

Error Handling

Adám Brudzewsky



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Error Handling – Part 1

Number for given message
aplcart.info?q=:: message

Tradfn structure : Trap errnos (0 means all)

Dfn error guard errnos : : code

Error Number of last error □ EN

Error Message for number □ EM

Error Handling – Part 2

Execute there on error

Cut back and execute

Ext'd Diagnostic Message

Construct error message
`aplcart.info?q=dmx 1`

□ TRAP ← errnos ' E ' code

□ TRAP ← errnos ' C ' code

□ DMX

Error Handling – Part 3

Signal an error: `□ SIGNAL errno`

Signal a custom error: `□ SIGNAL <name-value pairs`

Assert: `aplcart.info?q=assert`

Resignal: `aplcart.info?q=resignal`

Error Handling – Part 3

dyalog.tv

Signal an error: `⊞ SIGNAL errno`

Signal a custom error: `⊞ SIGNAL <name-value pairs`

Assert: aplcart.info?q=assert

Resignal: aplcart.info?q=resignal

Overview



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Error trapping in applications:

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- Error types: “expected” vs. “unexpected”

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- Error types: “expected” vs. “unexpected”
- Switching trapping on and off

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Error trapping in applications:

- ◆ Error types: “expected” vs. “unexpected”
- ◆ Switching trapping on and off
- ◆ Collecting error information

Overview

Error trapping in applications:

- Error types: “expected” vs. “unexpected”
- Switching trapping on and off
- Collecting error information
- Throwing errors inside a tradfn

Overview

Error trapping in applications:

- Error types: “expected” vs. “unexpected”
- Switching trapping on and off
- Collecting error information
- Throwing errors inside a tradfn
- Special dfn considerations



Meet Our App!

disrupting the industry

Our app

```
:Namespace app
```

```
  ▽ hex←Hex file;bytes
```

```
  bytes←'UTF-8'◦[]UCS``>[]NGET file 1
```

```
  hex←↑{,ϕ3↑([]D,[]A)[16 16τω]}``bytes
```

```
  ▽
```

```
:EndNamespace
```

Our app

```
:Namespace app
  ▽ hex←Hex file;bytes
  bytes←'UTF-8'∘UCS"∘NGET file 1
  hex←↑{,⊃3↑(⊂D,⊂A)[16 16τω]}"bytes
  ▽
:EndNamespace
```


Our app

```
:Namespace app
  ▽ hex←Hex file;bytes
  bytes←'UTF-8'∘UCS"∘NGET file 1
  hex←↑{,⊃3↑(⊂D,⊂A)[16 16τω]}"bytes
  ▽
:EndNamespace

(c'Hi' 'Earth')⊂NPUT'/tmp/my.txt'1
```

Our app

```
:Namespace app
  ▽ hex←Hex file;bytes
  bytes←'UTF-8'∘UCS"∘NGET file 1
  hex←↑{,⊆3↑(⊆D,⊆A)[16 16τω]}"bytes
  ▽
:EndNamespace

(c'Hi' 'Earth')⊆NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
```

Our app

```
:Namespace app
  ▽ hex←Hex file;bytes
  bytes←'UTF-8'∘UCS`>NGET file 1
  hex←↑{,⊃3↑(D,A)[16 16τω]}`bytes
  ▽
:EndNamespace

(c'Hi' 'Earth')NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'

37 58
34 50 61 63 57
```

Our app

```
:Namespace app
  ▽ hex←Hex file;bytes
  bytes←'UTF-8'∘UCS"→NGET file 1
  hex←↑{,⊃3↑(D,A)[16 16τω]}"bytes
  ▽
:EndNamespace

(c'Hi' 'Earth')NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'

37 58
34 50 61 63 57
```



Let's Deploy!
rapid development for the win



Let's deploy!

```
:Namespace app
  ▽ hex←Hex file;bytes
  bytes←'UTF-8'∘UCS"→NGET file 1
  hex←↑{,⊃3↑(D,A)[16 16τω]}bytes
  ▽
:EndNamespace

(c'Hi' 'Earth')NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'

37 58
34 50 61 63 57
```



Let's deploy!

```
:Namespace app
  ▽ hex←Hex file;bytes
  bytes←'UTF-8'∘UCS"→NGET file 1
  hex←↑{,⊃3↑(D,A)[16 16τω]}"bytes
  ▽
:EndNamespace

(c'Hi' 'Earth')NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'

37 58
34 50 61 63 57
app.Hex'/real/customer.txt'
```



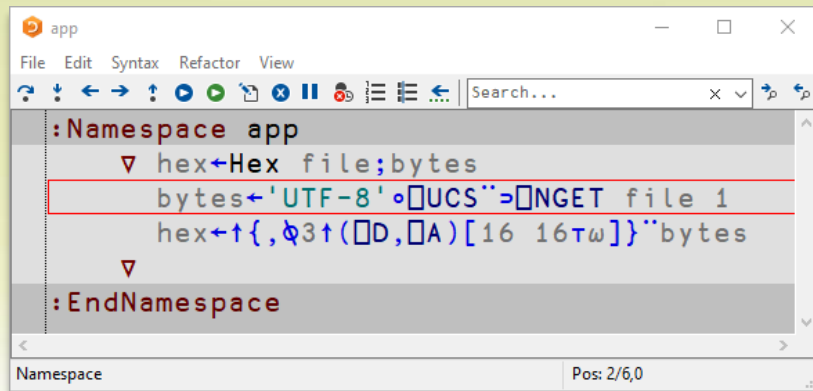
Let's deploy!

```

:Namespace app
  ▽ hex←Hex file;bytes
  bytes←'UTF-8'∘[]UCS⇒[]NGET file 1
  hex←↑{,⊙3↑([]D,[]A)[16 16τω]}↑bytes
  ▽
:EndNamespace

(c'Hi' 'Earth')[]NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
37 58
34 50 61 63 57
  app.Hex'/real/customer.txt'
FILE NAME ERROR: /real/customer.txt: Unable to open file
  ("The system cannot find the path specified.")
Hex[1] bytes←'UTF-8'∘[]UCS⇒[]NGET file
  ^


