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*Read Table:* INTERLISP

*Package:* INTERLISP

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::  
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(RPAQQ **CMLPARSECOMS**

(  
:: Parsing bodies and argument lists

(VARIABLES %%ARG-COUNT %%MIN-ARGS %%UNBOUNDED-ARG-COUNT %%LET-LIST %%KEYWORD-TESTS %%ENV-ARG-USED  
%%CTX-ARG-USED %%ENV-ARG-NAME %%CTX-ARG-NAME)

(VARIABLES \*DEFAULT-DEFAULT\* \*KEY-FINDER\*)

(FUNCTIONS PARSE-BODY)

(FUNCTIONS PARSE-DEFMACRO ANALYZE ANALYZE-AUX ANALYZE-KEY ANALYZE-PARAMETER CHECK-PARAMETER-NAME  
PUSH-KEYWORD-BINDING ANALYZE-REST RECURSIVELY-ANALYZE DEFMACRO-ARG-TEST)

:: Testing the argument-list parsing

(VARIABLES ANALYZE-TESTS)

:: Runtime support functions

(FUNCTIONS KEYWORD-TEST FIND-KEYWORD)

:: Arrange to use the correct compiler

(PROP FILETYPE CMLPARSE)))

:: Parsing bodies and argument lists

(CL:DEFVAR %%ARG-COUNT NIL)

(CL:DEFVAR %%MIN-ARGS NIL)

(CL:DEFVAR %%UNBOUNDED-ARG-COUNT 0)

(CL:DEFVAR %%LET-LIST NIL)

(CL:DEFVAR %%KEYWORD-TESTS NIL)

(CL:DEFVAR %%ENV-ARG-USED NIL)

(CL:DEFVAR %%CTX-ARG-USED NIL)

(CL:DEFVAR %%ENV-ARG-NAME NIL)

(CL:DEFVAR %%CTX-ARG-NAME NIL)

(CL:DEFVAR \*DEFAULT-DEFAULT\* NIL)

(CL:DEFVAR \*KEY-FINDER\* NIL)

(CL:DEFUN **PARSE-BODY** (XCL::BODY XCL::ENVIRONMENT &OPTIONAL (XCL::DOC-STRING-ALLOWED T))

:: CDR down the list of forms in BODY, looking for declarations and documentation strings, until we hit either the end of the BODY or a form that is  
:: neither of these. We expand macros in our search for declarations and doc-strings, but only until we find a form we don't understand.

::

:: Return three values:

:: 1) The remainder of the BODY, after declarations and doc-strings,

:: 2) A list of the declarations found,

:: 3) The first documentation string found, or NIL if none are present.

(LET ((XCL::TAIL XCL::BODY)

(XCL::DECLS NIL)

(XCL::DOC NIL))

(CL:LOOP (CL:WHEN (NULL XCL::TAIL)

```

    (RETURN))
  [LET ((XCL::FORM (CAR XCL::TAIL)))
    (COND
      ((AND (CL:STRINGP XCL::FORM)
             (CDR XCL::TAIL))
        ; Be careful about strings at the end of BODY... They aren't
        ; doc-strings!

        (CL:IF (AND (NOT XCL::DOC)
                     XCL::DOC-STRING-ALLOWED)
                 (CL:SETQ XCL::DOC XCL::FORM)))
      ([OR (CL:ATOM XCL::FORM)
            (NOT (CL:SYMBOLP (CAR XCL::FORM)
                              (RETURN)))
            (EQ (CAR XCL::FORM)
                 'DECLARE)
            (CL:PUSH XCL::FORM XCL::DECLS))
        (EQ (CAR XCL::FORM)
             COMMENTFLG)
        ; Ignore Interlisp comments.
        NIL)
      ((CL:SPECIAL-FORM-P (CAR XCL::FORM))
        (RETURN))
      (T (LET [(XCL::RESULT (CONDITIONS:RESTART-CASE (CL:MACROEXPAND XCL::FORM XCL::ENVIRONMENT)
                                                         )
                                                         (CONDITIONS:CONTINUE NIL :REPORT
                                                         (CL:LAMBDA (STREAM)
                                                           (LET (((*PRINT-LEVEL* 3)
                                                                (*PRINT-LENGTH* 3))
                                                                (CL:FORMAT STREAM "Assume that ~S does
                                                                not expand into a declaration."
                                                                XCL::FORM)))
                                                           XCL::FORM])
              (CL:IF (AND (CL:CONSP XCL::RESULT)
                          (EQ (CAR XCL::RESULT)
                              'DECLARE))
                    (CL:PUSH XCL::RESULT XCL::DECLS)
                    (RETURN))]
            (CL:POP XCL::TAIL))
        (CL:VALUES XCL::TAIL (CL:REVERSE XCL::DECLS)
                    XCL::DOC)))

