

File created: 16-May-90 15:39:16 {DSK}<usr>local>lde>lispcore>sources>DESCRIBE.;2

changes to: (IL:VARS IL:DESCRIBECOMS)

previous date: 16-May-88 17:04:26 {DSK}<usr>local>lde>lispcore>sources>DESCRIBE.;1

Read Table: XCL

Package: SYSTEM

Format: XCCS

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```
(IL:RPAQQ IL:DESCRIBECOMS
  ( ;; Common LISP describe facility
    (IL:FUNCTIONS DESCRIBE DESCRIBE-INTERNAL DESCRIBE-NEW-LINE DESCRIBE-USING-DESCRIPTERS
      GET-SUPER-DESCRIPTERS GET-INSPECT-MACRO INSPECT-MACRO-USABLE-BY-DESCRIBE?
      DESCRIBE-USING-INSPECT-MACRO DESCRIBE-USING-RECORD-DECL)
    (IL:FUNCTIONS A-OR-AN VOWEL-P)
    (IL:DEFINE-TYPES CL::DESCRIPTERS)
    (IL:FUNCTIONS CL::DEFDESCRIBER GET-DESCRIPTERS)
    (IL:PROP IL:PROPTYPE DESCRIPTERS)
    (CL::DESCRIPTERS SYMBOL CL::STRUCTURE-OBJECT CHARACTER FIXNUM SINGLE-FLOAT HASH-TABLE)
    (IL:VARIABLES CL::*DESCRIBE-DEPTH* CL::*DESCRIBE-INDENT* CL::*DESCRIBE-PRINT-LENGTH*
      CL::*DESCRIBE-PRINT-LEVEL*)
    (IL:PROPS (IL:DESCRIBE IL:MAKEFILE-ENVIRONMENT IL:FILETYPE))))
```

;; Common LISP describe facility

```
(DEFUN DESCRIBE (CL::OBJECT)
  "Describe OBJECT, printing to *STANDARD-OUTPUT*."
  (LET ((*PRINT-LENGTH* CL::*DESCRIBE-PRINT-LENGTH*)
        (*PRINT-LEVEL* CL::*DESCRIBE-PRINT-LEVEL*))
    (DESCRIBE-INTERNAL CL::OBJECT 0)
    (VALUES)))
```

```
(DEFUN DESCRIBE-INTERNAL (OBJECT DEPTH)
```

;;; Recursive entry point for descriptions.

```
(IF (< DEPTH CL::*DESCRIBE-DEPTH*)
  (LET* ((TYPE (TYPE-OF OBJECT))
        (TYPE-NAME (IF (CONSP TYPE)
                        (CAR TYPE)
                        TYPE)))
    (DESCRIPTERS INSPECT-MACRO SUPER-DESCRIPTERS IL:DECL)
    (DESCRIBE-NEW-LINE DEPTH)
    (FORMAT T "~A ~A, " (A-OR-AN TYPE-NAME)
             TYPE-NAME)
    (COND
      ((SETQ DESCRIPTERS (GET-DESCRIPTERS TYPE-NAME))
       (DESCRIBE-USING-DESCRIPTERS OBJECT (1+ DEPTH)
        DESCRIPTERS))
      ((AND (SETQ INSPECT-MACRO (GET-INSPECT-MACRO OBJECT))
            (INSPECT-MACRO-USABLE-BY-DESCRIBE? INSPECT-MACRO))
       (DESCRIBE-USING-INSPECT-MACRO OBJECT (1+ DEPTH)
        INSPECT-MACRO))
      ((SETQ SUPER-DESCRIPTERS (GET-SUPER-DESCRIPTERS TYPE-NAME))
       (DESCRIBE-USING-DESCRIPTERS OBJECT (1+ DEPTH)
        SUPER-DESCRIPTERS))
      ((SETQ IL:DECL (OR (IL:FINDRECDECL OBJECT)
                        (IL:FINDSYSRECDECL OBJECT)))
       (DESCRIBE-USING-RECORD-DECL OBJECT IL:DECL (1+ DEPTH)))
      (T ;; Punt to printing
       (PRIN1 OBJECT))))
  (PRIN1 OBJECT)))
```