```



```

app
File Edit Syntax Refactor View
Search...
:Namespace app
  ▽ hex←Hex file;bytes
  bytes←'UTF-8'∘[]UCS⇒[]NGET file 1
  hex←↑{,⊙3↑([]D,[]A)[16 16τω]}↑bytes
  ▽
:EndNamespace
Namespace Pos: 2/6,0

```

Oh.
move fast and break things

Let's deploy!

```

:Namespace app
  ▽ hex←Hex file;bytes
  bytes←'UTF-8'∘UCS⇒NGET file 1
  hex←↑{,⊃3↑(D,A)[16 16τω]}bytes
  ▽
:EndNamespace

(c'Hi' 'Earth')NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'

37 58
34 50 61 63 57
  app.Hex'/real/customer.txt'
FILE NAME ERROR: /real/customer.txt: Unable to open file
  ("The system cannot find the path specified.")
Hex[1] bytes←'UTF-8'∘UCS⇒NGET file
  ^

```

Let's deploy!

```

:Namespace app
  ▽ hex←Hex file;bytes
  bytes←'UTF-8'∘UCS⇒NGET file 1
  hex←↑{,⊃3↑(D,A)[16 16τω]}bytes
  ▽
:EndNamespace

(c'Hi' 'Earth')NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'

37 58
34 50 61 63 57
  app.Hex'/real/customer.txt'
FILE NAME ERROR: /real/customer.txt: Unable to open file
  ("The system cannot find the path specified.")
Hex[1] bytes←'UTF-8'∘UCS⇒NGET file
  ^

```



“Expected” Error
we should have anticipated this

“Expected” error

```
:Namespace app
  ▽ hex←Hex file;bytes
    bytes←'UTF-8'∘UCS`>NGET file 1
    hex←↑{,⊃3↑(D,A)[16 16τω]}bytes
  ▽
:EndNamespace
```

“Expected” error

```
:Namespace app
  ▾ hex←Hex file;bytes

  bytes←'UTF-8'◦[UCS``>[NGET file 1

  hex←↑{,⊕3↑([D,⊕A)[16 16τω]}`bytes
  ▾
:EndNamespace
```

“Expected” error

```
:Namespace app
  ▽ hex←Hex file;bytes
    :Trap 0
      bytes←'UTF-8'◊UCS''◊NGET file 1
    :Else
      ◊SIGNAL ◊EN
    :EndTrap
    hex←↑{,◊3↑(◊D,◊A)[16 16τω]}bytes
  ▽
:EndNamespace
```

“Expected”

*0 means
all errors*

```
:Namespace app
  ▽ hex←Hex file ,bytes
    :Trap 0
      bytes←'UTF-8'◊UCS''◊NGET file 1
    :Else
      ◊SIGNAL ◊EN
    :EndTrap
    hex←↑{,◊3↑(◊D,◊A)[16 16τω]}bytes
  ▽
:EndNamespace
```


“Expected”

*0 means
all errors*

```
:Namespace app
  ▽ hex←Hex file ,bytes
  :Trap 0
    bytes←'UTF-8'◦[UCS]◦[NGET file 1
  :Else
    [SIGNAL [EN
  :EndTrap
  hex←↑{,03↑([D,[16 16τω]}}bytes
  ▽
:EndNamespace
```

*See previous
webinar for
full “resignal”*

“Expected” error

```
(c'Hi' 'Earth')[]INPUT'/tmp/my.txt'1  
app.Hex'/tmp/my.txt'
```

```
37 58
```

```
34 50 61 63 57
```

“Expected” error

```
(c'Hi' 'Earth')[]NPUT'/tmp/my.txt'1  
app.Hex'/tmp/my.txt'
```

```
37 58
```

```
34 50 61 63 57
```

```
app.Hex'/real/customer.txt'
```

“Expected” error

```
(c'Hi' 'Earth')[]NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
37 58
34 50 61 63 57
app.Hex'/real/customer.txt'
FILE NAME ERROR
app.Hex'/real/customer.txt'
^
```



Switching Trapping On and Off

so we have a chance to see what's going on

Switching trapping on and off

```
:Namespace app
  ▽ hex←Hex file;bytes
    :Trap 0
      bytes←'UTF-8'◊UCS''◊NGET file 1
    :Else
      ◊SIGNAL ◊EN
    :EndTrap
    hex←↑{,◊3↑(◊D,◊A)[16 16τω]}bytes
  ▽
:EndNamespace
```