```

```

(CL:DEFUN PARSE-DEFMACRO [ARGUMENT-LIST WHOLE-EXPRESSION MACRO-BODY ERROR-LOCATION ENVIRONMENT &KEY
  [PATH `(CDR ,WHOLE-EXPRESSION)
    ((:ENVIRONMENT %%ENV-ARG-NAME))
    ((:CONTEXT %%CTX-ARG-NAME))
    (ERROR-STRING NIL)
    (DOC-STRING-ALLOWED T)
    ((:DEFAULT-DEFAULT *DEFAULT-DEFAULT*)
     NIL)
    ((:KEY-FINDER *KEY-FINDER*)
     'FIND-KEYWORD)
    (REMOVE-COMMENTS (AND (EQ (CAR ARGUMENT-LIST)
                                '&WHOLE)
                            (EQ (CADR ARGUMENT-LIST)
                                '%ORIGINAL-DEFINITION)
                            '%ORIGINAL-DEFINITION))]
  (DECLARE (CL:SPECIAL %%CTX-ARG-NAME %%ENV-ARG-NAME *KEY-FINDER* *DEFAULT-DEFAULT*))
  ;; "Parse-Defmacro provides a clean interface to ANALYZE for use by macros and macro-like forms that must parse some form according to a
  ;; defmacro-like argument list.
  ;;
  ;; -- ARGUMENT-LIST is the argument-list to be used for parsing.
  ;; -- WHOLE-EXPRESSION is the variable which is bound to the entire macro-call, or NIL if &whole is illegal.
  ;; -- MACRO-BODY is the code that will be executed in the scope of the argument-list.
  ;; -- ERROR-LOCATION is the name of the function being worked on, for use in error messages.
  ;; -- ENVIRONMENT is an environment in which PARSE-DEFMACRO may macroexpand the WHOLE-EXPRESSION, looking for declarations.
  ;; -- PATH is an access expression for getting to the object to be parsed, which defaults to the CDR of WHOLE.
  ;; -- :ENVIRONMENT is the place where the macroexpansion environment may be found. If not supplied, then no &environment arg is allowed.
  ;; -- :CONTEXT is the place where the macroexpansion compiler context may be found. If not supplied, then no &context arg is allowed.
  ;; -- :ERROR-STRING is used as the first argument to ERROR if an incorrect number of arguments are supplied. The additional arguments to
  ;; ERROR are ERRLOC and the number of arguments supplied. If ERROR-STRING is not supplied, then no argument count error checking is done.
  ;; -- :DOC-STRING-ALLOWED indicates whether a doc-string should be parsed out of the body.
  ;; -- :DEFAULT-DEFAULT is the default value for unsupplied arguments, which defaults to NIL.
  ;; -- :KEY-FINDER the function used to do keyword lookup. It defaults to a function that does the right thing. If you supply your own, it should take
  ;; two arguments, the keyword to be found and a list in which to find it, and return either a list of one element, the value of the given keyword, or NIL,
  ;; if the keyword is not present.
  ;; -- :REMOVE-COMMENTS should be non-NIL iff comments should be stripped from the macro-call before processing. The default is set up as a
  ;; horrible hack to allow macros created by DEFDEFINER to get this feature.
  ;;
  ;; The first value returned is a LET* form which binds things and then evaluates the specified CODE.
  ;; The second value is a list of ignore declarations for the WHOLE and ENVIRONMENT vars, if appropriate.

