libenv Reference

lib* namespace, version *0.1.53

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

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

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

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

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

Core

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

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

Fixnum

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

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

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

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

Reader/Printer

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

Struct

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

Exception

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
```

Streams

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 *stream*	*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*

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

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

nix:	uname
std:	command, exit
sysinfo:	sysinfo (disabled on macOS)

libenv API

```
[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
`!$%&*+-.` `<>=?@[]|` `:^_{}~/` `A..Za..z` `0..9`	symbol constituents
`0x09 #\tab` `0x0a #\linefeed` `0x0c #\page` `0x0d #\return` `0x20 #\space`	whitespace

mu-sys

```
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
```