

File created: 16-May-90 20:26:31 {DSK}<usr>local>lde>lispcore>sources>MACROAUX.;2

changes to: (VARS MACROAUXCOMS)

previous date: 3-Nov-86 11:54:19 {DSK}<usr>local>lde>lispcore>sources>MACROAUX.;1

Read Table: INTERLISP

Package: INTERLISP

Format: XCCS

::
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(RPAQQ **MACROAUXCOMS**

```
((EXPORT (DECLARE%: DONTCOPY (MACROS>NNLITATOM \NULL.OR.FIXP \CHECKTYPE CANONICAL.TIMERUNITS))
  (PROP DMACRO \MACRO.EVAL)
  (OPTIMIZERS \MACRO.MX))
 (COMS ; functions which help macro and compiler writers.
  (FNS LISPFORM.SIMPLIFY NO.SIDEEFFECTS.FNP CODE.SUBST CODE.SUBPAIR)
  (GLOBALRESOURCES \NSE.STRPTR))
 (COMS (FNS ARGS.COMMUTABLEP ARGS.COMMUTABLEP.LIST VAR.NOT.USED \VARNOTUSED \VARNOTUSED.LIST
  EVALUABLE.CONSTANTP EVALUABLE.CONSTANT.FIXP)
  (MACROS EVALUABLE.CONSTANT.FIXP CARCDR.FNP))
 (FNS \DECL.COMNT.PROCESS)
 (COMS (FNS \WALKOVER.SPECIALFORMS \WALKOVER.SF.LIST \WALKOVER.FUNCTION)
  (DECLARE%: DONTCOPY (CONSTANTS \QUOTIFYING.NLS \WALKABLE.SPECIALFORMS)
  (MACROS \WALKABLE.SPECIALFORMP))
  (ADDVARS (CONSTANTFOLDFNS IMIN IMAX IABS LOGOR LOGXOR LOGAND))
  (VARS NOSIDEFNS)
  (GLOBALVARS CLISPARRAY CONSTANTFOLDFNS))
 (PROP FILETYPE MACROAUX)))
```

:: FOLLOWING DEFINITIONS EXPORTED

(DECLARE%: DONTCOPY

(DECLARE%: EVAL@COMPILE

(PUTPROPS **NNLITATOM MACRO** (OPENLAMBDA (X)
 (AND X (LITATOM X))))

(PUTPROPS **\NULL.OR.FIXP MACRO** (OPENLAMBDA (X)
 (OR (NULL X)
 (FIXP X))))

(PUTPROPS **\CHECKTYPE MACRO** [X (PROG ((VAR (CAR X))
 (PRED (CADR X)))
 (if [AND (LISTP PRED)
 (MEMB (CAR PRED)
 'FUNCTION]
 then (SETQ PRED (LIST (CADR PRED)
 VAR)))
 (RETURN (SUBPAIR ' (MSG VAR PRED)
 (LIST (CONCAT "
 is not a suitable value for the variable: "
 VAR)
 VAR PRED)
 ' (until PRED do (SETQ VAR (ERROR VAR MSG]))

(PUTPROPS **CANONICAL.TIMERUNITS MACRO** (OPENLAMBDA (X) (* Checks for common abbreviations before calling
 \CanonicalizeTimerUnits)

```
(SELECTQ X
  ((TICKS MILLISECONDS SECONDS)
  (* These are the canonical forms)
  X)
  (NIL 'MILLISECONDS)
  (\CanonicalizeTimerUnits X)))
```

)
)

(PUTPROPS **\MACRO.EVAL DMACRO** [Z (PROG ((X (EXPANDMACRO (CAR Z)
 T)))
 (if (EQ X (CAR Z))
 then (ERROR "No macro property -- \MACRO.EVAL" X)
 else (RETURN (EVAL X]))

(DEFOPTIMIZER **\MACRO.MX** (FORM)
 FORM)

:: END EXPORTED DEFINITIONS

:: functions which help macro and compiler writers.