```

```
;; The fourth and fifth values are the minimum and maximum number of arguments allowed, in case you care about that kind of thing. The fifth value
;; is NIL if there is no upper limit.
```

(CL:DEFUN **ANALYZE** (ARGLIST PATH ERRLOC WHOLE))

```
(CL:ASSERT (CL:LISTP ARGLIST)
           NIL "The argument list %"~S%" was not a list." ARGLIST)
(CL:UNLESS (OR (CL:ATOM PATH)
               (NULL ARGLIST))
           ; Eliminate a common subexpression
           ; (OR ... (NULL ARGLIST)) is added for solution of
           ; AR#7337 (Edited by TT : 8-June-90)
```

```
(LET ((NEW-PATH (GENSYM)))
      (CL:PUSH ` (,NEW-PATH ,PATH)
                %LET-LIST)
      (CL:SETQ PATH NEW-PATH)))
(CL:DO ((ARGS ARGLIST (CDR ARGS))
        (OPTIONALP NIL)
        A)
      ((CL:ATOM ARGS)
       (CL:UNLESS (NULL ARGS)
                   ; If the variable-list is dotted, treat it as a &rest argument and
                   ; return.
```

```
(CL:SETQ %%UNBOUNDED-ARG-COUNT T)
(CL:PUSH ` (, ARGS , PATH)
  %%LET-LIST)))
(CL:SETQ A (CAR ARGS))
(CASE A
  ((&WHOLE) (COND
    ((AND WHOLE (CL:CONSP (CDR ARGS)))
      (ANALYZE-PARAMETER (CADR ARGS)
        WHOLE ERRLOC)
      (SETQ %%UNBOUNDED-ARG-COUNT T)
      (SETQ ARGS (CDR ARGS)))
    ; Only one CDR here; the other one is done by the DO loop,
    ; above.
```

```

)
(T (CL:ERROR "Illegal or ill-formed &whole arg in ~S." ERRLOC)))
((&ENVIRONMENT) (COND
  ((AND %%ENV-ARG-NAME (CL:CONSP (CDR ARGS))
    (CL:SYMBOLP (CADR ARGS)))
    (CHECK-PARAMETER-NAME (CADR ARGS)
      ERRLOC)
    (CL:PUSH ` (, (CADR ARGS)
      , %%ENV-ARG-NAME)
      %%LET-LIST)
    (CL:SETQ %%ENV-ARG-USED T)
    (CL:SETQ ARGS (CDR ARGS)))
    (T (CL:ERROR "Illegal or ill-formed &environment arg in ~S." ERRLOC))))
((&CONTEXT) (COND
  ((AND %%CTX-ARG-NAME (CL:CONSP (CDR ARGS))
    (CL:SYMBOLP (CADR ARGS)))
    (CL:SETQ %%CTX-ARG-USED T)
    (CL:SETQ ARGS (CDR ARGS)))
    (T (CL:ERROR "Illegal or ill-formed &context arg in ~S." ERRLOC))))
)

```

```

      (CL:SYMBOLP (CADR ARGS)))
    (CHECK-PARAMETER-NAME (CADR ARGS)
      ERRLOC)
    (CL:PUSH ` (, (CADR ARGS)
      ,%%CTX-ARG-NAME)
      %%LET-LIST)
    (CL:SETQ %%CTX-ARG-USED T)
    (CL:SETQ ARGS (CDR ARGS)))
    (T (CL:ERROR "Illegal or ill-formed &context arg in ~S." ERRLOC))))
  ((&OPTIONAL)
    (AND OPTIONALP (CL:CERROR "Ignore it." "Redundant &optional flag in varlist of ~S." ERRLOC))
    (CL:SETQ OPTIONALP T))
  ((&REST &BODY) (RETURN (ANALYZE-REST (CAR ARGS)
    (CDR ARGS)
    PATH ERRLOC WHOLE)))
  ((&KEY) (LET ((KEYWORD-ARGS-VAR (GENSYM)))
    (CL:SETQ %%UNBOUNDED-ARG-COUNT T)
    (CL:PUSH ` (,KEYWORD-ARGS-VAR ,PATH)
      %%LET-LIST)
    (RETURN (ANALYZE-KEY (CDR ARGS)
      KEYWORD-ARGS-VAR ERRLOC))))
  ((&ALLOW-OTHER-KEYS) (CL:CERROR "Ignore it." "Stray &ALLOW-OTHER-KEYS in arglist of ~S." ERRLOC))
  ((&AUX) (RETURN (ANALYZE-AUX (CDR ARGS)
    ERRLOC)))

