRINT-LENGTH*))
                (*PRINT-CASE* (OR *INTERLISP-PRIN1-CASE* *PRINT-CASE*))
                \THISFILELINELENGTH)
               (DECLARE (SPECVARS *PRINT-RADIX* *PRINT-ESCAPE* *PRINT-LEVEL* *PRINT-LENGTH* *PRINT-CASE*
                                \THISFILELINELENGTH))            ; *PRINT-CASE* because too many things in Interlisp prin1
                                                                 ; things expecting the symbol's pname
               (SETQ \THISFILELINELENGTH (.FILELINELENGTH. STRM))
               (\PRINDATUM X STRM 0)
               X])
```

```
(PRIN2
  [LAMBDA (X FILE RDTBL)                                         ; Edited 20-Jan-87 17:04 by bvm:
    (LET* [(STRM (\GETSTREAM FILE 'OUTPUT))
           (OBEY-PRINT-LEVEL (OR (fetch (READTABLEP COMMONLISP) of (SETQ RDTBL (\GTREADTABLE RDTBL)))
                                 (OR (\OUTTERMP STRM)
                                     PLVLFILEFLG]
          (LET ((*READTABLE* RDTBL)
                (*PRINT-ESCAPE* T)
                (*PRINT-LEVEL* (AND OBEY-PRINT-LEVEL *PRINT-LEVEL*))
                (*PRINT-LENGTH* (AND OBEY-PRINT-LEVEL *PRINT-LENGTH*))
                (*PACKAGE* (if (fetch (READTABLEP USESILPACKAGE) of RDTBL)
                               then *INTERLISP-PACKAGE*
                             else *PACKAGE*))
                \THISFILELINELENGTH)
               (DECLARE (SPECVARS *PRINT-ESCAPE* *READTABLE* *PRINT-LEVEL* *PRINT-LENGTH* *PACKAGE*
                                \THISFILELINELENGTH))
               (SETQ \THISFILELINELENGTH (.FILELINELENGTH. STRM))
               (\PRINDATUM X STRM 0)
               X])
```

```
(PRIN3
  [LAMBDA (X FILE)                                               (* bvm%: "29-Sep-86 23:59")

;;; Like PRIN1 but no linelength checking

    (LET* [(STRM (\GETSTREAM FILE 'OUTPUT))
           (OBEY-PRINT-LEVEL (OR (ffetch (READTABLEP COMMONLISP) of (\DTEST *READTABLE* 'READTABLEP))
                                 (OR (\OUTTERMP STRM)
                                     PLVLFILEFLG]
          (LET ((*PRINT-ESCAPE* NIL)
                (*PRINT-RADIX* NIL)
                (*PRINT-LEVEL* (AND OBEY-PRINT-LEVEL *PRINT-LEVEL*))
                (*PRINT-LENGTH* (AND OBEY-PRINT-LEVEL *PRINT-LENGTH*))
                (*PRINT-CASE* (OR *INTERLISP-PRIN1-CASE* *PRINT-CASE*))
                \THISFILELINELENGTH)
               (DECLARE (SPECVARS *PRINT-RADIX* *PRINT-ESCAPE* *PRINT-LEVEL* *PRINT-LENGTH* \THISFILELINELENGTH
                                ))
               (\PRINDATUM X STRM 0)
               X])
```

```
(PRIN4
  [LAMBDA (X FILE RDTBL)                                         ; Edited 20-Jan-87 17:05 by bvm:

;;; Like PRIN2 but doesn't check linelength

    (LET* [(STRM (\GETSTREAM FILE 'OUTPUT))
           (OBEY-PRINT-LEVEL (OR (fetch (READTABLEP COMMONLISP) of (SETQ RDTBL (\GTREADTABLE RDTBL)))
                                 (OR (\OUTTERMP STRM)
                                     PLVLFILEFLG]
          (LET ((*READTABLE* RDTBL)
                (*PRINT-ESCAPE* T)
                (*PRINT-LEVEL* (AND OBEY-PRINT-LEVEL *PRINT-LEVEL*))
                (*PRINT-LENGTH* (AND OBEY-PRINT-LEVEL *PRINT-LENGTH*))
                (*PACKAGE* (if (fetch (READTABLEP USESILPACKAGE) of RDTBL)
                               then *INTERLISP-PACKAGE*
                             else *PACKAGE*))
                \THISFILELINELENGTH)
               (DECLARE (SPECVARS *PRINT-ESCAPE* *READTABLE* *PRINT-LEVEL* *PRINT-LENGTH* *PACKAGE*
                                \THISFILELINELENGTH))
               (\PRINDATUM X STRM 0)
               X])
```

```
(PRINT
  [LAMBDA (X FILE RDTBL)                                         (* bvm%: " 9-May-86 23:08")
    (LET [(STRM (\GETSTREAM FILE 'OUTPUT]
         (PRIN2 X STRM RDTBL)
         (\OUTCHAR STRM (CHARCODE EOL))
         X])
```

```
(PRINTCCODE
  [LAMBDA (CHARCODE FILE)                                        (* bvm%: " 9-May-86 22:44")
    (\OUTCHAR (\GETSTREAM FILE 'OUTPUT)
           (COND
              ((\CHARCODEP CHARCODE)
               CHARCODE)
              (T (\ILLEGAL.ARG CHARCODE])
```

```
(\PRINTCCODE
  [LAMBDA (CHARCODE FILE)                                        ; Edited  5-May-2021 09:56 by rmk:

    ;; A copy of PRINTCCODE to be used in internal functions where \OUTCHAR doesn't have to be compiled open but which we don't want to screw
    ;; up if the user breaks PRINTCCODE

    (\OUTCHAR (\GETSTREAM FILE 'OUTPUT)
           (COND
              ((\CHARCODEP CHARCODE)
               CHARCODE)
              (T (\ILLEGAL.ARG CHARCODE])
```

```
(PRINTLEVEL
  [LAMBDA (CARVAL CDRVAL)                                        (* bvm%: " 9-May-86 22:47")

;;; Sets Interlisp print level to the given values in CAR and CDR directions.  These correspond to *PRINT-LEVEL* and *PRINT-LENGTH* in Common
;;; Lisp

    [COND
       ((LISTP CARVAL)
        (SETQ CDRVAL (CDR CARVAL))
        (SETQ CARVAL (CAR CARVAL]
    (PROG1 (CONS (OR *PRINT-LEVEL* -1)
                 (OR *PRINT-LENGTH* -1))
        [COND
           (CARVAL (SETQ *PRINT-LEVEL* (AND (IGEQ CARVAL 0)
                                             CARVAL]
        [COND
           (CDRVAL (SETQ *PRINT-LENGTH* (AND (IGEQ CDRVAL 0)
                                              CDRVAL])])
```

```
(RADIX
  [LAMBDA (N)                                                    (* bvm%: " 5-May-86 10:56")
    (PROG1 *PRINT-BASE*
        (AND N (SETQ *PRINT-BASE* (\CHECKRADIX N))))])
```

```
(SPACES
  [LAMBDA (N FILE)                                               (* rmk%: "21-OCT-83 12:32")
    [PROG ((STREAM (\GETSTREAM FILE 'OUTPUT))
           \THISFILELINELENGTH)
          (SETQ \THISFILELINELENGTH (.FILELINELENGTH. STREAM))
          (.SPACECHECK. STREAM N)
          (FRPTQ N (\OUTCHAR STREAM (CHARCODE SPACE]
    NIL])
```

```
(TERPRI
  [LAMBDA (FILE)                                                 (* rmk%: "21-OCT-83 12:31")
    (\OUTCHAR (\GETSTREAM FILE 'OUTPUT)
           (CHARCODE EOL))
    NIL])
```

```
(FRESHLINE
  [LAMBDA (STREAM)                                               (* rmk%: "22-AUG-83 13:48")

    ;; Adjusts the STREAM to be at a new line -- does equivalent of TERPRI unless it is already 'sitting at the beginning of a line'

    (COND
       ([NEQ 0 (fetch CHARPOSITION of (COND
                                        ((AND (type? STREAM STREAM)
                                              (WRITEABLE STREAM))
                                         STREAM)
                                        (T (SETQ STREAM (GETSTREAM STREAM 'OUTPUT]
        (\OUTCHAR STREAM (CHARCODE EOL))
        T])
```