Switching trapping on and off

```
:Namespace app
```

```
▽ hex←Hex file;bytes  
:Trap 0  
  bytes←'UTF-8'◦[UCS]◦[NGET file 1  
:Else  
  [SIGNAL [EN  
:EndTrap  
hex←↑{,⊕3↑([D,[A][16 16τω]}"bytes
```

```
▽
```

```
:EndNamespace
```

Switching trapping on and off

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap 0
      bytes←'UTF-8'◦[UCS]◦[NGET file 1
    :Else
      [SIGNAL [EN
    :EndTrap
  hex←↑{,⊕3↑([D,[A][16 16τω]}"bytes
  ▽
:EndNamespace
```


Switching trapping on and off


```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap 0
      bytes←'UTF-8'∘UCS`>NGET file 1
    :Else
      SIGNAL EN
    :EndTrap
  hex←↑{,⊕3↑(D,A)[16 16τω]}bytes
  ▽
:EndNamespace
```



:Trap 0

Switching trapping on and off

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug
      bytes←'UTF-8'◦[UCS`>[NGET file 1
    :Else
      [SIGNAL [EN
    :EndTrap
  hex←↑{,⊕3↑([D,[A][16 16τω]}"bytes
  ▽
:EndNamespace
```



:Trap debug

Switching trapping on and off

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      bytes←'UTF-8'∘UCS`>NGET file 1
    :Else
      SIGNAL EN
    :EndTrap
  hex←↑{,⊙3↑(D,A)[16 16τω]}bytes
  ▽
:EndNamespace
```



```
:Trap debug↓0
```



Let's Test More...
careful development for the win

Let's test more...

```
(c'Hi' 'Earth')[]INPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
37 58
34 50 61 63 57
app.Hex'/real/customer.txt'
FILE NAME ERROR
app.Hex'/real/customer.txt'
^
```

Let's test more...

```
(c'Hi' 'Earth')[]INPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
37 58
34 50 61 63 57
app.Hex'/real/customer.txt'
FILE NAME ERROR
app.Hex'/real/customer.txt'
^
```

Let's test more...

```
(c'Hi' 'Earth')[]NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
37 58
34 50 61 63 57
app.Hex'/real/customer.txt'
FILE NAME ERROR
app.Hex'/real/customer.txt'
^
(c'Hi' 'my bad')[]NPUT'/tmp/my.txt'1
```

Let's test more...

```
(c'Hi' 'Earth')[]NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
37 58
34 50 61 63 57
app.Hex'/real/customer.txt'
FILE NAME ERROR
app.Hex'/real/customer.txt'
^
(c'Hi' 'my bad')[]NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
```


Let's test more...

```

(c'Hi' 'Earth')INPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
37 58
34 50 61 63 57
app.Hex'/real/customer.txt'
FILE NAME ERROR
app.Hex'/real/customer.txt'
^
(c'Hi' 'my bad')INPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
INDEX ERROR
Hex[6] hex←↑{,⊕3↑(⊠D,⊠A)[16 16τω]}bytes
      ^

```

The screenshot shows a window titled 'app' with a menu bar (File, Edit, Syntax, Refactor, View) and a search bar. The code editor displays the following code:

```

:Else
  ⊠SIGNAL ⊠EN
:EndTrap
hex←↑{,⊕3↑(⊠D,⊠A)[16 16τω]}bytes
  ▾
:EndNamespace

```

The line `hex←↑{,⊕3↑(⊠D,⊠A)[16 16τω]}bytes` is highlighted with a red box. The status bar at the bottom indicates 'Namespace' and 'Pos: 8/11,0'.

Let's test more...

```

(c'Hi' 'Earth')[]INPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
37 58
34 50 61 63 57
app.Hex'/real/customer.txt'
FILE NAME ERROR
app.Hex'/real/customer.txt'
^
(c'Hi' 'my bad')[]INPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
INDEX ERROR
Hex[6] hex←↑{,⊕3↑(□D,□A)[16 16τω]}bytes
      ^
16 16τbytes

```

The screenshot shows a code editor window titled 'app'. The code is as follows:

```

:Else
  []SIGNAL []EN
:EndTrap
hex←↑{,⊕3↑(□D,□A)[16 16τω]}bytes
  ▾
:EndNamespace

```

A red rectangular box highlights the line `hex←↑{,⊕3↑(□D,□A)[16 16τω]}bytes`. The editor's status bar at the bottom indicates 'Namespace' and 'Pos: 8/11,0'.

Let's test more...

```

(c'Hi' 'Earth')[]INPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
37 58
34 50 61 63 57
app.Hex'/real/customer.txt'
FILE NAME ERROR
app.Hex'/real/customer.txt'
^
(c'Hi' 'my bad')[]INPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
INDEX ERROR
Hex[6] hex←↑{,⊕3↑(□D,□A)[16 16τω]}bytes
      ^
      16 16τbytes
4 6 0 6 7 2 6 6 6 0
8 9 10 13 9 0 2 1 4 10

```

```

app
File Edit Syntax Refactor View
Search...
:Else
  □SIGNAL □EN
:EndTrap
hex←↑{,⊕3↑(□D,□A)[16 16τω]}bytes
  ▾
:EndNamespace
Namespace Pos: 8/11,0

```

Let's test more...