```

;; It's actually a parameter!

```

(CL:OTHERWISE
  (COND
    ;; It's an optional argument.
    [OPTIONALP (CL:SETQ %%ARG-COUNT (CL:1+ %%ARG-COUNT))
      (COND
        ;; The normal case, a simple variable.
        ((CL:SYMBOLP A)
          (CHECK-PARAMETER-NAME A ERRLOC)
          (CL:PUSH `[ ,A (COND
            (,PATH (CAR ,PATH))
            (T ,*DEFAULT-DEFAULT*)]
            %%LET-LIST)))
        ;; A buggy case.
        ((CL:ATOM A)
          (CL:CERROR "Ignore this item." "Non-symbol variable name in ~S." ERRLOC))
        ;; The defaulting case: (var [default [svar]])
        (T (ANALYZE-PARAMETER (CAR A)
          `[COND
            (,PATH (CAR ,PATH))
            (T , (COND
              ((CDR A) ; Was a default value specified?
                (CADR A))
              (T *DEFAULT-DEFAULT*)]
              ERRLOC)
            (CL:WHEN (NOT (NULL (CDDR A)))
              (CHECK-PARAMETER-NAME (CADDR A)
                ERRLOC)
              (CL:PUSH `[ , (CADDR A)
                (NOT (NULL ,PATH)
                %%LET-LIST)) ]
                ))
          ))
    ;; It's a required argument.
    (T (CL:SETQ %%MIN-ARGS (CL:1+ %%MIN-ARGS))
      (CL:SETQ %%ARG-COUNT (CL:1+ %%ARG-COUNT))
      (ANALYZE-PARAMETER A `(CAR ,PATH)
        ERRLOC)))

```

;; After each real parameter, we need to advance PATH by CDRing. In many cases, though, we can eliminate a common  
;; subexpression.

```

(CL:IF (OR (CL:ATOM (CDR ARGS))
  (CL:ATOM (CDDR ARGS)))
  [CL:SETQ PATH `(CDR ,PATH]
  (LET ((NEW-PATH (GENSYM)))
    (CL:PUSH `(,NEW-PATH (CDR ,PATH)
      %%LET-LIST)
    (CL:SETQ PATH NEW-PATH))))))

```

```
(CL:DEFUN ANALYZE-AUX (ARGLIST ERRLOC)
```

;; Analyze stuff following &aux.

```

(CL:DO ((ARGS ARGLIST (CDR ARGS))
  ((NULL ARGS))
  (COND
    ((CL:ATOM ARGS)
      (CL:CERROR "Ignore the illegal terminator." "Dotted arglist after &AUX in ~S." ERRLOC)
      (RETURN NIL))