```
(DEFPRINT
  [LAMBDA (TYPE FN)                                              (* rmk%: "28-APR-80 12:04")
    (AND (FIXP TYPE)
         (SETQ TYPE (\TYPENAMEFROMNUMBER TYPE)))                 ; The FIXP case should never occur
    (PROG ((F (FASSOC TYPE \DEFPRINTFNS)))
          [COND
             (F (SETQ \DEFPRINTFNS (DREMOVE F \DEFPRINTFNS]
          [COND
```

```
             (FN (SETQ \DEFPRINTFNS (CONS (CONS TYPE FN)
                                           \DEFPRINTFNS]
          (RETURN (CDR F])
```

```
(LINELENGTH
  [LAMBDA (N FILE)                                                (* bvm%: "11-Mar-86 14:56")
```

;;; Sets to N the linelength of FILE -- defaults to primary output file

```
    (LET [(STREAM (\GETSTREAM FILE 'OUTPUT]
         (PROG1 (fetch (STREAM LINELENGTH) of STREAM)
             [AND N (COND
                        ((AND (NUMBERP N)
                              (ILESSP N 1))
                         (\ILLEGAL.ARG N))
                        (T (replace (STREAM LINELENGTH) of STREAM with (COND
                                                                         ((EQ N T)
                                                                  ; Infinite
                                                                          MAX.SMALLP)
                                                                         (T (FIX N])])
)

(RPAQ? PLVLFILEFLG NIL)

(RPAQ? \LINELENGTH 82)

(RPAQ? \FLOATFORMAT T)

(RPAQ? PRXFLG NIL)

(RPAQ? *PRINT-BASE* 10)

(RPAQ? *READ-BASE* 10)

(RPAQ? *PRINT-RADIX* NIL)

(RPAQ? *PRINT-ESCAPE* T)

(RPAQ? *PRINT-CASE* ':UPCASE)

(RPAQ? *PRINT-GENSYM* T)

(RPAQ? *PRINT-LEVEL* NIL)

(RPAQ? *PRINT-LENGTH* NIL)

(RPAQ? *PRINT-PRETTY* NIL)

(RPAQ? *PRINT-CIRCLE* NIL)

(RPAQ? *PRINT-ARRAY* NIL)

(RPAQ? *PRINT-CIRCLE-HASHTABLE* NIL)

(RPAQ? *PACKAGE* NIL)

(RPAQ? *KEYWORD-PACKAGE* NIL)

(RPAQ? *INTERLISP-PRIN1-CASE* ':UPCASE)

(RPAQ? \DEFPRINTFNS NIL)
```

;; PRINT internals

```
(DEFINEQ

(PRINT-CIRCLE-LOOKUP
  [LAMBDA (OBJECT)                                                (* Pavel "16-Oct-86 21:13")
    (LET ((TABLEENTRY (GETHASH OBJECT *PRINT-CIRCLE-HASHTABLE*)))
         (CASE TABLEENTRY
             ((T1 NIL) (CL:VALUES NIL NIL))
             (T2 (CL:VALUES (PROG1 (CONCAT (CHARACTER (fetch (READTABLEP HASHMACROCHAR) of *READTABLE*))
                                            *PRINT-CIRCLE-NUMBER* "=")
                                 (CL:SETF (CL:GETHASH OBJECT *PRINT-CIRCLE-HASHTABLE*)
                                        *PRINT-CIRCLE-NUMBER*)
                                 (CL:INCF *PRINT-CIRCLE-NUMBER*))
                        T))
             (CL:OTHERWISE (CL:IF (NUMBERP TABLEENTRY)
                                (CL:VALUES (CONCAT (CHARACTER (fetch (READTABLEP HASHMACROCHAR) of *READTABLE*))
                                                  TABLEENTRY "#")
                                       NIL)
                                (CL:ERROR "Print-circle-lookup hashtable error!")))))])

(PRINT-CIRCLE-LABEL-P
  [CL:LAMBDA (OBJECT)                                               (* jrb%: "30-Jun-86 23:04")
         (DECLARE (CL:SPECIAL *PRINT-CIRCLE-HASHTABLE*))
         (CL:BLOCK PRINT-CIRCLE-LABEL-P
             (LET ((TABLEENTRY (GETHASH OBJECT *PRINT-CIRCLE-HASHTABLE*)))
                  (COND
                     ((EQ TABLEENTRY 'T2))
                     ((CL:INTEGERP TABLEENTRY)
                      TABLEENTRY)
                     (T NIL))))])

(PRINT-CIRCLE-SCAN
  [CL:LAMBDA (OBJECT)                                               ; Edited 16-Jan-87 15:53 by jrb:
         (DECLARE (CL:SPECIAL *PRINT-ARRAY*))
         (CL:TYPECASE OBJECT
             (CONS [COND
                      ((NOT (PRINT-CIRCLE-ENTER OBJECT))
                       (PRINT-CIRCLE-SCAN (CAR OBJECT))
                       (PRINT-CIRCLE-SCAN (CDR OBJECT])
             (CL::STRUCTURE-OBJECT [COND
                                       ((AND XCL:*PRINT-STRUCTURE* (NOT (PRINT-CIRCLE-ENTER OBJECT)))
                                        (CL:MAPCAR [FUNCTION (LAMBDA (DESCRIPTOR)
                                                               (PRINT-CIRCLE-SCAN (FETCHFIELD DESCRIPTOR OBJECT]
                                               (CL::STRUCTURE-POINTER-SLOTS (CL:TYPE-OF OBJECT])
             ((CL:ARRAY T) [COND
                               ((AND *PRINT-ARRAY* (NOT (PRINT-CIRCLE-ENTER OBJECT)))
                                                                    ; No need to walk array if we're not printing them
                                (LET* [(ASIZE (CL:ARRAY-TOTAL-SIZE OBJECT))
                                       (VARRAY (COND
                                                  ((> (CL:ARRAY-RANK OBJECT)
                                                      1)
                                                   (CL:MAKE-ARRAY ASIZE :DISPLACED-TO OBJECT))
                                                  (T OBJECT]
                                      (CL:DOTIMES (X ASIZE)
                                          (PRINT-CIRCLE-SCAN (CL:AREF VARRAY X)))])])

(PRINT-CIRCLE-ENTER
  [CL:LAMBDA (OBJECT)
         (DECLARE (CL:SPECIAL *PRINT-CIRCLE-HASHTABLE* THERE-ARE-CIRCLES))
                                                                    ; Edited 31-Mar-87 19:16 by jrb:
         (CASE (CL:GETHASH OBJECT *PRINT-CIRCLE-HASHTABLE*)
             ((NIL)
                (CL:SETF (CL:GETHASH OBJECT *PRINT-CIRCLE-HASHTABLE*)
                       'T1)
                NIL)
             (T1
                (CL:SETF (CL:GETHASH OBJECT *PRINT-CIRCLE-HASHTABLE*)
                       'T2)
                (SETQ THERE-ARE-CIRCLES T)
                T)
             (T2 T)
             (CL:OTHERWISE (CL:ERROR "Print-circle-enter hashtable error!")))])

)

(DEFINEQ

(\PRINDATUM
  [LAMBDA (OBJECT STREAM CPL)                                       ; Edited 11-Feb-91 14:34 by jds
    (DECLARE (USEDFREE *READTABLE* *PRINT-RADIX* *PRINT-BASE* *PRINT-ESCAPE*))
    (SELECTC (NTYPX OBJECT)
         ((LIST \LITATOM \NEW-ATOM)
             (\LITPRIN OBJECT STREAM))
         (\LISTP ;; macro call that uses the arguments already bound, to save a fn call.