```

(c'Hi' 'Earth')[]NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
37 58
34 50 61 63 57
app.Hex'/real/customer.txt'
FILE NAME ERROR
app.Hex'/real/customer.txt'
^
(c'Hi' 'my bad')[]NPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
INDEX ERROR
Hex[6] hex←↑{,⊙3↑(□D,□A)[16 16τω]}bytes
                                     ^
16 16τbytes
4 6 0 6 7 2 6 6 6 0
8 9 10 13 9 0 2 1 4 10

```

```

app
File Edit Syntax Refactor View
Search...
:Else
  □SIGNAL □EN
:EndTrap
hex←↑{,⊙3↑(□D,□A)[16 16τω]}bytes
:EndNamespace
Namespace Pos: 8/11,0

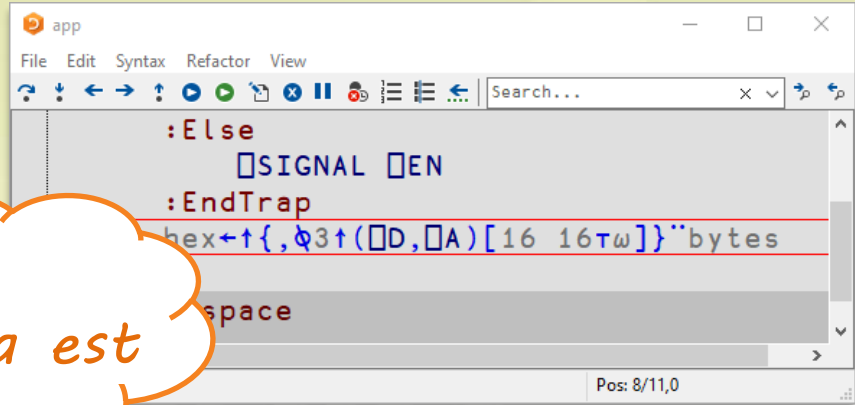
```

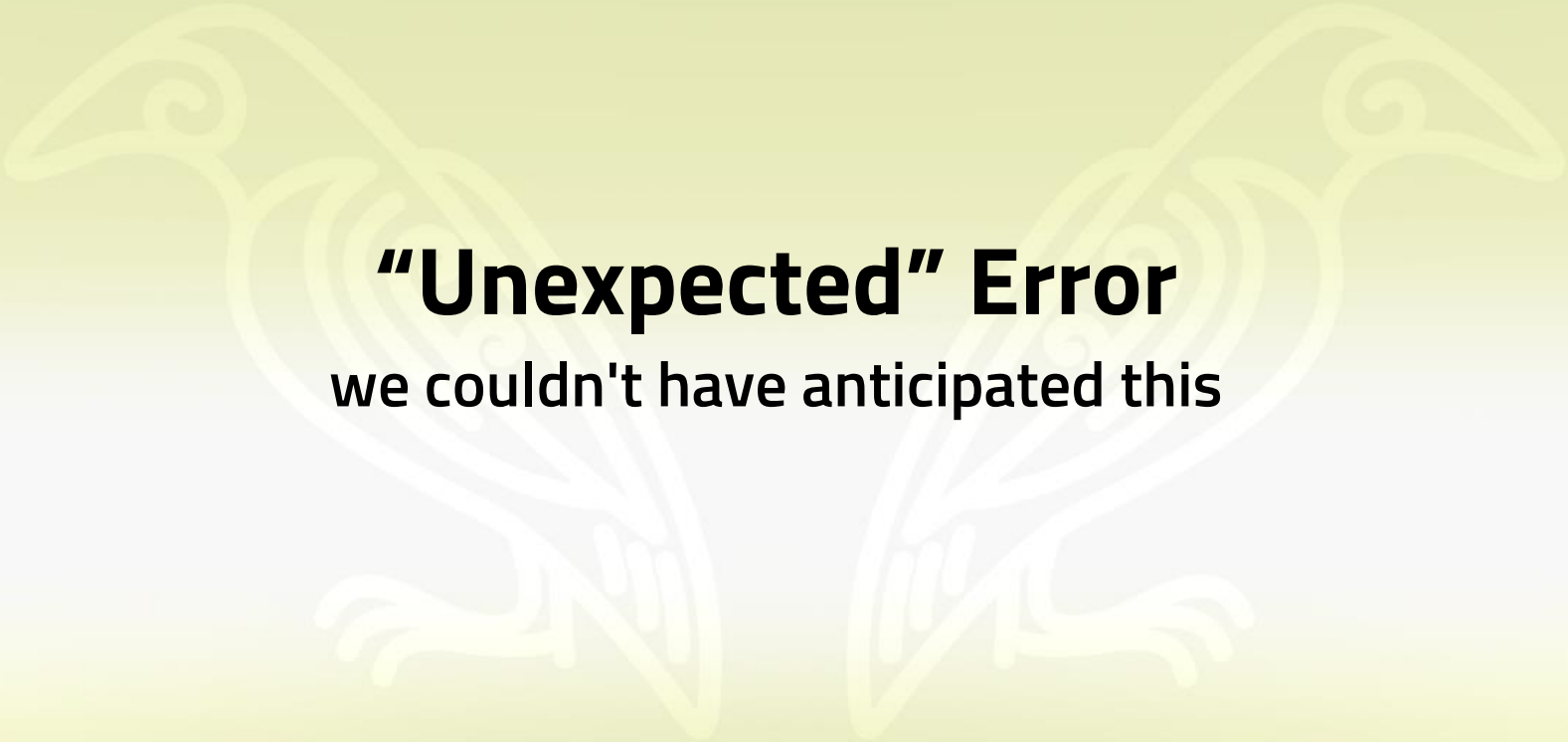
Let's test more...