(DEFINEQ

(LISPFORM.SIMPLIFY

[LAMBDA (X EVALFLG)

(* Imm "11-Jul-85 02:46")

(* Reduce some LISP code to its more primitive form. Currently, support macroexpansion, dwimmification, and evaluation of compile-time constants.)

```

(if (LISTP X)
  then (LET ((FN (CAR X))
             Y)
        (COND
         ((NOT (LITATOM FN))
          X)
         ((AND EVALFLG (GETD FN))
          X)
         ((SETQ Y (GETMACROPROP FN COMPILERMACROPROPS))
          (if (EQ X (SETQ X (MACROEXPANSION X Y)))
              then X
              else (LISPFORM.SIMPLIFY X)))
         ([AND (OR (SETQ Y (GETHASH X CLISPARRAY))
                  (DWIMIFY0? X X X NIL T "LISPFORM.SIMPLIFY"))
          (SETQ Y (GETHASH X CLISPARRAY))
          (LISPFORM.SIMPLIFY Y))
         ((SETQ Y (CONSTANTEXPRESSIONP X))
          (KWOTE (CAR Y)))
         (T X)))
    else (if EVALFLG
            then X
            else (LET ((CE (CONSTANTEXPRESSIONP X)))
                  (if CE
                     then (CAR CE)
                     else X]))

```

(NO.SIDEEFFECTS.FNP

[LAMBDA (X)

(* edited%: "14-May-86 15:12")

(* Fast-case-test for simple memory access fns)

```

(AND (NNLITATOM X)
     (OR (GETPROP X 'CROPS)
         (FMEMB X NOSIDEFNS]))

```

(CODE.SUBST

[LAMBDA (X Y FORM)

(* JonL "21-NOV-82 14:24")

(* Ho Hum, someday this ought to be made to work!)

```

(SUBST X Y FORM])

```

(CODE.SUBPAIR

[LAMBDA (L1 L2 FORM)

(* JonL "21-NOV-82 14:24")

(* Ho Hum, someday this ought to be made to work!)

```

(SUBPAIR L1 L2 FORM])

```

)

(DECLARE%: DONTCOPY

(DECLARE%: EVAL@COMPILE

[PUTDEF '\NSE.STRPTR 'RESOURCES ' (NEW (ALLOCSTRING 0)

)

)

(/SETTOPVAL '\NSE.STRPTR.GLOBALRESOURCE NIL)

(DEFINEQ

(ARGS.COMMUTABLEP

[LAMBDA (X Y)

(* Imm "11-Jul-85 02:48")

(* non-NIL iff the evaluation of X and Y can be done in either order without any change in effects or value.)

```

(PROG (FN)
  [if (NLISTP Y)
    then (if (NLISTP X)
             then

```

(* If both args are atoms, then we can just punt out here with the answer.)

```

(RETURN T))

```

(* Switch args so that we don't have to handle the case of Y an atom)

```

  (SETQ X (PROG1 Y (SETQ Y X))
  (if (if (LISTP X)
          then

```

(* Fast check for quoted frobs. Remember, Y can't be an atom.)

```

(MEMB (CAR X)
  \QUOTIFYING.NLS)
else
  (NOT (NNLITATOM X)))
then (RETURN T)
(SETQ Y (LISPFORM.SIMPLIFY Y T))
(RETURN (if (LISTP (SETQ FN (CAR Y)))
  then (if (EQ (CAR FN)
    'LAMBDA)
    then (ARGS.COMMUTABLEP.LIST Y (LISPFORM.SIMPLIFY X T)))
  elseif (MEMB FN \QUOTIFYING.NLS)
  then 'T
  elseif (EQ FN 'SETQ)
  then (AND (\VARNOTUSED X (CADR Y))
    (ARGS.COMMUTABLEP.LIST (CDDR Y)
    (LISPFORM.SIMPLIFY X T)))
  elseif (\WALKABLE.SPECIALFORMP FN)
  then (\WALKOVER.SPECIALFORMS (FUNCTION ARGS.COMMUTABLEP)
    Y
    (LISPFORM.SIMPLIFY X T))
  else (AND (NO.SIDEEFFECTS.FNP FN)
    (ARGS.COMMUTABLEP.LIST (CDR Y)
    (LISPFORM.SIMPLIFY X T)))