                 (\PRINDATUM-LISTP))
         ((LIST \SMALLP \FIXP)
             (WITH-RESOURCES (\NUMSTR \NUMSTR1)
                    (\CKPOSSOUT STREAM (\CONVERTNUMBER OBJECT (\CHECKRADIX *PRINT-BASE*)
                                                T
                                                (AND (if (fetch (READTABLEP COMMONLISP) of *READTABLE*)
                                                         then       ; Common Lisp controlled solely by this var
                                                              *PRINT-RADIX*
                                                       else         ; Interlisp prints radix if it is not 10 and we are prin2
                                                            (AND *PRINT-ESCAPE* (NEQ *PRINT-BASE* 10)))
                                                     *READTABLE*)
                                                \NUMSTR \NUMSTR1))))
         (\FLOATP [WITH-RESOURCES (\NUMSTR \NUMSTR1)
                         (\CKPOSSOUT STREAM (\CONVERT.FLOATING.NUMBER OBJECT \NUMSTR \NUMSTR1
                                                     (COND
                                                        ((AND (PNAMESTREAMP STREAM)
                                                              (NOT PRXFLG))

                                                 ;; The pname of a number is unaffected by RADIX unless PRXFLG is true.  This seems
                                                 ;; silly, but assorted code will break otherwise

                                                         T)
                                                      (T \FLOATFORMAT])
        (\STACKP (\PRINSTACKP OBJECT STREAM))
        (COND
           ((STRINGP OBJECT)
            (\PRINSTRING OBJECT STREAM))
           ((TYPENAMEP OBJECT 'CL::STRUCTURE-OBJECT)

            ;; this is a structure, don't use defprint.

            (CL::PRINT-STRUCTURE-INSTANCE OBJECT STREAM CPL))
           ((TYPENAMEP OBJECT 'T)

            ;; this is a common-loops object, since it is a sub-class of t, so call the print-instance method.

            (PRINT-INSTANCE OBJECT STREAM 0))
           (T (\PRINT-USING-DEFPRINT OBJECT STREAM CPL])

(\PRINT-USING-DEFPRINT
  [LAMBDA (X STREAM CPL)                                        ; Edited 18-Dec-86 12:22 by bvm:
    (DECLARE (USEDFREE *PRINT-LEVEL*))
    (LET* ((TYPE (TYPENAME X))
           (FN (FASSOC TYPE \DEFPRINTFNS)))
          (COND
             ([OR (NULL FN)
                  (NULL (SETQ FN (LET [(*PRINT-LEVEL* (AND *PRINT-LEVEL* (IDIFFERENCE *PRINT-LEVEL*
                                                                               (OR CPL 0]
                                                                ; This way recursive calls to PRINT etc will be at the 'right' level
                                      (CL:FUNCALL (CDR FN)
                                            X STREAM 0]

              ;; No defined printer, or printer declined to do anything

              (\PRINT-USING-ADDRESS X STREAM CPL))
             ((LISTP FN)

              ;; PRIN1 the CAR (usually a macro char) and PRIN2 the CDR.  Nowadays there is little reason for a defprint fn to not do its own
              ;; printing

              (AND (CAR FN)
                   (LET (*PRINT-ESCAPE*)
                        (\PRINDATUM (CAR FN)
                               STREAM)))
              (AND (CDR FN)
                   (\PRINDATUM (CDR FN)
                          STREAM CPL])

(\PRINT-USING-ADDRESS
  (CL:LAMBDA (X STREAM CPL)
         (CL:BLOCK \PRINT-USING-ADDRESS
             [LET ((TYPE (TYPENAME X)))
                  (COND
                     ((fetch (READTABLEP COMMONLISP) of *READTABLE*)
                      (.SPACECHECK. STREAM 2)
                      (\OUTCHAR STREAM (fetch (READTABLEP HASHMACROCHAR) of *READTABLE*))
                      (\OUTCHAR STREAM (CHARCODE "<"))
                      (AND TYPE (\LITPRIN TYPE STREAM))
                      (\CKPOSSOUT STREAM " @ ")
                      (\PRINTADDR X STREAM)
                      (\CKPOSBOUT STREAM (CHARCODE ">")))
                     (T (\CKPOSBOUT STREAM (CHARCODE {))
                        (AND TYPE (\LITPRIN TYPE STREAM))
                        (\CKPOSBOUT STREAM (CHARCODE }))
                        (\OUTCHAR STREAM (CHARCODE "#"))
                        (\PRINTADDR X STREAM]
             T)))

(\ELIDE.PRINT.ELEMENT
  [LAMBDA (STREAM)                                              (* jrb%: "29-Jun-86 21:05")
    (\OUTCHAR STREAM (\ELIDE.ELEMENT.CHAR])

(\ELIDE.ELEMENT.CHAR
  [LAMBDA NIL                                                   (* jrb%: "29-Jun-86 21:04")
    (COND
       ((fetch (READTABLEP COMMONLISP) of *READTABLE*)
        (fetch (READTABLEP HASHMACROCHAR) of *READTABLE*))
       (T (CHARCODE "&"])

(\ELIDE.PRINT.TAIL
  [LAMBDA (STREAM NOSPACEP)                                     (* jrb%: "29-Jun-86 21:06")

;;; Prints the appropriate elision indicator for elements beyond *PRINT-DEPTH* according to the read table we're using.  Prints first a space unless
;;; NOSPACEP

    [COND
       ((NOT NOSPACEP)
        (\OUTCHAR STREAM (CHARCODE SPACE]
    (\SOUT (\ELIDE.TAIL.STRING)
           STREAM])

(\ELIDE.TAIL.STRING
  [LAMBDA NIL                                                       (* jrb%: "29-Jun-86 21:05")
    (COND
       ((fetch (READTABLEP COMMONLISP) of *READTABLE*)
        "...")
       (T "--"])

(\CKPOSBOUT
  [LAMBDA (STREAM X)                                                (* rmk%: "21-OCT-83 12:32")
    (.SPACECHECK. STREAM 1)
    (\OUTCHAR STREAM X])

(\CKPOSSOUT
  [LAMBDA (STREAM X)                                                (* rmk%: "21-OCT-83 12:32")
    (.SPACECHECK. STREAM (\NSTRINGCHARS X))
    (for I instring X do (\OUTCHAR STREAM I])

(\CONVERTNUMBER
  [LAMBDA (N R IGNORE RDTBL NS NSB)                                 ; Edited 18-Dec-86 17:53 by bvm:

;;; Convert integer N to a string in radix R.  RDTBL governs whether radix qualifiers appear.  NS is a scratch promised to be of sufficient length;  NSB is
;;; a scratch string pointer.  IGNORE is obsolete flag for printing unsigned numbers

    (LET* ((SIGN)
           [MAGNITUDE (if (>= N 0)
                          then N
                        else (SETQ SIGN (IMINUS N]
           (X MAGNITUDE)
           (POS (\NSTRINGCHARS NS))
           (END (SUB1 POS))
           COMMONLISPY DIDQ)
          (if RDTBL
              then                                                  ; do bletcherous suffix cases first
                   (if (SETQ COMMONLISPY (fetch (READTABLEP COMMONLISP) of RDTBL))
                       then                                         ; decimal is suffix
                            (if (EQ R 10)
                                then (RPLCHARCODE NS (add END 1)
                                            (CHARCODE "."))
                                     (SETQ DIDQ T))
                     elseif (AND (EQ R 8)
                                 (> MAGNITUDE 7))
                       then                                         ; Octal numbers have Q suffix
                            (RPLCHARCODE NS (add END 1)
                                   (CHARCODE Q))
                            (SETQ DIDQ T)))
          (repeatuntil (EQ X 0) do                                  ; note this loop happens at least once, for benefit of
                                                                    ; MAGNITUDE = 0
                                 [RPLCHARCODE NS (add POS -1)
                                        (LET ((DIGIT (IREMAINDER X R)))
                                             (if (< DIGIT 10)
                                                 then (+ DIGIT (CHARCODE 0))
                                               else                 ; For radices higher than 10, use letters of alphabet from A on up
                                                    (+ (- DIGIT 10)
                                                       (CHARCODE A]
                                 (SETQ X (IQUOTIENT X R)))
          (if SIGN
              then (RPLCHARCODE NS (add POS -1)
                          (CHARCODE -)))
          (if [AND RDTBL (NOT DIDQ)
                   (OR COMMONLISPY (AND (NEQ R 10)
                                        (OR (> MAGNITUDE 9)
                                            (>= MAGNITUDE R]
              then ;; Prepend a radix qualifier if it wasn't already done as a suffix.  In Interlisp we don't do this if the radix is decimal or the number
                   ;; is smaller than the radix.

