Mu Namespace

dyad mu version *0.0.8*

Type keywords

T type superclass

`:t :nil` *boolean*
`:char` *char*
`:cons` *cons*
`:fixnum` 61 bit signed *integer*
`:float` 32 bit IEEE *float*
`:func` *function*
`:ns` *symbol* bindings
`:stream` file, string, socket
`:symbol` LISP-1 binding
`:vector` `:t` `:byte` `:char` `:fixnum` `:float`

Heap

hp-info heap values *alist*
hp-type `type of`
type occupancy:
`type`: type keyword
`of`: `:alloc` `:in-use` `:free` `:size`

Frame

:fr-ref *fix fix'* ref frame variable

***fr-pop** *func* pop frame binding
***fr-push** *list* push frame binding

Functions

fn-prop `prop fn` function property
`prop:` `:nreq` `:lambda` `:frame` `:form`

Symbols

boundp *symbol* *symbol* bound?
keyp *symbol* *keyword* predicate

keyword *string* *keyword* from *string*
symbol *string* uninterned *symbol*

sy-ns *symbol* *symbol ns* binding
sy-name *symbol* *symbol* name binding
sy-val *symbol* *symbol* value binding

Special Forms

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

Core

coerce *T :type* *coerce* to type keyword
eval *T* evaluate form
eq *T T'* are *T* and *T'* identical?
type-of *T* type *keyword*
apply *fn list* apply *function* to arg *list*
compile *T* library form compiler
***:context** active frame list
with-ex *fn fn'* catch exception
raise *keyword T* raise exception
tag-of *T* object tag to *fixnum*

***gc** garbage collection
view *T* view vector of object
fix *fn T* fixpoint *function*

:if *T fn fn'* **:if** implementation

Reader/Printer

read *stream bool T*
read object from stream
write *T bool stream*
print with escapes

Fixnums

fx-mul *fix fix'* product of *fix* and *fix'*
fx-add *fix fix'* sum of *fix* and *fix'*
fx-sub *fix fix'* difference of *fix* and *fix'*
fx-lt *fix fix'* is *fix* less than *fix'?*
fx-div *fix fix* *fix* divided by *fix'*

logand *fix fix'* bitwise *and* of *fix* and *fix'*
logor fix fix' bitwise *or* fix and fix'

Floats

fl-mul *float float'* product of *float* and *float'*
fl-add *float float'* sum of *float* and *float'*
fl-sub *float float'* difference of *float* and *float'*
fl-lt *float float'* is *float* less than *float'?*
fl-div *float float'* *float* divided by *float'*

Lists

car *list* head of *list*
cdr *list* tail of *list*
cons *T T'* *cons* from *T* and *T'*
length *list* length of *list*

nth *fix list* nth *car* of *list*
nthcdr *fix list* nth *cdr* of *list*

Vectors

vector *type list* specialized vector from list

sv-len *vector* *fixnum* length of *vector*
sv-ref *vector fix* *nth* element
sv-type *vector* type of *vector* elements

Condition Keywords

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

Streams

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

open *type dir string*
open *stream* from
type **:file** | **:string**
dir **:input** | **:output**

close *stream* close *stream*
openp *stream* is *stream* open?
eof *stream* is *stream* at end of file?

get-str *stream*
get *vector* from *stream*

rd-byte *stream bool T*
read *byte* from *stream*
un-byte *byte stream* push *byte* onto *stream*
wr-byte *byte stream* write *byte* to *stream*

rd-char *stream bool T*
read *char* from *stream*
un-char *char stream* push *char* onto *stream*
wr-char *char stream* write *char* to *stream*

Namespaces

make-ns *string ns*
make *namespace*
map-ns *string* map *string* to namespace

intern *ns scope string value*
intern bound symbol
scope **:intern :extern**

ns-map *ns string*
map *string* to *symbol*

ns-imp *ns* *namespace's* import
ns-name *ns* *namespace's* name
ns-int *ns* *namespace's* interns
ns-ext *ns* *namespace's* externs

Rust API

```
use crate::mu::core::mu::{
    Exception,
    Extern,
    Mu,
    MuCondition,
    Tag
},

<Mu as Extern>::new(config: String) -> Mu
        config: comma-separated
        list of name:value pairs:

        heap:npages
        gc:on|off

&'static str <Mu as Extern>::VERSION

pub trait Export for Mu {
  fn nil() -> Tag

  fn eq(tag: Tag, tag1: Tag) -> bool

  fn apply(&self, func: Tag, args) →
            Exception::Result<Tag>

  fn compile(&self, expr: Tag) ->
            Exception::Result<Tag>

  fn eof(&self, stream: Tag) ->
        Exception::Result<Tag>

  fn eval(&self, expr: Tag) ->
         Exception::Result<Tag>

  fn read_stream(&self, stream: Tag,
                 eof: Tag,
                 eof_value: Tag) ->
                 Exception::Result<Tag>

  fn read_string(&self, expr: String) ->
                 Exception::Result<Tag>

  fn write(&self, expr: Tag,
                 escape: bool,
                 stream: Tag) ->
           Exception::Result<()>

  fn write_string(&self, string: String,
                         stream: Tag) ->
                 Exception::Result<()>
}
```

Reader Syntax

`;`	comment to end of line
`#|...|#`	block comment
`(…)`	constant list
`()`	empty list, prints as `:nil`
`` ` ``	quoted form
`"…"`	string/char vector
*`#x`	hexadecimal *fixnum*
`#\`	character
*`#(:vector-type …)`	vector
`#:symbol`	uninterned *symbol*
`\`	single escape in strings
`"`,;`	terminating macro char
`#`	non-terminating macro char

symbol constituent:

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

whitespace:

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

runtime

```
runtime: 0.0.8: [-h?psvcelq] [file...]
  ?: usage message
  h: usage message
  c: [name:value,...]
  e: eval [form] and print result
  l: load [path]
  p: pipe mode
  q: eval [form] quietly
  s: script mode
  v: print version and exit
```