```

(ARGS.COMMUTABLEP.LIST

```

[LAMBDA (L Y)
  (EVERY L (FUNCTION (LAMBDA (X)
    (ARGS.COMMUTABLEP X Y))

```

(* JonL "21-NOV-82 15:07")

(VAR.NOT.USED

```

[LAMBDA (FORM VAR SETQONLY?)
  (PROG NIL
    A (if (NOT (LITATOM VAR))
      then (SETERRORN 14 VAR)
      (SETQ VAR (ERRORX))
      (GO A))
    (if (MEMB VAR ' (NIL T))
      then (SETERRORN 27 VAR)
      (SETQ VAR (ERRORX))
      (GO A))
  (RETURN (\VARNOTUSED FORM VAR SETQONLY?))

```

(* JonL "21-NOV-82 14:01")

(\VARNOTUSED

```

[LAMBDA (FORM VAR SETQONLY?)
  (if (NLISTP FORM)
    then (AND (NOT SETQONLY?)
      (NEQ VAR FORM))
    elseif (LISTP (CAR FORM))
    then (\VARNOTUSED.LIST FORM VAR SETQONLY?)
    elseif (EQ (CAR FORM)
      'LAMBDA)
    then

```

(* JonL "21-NOV-82 16:10")

(* Look for free occurrences of a variable VAR which may be evaluable in FORM)

(* Note that if a LAMBDA form bind a var X, then VAR can't be "used inside" the form.)

```

  (OR (MEMB VAR (CADR FORM))
    (\VARNOTUSED (CDDR FORM)
    VAR SETQONLY?))
  elseif (MEMB (CAR FORM)
    \QUOTIFYING.NLS)
  then T
  elseif (MEMB (CAR FORM)
    ' (SETQ))
  then
    (AND (NEQ VAR (CADR FORM))
      (\VARNOTUSED.LIST FORM VAR SETQONLY?))
  elseif (\WALKABLE.SPECIALFORMP (CAR FORM))
  then (\WALKOVER.SPECIALFORMS (FUNCTION \VARNOTUSED)
    FORM VAR SETQONLY?)
  elseif (NO.SIDEEFFECTS.FNP (CAR FORM))
  then (\VARNOTUSED.LIST (CDR FORM)
    VAR SETQONLY?)

```

(* Stupid Interlisp SETQ format -- You really wound't believe it!)

(\VARNOTUSED.LIST

```

[LAMBDA (L X SETQONLY?)
  (EVERY L (FUNCTION (LAMBDA (FORM)
    (\VARNOTUSED FORM X SETQONLY?))

```

(* JonL "21-NOV-82 15:06")

(EVALUABLE.CONSTANTP

```
[LAMBDA (X)
  (if (OR (NLISTP X)
         (EQ (CAR X) 'QUOTE)
         (EQ (CAR X) 'CONSTANT)
         (FMEMB (CAR X) CONSTANTFOLDFNS))
      then
```

(* Imm "12-Apr-85 09:42")

(* Unfortunately, CONSTANT has a macro property which may conflict with the action of LISPFORM.SIMPLIFY)

```
(CONSTANTEXPRESSIONP X)
else (if (LISTP X)
  then (SETQ X (LISPFORM.SIMPLIFY X T)))
  (if (NLISTP X)
    then (CONSTANTEXPRESSIONP X)
    elseif (NNLITATOM (CAR X))
    then [if (\WALKABLE.SPECIALFORMP (CAR X))
      then (if (\WALKOVER.SPECIALFORMS (FUNCTION EVALUABLE.CONSTANTP)
        X)
        then
```

