libenv Reference

lib namespace, version *0.1.52*

Type Keywords and aliases

supertype	*T*	
bool	(),:nil are false, otherwise true	
condition	*keyword,* see ***Exception***	
list	*cons* or (),:nil	
frame	*cons*, see ***Frame***	
ns	*keyword* or (), see ***Namespace***	
:null	(),:nil	
:char	*char*	
:cons	*cons*	
:fixnum	*fixnum, fix*	56 bit signed integer
:float	*float, fl*	32 bit IEEE float
:func	*function, fn*	function
:keyword	*keyword, key*	*symbol*
:stream	*stream, strm*	file or string type
:struct	*struct*	typed vector
:symbol	*symbol, sym*	LISP-1 symbol
:vector	*vector, string, str*	
	:char :t :byte :fixnum :float	

Heap *p*

hp-info	*vector*	heap static information
	#(:t *type pages pagesize*)	
hp-stat	*vector*	heap allocations
	#(:t *:type size total free ...*)	
hp-size *T*	*fixnum*	heap occupancy in bytes

Frame *e*

frame binding: (*fn* . #(:t …))

frames	*list*	active *frame binding* list
fr-pop *fn*	*fn,*	pop *function's* top frame binding
fr-push *frame*	*cons*	push frame binding
fr-ref *fix fix*	*T*	frame id, offset

Symbol *l*

boundp *sym*	*bool*	is *symbol* bound?
keyword *str*	*key*	*keyword* from *string*
symbol *str*	*symbol*	uninterned *symbol*
sy-ns *sym*	*key*	*symbol* namespace
sy-name *sym*	*string*	*symbol* name binding
sy-val *sym*	*T*	*symbol* value binding

Special Forms *s*

:lambda *list . list'*		
	function	anonymous function
:quote *form*	*list*	quoted form
:if *form T T'*	*T*	conditional

Core *s*

apply *fn list*	*T*	apply *function* to *list*
eval *form*	*T*	evaluate *form*
eq *T T'*	*bool*	are *T* and *T'* identical?
type-of *T*	*keyword*	
compile *form*	*T*	*mu* form compiler
view *form*	*vector*	vector of object
utime	*fixnum*	elapsed time usec
repr *type T*	*T*	tag representation
	type	- :t :vector

if type is :vector, return 8 byte
byte vector of argument tag bits,
otherwise convert argument byte
vector to tag.

fix *fn form*	*T*	fixpoint of *function* on *form*
gc	*bool*	garbage collection, verbose
version	*string*	type *symbol,* version string

Future *s*

defer *fn list*	*struct*	future application
detach *fn list*	*struct*	future application
force *struct*	*T*	force completion
poll *struct*	*bool*	poll completion

Fixnum *m*

fx-mul *fix fix'*	*fixnum*	product
fx-add *fix fix'*	*fixnum*	sum
fx-sub *fix fix'*	*fixnum*	difference
fx-lt *fix fix'*	*bool*	*fix < fix'*?
fx-div *fix fix'*	*fixnum*	quotient
ash *fix fix'*	*fixnum*	arithmetic shift
logand *fix fix'*	*fixnum*	bitwise and
logor *fix fix'*	*fixnum*	bitwise or
lognot *fix*	*fixnum*	bitwise complement

Float *t*

fl-mul *fl fl'*	*float*	product
fl-add *fl fl'*	*float*	sum
fl-sub *fl fl'*	*float*	difference
fl-lt *fl fl'*	*bool*	*fl < fl'*?
fl-div *fl fl'*	*float*	quotient

Conses/Lists *s*

append *list T*	*list*	append
car *list*	*list*	head of *list*
cdr *list*	*T*	tail of *list*
cons *T T'*	*cons*	(*form . form'*)
length *list*	*fixnum*	length of *list*
nth *fix list*	*T*	nth *car* of *list*
nthcdr *fix list*	*T*	nth *cdr* of *list*

Vector *s*

vector *key list*	*vector*	specialized vector from list
sv-len *vector*	*fixnum*	length of *vector*
sv-ref *vector fix*	*T*	nth element
sv-type *vector*	*key*	type of *vector*

Reader/Printer *s*

read *strm bool T*		
	T	read stream object
write *T bool strm*		
	T	write escaped object

