

File created: 16-May-90 12:14:36 {DSK}<usr>local>lde>lispcore>sources>BRKDOWN.;2

changes to: (VARS BRKDOWNCOMS)

previous date: 23-Oct-86 21:37:08 {DSK}<usr>local>lde>lispcore>sources>BRKDOWN.;1

Read Table: INTERLISP

Package: INTERLISP

Format: XCCS

```
::
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```

(RPAQQ **BRKDOWNCOMS**

```
  [(DECLARE%: FIRST (ADDVARS (NOSWAPFNS BRKDOWN2)))
   (FNS BREAKDOWN BRKDOWNINIT BRKDOWNSETUP BRKDOWN1 BRKDOWNFORM BRKDOWNCOMPILE2 BRKDOWNTIME BRKDOWNCONSES
    BRKDOWNBOXES BRKDOWNFBOXES RESULTS BRKDOWNRESULTS BRKDOWNRESULTS1 BRKDOWNRESULTS2 BRKDOWNCLEAR)
   (DECLARE%: EVAL@COMPILE (MACROS BRKDOWNMACRO BRKDOWNINCA)
    (MACROS BRKDOWNADDTOA BRKDOWNDIFFA CPUTIME IBOXCOUNT FBOXCOUNT BRKDOWNELT BRKDOWNSETA BRKDOWNARRAY))
  [VARS (BRKDOWNLENGTH 0)
   (BRKDOWNCOMPFLG NIL)
   BRKDOWNARGS BRKDOWNTYPES (BRKDOWNFLTFMT (NUMFORMATCODE ' (FLOAT 7 3 NIL NIL 10])
  (VARS (BRKDOWNTYPE 'TIME)
   (BRKDOWNLABELS)
   (BRKDOWNLST))
  (GLOBALVARS BRKDOWNARGS BRKDOWNLABELS BRKDOWNLENGTH BRKDOWNLST BRKDOWNTOTLST BDLST BDSINK BDPTR)
  (BLOCKS (NIL BRKDOWNTIME BRKDOWNCONSES BRKDOWNBOXES (LINKFNS . T))
   (BREAKDOWN BREAKDOWN BRKDOWNSETUP BRKDOWN1 BRKDOWNFORM BRKDOWNCOMPILE2 (GLOBALVARS NOSWAPFLG))
   (BRKDOWNRESULTS BRKDOWNRESULTS BRKDOWNRESULTS1 BRKDOWNRESULTS2))
  (DECLARE%: DONTEVAL@LOAD DOEVAL@COMPILE DONTCOPY COMPILERVERS (ADDVARS (NLAMA BREAKDOWN)
                                                                    (NLAML BRKDOWNFBOXES BRKDOWNBOXES
                                                                    BRKDOWNCONSES BRKDOWNTIME)
                                                                    (LAMA]))
```

(DECLARE%: FIRST

(ADDTOVAR **NOSWAPFNS** BRKDOWN2)
)

(DEFINEQ

(**BREAKDOWN**

```
  [NLAMBDA FNS
   (SETQ FNS (NLAMBDA.ARGs FNS))
   (BRKDOWNINIT)
   [SETQ BRKDOWNLST (SUBSET BRKDOWNLST (FUNCTION (LAMBDA (X)
                                                    (PROG [(DEF (GETD (CAR X)
(* Imm "14-Aug-84 19:18")
```

(* This enables both adding to and subtracting from the BREAKDOWN list.
If functions originally on BRKDOWNLST are still broken, they are kept.
Then the new functions are added. The second alternative in the OR is for functions with open-coded BRKDOWN2.)

```
(RETURN (AND [OR (AND (EXPRP DEF)
                      (EQ (CAADDR DEF)
                          'BRKDOWN2))
                (AND DEF (EQP DEF (CADDR X)
                      (NOT (MEMB (CAR X)
                                  FNS])
```

(COND
(BRKDOWNTYPE

(* BRKDOWN1 initializes BRKDOWNLABELS and BRKDOWNLENGTH and compiles a measuring function, when necessary, for the measurement indicated by BRKDOWNTYPE. BRKDOWNTYPE is initially set to TIME.)

