*Mu* Namespace

**mu version *0.0.1***

***Type keywords and aliases***

*supertype T****,*** *form*

*bool* (),:nil is false, otherwise true

*condition* condition *keyword* (see **Exceptions**)

*type type-of* returns *keyword* of:

*list 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*)

***frames***

**fr-get** *fn* *struct,*copyframe binding

**fr-pop** *fn function*, pop frame binding

**fr-push** *struct struct,* push frame binding

**:fr-ref** *fix* *fix* *T,*ref frame variable

***Reader/Printer***

**read** *stream* *bool* *T*

*T*, read stream object

**write** *T* *bool stream*

*T,* write escaped object

***Structs***

**make-st** *keyword* *list*

*struct, of* type *keyword* from list

**st-type** *struct* *keyword*, structtype

**st-vec** *struct* *vector,* of struct members

***Symbols***

**boundp** s*ym bool,*is*symbol* bound?

**keyp** s*ym* *bool,* *keyword* predicate

**keyword** *string* *keyword* from *string*

**make-sy** *string sym,* uninterned *symbol*

**sy-ns** *sym* *ns,* symbolnamespace

**sy-name** *sym string,* symbol name binding

**sy-val** *sym T*, value binding

S***pecial*** ***Forms***

**:lambda** *list* . *list’*

*function,* anonymous

***:*quote** *form* *list*, quoted form

***:*if** *form* *form* form*’*

*T,* conditional

***Core***

**eval** *form* *T,* evaluate *form*

**eq** *form* *form’ bool****,*** *are form* and *form’*  identical?

**type-of** *form* *keyword*

**apply** *fn* *list* *T****,***apply *function* to *list*

**compile** *form* *T****,***library form compiler

**view** *form* *vector,* vector of object

**fix** *fn form* *T****,***fixpoint of *function* on *form*

**::if** *T fn fn’* *T****,*****:if** implementation

**::frames** *cons****,*** active frame list

**\*::gc** *bool,* garbage collection

***System***

**real-tm** *T* *fixnum*, system clock secs

**run-us** *T* *fixnum****,*** process time *μs*

***Fixnums***

**fx-mul** *fix* *fix’*’ *fixnum****,*** product

**fx-add** *fix* *fix’* *fixnum****,*** sum

**fx-sub** *fix* *fix’* *fixnum****,*** difference

**fx-lt** *fix* *fix’* *bool****,*** is *fix* less than *fix’?*

**fx-div** *fix* *fix*’ *fixnum****,*** quotient

**logand** *fix* *fix’* *fixnum****,*** bitwise *and*

**logor** fix fix’ *fixnum****,*** bitwise *or*

***Floats***

**fl-mul** *fl* *fl’*’ *float,* product

**fl-add** *fl* *fl’* *float,* sum

**fl-sub** *fl* *fl’* *float,* difference

**fl-lt** *fl* *fl’* *bool,* is *fl* less than *fl’?*

**fl-div** *fl* *fl’* *float,* quotient

***Conses and Lists***

**car** *list* *list,* head of *list*

**cdr** *list* *list,* tail of *list*

**cons** *form* *form’* *cons,* from *T* and *T’*

**length** *list* *fixnum,* length of *list*

**nth** *fix* *list* *T,* nth *car* of *list*

**nthcdr** *fix* *list* *T,* nth *cdr* of *list*

***Vectors***

**make-sv** *keyword* *list*

*vector*, typed vector of list

**sv-len** *vector* *fixnum*, length of *vector*

**sv-ref** *vector* *fix* *T*, *n*th element

**sv-type** *vector* *keyword*, type of *vector*

***Exceptions***

**with-ex** *fn fn’* *T****,***catchexception

*fn* - (:lambda (*obj**condition*) ***.*** *list*)

*fn’* - (: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** *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

**close** *stream* *bool,* close *stream*

**openp** *stream* *bool,* is *stream* open?

**eof** s*tream* *bool,* is *stream* at end of file?

**flush** s*tream* *bool,* flush output steam

**get-str** *stream string,* from *string* *stream*

**rd-byte** *stream bool form*

*byte,* read *byte* from *stream,*

*bool:* error on eof, *form:* eof value

**rd-char** *stream bool form*

*char,* read *char* from *stream,*

*bool:* error on eof, *form:* eof value

**wr-byte** *byte* *stream*

*byte,* write *byte* to *stream*

**wr*-*char** *char* *stream*

*char,* write *char* to *stream*

**un-char** *char* *stream*

*char,* push *char* onto *stream*

***Namespaces***

**make-ns** *string* *ns*

*ns,* make *namespace*

**map-ns** *string ns,* map *string* to namespace

**untern** *ns* scope *string*

*symbol,* intern unbound symbol

scope - :intern :extern

**intern** *ns* scope *string value*

*symbol,* intern bound symbol

scope - :intern :extern

**ns-find** *ns* scope *string*

*symbol,* map *string* to *symbol*

scope - :intern :extern

**ns-imp** *ns* *ns,* namespace’simport

**ns-name** *ns* *string,* namespace’s name

**ns-int** *ns* *list,* namespace’s interns

**ns-ext** *ns* *list,* namespace’s externs

*library API*

*[dependencies]*

*mu = { git = “*[*https://github.com/Software-Knife-and-Tool/thorn.git*](https://github.com/Software-Knife-and-Tool/dyad.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

,*form* eval backquoted form

,@*form* eval-splice backquoted form (not yet)

(…) constant *list*

() empty *list*, prints as :nil

“…” *string, char vector*

#x hexadecimal *fixnum*

#\c *char*

#(:type …) *vector*

#s(:type …) *struct*

#:symbol uninterned *symbol*

\ single escape in strings

“`,; 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: xx.xx.xx: [-h?pvcedlq] [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