                   [SELECTQ R
                       (16                                          ; hex
                           (RPLCHARCODE NS (add POS -1)
                                  (CHARCODE x)))
                       (8                                           ; octal
                          (RPLCHARCODE NS (add POS -1)
                                 (CHARCODE o)))
                       (2 (RPLCHARCODE NS (add POS -1)
                                 (CHARCODE b)))
                       (PROGN (RPLCHARCODE NS (add POS -1)
                                     (CHARCODE r))
                              (RPLCHARCODE NS (add POS -1)
                                     (+ (CHARCODE 0)
                                        (IREMAINDER R 10)))
                              (if (>= R 10)
                                   then                           ; two-digit radix
                                       (RPLCHARCODE NS (add POS -1)
                                               (+ (CHARCODE 0)
                                                  (IQUOTIENT R 10]
                   (RPLCHARCODE NS (add POS -1)
                          (fetch (READTABLEP HASHMACROCHAR) of RDTBL)))
          (SUBSTRING NS POS END NSB])

(\LITPRIN
  [LAMBDA (X STREAM)                                              ; Edited 14-Apr-87 14:49 by jrb:
    (DECLARE (USEDFREE \THISFILELINELENGTH *PRINT-ESCAPE* *READTABLE* *PACKAGE* *PRINT-GENSYM* *PRINT-CASE*))
    (COND
       (*PRINT-ESCAPE* (LET ((RDTBL *READTABLE*)
                             PKG PKGSEPR)
                            [COND
                                (*PACKAGE*                        ; This is NIL until packages get turned on
                                       (COND
                                          ((EQ *PACKAGE* (SETQ PKG (fetch (CL:SYMBOL PACKAGE) of X)))
                                                                  ; No prefix needed in current package
                                           (SETQ PKG NIL))
                                          [(NULL PKG)             ; Uninterned.  Print something if flag is on
                                           (COND
                                              (*PRINT-GENSYM*     ; Print #: as prefix.  Not PACKAGECHAR here because colon
                                                                  ; hardwired into hashmacro dispatch.
                                                     (RPLCHARCODE (SETQ PKGSEPR (ALLOCSTRING 2 (CHARCODE ":")))
                                                            1
                                                            (fetch (READTABLEP HASHMACROCHAR) of RDTBL]
                                          ((EQ PKG *KEYWORD-PACKAGE*)
                                                                  ; Keywords get single colon, no prefix
                                           (SETQ PKGSEPR (ALLOCSTRING 1 (fetch (READTABLEP PACKAGECHAR)
                                                                           of RDTBL)))
                                           (SETQ PKG NIL))
                                          ((FIND-EXACT-SYMBOL X *PACKAGE*)

                                      ;; Symbol is accessible in current package, either by being imported or by inheritance.  This is a
                                      ;; messy test, which is why we test for special case of PKG being the current package first above.  No
                                      ;; prefix needed here.

                                           (SETQ PKG NIL))
                                          (T
                                             ;; Package qualifier is needed; we need only know now whether symbol is  internal or
                                             ;; external in its home package.

                                             (SETQ PKGSEPR (ALLOCSTRING (COND
                                                                           ((EQ X (FIND-EXTERNAL-SYMBOL X PKG))
                                                                  ; X is external in PKG, use single colon
                                                                            1)
                                                                           (T 2))
                                                                  (fetch (READTABLEP PACKAGECHAR) of RDTBL]
                             (\LITPRIN.INTERNAL X RDTBL STREAM (AND PKG (PACKAGE-NAME-AS-SYMBOL PKG))
                                    PKGSEPR \THISFILELINELENGTH)))
       (T (.SPACECHECK. STREAM (\NATOMCHARS X))

          ;; Following code munged to match \LITPRIN.INTERNAL's handling of :CAPITALIZE

          (for C inatom X bind (DOWNCASE _ (AND (fetch (READTABLEP CASEINSENSITIVE) of *READTABLE*)
                                                (SELECTQ *PRINT-CASE*
                                                    ((:DOWNCASE :CAPITALIZE)
                                                         *PRINT-CASE*)
                                                    NIL)))
                               (WAS-ALPHA _ NIL)
             do (\OUTCHAR STREAM (if DOWNCASE
                                      then                        ; may have to change case
                                           (if (AND (>= C (CHARCODE A))
                                                    (<= C (CHARCODE Z)))
                                               then (if (OR (NEQ DOWNCASE :CAPITALIZE)
                                                            (PROG1 WAS-ALPHA (SETQ WAS-ALPHA T)))
                                                        then      ; for :capitalize, lower all but the characters that start "words",
                                                                  ; i.e., those immediately after a non-alphanumeric
                                                             (+ C (- (CHARCODE a)
                                                                     (CHARCODE A)))
                                                      else C)
                                             else [if (EQ DOWNCASE :CAPITALIZE)
                                                      then        ; C not upper-case.  Set WAS-ALPHA if it's lowercase alpha or
                                                                  ; numeric
                                                          (SETQ WAS-ALPHA (OR (AND (>= C (CHARCODE a))
                                                                                   (<= C (CHARCODE z)))
                                                                              (AND (>= C (CHARCODE 0))
                                                                                   (<= C (CHARCODE 9]
                                                  C)
                                    else C])

(\LITPRIN.INTERNAL
  [LAMBDA (SYMBOL RDTBL STREAM PKGNAME PKGSEPR CHECKLENGTH)       ; Edited 18-Dec-86 17:33 by bvm:

;;; Print SYMBOL to STREAM according to RDTBL, preceded by PKGNAME (if non-NIL) and/or PKGSEPR.  PKGNAME is a symbol, PKGSEPR is a
;;; string.  If CHECKLENGTH is true, need to check that there is room for printing all three parts on this line;  else caller has verified that there is room
```