```

(c'Hi' 'Earth')INPUT'/tmp/my.txt'1
app.Hex'/tmp/my.txt'
37 58
34 50 61 63 57
app.Hex'/real/cust
FILE NAME ERROR
app.Hex'/real/cus
^
(c'Hi' 'my bad')INPUT
app.Hex'/tmp/my.txt'
INDEX ERROR
Hex[6] hex←↑{,⊕3↑(⊠D,⊠A)[16 16τω]}bytes
^
16 16Tbytes
4 6 0 6 7 2 6 6 6 0
8 9 10 13 9 0 2 1 4 10
    
```

IO delenda est





“Unexpected” Error
we couldn't have anticipated this

“Unexpected” error

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      bytes←'UTF-8'∘[UCS`>[NGET file 1
    :Else
      [SIGNAL [EN
    :EndTrap
  hex←↑{,⊕3↑([D,[A][16 16τω]}“bytes
  ▽
:EndNamespace
```

“Unexpected” error

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes

  :Trap debug↓0
    bytes←'UTF-8'◦[]UCS``◦[]NGET file 1
  :Else
    []SIGNAL []EN
  :EndTrap
  hex←↑{,⊘3↑([]D,[]A)[16 16τω]}bytes

  ▽
:EndNamespace
```


“Unexpected” error

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap debug↓0
        bytes←'UTF-8'◦[]UCS''◦[]NGET file 1
      :Else
        []SIGNAL []EN
      :EndTrap
      hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
    :Else

  :EndTrap
  ▽
:EndNamespace
```

“Unexpected” error

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap debug↓0
        bytes←'UTF-8'∘[UCS'']⇒[NGET file 1
      :Else
        [SIGNAL [EN
      :EndTrap
    hex←↑{,⊘3↑([D,[A][16 16τω]}"}bytes
  :Else

  :EndTrap
  ▽
:EndNamespace
```



:Trap debug↓0

“Unexpected” error

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap debug↓0 0
        bytes←'UTF-8'◦[]UCS''>[]NGET file 1
      :Else
        []SIGNAL []EN
      :EndTrap
    hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
  :Else

  :EndTrap
  ▽
:EndNamespace
```



:Trap debug↓0 0

“Unexpected” error

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◦[]UCS''>[]NGET file 1
      :Else
        []SIGNAL []EN
      :EndTrap
    hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
  :Else

  :EndTrap
  ▽
:EndNamespace
```



:Trap εdebug↓0(1 22)

“Unexpected” error

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◦[UCS``>[NGET file 1
      :Else
        [SIGNAL [EN
      :EndTrap
      hex←↑{,⊘3↑([D,[A][16 16τω]} bytes
    :Else
      :EndTrap
  ▽
:EndNamespace
```

“Unexpected” error

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[UCS``>[NGET file 1
      :Else
        [SIGNAL [EN
      :EndTrap
      hex←↑{,⊘3↑([D,[A][16 16τω]} bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```



Debug Levels

choose your behaviour

Debug levels

```
app.Hex '/real/customer.txt'  
FILE NAME ERROR  
app.Hex '/real/customer.txt'  
^
```


Debug levels

```
app.Hex '/real/customer.txt'  
FILE NAME ERROR  
app.Hex '/real/customer.txt'  
^  
app.Hex '/tmp/my.txt'  
unexpected error  
app.Hex '/tmp/my.txt'  
^
```

Debug levels

app.debug←1

Debug levels

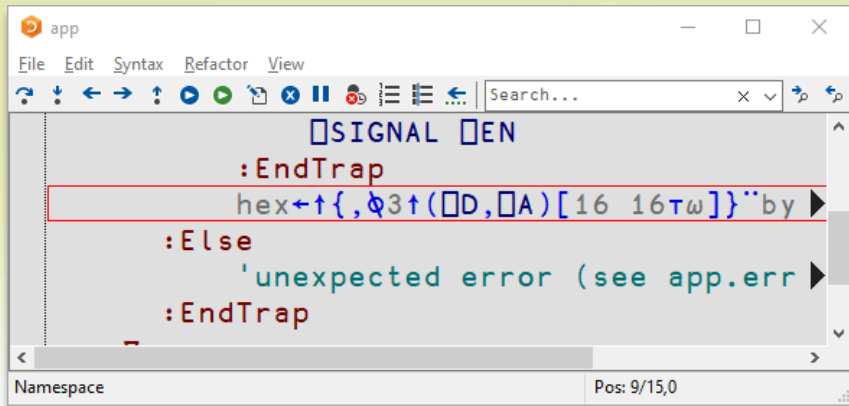
```
app.debug←1
app.Hex '/real/customer.txt'
FILE NAME ERROR
app.Hex '/real/customer.txt'
^
```

Debug levels

```
app.debug←1
app.Hex '/real/customer.txt'
FILE NAME ERROR
app.Hex '/real/customer.txt'
^
app.Hex '/tmp/my.txt'
```