(* This branch currently has a bug in it -- we'd like a version of EVAL which didn't just do an EVALV on litatoms, but first check CONSTANTEXPRESSIONP on them. The problem occurs in cross-compilation.)

```
(LIST (EVAL X)))
elseif (AND [NOT (FMEMB (CAR X)
  '(CONS LIST \ALLOCKBLOCK ARRAY MKSTRING MKATOM ALLOCSTRING SYSTEMTYPE
  MACHINETYPE GETD]
  (NO.SIDEEFFECTS.FNP (CAR X)))
  then
```

(* If a random function without side-effects, then it is constant when applied to constant args, except for consers of various kinds.)

```
(PROG [(VALS (for Z in (CDR X) collect (CAR (OR (EVALUABLE.CONSTANTP Z)
  (RETURN)
  (RETURN (if VALS
    then (LIST (APPLY (CAR X)
  VALS]
elseif (AND (LISTP (CAR X))
  (EQ (CAAR X) 'LAMBDA))
  then (if (NLISTP (CADAR X))
    then [EVALUABLE.CONSTANTP (CONS 'PROGN (APPEND (CDR X)
  (CDDAR X)
  else (for Z VALS in (CDR X) do
    (* Be sure that any "arguments" are all constant.
    Then do "beta" reduction.)
    [push VALS (KWOTE (CAR (OR (EVALUABLE.CONSTANTP Z)
  (RETURN)
  finally (RETURN (EVALUABLE.CONSTANTP (CODE.SUBPAIR (CADAR X)
  VALS
  (CONS 'PROGN (CDDAR X]))
```

(EVALUABLE.CONSTANT.FIXP

```
[LAMBDA (X)
  (FIXP (CAR (EVALUABLE.CONSTANTP X]))
)
```

(* JonL "25-FEB-83 20:36")

(DECLARE%: EVAL@COMPILE

(PUTPROPS EVALUABLE.CONSTANT.FIXP MACRO [(X)
 (FIXP (CAR (EVALUABLE.CONSTANTP X)))]

(PUTPROPS CARCDR.FNP MACRO ((X)
 (GETPROP X 'CROPS)))

(DEFINEQ

(DECL.COMNT.PROCESS

```
[LAMBDA (FORMS)
```

(* JonL "17-OCT-83 22:01")

(* Returns a list whose first element is the list of all declarations preceeding significant, whose second element is the list of all comments preceeding significant, and whose remaining elements are the "body" of FORMS)

```
(for L DECLS COMNTS Y on FORMS while [AND (LISTP (SETQ Y (CAR L)))
  (OR (EQ COMMENTFLG (SETQ Y (CAR Y)))
  (EQ Y 'DECLARE]
do (if (EQ COMMENTFLG Y)
  then (push COMNTS (CAR L))
  elseif (EQ Y 'DECLARE)
  then (push DECLS (CAR L)))
finally (RETURN (CONS DECLS (CONS COMNTS L]))
```

)

(DEFINEQ

(\WALKOVER.SPECIALFORMS

[LAMBDA (PRED FORM REST1 REST2 REST3)

(* JonL "29-JAN-83 21:30")