```
(LET
 ((PNAMELENGTH (\NATOMCHARS SYMBOL))
  (ESCAPE (fetch (READTABLEP ESCAPECHAR) of RDTBL))
  (MULTESCAPE (fetch (READTABLEP MULTESCAPECHAR) of RDTBL))
  USEMULTESCAPE CASEBASE SA SYN NESCAPES CHECKESCAPE FIRSTESCAPE)
 (if (OR (NEQ MULTESCAPE 0)
        CHECKLENGTH)
     then                                                   ; have to check now if linelength matters or we plan to use
                                                            ; multiple escapes
          (SETQ NESCAPES (\SYMBOL.ESCAPE.COUNT SYMBOL RDTBL (NULL CHECKLENGTH)))
          (if (EQ NESCAPES -1)
              then                                          ; Pname is numeric and we don't have a multiple escape
                                                            ; available--need to escape first char
                   (SETQ NESCAPES 1)
                   (SETQ FIRSTESCAPE T)
            elseif (< NESCAPES 0)
              then                                          ; Use multiple escapes
                   (SETQ NESCAPES (IMINUS NESCAPES))
                   (SETQ USEMULTESCAPE T)
            elseif (NEQ NESCAPES 0)
              then (SETQ CHECKESCAPE T))
   else                                                     ; if we don't check now then have to check while printing
       (SETQ CHECKESCAPE T))
 [if CHECKLENGTH
     then                                                   ; Verify space for everything
          (.SPACECHECK. STREAM (+ PNAMELENGTH NESCAPES (if PKGNAME
                                                          then
                                                            ; How much space to print package name
                                                              (IABS (\SYMBOL.ESCAPE.COUNT PKGNAME RDTBL))
                                                        else 0)
                                 (if PKGSEPR
                                     then                   ; Extra characters between pkg name and symbol name
                                          (\NSTRINGCHARS PKGSEPR)
                                   else 0]
 ;; First print any needed package qualifier
 (if PKGNAME
     then                                                   ; Print package name, don't check length
          (\LITPRIN.INTERNAL PKGNAME RDTBL STREAM))
 (if PKGSEPR
     then (\SOUT PKGSEPR STREAM))
 (if USEMULTESCAPE
     then                                                   ; Surround pname with multiple escape char, only escape
                                                            ; internal escapes
          (\OUTCHAR STREAM MULTESCAPE)
          (for C inatom SYMBOL do (if (OR (EQ C MULTESCAPE)
                                       (EQ C ESCAPE))
                                    then (\OUTCHAR STREAM ESCAPE))
                                (\OUTCHAR STREAM C))
          (\OUTCHAR STREAM MULTESCAPE)
   else [if FIRSTESCAPE
            then                                            ; Need an escape character at start to keep atom from being
                                                            ; interpreted as number
                 (\OUTCHAR STREAM ESCAPE)
          elseif CHECKESCAPE
            then (if (AND (EQ PNAMELENGTH 1)
                          (EQ (CHCON1 SYMBOL)
                              (CHARCODE ".")))
                     then                                   ; have to handle period special because it is only special in a
                                                            ; dotted context
                          (\OUTCHAR STREAM ESCAPE)
                          (SETQ CHECKESCAPE NIL)
                   else                                     ; prepare to check for escaping of chars in the printing loop
                        (SETQ CASEBASE (AND (fetch (READTABLEP CASEINSENSITIVE) of RDTBL)
                                            (fetch (ARRAYP BASE) of UPPERCASEARRAY)))
                        (SETQ SA (fetch READSA of RDTBL]
       (for C inatom SYMBOL bind (FIRSTFLG _ T)
                                 (DOWNCASE _ (AND (fetch (READTABLEP CASEINSENSITIVE) of RDTBL)
                                                  (SELECTQ *PRINT-CASE*
                                                      ((:DOWNCASE :CAPITALIZE)
                                                           *PRINT-CASE*)
                                                      NIL)))
                                 WAS-ALPHA
          do (if [AND CHECKESCAPE (OR (if (AND CASEBASE (ILEQ C \MAXTHINCHAR)
                                                (NEQ C (\GETBASEBYTE CASEBASE C)))
                                          then              ; lower-case alphabetic.  We are assuming that no alphanumeric
                                                            ; char will pass the next text
                                                (SETQ WAS-ALPHA T))
                                      (AND (fetch (READCODE ESCQUOTE) of (SETQ SYN (\SYNCODE SA C)))
                                           (OR FIRSTFLG (fetch (READCODE INNERESCQUOTE) of SYN]
                 then ;; Need to escape if: character is lower case when case-insensitive, or character intrinsically needs escape.
                      (\OUTCHAR STREAM ESCAPE)
                      (\OUTCHAR STREAM C)
               else (\OUTCHAR STREAM (if DOWNCASE
                                         then               ; may have to change case
                                              (if (AND (<= C (CHARCODE Z))
                                                             (>= C (CHARCODE A)))
                                                        then (if (OR (NEQ DOWNCASE :CAPITALIZE)
                                                                     (PROG1 WAS-ALPHA (SETQ WAS-ALPHA T)))
                                                                 then
                                                                    ; for :capitalize, lower all but the characters that start "words",
                                                                    ; i.e., those immediately after a non-alphanumeric
                                                                      (+ C (-  (CHARCODE a)
                                                                               (CHARCODE A)))
                                                               else C)
                                                      else [if (EQ DOWNCASE :CAPITALIZE)
                                                               then ; C not upper-case.  It's also not lowercase, because that was
                                                                    ; caught in the CHECKESCAPE clause if any, but note if it's
                                                                    ; numeric
                                                                    (SETQ WAS-ALPHA (AND (>= C (CHARCODE 0))
                                                                                          (<= C (CHARCODE 9]
                                                          C)
                                             else C)))
                   (SETQ FIRSTFLG NIL])
```

```
(\SYMBOL.ESCAPE.COUNT
  [LAMBDA (SYMBOL RDTBL INEXACTOK)                                  ; Edited 18-Dec-86 17:08 by bvm:

;;; Counts the number of escape characters needed to print SYMBOL by RDTBL.  If RDTBL has a multiple-escape character, then we return a negative
;;; count if we're assuming it is used instead of single escapes;  else a positive count.  The special value -1 means the symbol is numeric, so must be
;;; quoted, but no multiple escape is available, so just escape the first character.  If INEXACTOK is true and we discover we want to use multiple escape
;;; char, returns -2 immediately.

    (for C inatom SYMBOL bind (RESULT _ 0)
                               (NESCAPES _ 0)
                               (FIRSTFLG _ T)
                               (MULTESCAPE _ (fetch (READTABLEP MULTESCAPECHAR) of RDTBL))
                               (ESCAPE _ (fetch (READTABLEP ESCAPECHAR) of RDTBL))
                               (CASEBASE _ (AND (fetch (READTABLEP CASEINSENSITIVE) of RDTBL)
                                                (fetch (ARRAYP BASE) of UPPERCASEARRAY)))
                               (SA _ (fetch READSA of RDTBL))
                               SYN
       first (if (EQ MULTESCAPE 0)
                 then                                               ; Can't use multiple-escape
                      (SETQ MULTESCAPE NIL))
       do [if [OR (AND CASEBASE (ILEQ C \MAXTHINCHAR)
                       (NEQ C (\GETBASEBYTE CASEBASE C)))
                  (AND (fetch (READCODE ESCQUOTE) of (SETQ SYN (\SYNCODE SA C)))
                       (OR FIRSTFLG (fetch (READCODE INNERESCQUOTE) of SYN]
              then ;; Need protection if char is lowercase in a case-insensitive read table or the read table says it needs it

                   (add RESULT 1)
                   (if MULTESCAPE
                       then (if (OR (EQ C MULTESCAPE)
                                    (EQ C ESCAPE))
                                then                                ; These have to be escaped no matter what
                                      (add NESCAPES 1)
                              elseif (AND INEXACTOK (> (- RESULT NESCAPES)
                                                       1))
                                then                                ; If at least 2 chars need escaping, better to use multiple escape,
                                                                    ; and we can quit scanning now
                                      (RETURN -2]
           (SETQ FIRSTFLG NIL)
       finally (RETURN (if (EQ RESULT 0)
                           then                                     ; No funny chars, check for some other perverse cases
                                (LET ((LEN (\NATOMCHARS SYMBOL)))
                                     (if (EQ LEN 0)
                                         then                       ; The bletcherous null symbol.  Shouldn't be allowed to create
                                                                    ; this, grumble.
                                              (if MULTESCAPE
                                                  then              ; Can print as ||
                                                       -2
                                                else                ; Single escape can't work
                                                     0)
                                       elseif (AND (EQ LEN 1)
                                                   (EQ C (CHARCODE ".")))
                                         then                       ; Special case, dot is always escaped when by itself, and prefer
                                                                    ; single escape to multiple
                                             -1
                                       elseif (\NUMERIC.PNAMEP SYMBOL (if (fetch (READTABLEP COMMONLISP) of RDTBL)
                                                                          then *READ-BASE*
                                                                        else 10))
                                         then

                                        ;; Is numeric, must escape it.  Note that if pname is numeric, there can't be any special chars inside it
                                        ;; needing escaping.  We wait until now to test numeric on the grounds that it is more likely we will
                                        ;; print a symbol with escapable chars than one that is a potential number.

                                              (if MULTESCAPE
                                                  then              ; Nicer to use multiple escape around whole symbol
                                                       -2
                                                else                ; Say to escape first char
                                                     -1)
                                     else 0))
                       elseif (AND MULTESCAPE (> (- RESULT NESCAPES)
                                                1))
                         then ;; The number of characters needing escaping, not counting the ones that have to be escaped in any case, is at
                              ;; least two.  Use two multiple-escapes and NESCAPES regular escapes for the internal escapes =
                              ;; -(NESCAPES+2) total extra characters

                              (- -2 NESCAPES)
                       else RESULT])

(\NUMERIC.PNAMEP
  [LAMBDA (SYMBOL RADIX)                                            ; Edited 17-Jan-2020 05:43 by rmk:
                                                                    ; Edited  6-Dec-91 11:27 by jds

;;; True if the chars in SYMBOL are a potential number in RADIX, which defaults to the current read base (according to current read table), OR IF the
;;; symbol consists solely of decimal points.

    (LET* ((LASTCHARTYPE 'FIRST)
           [EFFECTIVE-RADIX (OR RADIX (COND
                                         ((fetch (READTABLEP COMMONLISP) of *READTABLE*)
                                          *READ-BASE*)
                                         (T 10]
           (MAXALPHADIGIT (+ (CHARCODE A)
                             (- EFFECTIVE-RADIX 11)))
           SEENALPHADIGITS SEENDIGITS SEENDECPT SEENEXPONENT SEENTIGHTLETTERS SEEN-ILLEGAL-SYNTAX)
                                                                    ; If RADIX is bigger than 10, this allows alphabetic digits
          (for C inpname SYMBOL do ;; The inpname is a nicety so it works on strings too (useful for testing) --- Note that we are assuming a
                                   ;; partitioning of character space as follows: (--- + / decpt) (digits) (A-Z) (_ ^) (a-z)

                                   [SETQ LASTCHARTYPE
                                    (COND
                                       [(< C (CHARCODE A))          ; Numeric or funny char
                                        (COND
                                           ((< C (CHARCODE 0))
                                            (SELCHARQ C
                                                 ((- +)             ; Signs anywhere but end


                                      ;; RMK 2020-01-17: Anywhere at the end conforms to the Commonlisp notion of being able to extend
                                      ;; the number syntax.  But this is never going to happen here, and the consequence of not
                                      ;; recognizing signs just at the beginning is that tokens like 1-2 will get printed as |1-2|, which is
                                      ;; surprising.  So: I'm restricting signs to first position.