```
(DEFUN DESCRIBE-NEW-LINE (DEPTH)
  (FRESH-LINE)
  (DOTIMES (N (* DEPTH CL::*DESCRIBE-INDENT*))
    (WRITE-CHAR #\Space)))
```

```
(DEFUN DESCRIBE-USING-DESCRIPTERS (OBJECT DEPTH DESCRIPTERS)
  (MAPC #'(LAMBDA (DESCRIPTOR)
    (IF (AND (CONSP DESCRIPTOR)
              (STRINGP (FIRST DESCRIPTOR)))
        (MULTIPLE-VALUE-BIND (FIELD EMPTY?)
          (FUNCALL (SECOND DESCRIPTOR)
                   OBJECT)
          (UNLESS EMPTY?
```

```

        (DESCRIBE-NEW-LINE DEPTH)
        (FORMAT T "~A: " (FIRST DESCRIBER))
        (DESCRIBE-INTERNAL FIELD (1+ DEPTH)))
    (FUNCALL DESCRIBER OBJECT DEPTH))
DESCRIBERS)

```

```

(DEFUN GET-SUPER-DESCRIPTERS (TYPE)
  ;; Search up super-types of TYPE for descriptors
  (DO* ((TYPE TYPE (IL:GETSUPERTYPE TYPE))
        (DESCRIBER NIL (GET-DESCRIPTERS TYPE)))
        ((OR DESCRIBER (NULL TYPE))
         DESCRIBER)))

```

```

(DEFUN GET-INSPECT-MACRO (OBJECT)
  ;; Search IL:INSPECTMACROS for an inspect macro for OBJECT
  (DECLARE (XCL:GLOBAL IL:INSPECTMACROS))
  (DO* ((TAIL IL:INSPECTMACROS (REST TAIL))
        (HEAD NIL (FIRST TAIL))
        (TYPE NIL (FIRST HEAD))
        (MACRO NIL (TYPECASE TYPE
                      (CONS (AND (EQ (FIRST TYPE)
                                     'IL:FUNCTION)
                                (FUNCALL (SECOND TYPE)
                                           OBJECT)))
                      (OTHERWISE (TYPEP OBJECT TYPE))))))
        ((OR MACRO (NULL TAIL))
         HEAD)))

```

```

(DEFUN INSPECT-MACRO-USABLE-BY-DESCRIBE? (MACRO)
  (CONSP (REST MACRO)))

```

```

(DEFUN DESCRIBE-USING-INSPECT-MACRO (OBJECT DEPTH MACRO)
  (LET ((FETCHFN (THIRD MACRO))
        (FIELDS (SECOND MACRO)))
    (MAPCAR #'(LAMBDA (FIELD-NAME)
               (DESCRIBE-NEW-LINE DEPTH)
               (PRINC FIELD-NAME)
               (PRINC ": ")
               (DESCRIBE-INTERNAL (FUNCALL FETCHFN OBJECT FIELD-NAME)
                                   (1+ DEPTH)))
            (IF (CONSP FIELDS)
                FIELDS
                (FUNCALL FIELDS OBJECT)))))

```

```

(DEFUN DESCRIBE-USING-RECORD-DECL (OBJECT IL:DECL DEPTH)
  (MAPC #'(LAMBDA (FIELD-NAME)
                (DESCRIBE-NEW-LINE DEPTH)
                (FORMAT T "~A: " FIELD-NAME)
                (DESCRIBE-INTERNAL (IL:RECORDACCESS FIELD-NAME OBJECT IL:DECL)
                                    (1+ DEPTH)))
        (IL:INSPECTABLEFIELDNAMES IL:DECL)))

```

```

(DEFUN A-OR-AN (WORD)
  "Return 'a' or 'an' depending upon whether the first letter in WORD is a vowel"
  (IF (VOWEL-P (ELT (ETYPECASE WORD
                     (SYMBOL (SYMBOL-NAME WORD))
                     (STRING WORD))
                   0))
      "an"
      "a"))

```

```

(DEFUN VOWEL-P (CHAR)
  "T if char is an A, E, I, O or U. Not dependable with funky charsets."
  (CASE (CHARACTER CHAR)
    ((#\A #\a #\E #\e #\I #\i #\O #\o #\U #\u) T)
    (OTHERWISE NIL)))

```