```

```
(SETQ K (MAKE-KEYWORD (CAR A)))
(SETQ SP-VAR (CADDR A))
(PUSH-KEYWORD-BINDING (CAR A)
  K
  (CADDR A)
  SP-VAR RESTVAR TEMP ERRLOC)
(CL:PUSH K KEYWORDS-SEEN))
(OR (CL:ATOM (CAR A))
  (NOT (CL:KEYWORDP (CAAR A)))
  (CL:ATOM (CDAR A)))
  ; Filter out more error cases that might kill defmacro.
(CL:CERROR "Ignore this item." "~S -- ill-formed keyword arg in ~S." (CAR A)
  ERRLOC))
(CL:SYMBOLP (CADR (CAR A)))
  ; Next case is
  ; ((:key var) [init [supplied-p]]).
```

```

    (SETQ K (CAAR A))
    (CL:UNLESS (CL:KEYWORDP K)
      (CL:ERROR "%~S%" should be a keyword, in arglist of ~S." K ERRLOC))
    (SETQ SP-VAR (CADDR A))
    (PUSH-KEYWORD-BINDING (CADR (CAR A))
      K
      (CADR A)
      SP-VAR RESTVAR TEMP ERRLOC)
    (CL:PUSH K KEYWORDS-SEEN))
  (T ; Same case, but must destructure the 'variable'.
    (SETQ K (CAAR A))
    (CL:UNLESS (CL:KEYWORDP K)
      (CL:ERROR "%~S%" should be a keyword, in arglist of ~S." K ERRLOC))
    (SETQ TEMP1 (GENSYM))
    (SETQ SP-VAR (CADDR A))
    (PUSH-KEYWORD-BINDING TEMP1 K (CADR A)
      SP-VAR RESTVAR TEMP ERRLOC)
    (CL:PUSH K KEYWORDS-SEEN)
    (RECURSIVELY-ANALYZE (CADR A)
      TEMP1 ERRLOC NIL)))
  (CL:WHEN CHECK-KEYWORDS
    (CL:PUSH `(KEYWORD-TEST ,RESTVAR ',KEYWORDS-SEEN)
      %%KEYWORD-TESTS)))

```

```
(CL:DEFUN ANALYZE-PARAMETER (PARAM PATH ERRLOC)
```

;;; We are given a single parameter and the path for getting to its value. The parameter may ask us to destructure the value. Arrange for the parameter to get its value.

```

[COND
  ((CL:SYMBOLP PARAM) ; The simple, normal case.
    (CHECK-PARAMETER-NAME PARAM ERRLOC)
    (CL:PUSH `(.PARAM ,PATH)
      %%LET-LIST))
  ((CL:ATOM PARAM) ; Not so good.
    (CL:CERROR "Ignore this item." "Non-symbol variable name %~S%" in ~S." PARAM ERRLOC))
  (T ; The destructuring case.
    (LET ((NEW-WHOLE (GENSYM)))
      (CL:PUSH `(.NEW-WHOLE ,PATH)
        %%LET-LIST)
      (RECURSIVELY-ANALYZE PARAM NEW-WHOLE ERRLOC NEW-WHOLE]))

```

```
(CL:DEFUN CHECK-PARAMETER-NAME (NAME ERRLOC)
```

```

  (CL:ASSERT (CL:SYMBOLP NAME)
    NIL "CHECK-PARAMETER-NAME should only be called with a symbol!")
  (COND
    ((NULL NAME)
      (CL:CERROR "Try to continue. Good luck!" "NIL used as a parameter name in ~S" ERRLOC))
    ((CL:KEYWORDP NAME)
      (CL:CERROR "Use it anyway. This is UGLY..." "The keyword ~S was used as a parameter name in ~S" NAME
        ERRLOC))
    ((MEMBER NAME CL:LAMBDA-LIST-KEYWORDS :TEST 'EQ)
      (CL:CERROR "Use it anyway. This is UGLY..." "The lambda-list keyword ~S was used as a parameter name in ~S" NAME ERRLOC)))

```

```
(CL:DEFUN PUSH-KEYWORD-BINDING (VARIABLE CL:KEYWORD DEFAULT SUPPLIED-P-VAR REST-VAR TEMP-VAR ERRLOC)
```

```

  (CHECK-PARAMETER-NAME VARIABLE ERRLOC)
  (CL:UNLESS (CL:SYMBOLP SUPPLIED-P-VAR)
    (CL:ERROR "Non-symbolic supplied-p parameter %~S%" found in arglist of ~S." SUPPLIED-P-VAR ERRLOC))
  (CL:PUSH `[,VARIABLE (COND
    ((CL:SETQ ,TEMP-VAR (*KEY-FINDER* ',CL:KEYWORD ,REST-VAR))
      (CAR ,TEMP-VAR))
    (T , (OR DEFAULT *DEFAULT-DEFAULT*)))
    %%LET-LIST)
  (CL:WHEN (NOT (NULL SUPPLIED-P-VAR))
    (CHECK-PARAMETER-NAME SUPPLIED-P-VAR ERRLOC)
    (CL:PUSH `[,SUPPLIED-P-VAR (NOT (NULL ,TEMP-VAR)
      %%LET-LIST)))