                                                      (CL:UNLESS (EQ LASTCHARTYPE 'FIRST)
                                                             (RETURN NIL))
                                                      'SIGN)
                                                 ("." (COND
                                                         (SEENALPHADIGITS

                                              ;; Can't have decimal point in other radices, so if we saw combinations of chars that would
                                              ;; have been invalid in radix 10, bomb out

                                                                (COND
                                                                   (SEENTIGHTLETTERS (RETURN NIL)))
                                                                (SETQ SEENALPHADIGITS NIL))
                                                         (SEENDECPT

                                                                ;; Can't have 2 decimal points.

                                                                (SETQ SEEN-ILLEGAL-SYNTAX T)))
                                                      (SETQ MAXALPHADIGIT 0)
                                                      (SETQ SEENDECPT T))
                                                 (/ (COND
                                                       ((EQ LASTCHARTYPE 'FIRST)
                                                                    ; Can't start with ratio marker
                                                        (RETURN NIL))))
                                                 (RETURN NIL)))
                                           ((<= C (CHARCODE 9))     ; digit
                                            (SETQ SEENDIGITS T)
                                            'DIGIT)
                                           (T (RETURN NIL]
                                       ((> C (CHARCODE z))          ; Out in the wilderness.
                                        (RETURN NIL))
                                       ((PROGN [COND
                                                  ((>= C (CHARCODE a))
                                                                    ; Raise it
                                                   (SETQ C (- C (- (CHARCODE a)
                                                                   (CHARCODE A]
                                               (<= C (CHARCODE Z)))
                                                                    ; Letter
                                        [COND
                                           ((<= C MAXALPHADIGIT)    ; Letter is a digit in this base.  Can't be digit in number with
                                                                    ; decimal pt
                                            (COND
                                               (SEENDECPT

                                                      ;; If there was a decimal point earlier, bail out.

                                                      (RETURN NIL)))
                                            (SETQ SEENALPHADIGITS T)
                                            (SELECTQ LASTCHARTYPE
                                                 ((LETTER FIRST)  ; Two letters in a row or started with letter.  Notice this in case a
                                                                  ; dec pt comes along
                                                     (SETQ SEENTIGHTLETTERS T))
                                                 NIL))
                                           (T                     ; Potential exponent marker, only in radix 10
                                              (OR (IEQP 10 EFFECTIVE-RADIX)
                                                  (RETURN NIL))
                                              (AND SEENEXPONENT (RETURN NIL))
                                              (SELECTQ LASTCHARTYPE
                                                   ((LETTER FIRST)
                                                       (RETURN NIL))
                                                   (COND
                                                      ((FMEMB C (CHARCODE (E S F D L)))
                                                       (SETQ SEENEXPONENT T))
                                                      (T (RETURN NIL]
                                        'LETTER)
                                       ((OR (EQ C (CHARCODE "_"))
                                            (EQ C (CHARCODE "^")))
                                                                  ; Extension chars, not used now but maybe some day.  We're
                                                                  ; supposed to escape these
                                        NIL)
                                       (T (RETURN NIL]
             finally                                              ; Success if there was at least one digit and didn't end in a sign.
                                                                  ; Also true if symbol consisted solely of periods.
                   (RETURN (OR (AND (NOT SEEN-ILLEGAL-SYNTAX)
                                    (OR SEENDIGITS SEENALPHADIGITS)
                                    (NEQ LASTCHARTYPE 'SIGN))
                               (AND SEENDECPT (EQ LASTCHARTYPE T)
                                    (for C inpname SYMBOL always (EQ C (CHARCODE "."])

(\PRINSTACKP
  [LAMBDA (X STREAM)                                              (* bvm%: "11-May-86 16:09")

;;; Print stackp as addr/framename.  If stackp is released or framename is not a symbol, print mumble

    (.SPACECHECK. STREAM (IPLUS 1 (CONSTANT (NCHARS "<StackP "))
                                 (PROGN                           ; Longest stack address is '177,177777'
                                        10)
                                 1
                                 (COND
                                    ((RELSTKP X)
                                     (CONSTANT (NCHARS "released")))
                                    ((LITATOM (STKNAME X))
                                     (\NATOMCHARS (STKNAME X)))
                                    (T 6))
                                 1))
    (\OUTCHAR STREAM (fetch (READTABLEP HASHMACROCHAR) of *READTABLE*))
    (\SOUT "<StackP " STREAM)
    (\PRINTADDR X STREAM)
    (\OUTCHAR STREAM (CHARCODE /))
    (COND
       ((RELSTKP X)
        (\SOUT "released" STREAM))
       ((LITATOM (SETQ X (STKNAME X)))
        (\LITPRIN X STREAM))
       (T (\SOUT "*form*" STREAM)))
    (\OUTCHAR STREAM (CHARCODE >])

(\PRINTADDR
  [LAMBDA (X STREAM)                                              (* bvm%: "11-May-86 15:13")
    (WITH-RESOURCES (\NUMSTR \NUMSTR1)
           (SELECTQ (SYSTEMTYPE)
                (D (\CKPOSSOUT STREAM (\CONVERTNUMBER (\HILOC X)
                                              8 NIL NIL \NUMSTR \NUMSTR1))
                   (\CKPOSBOUT STREAM (CHARCODE %,))
                   (\CKPOSSOUT STREAM (\CONVERTNUMBER (\LOLOC X)
                                              8 NIL NIL \NUMSTR \NUMSTR1)))
                (JERICHO (\CKPOSSOUT STREAM (\CONVERTNUMBER (LOGAND \ADDRMASK (LOC X))
                                                    8 NIL NIL \NUMSTR \NUMSTR1)))
                (VAX (\CKPOSSOUT STREAM (\CONVERTNUMBER (LOC X)
                                                16 T NIL \NUMSTR \NUMSTR1)))
                ((TENEX TOPS-20)
                     (\CKPOSSOUT STREAM (\CONVERTNUMBER (LOC X)
                                                8 T NIL \NUMSTR \NUMSTR1)))
                (SYSTEMTYPEPUNT '(\PRINDATUM X])

(\PRINSTRING
  [LAMBDA (X STREAM)                                              (* bvm%: "11-May-86 15:08")
    (COND
       [*PRINT-ESCAPE*                                            ; Print with double quotes and escaped as needed
              (LET ((ESC (fetch (READTABLEP ESCAPECHAR) of *READTABLE*)))
                   [.SPACECHECK. STREAM (IPLUS 2 (\NSTRINGCHARS X)
                                                (for C instring X count (OR (EQ C (CHARCODE %"))
                                                                           (EQ C ESC]
                   (\OUTCHAR STREAM (CHARCODE %"))
                   (for C instring X do (COND
                                           ((OR (EQ C (CHARCODE %"))
                                                (EQ C (CHARCODE LF))
                                                (EQ C ESC))      ; VM says only " is escaped no matter what stringdelim's are.
                                            (\OUTCHAR STREAM ESC)))
                                        (\OUTCHAR STREAM C))
                   (\OUTCHAR STREAM (CHARCODE %"]
       (T (.SPACECHECK. STREAM (\NSTRINGCHARS X))
          (\SOUT X STREAM])

(\SOUT
  [LAMBDA (X STREAM)                                             ; Edited 14-Dec-88 22:17 by jds

    ;; Print the string X onto STREAM, which -must- be a stream.

