

File created: 18-Oct-93 15:29:00 {Pele:mv:envos}<LispCore>Sources>CLTL2>DESCRIBE.;2

previous date: 4-Feb-92 12:21:53 {Pele:mv:envos}<LispCore>Sources>CLTL2>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-DESCRIBERS
  GET-SUPER-DESCRIBERS 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::DESCRIBERS)
(IL:FUNCTIONS CL::DEFDESCRIBER GET-DESCRIBERS)
(IL:PROP IL:PROPTYPE DESCRIBERS)
(CL::DESCRIBERS 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 &OPTIONAL STREAM) ; Edited 3-Feb-92 11:16 by jrb:

```
"Describe OBJECT, printing to STREAM."
(LET ((*PRINT-LENGTH* CL::*DESCRIBE-PRINT-LENGTH*
      (*PRINT-LEVEL* CL::*DESCRIBE-PRINT-LEVEL*
      (*STANDARD-OUTPUT* (IL:\GETSTREAM STREAM)))
      (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))
        (DESCRIBERS INSPECT-MACRO SUPER-DESCRIBERS IL:DECL)
        (DESCRIBE-NEW-LINE DEPTH)
        (FORMAT T "~A ~A, " (A-OR-AN TYPE-NAME)
                TYPE-NAME)
        (COND
         ((SETQ DESCRIBERS (GET-DESCRIBERS TYPE-NAME))
          (DESCRIBE-USING-DESCRIBERS OBJECT (1+ DEPTH)
          DESCRIBERS))
         ((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-DESCRIBERS (GET-SUPER-DESCRIBERS TYPE-NAME))
          (DESCRIBE-USING-DESCRIBERS OBJECT (1+ DEPTH)
          SUPER-DESCRIBERS))
         ((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-DESCRIBERS** (OBJECT DEPTH DESCRIBERS)

```
(MAPC #'(LAMBDA (DESCRIBER)
  (IF (AND (CONSP DESCRIBER)
          (STRINGP (FIRST DESCRIBER)))
      (MULTIPLE-VALUE-BIND (FIELD EMPTY?)
        (FUNCCALL (SECOND DESCRIBER)
                  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-DESCRIBERS (TYPE)
  ;; Search up super-types of TYPE for describers
  (DO* ((TYPE TYPE (IL:GETSUPERTYPE TYPE))
        (DESCRIBER NIL (GET-DESCRIBERS 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::DESCRIBERS "Describers of objects")

```

```

(XCL:DEFDEFINER CL::DEFDESCRIBER CL::DESCRIBERS (TYPE &REST CL::DESCRIBERS)
  `(SETF (GET ',TYPE 'DESCRIBERS)
         (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::DESCRIBERS)))

```

```

(DEFUN GET-DESCRIBERS (TYPE)
  (GET TYPE 'DESCRIBERS))

```

```

(IL:PUTPROPS DESCRIBERS IL:PROPTYPE IGNORE)

```

(CL::DEFDESCRIBER **SYMBOL**

;; This describer 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" (LAMBDA (SYMBOL) ; use of multiple values in accessor

```

    (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**

;; Describer 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 :COMPILE-FILE)
```

```
(IL:PUTPROPS IL:DESCRIBE IL:COPYRIGHT ("Venue & Xerox Corporation" 1986 1987 1988 1990 1991 1992 1993))
```

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**FUNCTION INDEX**

A-OR-AN .....	2	DESCRIBE-USING-DESCRIBERS .....	1	GET-INSPECT-MACRO .....	2
DESCRIBE .....	1	DESCRIBE-USING-INSPECT-MACRO .....	2	GET-SUPER-DESCRIBERS .....	2
DESCRIBE-INTERNAL .....	1	DESCRIBE-USING-RECORD-DECL .....	2	INSPECT-MACRO-USABLE-BY-DESCRIBE? .....	2
DESCRIBE-NEW-LINE .....	1	GET-DESCRIBERS .....	3	VOWEL-P .....	2

---

**DESCRIBER INDEX**

CHARACTER .....	3	HASH-TABLE .....	4	CL::STRUCTURE-OBJECT .....	3
FIXNUM .....	4	SINGLE-FLOAT .....	4	SYMBOL .....	3

---

**VARIABLE INDEX**

CL::*DESCRIBE-DEPTH* .....	4	CL::*DESCRIBE-PRINT-LENGTH* .....	4
CL::*DESCRIBE-INDENT* .....	4	CL::*DESCRIBE-PRINT-LEVEL* .....	4

---

**PROPERTY INDEX**

IL:DESCRIBE .....	4	DESCRIBERS .....	3
-------------------	---	------------------	---

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**DEFINE-TYPE INDEX**

CL::DESCRIBERS .....	2
----------------------	---

---

**DEFINER INDEX**

CL::DEFDESCRIBER .....	2
------------------------	---

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