```
  (BRKDOWN1))
  (CONSCOUNT 0)
  (BRKDOWNCLEAR BDLST (ADD1 BRKDOWNLENGTH))
```

(* BDLST is initialized to point to the first cell of an unboxed array and is used for storing the last values of the statistics to be measured. BDSINK is a dummy array for accumulating values not charged to any function.)

```
(SETQ BDPTR BDSINK)
[COND
  (FNS
   (PROG ((N 1))
    (for X in FNS
     do (if (NUMBERP X)
            then (SETQ N X)
            NIL
            else (for X in (BREAK0 X T NIL 'BRKDOWN2)
```

```

do (if (LISTP X)
      then (PRINT X T T)
      else

```

(* BRKDOWNSETUP returns a list of the form (PTR N) or (PTR N CODE DEF) which becomes an element of BRKDOWNLST after adding FN in front.)

```

      (SETQ BRKDOWNLST (NCONC1 BRKDOWNLST (CONS X (BRKDOWNSETUP
X
      (GETD X)
      (BRKDOWNARRAY (ADD1 BRKDOWNLENGTH
      ))
N])

```

```

[MAPC BRKDOWNLST (FUNCTION (LAMBDA (FNS)
      (BRKDOWNCLEAR (CADR FNS)
      (ADD1 BRKDOWNLENGTH)

```

(* If a completely new BREAKDOWN was done, this isn't really necessary, but it may have been just an additive BREAKDOWN, so counters for old functions should be zeroed.
Note that BREAKDOWN of NIL just zeroes counters without unbreaking any functions.
Note also that BRKDWNTYPE can be changed without unbreaking and rebreaking, since redefining the function BRKDOWN2 will take care of everything, except that if more things are being measured, the statistic arrays must all be lengthened (BRKDOWN1 takes care of this.))

```

(MAPCAR BRKDOWNLST (FUNCTION CAR])

```

(BRKDOWNINIT

```

[LAMBDA NIL
      (COND
      ((NOT BDPTR)
      (SETQ BRKDOWNLENGTH 0)
      (SETQ BDLST (BRKDOWNARRAY 1))
      (SETQ BDSINK (BRKDOWNARRAY 1))
      (SETQ BDPTR BDSINK])

```

(* Imm "14-MAR-80 09:04")

(BRKDOWNSETUP

```

[LAMBDA (FN DEF PTR N)
      (PROG ((BDEF (CADDR DEF))
      (TEM (LIST PTR N)))

```

(* lpd "31-MAY-77 16:28")

(* Form of breakdown function is BDEF= (BRKDOWN2 FORM PTR N) where PTR points to the first cell of an unboxed array%: this cell contains the number of times the function has been called, and following cells contain the (negative of the) parameter/s being measured. N is number of times FORM is to be evaluated.
If N is greater than 1, FORM should not involve any side effects since it will be performed more than once.)

```

(COND
      (BRKDOWNCOMPFLG

```

(* Compile the BRKDOWN2 form open, redefining FN. The PUTD nonsense is so that the compiler doesn't unbreak FN in the process of redefining it.)

```

      (PUTD 'BRKDOWNFN NIL)
      [BRKDOWNCOMPILE2 'BRKDOWNFN (LIST (CAR DEF)
      (CADR DEF)
      (LIST 'PROG (CADDR BRKDOWNARGS)
      (LIST 'RETURN (BRKDOWNFORM
      BRKDOWNLABELS
      [LIST 'SETQ 'BDY
      (COND
      ((NEQ N 1)
      (LIST 'RPTQ N (CADR BDEF)))
      (T (CADR BDEF]
      (KWOTE PTR]

      (PUTD FN (GETD 'BRKDOWNFN))
      (PUTD 'BRKDOWNFN NIL)

```

(* * Save the address of the code, for checking whether the function is still broken, and the old definition, to allow rebreaking if BRKDWNTYPE changes.)

```

      (NCONC1 TEM (GETD FN))
      (NCONC1 TEM DEF))
      (T (RPLACD (CDR BDEF)
      TEM)))
      (RETURN TEM])

```

(BRKDOWN1

```

[LAMBDA NIL
      (PROG ((LST (OR (LISTP BRKDWNTYPE)
      (LIST BRKDWNTYPE)))
      LEN X Y)

```

(* Imm "19-Jul-84 18:55")

(* * Form of each entry on BRKDWNTYPES is (NAME FORM1 FORM2) e.g.
(TIME (LAMBDA NIL (CLOCK 2)) (LAMBDA (X) (FQUOTIENT X
(TICKPS)))) FORM1 is the parameter being measured, FORM2

(optional) can be used to convert the value of FORM1 to some other units, e.g. clock ticks to seconds.)