```

(XCL:DEF-DEFINE-TYPE CL::DESCRIPTERS "Descriptors of objects")

```

```

(XCL:DEFDEFINER CL::DEFDESCRIBER CL::DESCRIPTERS (TYPE &REST CL::DESCRIPTERS)
  `(SETF (GET ',TYPE 'DESCRIPTERS)
    (LIST ,@(MAPCAR #'(LAMBDA (CL::ITEM)

```

```

;; Throughout here symbols are quoted and lambda-expressions are hash-quoted for compiler

```

```

(IF (AND (CONSP CL::ITEM)
         (STRINGP (FIRST CL::ITEM)))

```

```

;; It's a field name and function

```

```

        `(LIST ', (FIRST CL::ITEM)
              (IF (CONSP ', (SECOND CL::ITEM))
                  #' , (SECOND CL::ITEM)
                  ', (SECOND CL::ITEM)))

;; Else, it must be just a function
        (IF (CONSP CL::ITEM)
            `#' ,CL::ITEM
            `` ,CL::ITEM))
    CL::DESCRIPTORS)))

(DEFUN GET-DESCRIPTERS (TYPE)
  (GET TYPE 'DESCRIPTORS))

(IL:PUTPROPS DESCRIBERS IL:PROPTYPE IGNORE)

(CL::DEFDESCRIBER SYMBOL
  ;; This descriptor uses all features
  ("name" SYMBOL-NAME) ; A field name and accessor
  (LAMBDA (SYMBOL CL::DEPTH) ; An arbitrary function
    (LET ((CL::FIRST-TIME? 'T)
          (CL::HASH-TABLES))
      (MAPHASH #' (LAMBDA (TYPE HASH-TABLE)
        (WHEN (NOT (MEMBER HASH-TABLE CL::HASH-TABLES :TEST #'EQ))
          (PUSH HASH-TABLE CL::HASH-TABLES)
          (LET ((CL::DOC (GETHASH SYMBOL HASH-TABLE)))
            (WHEN CL::DOC
              (WHEN CL::FIRST-TIME?
                (SETQ CL::FIRST-TIME? 'NIL)
                (DESCRIBE-NEW-LINE CL::DEPTH)
                (PRINC "documentation:"))
              (DESCRIBE-NEW-LINE (1+ CL::DEPTH))
              (FORMAT T "~A: ~A" TYPE CL::DOC)
              NIL))))
            IL:*DOCUMENTATION-HASH-TABLE*))))
    ("package cell" SYMBOL-PACKAGE) ; another field name & accessor
    ("value cell" ; use of multiple values in accessor
      (LAMBDA (SYMBOL)
        (LET ((CL::UNBOUND? (NOT (BOUNDP SYMBOL))))
          (VALUES (UNLESS CL::UNBOUND? (SYMBOL-VALUE SYMBOL))
                  CL::UNBOUND?))))
    ("function cell" ; ditto
      (LAMBDA (SYMBOL)
        (LET ((CL::UNDEFINED? (NOT (FBOUNDP SYMBOL))))
          (VALUES (UNLESS CL::UNDEFINED? (SYMBOL-FUNCTION SYMBOL))
                  CL::UNDEFINED?))))
    (LAMBDA (SYMBOL CL::DEPTH) ; arbitrary function again
      (LET ((CL::PLIST (SYMBOL-PLIST SYMBOL)))
        (WHEN CL::PLIST
          (DESCRIBE-NEW-LINE CL::DEPTH)
          (PRINC "property list:")
          (DO ((CL::PLIST CL::PLIST (CDDR CL::PLIST)))
              ((NULL CL::PLIST))
            (DESCRIBE-NEW-LINE (1+ CL::DEPTH))
            (PRIN1 (FIRST CL::PLIST))
            (PRINC " : ")))
          ;; Recurse on each property
          (DESCRIBE-INTERNAL (SECOND CL::PLIST)
                            (+ CL::DEPTH 2))))))