```

```
(CL:DEFUN ANALYZE-REST (CL:KEYWORD ARGLIST PATH ERRLOC WHOLE)
```

;;; This is complicated by the "implicit PARSE-BODY" convention. If a &body keyword is followed by a symbol, then it's just a normal &rest. If it's followed by a list of length one, then it's just like &rest using the CAR of that list. Otherwise, it's a list of length either 2 or 3: (body decls [doc]). The tail of the macro-call arguments is passed to PARSE-BODY along with the current lexical environment (as from &environment) and a doc-string-allowed-p argument of T iff the "doc" was specified (that is, the list after &body was of length three). PARSE-BODY returns three values that are then matched against "body", "decls", and "doc" respectively. Those three values can, in turn, be destructured, but it's not likely to be useful in any but the "body" case.

```

  (CL:WHEN (CL:ATOM ARGLIST)
    (CL:ERROR "Bad ~S arg in ~S." CL:KEYWORD ERRLOC))
  (SETQ %%UNBOUNDED-ARG-COUNT T)
  [LET ((REST-ARG (CAR ARGLIST)))
    (COND

```

```

((OR (CL:ATOM REST-ARG)
      (EQ CL:KEYWORD '&REST)
      (AND (EQ CL:KEYWORD '&BODY)
            (CL:CONSP REST-ARG)
            (NULL (CDR REST-ARG))
            (PROGN (SETQ REST-ARG (CAR REST-ARG))
                    T)))) ; The non-parsing case of &rest or &body.
      (ANALYZE-PARAMETER REST-ARG PATH ERRLOC))
[ (AND (CL:CONSP REST-ARG)
      (> (CL:LENGTH REST-ARG)
          1)) ; Fancy case:
          ; (body-var decls-var [doc-var])
          ; an implicit call to PARSE-BODY.

      (CL:UNLESS %%ENV-ARG-NAME (CL:ERROR "The parsing version of &body is not allowed when no lexical
                                         environment is available."))

      (LET ((BODY (CL:FIRST REST-ARG))
            (DECLS (CL:SECOND REST-ARG))
            (DOC (CL:THIRD REST-ARG))
            (PARSE-BODY-RESULT (GENSYM)))
            (SETQ REST-ARG NIL) ; This makes &key illegal.
            (CL:PUSH `[,PARSE-BODY-RESULT (CL:MULTIPLE-VALUE-LIST (PARSE-BODY ,PATH ,%%ENV-ARG-NAME
                                                                    , (NOT (NULL DOC)
                                                                    %%LET-LIST)
            (ANALYZE-PARAMETER BODY `(CL:FIRST ,PARSE-BODY-RESULT)
                                ERRLOC)
            (ANALYZE-PARAMETER DECLS `(CL:SECOND ,PARSE-BODY-RESULT)
                                ERRLOC)
            (CL:WHEN DOC
              (ANALYZE-PARAMETER DOC `(CL:THIRD ,PARSE-BODY-RESULT)
                                  ERRLOC)))
      (T (CL:ERROR "Bad &rest or &body arg in ~S." ERRLOC)))
;; Handle any arguments after &rest or &body.
(CL:DO ((MORE (CDR ARGLIST)
              (CDR MORE)))
      ((CL:ATOM MORE)
       (CL:IF (NULL MORE)
               NIL
               (CL:CERROR "Ignore the illegal terminator." "Dotted arglist terminator after &rest arg in
                           ~S." ERRLOC)))
      (CASE (CAR MORE)
        ((&KEY) (CL:IF (NULL REST-ARG)
                      (CL:CERROR "Ignore the keywords." "The parsing version of &body was mixed with &key
                          in arglist of ~S." ERRLOC)
                      (RETURN (ANALYZE-KEY (CDR MORE)
                                           REST-ARG ERRLOC))))
        ((&AUX) (RETURN (ANALYZE-AUX (CDR MORE)
                                     ERRLOC)))
        ((&ALLOW-OTHER-KEYS) (CL:CERROR "Ignore it." "Stray &ALLOW-OTHER-KEYS in arglist of ~S." ERRLOC)
        )
        ((&WHOLE) (COND
                  ((AND WHOLE (CL:CONSP (CDR MORE))
                        (CL:SYMBOLP (CADR MORE)))
                   (CL:PUSH `[, (CADR MORE)
                           ,WHOLE)
                   %%LET-LIST)
                  (SETQ MORE (CDR MORE)))
                  (T (CL:ERROR "Ill-formed or illegal &whole arg in ~S." ERRLOC))))
        ((&ENVIRONMENT) (COND
                        ((AND %%ENV-ARG-NAME (CL:CONSP (CDR MORE))
                              (CL:SYMBOLP (CADR MORE)))
                         (CL:PUSH `[, (CADR MORE)
                                 ,%%ENV-ARG-NAME)
                         %%LET-LIST)
                        (SETQ %%ENV-ARG-USED T)
                        (SETQ MORE (CDR MORE)))
                        (T (CL:ERROR "Ill-formed or illegal &environment arg in ~S." ERRLOC))))
        ((&CONTEXT) (COND
                    ((AND %%CTX-ARG-NAME (CL:CONSP (CDR MORE))
                          (CL:SYMBOLP (CADR MORE)))
                     (CL:PUSH `[, (CADR MORE)
                             ,%%CTX-ARG-NAME)
                     %%LET-LIST)
                    (SETQ %%CTX-ARG-USED T)
                    (SETQ MORE (CDR MORE)))
                    (T (CL:ERROR "Ill-formed or illegal &context arg in ~S." ERRLOC))))
        (CL:OTHERWISE (CL:CERROR "Ignore it." "Stray parameter %"~S%" found in arglist of ~S."
                                (CAR MORE)
                                ERRLOC))))))