Debug levels

```
app.debug←1
app.Hex '/real/customer.txt'
FILE NAME ERROR
app.Hex '/real/customer.txt'
^
app.Hex '/tmp/my.txt'
INDEX ERROR
Hex[7] hex←,⊘3↑(⊘D,⊘A)[16 16τbytes]
^
```




The screenshot shows a debugger window titled 'app'. The menu bar includes 'File', 'Edit', 'Syntax', 'Refactor', and 'View'. The toolbar contains various icons for navigation and execution. The main area displays code with a trap handler:

```
⊘SIGNAL ⊘EN
:EndTrap
hex←,⊘3↑(⊘D,⊘A)[16 16τbytes] by ▶
:Else
'unexpected error (see app.err ▶
:EndTrap
```

The line `hex←,⊘3↑(⊘D,⊘A)[16 16τbytes] by ▶` is highlighted with a red box. The status bar at the bottom shows 'Namespace' and 'Pos: 9/15,0'.

Debug levels

app.debug←2



Debug levels

```
app.debug←2  
app.Hex '/real/customer.txt'
```

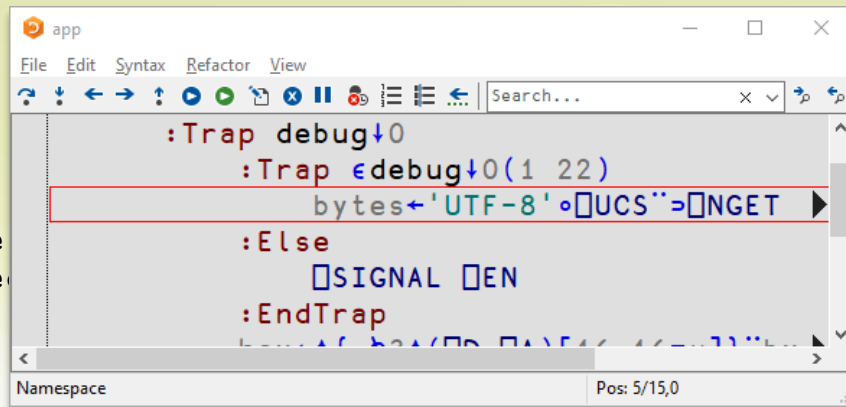
Debug levels

```
app.debug←2
```

```
app.Hex '/real/customer.txt'
```

```
FILE NAME ERROR: /real/customer.txt: Unable  
("The system cannot find the path specifie  
Hex[3] bytes←'UTF-8' UCS⇒NGET file
```

^



```
app
File Edit Syntax Refactor View
Search...
:Trap debug↓0
  :Trap εdebug↓0(1 22)
    bytes←'UTF-8' UCS⇒NGET file
  :Else
    SIGNAL EN
:EndTrap
Namespace Pos: 5/15,0
```


Debug levels

```
app.debug←2
app.Hex '/real/customer.txt'
FILE NAME ERROR: /real/customer.txt: Unable to open file
("The system cannot find the path specified.")
Hex[3] bytes←'UTF-8' UCS⇒NGET file
      ^
```

Debug levels

```
app.debug←2
app.Hex '/real/customer.txt'
FILE NAME ERROR: /real/customer.txt: Unable to open file
("The system cannot find the path specified.")
Hex[3] bytes←'UTF-8' UCS⇒NGET file
      ^
app.Hex '/tmp/my.txt'
```

Debug levels

```
app.debug←2
```

```
app.Hex '/real/customer.txt'
```

```
FILE NAME ERROR: /real/customer.txt: Unable
("The system cannot find the path specifie
Hex[3] bytes←'UTF-8' UCS⇒NGET file
```

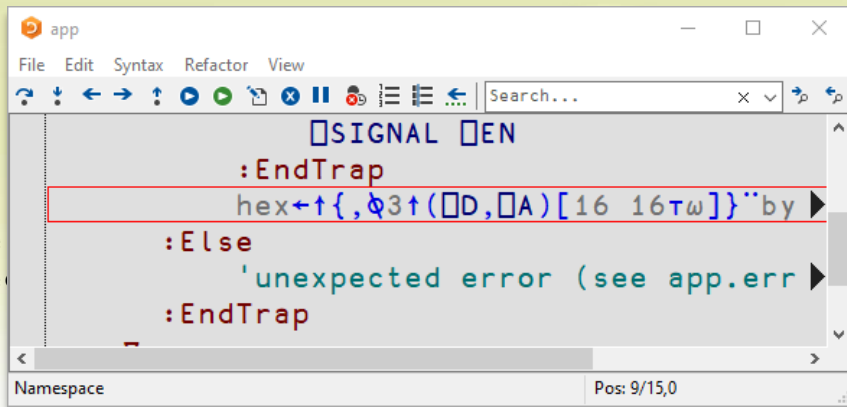
^

```
app.Hex '/tmp/my.txt'
```

```
INDEX ERROR
```

```
Hex[7] hex←,Ⓚ3↑(D,A)[16 16τbytes]
```