Struct *t*

struct *key list*	*struct*	of type *key* from list
st-type *struct*	*key*	struct type keyword
st-vec *struct*	*vector*	of struct members

unwind *fn fn'*   *T*   catch exception

    fn - (:lambda (`obj cond src`) . `body`)
    fn'- (:lambda () . `body`)

raise *T keyword*   raise exception with
                         condition

```
:arity  :eof    :open   :read
:syscall :write :error  :syntax
:type    :sigint :div0  :stream
:range   :except :future :ns
:over    :under  :unbound :return
```

Stream

std-in   *symbol* standard input *stream*
std-out   *symbol* standard output *stream*
err-out   *symbol* standard error *stream*

open `type direction` *string*
              stream open *stream*
    `type`   - :file :string
    `direction` - :input :output :bidir

close *stream*   *bool*   close *stream*
openp *stream*   *bool*   is *stream* open?

flush s*tream*   *bool*   flush output steam
get-str *stream* *string* from *string stream*

rd-byte *stream bool T*
        byte   read *byte* from *stream,*
               error on `eof`, *T:* eof value

rd-char *stream bool T*
        char   read *char* from *stream,*
               error on `eof`, *T:* eof value

un-char *char stream*
        char   push *char* onto *stream*

wr-byte *byte stream*
        byte   write *byte* to *stream*
wr-char *char stream*
        char   write *char* to *stream*

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Namespace

make-ns *ns*   *key*   make namespace
ns-map   *list*   list of mapped namespaces
unbound *ns string*
         symbol intern unbound symbol
intern *ns string value*
         symbol intern bound symbol
ns-find *ns string*
         symbol map *string* to *symbol*
ns-syms *type ns*
        T   namespace's *symbols*
        type   - :list :vector

Features I

```
[dependencies]
default = [ "nix", "std", "sysinfo" ]
```

nix: uname
std: command, exit
sysinfo: sysinfo

libenv API I

```
[dependencies]
mu = {
    git = "https://github.com/Software-Knife-and-Tool/mu.git",
    branch=main
}

use libenv::{Condition, Config, Env, Exception, Result, Tag}

config string format: "npages:N,gcmode:GCMODE"
      GCMODE - { none, auto, demand }

If the signal_exception() interface is called, ^C will
generate a :sigint exception.

impl Env {
  const VERSION: &str
  fn signal_exception()
  fn config(config: Option<String>) → Option<Config>
  fn new(config: &Config) → Mu
  fn apply(&self, func: Tag, args: Tag) → Result<Tag>
  fn compile(&self, form: Tag) → Result<Tag>
  fn eq(&self, func: Tag, args: Tag) → bool;
  fn exception_string(&self, ex: Exception) → String
  fn eval(&self, exp: Tag) → Result<Tag>
  fn eval_str(&self, exp: &str) → Result<Tag>
  fn load(&self, file_path: &str) → Result<bool>
  fn load_image(&self, path: &str) → Result<bool>;
  fn read(&self, st: Tag, eofp: bool, eof: Tag) → Result<Tag>
  fn read_str(&self, str: &str) → Result<Tag>
  fn save_and_exit(&self, path: &str) → Result<bool>
  fn err_out(&self) → Tag
  fn std_in(&self) → Tag
  fn std_out(&self) → Tag
  fn write(&self, exp: Tag, esc: bool, st: Tag) → Result<()>
  fn write_str(&self, str: &str, st: Tag) → Result<()>
  fn write_to_string(&self, exp: Tag, esc: bool) → String
}
```

Reader Syntax

```
;                      comment to end of line
#|...|#                block comment

'form                  quoted form

`form                  backquoted form
`(...)                 backquoted list (proper lists only)
,form                  eval backquoted form
,@form                 eval-splice backquoted form

(...)                  constant list
()                     empty list, prints as :nil
(… . .)                dotted list


"…"                    string, char vector
\                      single escape in strings

#x                     hexadecimal fixnum
#\c                    char
#(:type …)             vector
#s(:type …)            struct
#:symbol               uninterned symbol

"`,;                   terminating macro char
#                      non-terminating macro char

!$%&*+-.               symbol constituents
<>=?@[]|
:^_{}~/
A..Za..z
0..9


0x09 #\tab             whitespace
0x0a #\linefeed
0x0c #\page
0x0d #\return
0x20 #\space
```

Runtime

```
mu-sys: x.y.z: [-h?pvcelq0] [file…]

?: usage message
h: usage message
c: [name:value,…]
e: eval [form] and print result
l: load [path]
p: pipe mode (no repl)
q: eval [form] quietly
v: print version and exit
0: null terminate
```