```

```

(CL:DEFUN RECURSIVELY-ANALYZE (ARGLIST PATH ERRLOC WHOLE)

```

```

;; Make a recursive call on ANALYZE, being careful to shield the data-structures of outer calls and to make certain constructs illegal. The bindings of
;; MIN-ARGS, ARG-COUNT, and UNBOUNDED-ARG-COUNT are for shielding and those of ENV-ARG-NAME and CTX-ARG-NAME are to disallow
;; &environment and &context respectively.

```

```

(LET ((%MIN-ARGS 0)

```

```

    (%ARG-COUNT 0)
    (%UNBOUNDED-ARG-COUNT NIL)
    (%ENV-ARG-NAME NIL)
    (%CTX-ARG-NAME NIL))
  (ANALYZE ARGLIST PATH ERRLOC WHOLE))

```

```
(CL:DEFUN DEFMACRO-ARG-TEST (ARGS)
```

```
;; Return a form which tests whether an illegal number of arguments have been supplied. Args is a form which evaluates to the list of arguments.
```

```

[COND
  ((AND (ZEROP %%MIN-ARGS)
        %%UNBOUNDED-ARG-COUNT)
   NIL)
  [(ZEROP %%MIN-ARGS)
   `(> (CL:LENGTH ,ARGS)
       ,%%ARG-COUNT)]
  [%%UNBOUNDED-ARG-COUNT `(< (CL:LENGTH ,ARGS)
                             ,%%MIN-ARGS)]
  [(= %%MIN-ARGS %%ARG-COUNT)
   `(CL:/= (CL:LENGTH ,ARGS)
           ,%%MIN-ARGS)]
  (T `(OR (> (CL:LENGTH ,ARGS)
             ,%%ARG-COUNT)
          (< (CL:LENGTH ,ARGS)
            ,%%MIN-ARGS)))]