(* Loser! What I really need is a &REST argument L, and use (APPLY PRED <specific-item> L) instead of the APPLY*)

```
(SELECTQ (CAR (LISTP FORM))
(COND [EVERY (CDR FORM)
(FUNCTION (LAMBDA (CLZ)
(OR (NLISTP CLZ)
(\WALKOVER.SF.LIST PRED CLZ REST1 REST2 REST3])
((SELECTQ SELECTC)
(AND (APPLY* PRED (CADR FORM)
REST1 REST2 REST3)
(APPLY* PRED (CAR (LAST FORM))
REST1 REST2 REST3)
(for LL on (CDDR FORM) until (NULL (CDR LL)) do (OR (\WALKOVER.SF.LIST PRED (CDAR LL)
REST1 REST2 REST3)
(RETURN) )
finally (RETURN T))))
((AND OR FRPTQ SETQ)
(\WALKOVER.SF.LIST PRED (CDR FORM)
REST1 REST2 REST3))
((APPLY APPLY*)
(AND (\WALKOVER.FUNCTION PRED (CADR FORM)
REST1 REST2 REST3)
(\WALKOVER.SF.LIST PRED (CDDR FORM)
REST1 REST2 REST3)))
((MAP MAPLIST MAPC MAPCAR MAPCON MAPCONC MAPHASH EVERY SOME NOTEVERY NOTANY)
(AND (APPLY* PRED (CADR FORM)
REST1 REST2 REST3)
(CAR (SETQ FORM (CDDR FORM)))
(\WALKOVER.FUNCTION PRED (CAR FORM)
REST1 REST2 REST3)
(OR (NLISTP (CDR FORM))
(\WALKOVER.FUNCTION PRED (CADR FORM)
REST1 REST2 REST3))))
((MAPATOMS)
(\WALKOVER.FUNCTION PRED (CADR FORM)
REST1 REST2 REST3))
((PROG)
[AND [EVERY (CADR FORM)
(FUNCTION (LAMBDA (L)
(OR (NLISTP L)
(NLISTP (CDR L))
(APPLY* PRED (CADR L)
REST1 REST2 REST3])
(EVERY (CDDR FORM)
(FUNCTION (LAMBDA (L)
(OR (NLISTP L)
(APPLY* PRED L REST1 REST2 REST3]))
(SHOULDNT])
```

(* FooBar! Note that we can't currently walk over a PROG -- 30 JAN 1983)

(\WALKOVER.SF.LIST

[LAMBDA (PRED L REST1 REST2 REST3)
(EVERY L (FUNCTION (LAMBDA (X)
(APPLY* PRED X REST1 REST2 REST3]))

(* JonL "21-NOV-82 15:04")

(\WALKOVER.FUNCTION

[LAMBDA (PRED FN REST1 REST2 REST3)

(* JonL "21-NOV-82 15:11")
(* Analyze case where FN is being applied
(e.g. as in MAPCAR))

```
(if [OR (NLISTP FN)
(NOT (MEMB (CAR FN)
'FUNCTION])
then (AND (APPLY* PRED FN REST1 REST2 REST3)
(APPLY* PRED '(\TypicalUnknownFunction)
REST1 REST2 REST3))
else (APPLY* PRED (if (NLISTP (SETQ FN (CADR FN)))
then (LIST FN)
else FN)
REST1 REST2 REST3])
```

)

(DECLARE%: DONTCOPY

(DECLARE%: EVAL@COMPILE

(RPAQQ \QUOTIFYING.NLS (QUOTE FUNCTION DECLARE CONSTANT DEFERREDCONSTANT))

```
(RPAQQ WALKABLE.SPECIALFORMS (COND SELECTQ SELECTC AND OR SETQ FRPTQ APPLY APPLY* MAP MAPLIST MAPC MAPCAR
MAPCON MAPCONC MAPHASH MAPATOMS EVERY SOME NOTEVERY NOTANY))

(CONSTANTS \QUOTIFYING.NLS \WALKABLE.SPECIALFORMS)
)

(DECLARE%: EVAL@COMPILE

(PUTPROPS WALKABLE.SPECIALFORMP MACRO ((FORM)
(MEMB FORM \WALKABLE.SPECIALFORMS)))
)

(ADDTOVAR CONSTANTFOLDFNS IMIN IMAX IABS LOGOR LOGXOR LOGAND)

(RPAQQ NOSIDEFNS (fetch CONS NLISTP PROGN APPEND LIST NEQ MEMB MEMBER FMEMB ASSOC TAILP COPY create ELT ELTD
AND OR ADD1 SUB1 IPLUS IDIFFERENCE EQ EQUAL NOT NULL))

(DECLARE%: DOEVAL@COMPILE DONTCOPY

(GLOBALVARS CLISPARRAY CONSTANTFOLDFNS)
)

(PUTPROPS MACROAUX FILETYPE COMPILE-FILE)

(PUTPROPS MACROAUX COPYRIGHT ("Venue & Xerox Corporation" 1983 1984 1985 1986 1990))
```

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