(CL::DEFDESCRIBER CL::STRUCTURE-OBJECT
  ;; Descriptor for objects created by DEFSTRUCT
  (LAMBDA (CL::OBJECT CL::DEPTH)
    (MAPC #' (LAMBDA (CL::SLOT)
      (DESCRIBE-NEW-LINE CL::DEPTH)
      (FORMAT T "~A: " (CL::PSLOT-NAME CL::SLOT))
      ;; Recurse on fields
      (DESCRIBE-INTERNAL (FUNCALL (CL::PSLOT-ACCESSOR CL::SLOT)
                                CL::OBJECT)
                        (1+ CL::DEPTH)))
      (CL::PS-ALL-SLOTS (CL::PARSED-STRUCTURE (TYPE-OF CL::OBJECT))))))

(CL::DEFDESCRIBER CHARACTER
  (LAMBDA (CHAR CL::DEPTH)
    (MULTIPLE-VALUE-CALL 'FORMAT T "'~:@C', code #\\~0~3,'00 (~D decimal, ~:*~X hex, ~:*~B binary)" CHAR
      (FLOOR (CHAR-CODE CHAR)
              256)
      (CHAR-CODE CHAR)))

```

```

(CL::DEFDESCRIBER FIXNUM (LAMBDA (NUMBER CL::DEPTH)
  (FORMAT T "~D decimal, ~:*~O octal, ~:*~X hex, ~:*~B binary~@[, '~C'
    character~]" NUMBER (INT-CHAR NUMBER)))

(CL::DEFDESCRIBER SINGLE-FLOAT
  ("sign" (LAMBDA (FLOAT)
    (ECASE (FLOAT-SIGN FLOAT)
      (1.0 'CL::POSITIVE)
      (-1.0 'CL::NEGATIVE))))
  ("radix" FLOAT-RADIX)
  ("digits" FLOAT-DIGITS)
  ("significand" (LAMBDA (FLOAT)
    ;; onlyt return first value, as second confuses describe.
    (VALUES (DECODE-FLOAT FLOAT))))
  ("exponent" (LAMBDA (FLOAT)
    (SECOND (MULTIPLE-VALUE-LIST (DECODE-FLOAT FLOAT)))))

(CL::DEFDESCRIBER HASH-TABLE ("count" HASH-TABLE-COUNT)
  ("size" IL:HARRAYSIZE)
  ("test" (LAMBDA (CL::TABLE)
    (IL:HARRAYPROP CL::TABLE 'IL:EQUIVFN)))
  (LAMBDA (CL::TABLE CL::DEPTH)
    (DESCRIBE-NEW-LINE CL::DEPTH)
    (PRINC "contents:")
    (LET* ((CL::NEW-DEPTH (1+ CL::DEPTH))
      (CL::NEW-NEW-DEPTH (1+ CL::NEW-DEPTH)))
      (MAPHASH #'(LAMBDA (CL::KEY CL::VALUE)
        (DESCRIBE-NEW-LINE CL::NEW-DEPTH)
        (PRIN1 CL::KEY)
        (PRINC " : "))
        (DESCRIBE-INTERNAL CL::VALUE CL::NEW-NEW-DEPTH))
      CL::TABLE)))

(DEFPARAMETER CL::*DESCRIBE-DEPTH* 1
  "The recursive depth to which DESCRIBE describes")

(DEFPARAMETER CL::*DESCRIBE-INDENT* 3
  "Number of spaces to indent recursive descriptions")

(DEFPARAMETER CL::*DESCRIBE-PRINT-LENGTH* 3
  "The value of *PRINT-LENGTH* in DESCRIBE")

(DEFPARAMETER CL::*DESCRIBE-PRINT-LEVEL* 3
  "The value of *PRINT-LEVEL* in DESCRIBE")

(IL:PUTPROPS IL:DESCRIBE IL:MAKEFILE-ENVIRONMENT (:READTABLE "XCL" :PACKAGE "SYSTEM"))
(IL:PUTPROPS IL:DESCRIBE IL:FILETYPE :XCL-COMPILE-FILE)
(IL:PUTPROPS IL:DESCRIBE IL:COPYRIGHT ("Venue & Xerox Corporation" 1986 1987 1988 1990))

```

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