```
[OR [GETD (SETQ Y (PACK (CONS 'BRKDOWN LST)
  (BRKDOWNCOMPILE2 Y '(NLAMBDA %, BRKDOWNARGS (DECLARE (LOCALVARS . T))
    %,
    (BRKDOWNFORM LST '[PROG NIL
      BDLP
      (SETQ BDY (EVAL BDEXP))
      (COND
        ((NEQ BDN 1)
         (SUB1VAR BDN)
         (GO BDLP]
      (CADR BRKDOWNARGS]
    (PUTD 'BRKDOWN2 (GETD Y)
      T)
```

(* The function used for breaking the functions of interest is BRKDOWNNAME e.g. BRKDOWNTIME, BRKDOWNCONSES etc. Its definition is created, if not already defined, by BRKDOWNFORM and then compiled. BRKDOWNTIME and BRKDOWNCONSES are already defined in the system since they are used so frequently.)

```
[COND
  ((IGREATERP (SETQ LEN (LENGTH LST))
   BRKDOWNLENGTH)
```

(* More statistics are being measured, so go through all the broken functions and give them larger statistic arrays.)

```
(MAPC BRKDOWNLST (FUNCTION (LAMBDA (FNS)
  (PROG [(A (BRKDOWNARRAY (ADD1 LEN]
    (COND
      [(CDDDR FNS) (* Function has open-coded BRKDOWN2 and must be
                    recomplied.)
      (RPLACD FNS (BRKDOWNSETUP (CAR FNS)
                                (PUTD (CAR FNS)
                                      (CAR (CDDDDR FNS))))
      A
      (CADDR FNS]
    (T (RPLACA [CDDR (CADDR (GETD (CAR FNS)
                                A]))
      (RPLACA (CDR FNS)
              A]
    (SETQ BRKDOWNLENGTH (LENGTH (SETQ BRKDOWNLABELS (APPEND LST]
    (SETQ BRKDOWNTOTLST (CONS NIL (APPEND BRKDOWNLABELS)))
    (SETQ BDLST (BRKDOWNARRAY (ADD1 BRKDOWNLENGTH)))
    (SETQ BDSINK (BRKDOWNARRAY (ADD1 BRKDOWNLENGTH)))
    (SETQ BRKDOWNTYPE NIL]))
```

(BRKDOWNFORM

```
[LAMBDA (LST SETFORM PTR)
  (PROG ((I 1)
    (LST1 (CONS))
    (LST2 (CONS)))
```

(* lpd "31-MAY-77 16:29")

(* Computes the body of the BRKDOWNNAME function (closed or open coded) when LST is the list of things being measured. PTR is the (name of the) pointer to the statistics array.)

```
[MAPC LST (FUNCTION (LAMBDA (STAT)
  (PROG [(X (CADR (ASSOC STAT BRKDOWNTYPES)
    (OR X (HELP STAT "not found"))
    (TCONC LST1 (LIST 'BRKDOWNINCA 'BDPTR 'BDLST I X))
    (TCONC LST2 (LIST 'BRKDOWNINCA 'BDZ 'BDLST I X))
    (ADD1VAR I]
  (RETURN (LIST 'BRKDOWNMACRO (CONS 'PROGN (CAR LST1))
    (CONS 'PROGN (CAR LST2))
    SETFORM PTR]))
```

(BRKDOWNCOMPILE2

```
[LAMBDA (FN DEF)
  (DECLARE (SPECVARS LCFIL LAPFLG STRF SVFLG LSTFIL SPECVARS LOCALVARS))
  (DECLARE (GLOBALVARS NLAMA NLAML LAMS LAMA NOFIXFNSLST NOFIXVARSLST))
  (RESETVARS ((NLAMA NLAMA)
    (NLAML NLAML)
    (LAMS LAMS)
    (LAMA LAMA)
    (NOFIXFNSLST NOFIXFNSLST)
    (NOFIXVARSLST NOFIXVARSLST))
  (RETURN (RESETLST
```

(* RESETLST to provide reset context for macros under COMPILE1 as generated e.g. by DECL.)

