

Mu Namespace

mu version 0.0.3

Type keywords and aliases

<i>supertype</i>	<i>T</i> , form
<i>bool</i>	() , :nil is false, otherwise true
<i>condition</i>	condition <i>keyword</i> (see Exceptions)
<i>type</i>	type-of returns <i>keyword</i> of:
<i>list</i>	cons or () :nil
:null	() , :nil
:char	char
:cons	cons,
:fixnum	fix, fixnum, a 61 bit signed integer
:float	float, fl a 32 bit IEEE float
:func	fn, a function
:ns	ns, collection of symbol bindings
:stream	stream, file or string type
:struct	struct
:symbol	sym, symbol, keyword
:vector	simple vector, string (:char)
	:t :byte:fixnum :float

Heap

hp-info	vector, heap allocations #(:t type total alloc in-use)
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frames

fr-get <i>fn</i>	struct, copy frame binding
fr-pop <i>fn</i>	function, pop frame binding
fr-push <i>struct</i>	struct, push frame binding
::fr-ref <i>fix fix</i>	<i>T</i> , ref frame variable

Reader/Printer

read <i>stream bool T</i>	<i>T</i> , read stream object
write <i>T bool stream</i>	<i>T</i> , write escaped object

Structs

make-st <i>keyword list</i>	struct, of type <i>keyword</i> from list
st-type <i>struct</i>	keyword, struct type
st-vec <i>struct</i>	vector, of struct members

Symbols

boundp <i>sym</i>	bool, is symbol bound?
keyp <i>sym</i>	bool, keyword predicate
keyword <i>string</i>	keyword from string
make-sy <i>string</i>	sym, uninterned symbol
sy-ns <i>sym</i>	ns, symbol namespace
sy-name <i>sym</i>	string, symbol name binding
sy-val <i>sym</i>	<i>T</i> , value binding

Special Forms

:lambda <i>list . list'</i>	function, anonymous
:quote <i>form</i>	list, quoted form
:if <i>form form form'</i>	<i>T</i> , conditional

Core

eval <i>form</i>	<i>T</i> , evaluate form
eq <i>form form'</i>	bool, are form and form' identical?
type-of <i>form</i>	keyword

apply <i>fn list</i>	<i>T</i> , apply function to list
compile <i>form</i>	<i>T</i> , library form compiler

view <i>form</i>	vector, vector of object
fix <i>fn form</i>	<i>T</i> , fixpoint of function on form

::frames	cons, active frame list
*::gc	bool, garbage collection

System

real-tm <i>T</i>	fixnum, system clock secs
run-us <i>T</i>	fixnum, process time μ s

Fixnums

fx-mul <i>fix fix"</i>	fixnum, product
fx-add <i>fix fix'</i>	fixnum, sum
fx-sub <i>fix fix'</i>	fixnum, difference
fx-lt <i>fix fix'</i>	bool, is fix less than fix'?
fx-div <i>fix fix'</i>	fixnum, quotient

logand <i>fix fix'</i>	fixnum, bitwise and
logor <i>fix fix'</i>	fixnum, bitwise or

Floats

fl-mul <i>fl fl"</i>	float, product
fl-add <i>fl fl'</i>	float, sum
fl-sub <i>fl fl'</i>	float, difference
fl-lt <i>fl fl'</i>	bool, is fl less than fl'?
fl-div <i>fl fl'</i>	float, quotient

Conses and Lists

car <i>list</i>	list, head of list
cdr <i>list</i>	list, tail of list
cons <i>form form'</i>	cons, from <i>T</i> and <i>T'</i>
length <i>list</i>	fixnum, length of list
nth <i>fix list</i>	<i>T</i> , nth car of list
nthcdr <i>fix list</i>	<i>T</i> , nth cdr of list

Vectors

make-sv <i>keyword list</i>	vector, typed vector of list
sv-len <i>vector</i>	fixnum, length of vector
sv-ref <i>vector fix</i>	<i>T</i> , nth element
sv-type <i>vector</i>	keyword, type of vector

Exceptions

with-ex <i>fn fn' T</i>	catch exception
	<i>fn</i> - (:lambda (obj condition) . list)
	<i>fn'</i> - (:lambda () . list)

raise *T keyword* raise exception with condition:

:arity :eof :open :read
:write :error :syntax
:type :unbound :div0
:stream :except :range

Streams

std-in	<i>symbol</i> , standard input <i>stream</i>
std-out	<i>symbol</i> , standard output <i>stream</i>
err-out	<i>symbol</i> , standard error <i>stream</i>
open type direction <i>string</i>	
	<i>stream</i> , open <i>stream</i>
	type - :file :string
	direction - :input :output
close stream	<i>bool</i> , close <i>stream</i>
openp stream	<i>bool</i> , is <i>stream</i> open?
eof stream	<i>bool</i> , is <i>stream</i> at end of file?
flush stream	<i>bool</i> , flush output <i>stream</i>
get-str stream	<i>string</i> , from <i>string stream</i>
rd-byte stream	<i>bool form</i>
	<i>byte</i> , read <i>byte</i> from <i>stream</i> ,
	<i>bool</i> : error on eof, <i>form</i> : eof value
rd-char stream	<i>bool form</i>
	<i>char</i> , read <i>char</i> from <i>stream</i> ,
	<i>bool</i> : error on eof, <i>form</i> : eof value
wr-byte <i>byte stream</i>	
	<i>byte</i> , write <i>byte</i> to <i>stream</i>
wr-char <i>char stream</i>	
	<i>char</i> , write <i>char</i> to <i>stream</i>
un-char <i>char stream</i>	
	<i>char</i> , push <i>char</i> onto <i>stream</i>

Namespaces

make-ns <i>string ns</i>	
	<i>ns</i> , make <i>namespace</i>
map-ns <i>string ns</i>	<i>ns</i> , map <i>string</i> to <i>namespace</i>
untern <i>ns scope string</i>	
	<i>symbol</i> , intern unbound <i>symbol</i>
	scope - :intern :extern
intern <i>ns scope string value</i>	
	<i>symbol</i> , intern bound <i>symbol</i>
	scope - :intern :extern
ns-find <i>ns scope string</i>	
	<i>symbol</i> , map <i>string</i> to <i>symbol</i>
	scope - :intern :extern
ns-imp <i>ns</i>	<i>ns</i> , namespace's import
ns-name <i>ns</i>	<i>string</i> , namespace's name
ns-int <i>ns</i>	<i>list</i> , namespace's interns
ns-ext <i>ns</i>	<i>list</i> , namespace's externs

library API

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

use mu::{Condition, Exception, Mu, Result, System, Tag}

const Mu::VERSION: &str

Mu::new(config: String)-> Mu
Mu::apply(&self, func: Tag, args: Tag)-> Result
Mu::eq(&self, func: Tag, args: Tag) -> Result
Mu::eval(&self, expr: Tag) -> Result
Mu::compile(&self, form: Tag) -> Result
Mu::read(&self, stream: Tag, eofp: bool, value: Tag) -> Result
Mu::write(&self, form: Tag, esc: bool, stream: Tag) -> Result
Mu::get_string(&self, stream: Tag) -> Result
Mu::write_string(&self, str: String, stream: Tag) -> Result
Mu::from_u64(&self, tag: u64) -> Tag
Mu::as_u64(&self, tag: Tag) -> u64
Mu::std_in(&self) -> Tag
Mu::std_out(&self) -> Tag
Mu::err_out(&self) -> Tag

System::new(config: String)-> System
System::mu(&self)-> &Mu
System::version(&self) -> String
System::eval(&self, expr: &String) -> Result
System::error(&self, ex: Exception) -> String
System::read(&self, string: String) -> Result
System::write(&self, expr: Tag, escape: bool) -> String
System::load(&self, file_path: &String) -> Result
```

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 <i>list</i>
()	empty <i>list</i> , prints as :nil
"..."	<i>string</i> , <i>char vector</i>
\	single escape in strings
#x	hexadecimal <i>fixnum</i>
#\c	<i>char</i>
#(:type ...)	<i>vector</i>
#s(:type ...)	<i>struct</i>
#:symbol	uninterned <i>symbol</i>
"`,";	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

```
runtime: x.y.z: [-h?pvcdlq] [file...]
```

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