```

```
;; Testing the argument-list parsing
```

```
(CL:DEFVAR ANALYZE-TESTS
```

```

'((CL:MULTIPLE-VALUE-LIST (PARSE-DEFMACRO '((&WHOLE HEAD MOUTH &OPTIONAL EYE1 (EYE2 7 EYE2-P))
      ([FIN1 LENGTH1 &KEY ONE (TWO 8)
        ((:THREE TROIS)
         3 TRES-P)
        ((:FOUR (QUATRE QUATRO))
         '(4 4])
        &OPTIONAL
        ((FIN2 LENGTH2)
         9 FL2-P))
      TAIL &REST (FOO BAR BAZ)
      &ENVIRONMENT ENV)
  'WHOLE-ARG
  '((CODE))
  'ERRLOC :ENVIRONMENT '*ENV* :ERROR-STRING "Ack!")
'((&WHOLE HEAD MOUTH EYE1 EYE2)
  ((FIN1 LENGTH1)
   (FIN2 LENGTH2))
  TAIL)
'((&WHOLE HEAD MOUTH &OPTIONAL EYE1 (EYE2 7 EYE2-P))
  ([FIN1 LENGTH1 &KEY ONE (TWO 8)
    ((:THREE TROIS)
     3 TRES-P)
    ((:FOUR (QUATRE QUATRO))
     '(4 4])
    &OPTIONAL
    ((FIN2 LENGTH2)
     9 FL2-P))
  TAIL &REST (FOO BAR BAZ)
  &ENVIRONMENT ENV)))

```

```
;; Runtime support functions
```

```
(CL:DEFUN KEYWORD-TEST (ARGS KEYS)
```

```
;; Signal an error unless
```

```
;; -- one of the keywords on ARGS is :ALLOW-OTHER-KEYS and it has a non-NIL value, or
```

```
;; -- all of the keywords on ARGS are also on KEYS.
```

```
;; Note that we should search ARGS by CDDR and KEYS by CDR.
```

```

(LET ((EXTRA-KEY-FOUND NIL)
      (ALLOW-OTHER-KEYS-P NIL))
  [FOR TAIL ON ARGS BY (CDDR TAIL) DO (CL:WHEN (EQ (CAR TAIL)
                                                    :ALLOW-OTHER-KEYS)
        (SETQ ALLOW-OTHER-KEYS-P (CADR TAIL)))
    (CL:UNLESS (CL:MEMBER (CAR TAIL)
                          KEYS :TEST #'EQ)
              (CL:SETQ EXTRA-KEY-FOUND (CAR TAIL)))]
  (CL:WHEN (AND EXTRA-KEY-FOUND (NOT ALLOW-OTHER-KEYS-P))
    (CL:ERROR "Extraneous keyword %~S% given." EXTRA-KEY-FOUND)))

```

```
(CL:DEFUN FIND-KEYWORD (CL:KEYWORD KEYLIST)
```

```
;; If keyword is present in the keylist, return a list of its argument. Else, return NIL.
```



```
(CL:DO ((L KEYLIST (CDDR L)))
  ((CL:ENDP L)
   NIL)
 (CL:WHEN (CL:ENDP (CDR L))
  (CL:CERROR "Stick a NIL on the end and go on." "Unpaired item in keyword portion of macro call.")
  (RPLACD L (LIST NIL)))
 (CL:WHEN (EQ (CAR L)
  CL:KEYWORD)
  (RETURN (LIST (CADR L))))))
```

:: Arrange to use the correct compiler

```
(PUTPROPS CMLPARSE FILETYPE CL:COMPILE-FILE)
```

```
(PUTPROPS CMLPARSE COPYRIGHT ("Venue & Xerox Corporation" 1986 1988 1990))
```

---

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---

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%%ARG-COUNT .....	1	%%ENV-ARG-NAME .....	1	%%LET-LIST .....	1	*DEFAULT-DEFAULT* .....	1
%%CTX-ARG-NAME .....	1	%%ENV-ARG-USED .....	1	%%MIN-ARGS .....	1	*KEY-FINDER* .....	1
%%CTX-ARG-USED .....	1	%%KEYWORD-TESTS .....	1	%%UNBOUNDED-ARG-COUNT .....	1	ANALYZE-TESTS .....	8

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