```
(PROG [(LCFIL)
  (LAPFLG)
  (STRF T)
  (SVFLG)
  (LSTFIL T)
  (SPECVARS T)
  (LOCALVARS (COND
```

```

((NEQ LOCALVARS T)
 (UNION SYSLOCALVARS LOCALVARS))
(T SYSLOCALVARS]
(RETURN (COMPILE1 FN DEF T))))))

```

(BRKDOWNTIME

```

[NLAMBDA (BDEXP BDX BDN BDY BDZ)
  (DECLARE (LOCALVARS . T))
  (BRKDOWNMACRO (BRKDOWNINCA BDPTR BDLST 1 (CPUTIME))
    (BRKDOWNINCA BDZ BDLST 1 (CPUTIME))
    [PROG NIL
      BDLP
        (SETQ BDY (EVAL BDEXP))
        (COND
          ((NEQ BDN 1)
            (SUB1VAR BDN)
            (GO BDLP]
          (BDX])
    ]
  )
  (* lpd " 1-JUN-77 14:39")

```

(BRKDOWNCONSES

```

[NLAMBDA (BDEXP BDX BDN BDY BDZ)
  (DECLARE (LOCALVARS . T))
  (BRKDOWNMACRO (BRKDOWNINCA BDPTR BDLST 1 (CONSCOUNT))
    (BRKDOWNINCA BDZ BDLST 1 (CONSCOUNT))
    [PROG NIL
      BDLP
        (SETQ BDY (EVAL BDEXP))
        (COND
          ((NEQ BDN 1)
            (SUB1VAR BDN)
            (GO BDLP]
          (BDX])
    ]
  )
  (* lpd "31-MAY-77 16:31")

```

(BRKDOWNBOXES

```

[NLAMBDA (BDEXP BDX BDN BDY BDZ)
  (DECLARE (LOCALVARS . T))
  (BRKDOWNMACRO (BRKDOWNINCA BDPTR BDLST 1 (IBOXCOUNT))
    (BRKDOWNINCA BDZ BDLST 1 (IBOXCOUNT))
    [PROG NIL
      BDLP
        (SETQ BDY (EVAL BDEXP))
        (COND
          ((NEQ BDN 1)
            (SUB1VAR BDN)
            (GO BDLP]
          (BDX])
    ]
  )
  (* wt%: "15-MAR-78 16:31")

```

(BRKDOWNFBOXES

```

[NLAMBDA (BDEXP BDX BDN BDY BDZ)
  (DECLARE (LOCALVARS . T))
  (BRKDOWNMACRO (BRKDOWNINCA BDPTR BDLST 1 (FBOXCOUNT))
    (BRKDOWNINCA BDZ BDLST 1 (FBOXCOUNT))
    [PROG NIL
      BDLP
        (SETQ BDY (EVAL BDEXP))
        (COND
          ((NEQ BDN 1)
            (SUB1VAR BDN)
            (GO BDLP]
          (BDX])
    ]
  )
  (* wt%: "15-MAR-78 16:32")

```

(RESULTS

```

[LAMBDA (RETURNVALUESFLG)
  (BRKDOWNRESULTS RETURNVALUESFLG])
  (* wt%: "15-MAR-78 19:49")

```

(BRKDOWNRESULTS

```

[LAMBDA (RETURNVALUESFLG)
  (PROG (CL:VALUES (I 1))
    (CONSCOUNT 0)
    [MAP BRKDOWNTOTLST (FUNCTION (LAMBDA (X)
      (REPLACA X 0])
    [SETQ CL:VALUES (MAPCAR BRKDOWNLST (FUNCTION (LAMBDA (X)
      (BRKDOWNRESULTS1 (LIST (CAR X))
        (CADR X)
        (CADDR X]
    (COND
      (RETURNVALUESFLG
        (RETURN CL:VALUES)))
    (RESETFORM (FLTFMT BRKDOWNFLTFMT)
      (MAPC BRKDOWNLABELS (FUNCTION (LAMBDA (LABEL)
        (LISPXTERPRI T)
      )
    )
  )
  (* Return values, don't print.)

```