    (DECLARE (GLOBALVARS \DISPLAYSTREAMTYPES))
    (DECLARE (SPECVARS *DRIBBLE-OUTPUT* \PRIMTERMSA \TERM.OFD))
    (COND
       [(FMEMB (ffetch (IMAGEOPS IMAGETYPE) of (fetch (STREAM IMAGEOPS) of STREAM))
               \DISPLAYSTREAMTYPES)
        (LET ((*DRIBBLE-OUTPUT* *DRIBBLE-OUTPUT*)
              (\PRIMTERMSA \PRIMTERMSA)
              (\TERM.OFD \TERM.OFD))
             (for I instring X do (\OUTCHAR STREAM I]
       ((for I instring X do (\OUTCHAR STREAM I])

)

(DECLARE%: EVAL@COMPILE DONTCOPY

(DECLARE%: EVAL@COMPILE

(PUTPROPS .FILELINELENGTH. MACRO ((STRM)
                                   (LET ((L (fetch (STREAM LINELENGTH) of STRM)))
                                        (SELECTC L
                                            (0                   (* Some default)
                                               \LINELENGTH)
                                            (MAX.SMALLP          (* Infinite)
                                                        NIL)
                                            L))))
)


(DEFMACRO \PRINDATUM-LISTP ()

   ;; This is a hokey macro call to save the function call.  Read it as though it were inline code in \prindatum

   `[LET (LABEL FIRSTTIME)
         (OR CPL (SETQ CPL 0))
         (if *PRINT-CIRCLE-HASHTABLE*
             then ;; *PRINT-CIRCLE-HASHTABLE* is only non-nil when *print-circle*.

                  (CL:MULTIPLE-VALUE-SETQ (LABEL FIRSTTIME)
                         (PRINT-CIRCLE-LOOKUP OBJECT)))
         [if LABEL
             then (\CKPOSSOUT STREAM LABEL)
                  (CL:WHEN FIRSTTIME
                      (\CKPOSBOUT STREAM (CHARCODE SPACE)))]
         (COND
            ((AND LABEL (NOT FIRSTTIME))                                 ; Second reference --- just print label
             NIL)
            ((AND *PRINT-LEVEL* (ILEQ *PRINT-LEVEL* CPL))
             (\ELIDE.PRINT.ELEMENT STREAM))
            (T (PROG (CDRCNT)
                     [COND
                        (*PRINT-LENGTH* (SETQ CDRCNT (COND
                                                        ((fetch (READTABLEP COMMONLISP) of *READTABLE*)
                                                         0)
                                                        (T       ; Interlisp print depth is triangular, Common Lisp isn't
                                                           [COND
                                                              ((IGEQ CPL *PRINT-LENGTH*)
                                                                 ; We would just print '(--)' so it's nicer to print '&'
                                                               (RETURN (\ELIDE.PRINT.ELEMENT STREAM]
                                                           CPL]
                     (add CPL 1)                                 ; Recursive calls will be at 1 greater depth
                     (\CKPOSBOUT STREAM (CHARCODE %())
                 LP  [COND
                        ((AND CDRCNT (IGREATERP (add CDRCNT 1)
                                                *PRINT-LENGTH*)) ; have printed as many elements as allowed
                         (\ELIDE.PRINT.TAIL STREAM T))
                        (T (\PRINDATUM (CAR OBJECT)
                                  STREAM CPL)
                           (COND
                              ((LISTP (SETQ OBJECT (CDR OBJECT)))
                               (\CKPOSBOUT STREAM (CHARCODE SPACE))
                               (if (AND *PRINT-CIRCLE-HASHTABLE* (PRINT-CIRCLE-LABEL-P OBJECT))
                                   then                         ; Must print as a dotted tail
                                       (\CKPOSSOUT STREAM ". ")
                                       (\PRINDATUM OBJECT STREAM CPL)
                                 else (GO LP)))
                              (OBJECT                           ; Dotted tail
                                     (\CKPOSSOUT STREAM " . ")
                                     (\PRINDATUM OBJECT STREAM]
                     (\CKPOSBOUT STREAM (CHARCODE ")"])

;; FOLLOWING DEFINITIONS EXPORTED

(DECLARE%: EVAL@COMPILE

(PUTPROPS .SPACECHECK. MACRO ((STRM N)
                                (AND \THISFILELINELENGTH (IGREATERP (IPLUS N (fetch CHARPOSITION of STRM))
                                                               \THISFILELINELENGTH)
                                     (FRESHLINE STRM))))

(PUTPROPS \CHECKRADIX MACRO [LAMBDA (R)
                                (COND
                                   ((OR (NOT (SMALLP R))
                                        (ILESSP R 1)
                                        (IGREATERP R 36))
                                    (\INVALID.RADIX R))
                                   (T R])
)
)

;; END EXPORTED DEFINITIONS

(DEFINEQ

(\INVALID.RADIX
  [LAMBDA (N)                                                   (* bvm%: " 5-May-86 10:58")
    (ERROR "Bad value for *print-base*" N])
)

(DECLARE%: DOEVAL@COMPILE DONTCOPY

(SPECVARS \THISFILELINELENGTH)
)

;; Internal printing

(DEFINEQ

(\MAPPNAME
  [LAMBDA (FN X FLG RDTBL *PRINT-LEVEL* *PRINT-LENGTH*)          ; Edited 23-Mar-87 11:01 by bvm:

;;; Run thru the characters in the pname of X, calling FN on each character.  For speed, FN is defined to be of the same form as an OUTCHARFN, viz.,
;;; arglist = (stream char);  stream in this case is a dummy

    (LET [(*READTABLE* (if FLG
                           then (\GTREADTABLE RDTBL)
                         else (\DTEST *READTABLE* 'READTABLEP]
         (LET ((*PACKAGE* (if (AND FLG (fetch (READTABLEP USESILPACKAGE) of *READTABLE*))
                              then *INTERLISP-PACKAGE*
                            else *PACKAGE*))
               (*PRINT-ESCAPE* FLG)
               (*PRINT-BASE* (if (OR FLG PRXFLG)
                                 then *PRINT-BASE*
                               else 10))
               (*PRINT-RADIX* (AND FLG *PRINT-RADIX*)))
              (\MAPPNAME.INTERNAL FN X])

(\MAPPNAME.INTERNAL
  [LAMBDA (FN X)                                                ; Edited 10-May-2021 15:46 by rmk:
    (WITH-RESOURCE (\MAPPNAMESTREAM)
           (replace (STREAM OUTCHARFN) of \MAPPNAMESTREAM with FN)
           (replace STRMBOUTFN of \MAPPNAMESTREAM with FN)       ; Should never use the bout fn, but include it just in case
                                                                ; somebody thinks \OUTCHAR = \BOUT
           (LET (\THISFILELINELENGTH)                           ; Stream has no linelength checks
                (DECLARE (SPECVARS \THISFILELINELENGTH))
                (\PRINDATUM X \MAPPNAMESTREAM 0])

(PNAMESTREAMP
  [LAMBDA (STRM)                                                (* bvm%: "24-Mar-86 17:37")

;;; True if STRM is an internal-printing stream for pnames, i.e., one of the values of the \MAPPNAMESTREAM resource

    (AND (TYPENAMEP STRM 'STREAM)
         (EQ (fetch (STREAM DEVICE) of STRM)
             \PNAMEDEVICE])
```

```
)

(DECLARE%: DONTCOPY

(DECLARE%: EVAL@COMPILE

[PUTDEF '\MAPPNAMESTREAM 'RESOURCES '(NEW (create STREAM DEVICE _ \PNAMEDEVICE ACCESSBITS _ OutputBits
                                                 LINELENGTH _ MAX.SMALLP]
)

(DECLARE%: EVAL@COMPILE

(PUTPROPS PNAMESTREAMP DMACRO ((STRM)
                                  (EQ (fetch (STREAM DEVICE) of STRM)
                                      \PNAMEDEVICE)))
)
)

(/SETTOPVAL '\\MAPPNAMESTREAM.GLOBALRESOURCE NIL)

(RPAQ? \PNAMEDEVICE (NCREATE 'FDEV (\GETDEVICEFROMHOSTNAME 'NULL T)))

(DECLARE%: DOEVAL@COMPILE DONTCOPY

(GLOBALVARS \PNAMEDEVICE)
)

;; Obsolete

(DEFINEQ

(\MAPCHARS
  [LAMBDA (\MAPCHARFN X FLG RDTBL)                              (* bvm%: "13-Mar-86 18:53")
    (DECLARE (SPECVARS RDTBL))

;;; Run thru the characters in the pname of X, calling \MAPCHARFN on each character.