^

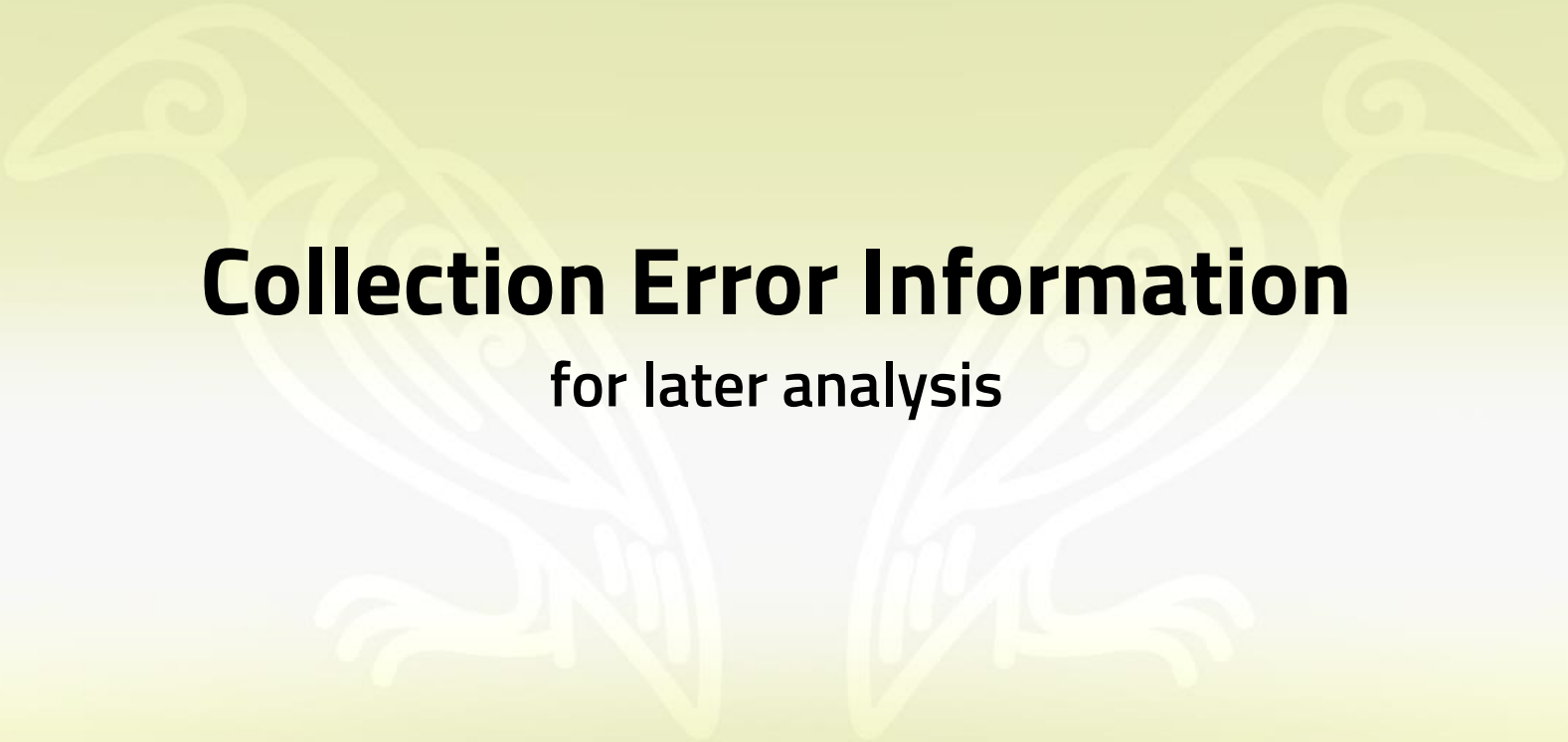


```

SIGNAL EN
:EndTrap
hex←↑({,Ⓚ3↑(D,A)[16 16τw]})"by
:Else
'unexpected error (see app.err
:EndTrap

```

Namespace Pos: 9/15,0



Collection Error Information

for later analysis

Collection error information

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[UCS``]⇒[NGET file 1
      :Else
        [SIGNAL [EN
      :EndTrap
      hex←↑{,⊘3↑([D,[A][16 16τω]]}bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

Collection error information

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◦[]UCS''>[]NGET file 1
      :Else
        []SIGNAL []EN
      :EndTrap
      hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
    :Else
      'unexpected error'[]SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

Collection error information

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊'NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,◊3↑(◊D,◊A)[16 16τω]}↑bytes
    :Else
      error←◊DMX
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

Collection error information

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘⊞UCS''-F
      :Else
        ⊞SIGNAL ⊞EN
      :EndTrap
    hex←↑{,⊞3↑(⊞D,⊞A)↑1
  :Else
    error←⊞DMX
    'unexpected error (see app.error)'⊞SIGNAL 256
  :EndTrap
  ▽
:EndNamespace
```

See part 2

Debug levels

```
app.Hex '/real/customer.txt'  
FILE NAME ERROR  
app.Hex '/real/customer.txt'  
^
```

Debug levels

```
app.Hex '/real/customer.txt'  
FILE NAME ERROR  
app.Hex '/real/customer.txt'  
^  
app.Hex '/tmp/my.txt'
```

Debug levels

```
    app.Hex '/real/customer.txt'  
FILE NAME ERROR  
    app.Hex '/real/customer.txt'  
    ^  
    app.Hex '/tmp/my.txt'  
unexpected error (see app.error)  
    app.Hex '/tmp/my.txt'  
    ^
```

Debug levels