```

(PROG [(TOT (CAR (FNTH (CDR BRKDWNTOTLST)
                     I)))
      (TERP (CADDR (ASSOC LABEL BRKDWNTYPES]
              (LISPXPRI1 "FUNCTIONS" T)
              (LISPXPRI1 LABEL T)
              (LISPXTAB 23 NIL T)
              (LISPXPRI1 "# CALLS" T)
              (LISPXTAB 33 NIL T)
              (LISPXPRI1 "PER CALL" T)
              (LISPXTAB 46 NIL T)
              (LISPXPRI1 "%%"
                          T)
      [MAPC CL:VALUES (FUNCTION (LAMBDA (X)
                                (BRKDOWNRESULTS2
                                 (CAR X)
                                 (CAR (FNTH (CDDR X)
                                             I))
                                 (CADR X)
                                 TOT TERP]
                                (BRKDOWNRESULTS2 'TOTAL TOT (CAR BRKDWNTOTLST)
                                                    TOT TERP))
      (ADD1VAR I)])

```

(BRKDOWNRESULTS1

[LAMBDA (NLST PTR N)

(* Imm " 8-Aug-84 12:40")

(* NLST is a list of the form (NAME NCALLS STAT1 [...] STATn) which is smashed
(and extended if necessary) with the values from PTR.)

```

(PROG ((I 0)
      (TOT BRKDWNTOTLST)
      (LST NLST)
      VAL)
  LP (SETQ VAL (IMINUS (BRKDOWNELT PTR I)))
    [RPLACA TOT (PLUS (CAR TOT)
                     (COND
                      ((OR (EQ N 1)
                          (EQ I 0))
                       VAL)
                      (T (FQUOTIENT VAL N]
    [COND
     ((LISTP (CDR LST))
      (RPLACA (SETQ LST (CDR LST))
              VAL))
     (T (RPLACD LST (SETQ LST (LIST VAL]
    [COND
     ((SETQ TOT (CDR TOT))
      (ADD1VAR I)
      (GO LP)))
     (RETURN NLST)]

```

(BRKDOWNRESULTS2

[LAMBDA (NAME X NCALLS TOT TERP)

(* lpd " 1-JUN-77 14:36")

```

(PROG [(TEM (COND
            (TERP (APPLY* TERP X))
            (T X]
      (LISPXPRI2 NAME T T)
      (LISPXTAB 14 NIL T)
      (LISPXPRI2 TEM T T)
      (LISPXTAB 26 NIL T)
      (LISPXPRI2 NCALLS T T)
      (LISPXTAB 34 NIL T)
      (LISPXPRI2 (FQUOTIENT TEM NCALLS)
                  T T)
      (LISPXTAB 45 NIL T)
      (AND (NEQ NAME 'TOTAL)
           (LISPXPRI2 [FIX (FPLUS 0.5 (FTIMES 100 (FQUOTIENT X TOT]
                       T T))
           (LISPXTERPRI T])

```

(BRKDOWNCLEAR

[LAMBDA (PTR N)

(PROG ((I N))

LP (COND

((NEQ I 0)

(SUB1VAR I)

(BRKDOWNSETA PTR I 0)

(GO LP))

)

(DECLARE%: EVAL@COMPILE

(DECLARE%: EVAL@COMPILE

```

(PUTPROPS BRKDOWNMACRO MACRO ((FORM1 FORM2 SETFORM PTR)
                                (PROGN FORM1 (BRKDOWNADDTOA PTR 0 -1)
                                             (SETQ BDZ BDPTR)
                                             (SETQ BDPTR PTR)
                                             SETFORM
                                             (SETQ BDZ (PROG1 BDPTR (SETQ BDPTR BDZ)))
                                             FORM2 BDY)))

(PUTPROPS BRKDOWNINCA MACRO ((PTR LST I VAL)
                                (BRKDOWNADDTOA PTR I (BRKDOWNDIFFA LST I VAL))))
)

(DECLARE%: EVAL@COMPILE

[PROGN (PUTPROPS BRKDOWNADDTOA DMACRO ((PTR I VAL) (* BOXIPLUS a little faster)
                                           (\BOXIPLUS (BRKDOWNELT PTR I)
                                                         VAL)))
      (PUTPROPS BRKDOWNADDTOA MACRO (OPENLAMBDA (PTR I VAL)
                                                  (SETA PTR (ADD1 I)
                                                         (IPLUS (ELT PTR (ADD1 I))
                                                             VAL))))])