    (\MAPPNAME [FUNCTION (LAMBDA (DUMMY CHAR)
                            (SPREADAPPLY* \MAPCHARFN CHAR]
           X FLG RDTBL])
)

(DECLARE%: EVAL@COMPILE DOCOPY

(ADDTOVAR SYSSPECVARS *PRINT-BASE* *READ-BASE* *PRINT-RADIX* *PRINT-ESCAPE* *PRINT-CASE* *PRINT-GENSYM*
                             *PRINT-LEVEL* *PRINT-LENGTH* *PRINT-PRETTY* *PRINT-CIRCLE* *PRINT-ARRAY* *PACKAGE*
)
)

;; PRINTNUM and friends

(DEFINEQ

(PRINTNUM
  [LAMBDA (FORMAT NUMBER FILE)                                  (* DECLARATIONS%: (RECORD FIXFMT
                                                                (WIDTH RADIX PAD0 LEFTFLUSH))
                                                                (RECORD FLOATFMT (WIDTH DECPART EXPPART PAD0
                                                                SIGDIGITS)))
                                                                (* rmk%: "17-MAY-82 10:07")
    (DECLARE (GLOBALVARS NILNUMPRINTFLG))
    (GLOBALRESOURCE (\NUMSTR \NUMSTR1)
           (PROG (STR WIDTH PAD TEMP RAD (FLOATFLAG (SELECTQ (CAR (LISTP FORMAT))
                                                        (FLOAT T)
                                                        (FIX NIL)
                                                        (LISPERROR "ILLEGAL ARG" FORMAT)))
                      (FMT (CDR FORMAT)))
                 (SETQ WIDTH (fetch WIDTH of FMT))
                 [SETQ STR (COND
                              ((AND (NULL NUMBER)
                                    NILNUMPRINTFLG))
                              (FLOATFLAG (\CONVERT.FLOATING.NUMBER (FLOAT NUMBER)
                                                \NUMSTR \NUMSTR1 (\CHECKFLTFMT FORMAT)))
                              (T (\CONVERTNUMBER (OR (FIXP NUMBER)
                                                       (FIXR NUMBER))
                                        (COND
                                           ((SETQ RAD (fetch RADIX of FMT))
                                            (SETQ TEMP (IABS RAD))
                                            (COND
                                               ((OR (IGREATERP 2 TEMP)
                                                    (IGREATERP TEMP 16))
                                                (\ILLEGAL.ARG RAD)))
                                            TEMP)
                                           (T 10))
                                        (OR (NULL RAD)
                                             (IGREATERP RAD 0))
                                         NIL \NUMSTR \NUMSTR1]
                 (SETQ PAD (COND
                              (WIDTH (IDIFFERENCE WIDTH (NCHARS STR)))
                              (T 0)))
                 [COND
                    ([AND (IGREATERP PAD 0)
                          (OR FLOATFLAG (NULL (fetch LEFTFLUSH of FMT]
                     (COND
                        ((COND
                            (FLOATFLAG (fetch (FLOATFMT PAD0) of FMT))
                            (T (fetch (FIXFMT PAD0) of FMT)))
                         (FRPTQ PAD (PRIN1 "0" FILE)))
                        (T (SPACES PAD FILE]
                 (PRIN1 STR FILE)
                 (COND
                    ((AND (IGREATERP PAD 0)
                          (NOT FLOATFLAG)
                          (fetch LEFTFLUSH of FMT))
                     (SPACES PAD FILE)))
                 (RETURN NUMBER])
```

```
(FLTFMT
  [LAMBDA (FORMAT)                                               (* bvm%: "30-JAN-81 23:20")
                                                                 ; numeric arg, as on 10, not allowed
    (PROG1 \FLOATFORMAT
        (AND FORMAT (\CHECKFLTFMT FORMAT)
             (SETQ \FLOATFORMAT FORMAT)))])
```

```
(\CHECKFLTFMT
  [LAMBDA (FORMAT)                                               (* bvm%: "29-JAN-81 15:41")

;;; Generates error if FORMAT is not legal FLOAT format: (FLOAT WIDTH DECPART EXPPART PAD SIGDIGITS)

    (COND
       ([OR (EQ FORMAT T)
            (AND (EQ (CAR FORMAT)
                     'FLOAT)
                 (EVERY (CDR FORMAT)
                        (FUNCTION (LAMBDA (X)
                                    (OR (NULL X)
                                        (FIXP X]
        FORMAT)
       (T (LISPERROR "ILLEGAL ARG" FORMAT])
```

```
(PRINTNUM-TO-STRING
  [LAMBDA (FORMAT NUMBER)                                        (* DECLARATIONS%: (RECORD FIXFMT
                                                                 (WIDTH RADIX PAD0 LEFTFLUSH))
                                                                 (RECORD FLOATFMT (WIDTH DECPART EXPPART PAD0
                                                                 SIGDIGITS)))
                                                                 ; Edited 27-Nov-91 13:32 by jds
    (DECLARE (GLOBALVARS NILNUMPRINTFLG))
    (GLOBALRESOURCE (\NUMSTR \NUMSTR1)
           (PROG (STR WIDTH PAD TEMP RAD (FLOATFLAG (SELECTQ (CAR (LISTP FORMAT))
                                                         (FLOAT T)
                                                         (FIX NIL)
                                                         (LISPERROR "ILLEGAL ARG" FORMAT)))
                      (FMT (CDR FORMAT)))
                 (SETQ WIDTH (fetch WIDTH of FMT))
                 [SETQ STR (COND
                              ((AND (NULL NUMBER)
                                    NILNUMPRINTFLG))
                              (FLOATFLAG (\CONVERT.FLOATING.NUMBER (FLOAT NUMBER)
                                                \NUMSTR \NUMSTR1 (\CHECKFLTFMT FORMAT)))
                              (T (\CONVERTNUMBER (OR (FIXP NUMBER)
                                                     (FIXR NUMBER))
                                        (COND
                                           ((SETQ RAD (fetch RADIX of FMT))
                                            (SETQ TEMP (IABS RAD))
                                            (COND
                                               ((OR (IGREATERP 2 TEMP)
                                                    (IGREATERP TEMP 16))
                                                (\ILLEGAL.ARG RAD)))
                                            TEMP)
                                           (T 10))
                                        (OR (NULL RAD)
                                            (IGREATERP RAD 0))
                                        NIL \NUMSTR \NUMSTR1]
                 (SETQ PAD (COND
                              (WIDTH (IDIFFERENCE WIDTH (NCHARS STR)))
                              (T 0)))
                 (RETURN (CONCAT (COND
                                    [[AND (IGREATERP PAD 0)
                                          (OR FLOATFLAG (NULL (fetch LEFTFLUSH of FMT]
                                     (COND
                                        ((COND
                                            (FLOATFLAG (fetch (FLOATFMT PAD0) of FMT))
                                            (T (fetch (FIXFMT PAD0) of FMT)))
                                         (ALLOCSTRING PAD "0"))
                                        (T (ALLOCSTRING PAD " "]
                                    (T ""))
                                STR])

)

(DECLARE%: EVAL@COMPILE 

(PROGN (PUTPROPS NUMFORMATCODE BYTEMACRO (= . PROG1))
       (PUTPROPS NUMFORMATCODE DMACRO (= . PROG1)))
)

(RPAQ? NILNUMPRINTFLG )

(DECLARE%: DOEVAL@COMPILE DONTCOPY 

(LOCALVARS . T)
)

(DECLARE%: DOEVAL@COMPILE DONTCOPY 

(GLOBALVARS \LINELENGTH \FLOATFORMAT PRXFLG \DEFPRINTFNS)
)

(DECLARE%: DONTEVAL@LOAD DOEVAL@COMPILE DONTCOPY COMPILERVARS 

(ADDTOVAR NLAMA )

(ADDTOVAR NLAML )

(ADDTOVAR LAMA )
)

(PUTPROPS APRINT COPYRIGHT ("Venue & Xerox Corporation" 1982 1983 1984 1985 1986 1987 1988 1990 1991 2020 2021))
)
```

{MEDLEY}<sources>APRINT.;1 28-Jun-2024 18:34:03
-- Listed on 30-Jun-2024 13:15:21 --

FUNCTION INDEX

VARIABLE INDEX

MACRO INDEX