[PROGN (PUTPROPS BRKDOWNDIFFA DMACRO (OPENLAMBDA (PTR I VAL)
                                                    (PROG1 (IDIFFERENCE (BRKDOWNELT PTR I)
                                                                    VAL)
                                                         (BRKDOWNSETA PTR I VAL))))
      (PUTPROPS BRKDOWNDIFFA MACRO (OPENLAMBDA (PTR I VAL)
                                                  (IDIFFERENCE (ELT PTR (ADD1 I))
                                                                (SETA PTR (ADD1 I)
                                                                    VAL))))])

(PUTPROPS CPUTIME MACRO (NIL (CLOCK 2)))

(PUTPROPS IBOXCOUNT MACRO (NIL (BOXCOUNT)))

(PUTPROPS FBOXCOUNT MACRO (NIL (BOXCOUNT 'FLOATP)))

[PROGN (PUTPROPS BRKDOWNELT MACRO ((ARR I)
                                     (ELT ARR (ADD1 I))))
      (PUTPROPS BRKDOWNELT DMACRO (= . ELT))]

[PROGN (PUTPROPS BRKDOWNSETA DMACRO ((ARR I VAL)
                                       (\PUTBASEFIXP (BRKDOWNELT ARR I)
                                                         0 VAL))
      (PUTPROPS BRKDOWNSETA MACRO ((ARR I VAL)
                                       (SETA ARR (ADD1 I)
                                                VAL))))]

[PROGN (PUTPROPS BRKDOWNARRAY DMACRO ((N)
                                           (PROG ((BLOCK (ARRAY (ADD1 N)
                                                                'POINTER NIL 0)))
                                                  [for I from 0 to N do (SETA BLOCK I (NCREATE 'FIXP]
                                                  (RETURN BLOCK)))]
                                           (PUTPROPS BRKDOWNARRAY MACRO ((N)
                                                                     (ARRAY N N))))]
)
)

(RPAQQ BRKDOWNLENGTH 0)

(RPAQQ BRKDOWNCOMPFLG NIL)

(RPAQQ BRKDOWNARGS (BDEXP BDX BDN BDY BDZ))

(RPAQQ BRKDOWNTYPES ([TIME (CPUTIME)
                              (LAMBDA (X)
                                    (FQUOTIENT X 1000]
                              (CONSES (CONSCOUNT))
                              (PAGEFAULTS (PAGEFAULTS))
                              (BOXES (IBOXCOUNT))
                              (FBOXES (FBOXCOUNT)))]

(RPAQ BRKDOWNFLTFMT (NUMFORMATCODE ' (FLOAT 7 3 NIL NIL 10)))

(RPAQQ BRKDOWNTYPE TIME)

(RPAQQ BRKDOWNLABELS NIL)

(RPAQQ BRKDOWNLST NIL)

(DECLARE%: DOEVAL@COMPILE DONTCOPY

(GLOBALVARS BRKDOWNARGS BRKDOWNLABELS BRKDOWNLENGTH BRKDOWNLST BRKDOWNTOTLST BDLST BDSINK BDPTR)
)

(DECLARE%: DONTEVAL@LOAD DOEVAL@COMPILE DONTCOPY

```

```
(BLOCK%: NIL BRKDWNTIME BRKDNCONSES BRKDNBOXES (LINKFNS . T))

(BLOCK%: BREAKDOWN BREAKDOWN BRKDNSETUP BRKDN1 BRKDNFORM BRKDNCOMPILE2 (GLOBALVARS NOSWAPFLG))

(BLOCK%: BRKDNRESULTS BRKDNRESULTS BRKDNRESULTS1 BRKDNRESULTS2)
)

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

(ADDTovar NLAMA BREAKDOWN)

(ADDTovar NLAML BRKDNFBOXES BRKDNBOXES BRKDNCONSES BRKDWNTIME)

(ADDTovar LAMA )
)

(PUTPROPS BRKDOWN COPYRIGHT ("Venue & Xerox Corporation" T 1982 1983 1984 1986 1990))
```

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