```
    app.Hex '/real/customer.txt'  
FILE NAME ERROR  
    app.Hex '/real/customer.txt'  
    ^  
    app.Hex '/tmp/my.txt'  
unexpected error (see app.error)  
    app.Hex '/tmp/my.txt'  
    ^  
    ↑ app.error.DM
```

Debug levels

```
    app.Hex '/real/customer.txt'  
FILE NAME ERROR  
    app.Hex '/real/customer.txt'  
    ^  
    app.Hex '/tmp/my.txt'  
unexpected error (see app.error)  
    app.Hex '/tmp/my.txt'  
    ^  
    ↑ app.error.DM  
INDEX ERROR  
Hex[7] hex←, 03↑(D,A)[16 16bytes]  
                ^
```

Collection error information

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊'NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
    hex←↑{,◊3↑(◊D,◊A)[16 16τω]}↑bytes
  :Else
    error←◊DMX
    'unexpected error (see app.error)'◊SIGNAL 256
  :EndTrap
  ▽
:EndNamespace
```

Collection error information

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↑0
      :Trap εdebug↑0(1 22)
        bytes←'UTF-8'∘⊖UCS"∘⊖NGET file 1
      :Else
        ⊖SIGNAL ⊖EN
      :EndTrap
      hex←↑{,⊖3↑(⊖D,⊖A)[16 16τω]}∘bytes
    :Else
      error←⊖DMX
      'unexpected error (see app.error)'⊖SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

Collection error information

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug←0
      :Trap εdebug←0(1 22)
        bytes←'UTF-8'∘⊖UCS"∘⊖NGET file 1
      :Else
        ⊖SIGNAL ⊖EN
      :EndTrap
      hex←↑{,⊖3↑(⊖D,⊖A)[16 16τω]}∘bytes
    :Else
      (error←⊖DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'⊖SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```


Collection error information

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊'NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,◊3↑(◊D,◊A)[16 16τω]}↑bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

Debug levels

```
    app.Hex '/real/customer.txt'  
FILE NAME ERROR  
    app.Hex '/real/customer.txt'  
    ^  
    app.Hex '/tmp/my.txt'  
unexpected error (see app.error)  
    app.Hex '/tmp/my.txt'  
    ^
```

Debug levels

```
    app.Hex '/real/customer.txt'  
FILE NAME ERROR  
    app.Hex '/real/customer.txt'  
    ^  
    app.Hex '/tmp/my.txt'  
unexpected error (see app.error)  
    app.Hex '/tmp/my.txt'  
    ^  
    app.error.bytes
```

Debug levels

```
    app.Hex '/real/customer.txt'  
FILE NAME ERROR  
    app.Hex '/real/customer.txt'  
    ^  
    app.Hex '/tmp/my.txt'  
unexpected error (see app.error)  
    app.Hex '/tmp/my.txt'  
    ^  
    app.error.bytes  
72 105 10 109 121 32 98 97 100 10
```



Dfns
what about them?

Dfns

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[UCS``>[NGET file 1
      :Else
        [SIGNAL [EN
      :EndTrap
      hex←↑{,⊘3↑([D,[A][16 16τω]} ``bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

Dfns

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘□UCS``>□NGET file 1
      :Else
        □SIGNAL □EN
      :EndTrap
    hex←↑{,⊘3↑(□D,□A)[16 16τω]}↑bytes
  :Else
    'unexpected error'□SIGNAL 256
  :EndTrap
  ▽
:EndNamespace
```

```
Hex←{
}
```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◦[]UCS''⇒[]NGET file 1
      :Else
        []SIGNAL []EN
      :EndTrap
    hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
  :Else
    'unexpected error'[]SIGNAL 256
  :EndTrap
  ▽
:EndNamespace

```

Hex←{

```

  bytes←'UTF-8'◦[]UCS''⇒[]NGET ω 1
  hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
}

```


Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[UCS``]⇒[NGET file 1]
      :Else
        [SIGNAL [EN]
      :EndTrap
      hex←↑{,⊘3↑([D,⊘A][16 16τω]}``bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

Hex←{

```

  debug↓0::'unexpected error'[SIGNAL 256
  εdebug↓0(1 22)::[SIGNAL [EN]
  bytes←'UTF-8'∘[UCS``]⇒[NGET ω 1]
  hex←↑{,⊘3↑([D,⊘A][16 16τω]}``bytes
}

```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[UCS``]⇒[NGET file 1]
      :Else
        [SIGNAL [EN]
      :EndTrap
      hex←↑{,⊘3↑([D,⊘A][16 16τω]}``bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

Hex←{

```

  debug↓0::'unexpected error'[SIGNAL 256
  εdebug↓0(1 22)::[SIGNAL [EN]
  bytes←'UTF-8'∘[UCS``]⇒[NGET ω 1]
  hex←↑{,⊘3↑([D,⊘A][16 16τω]}``bytes
}

```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[UCS``]⇒[NGET file 1]
      :Else
        [SIGNAL [EN]
      :EndTrap
      hex←↑{,⊘3↑([D,⊘A][16 16τω]}``bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

Hex←{

```

  debug↓0::'unexpected error'[SIGNAL 256
  εdebug↓0(1 22)::[SIGNAL [EN]
  bytes←'UTF-8'∘[UCS``]⇒[NGET ω 1]
  hex←↑{,⊘3↑([D,⊘A][16 16τω]}``bytes
}

```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[UCS``]⇒[NGET file 1]
      :Else
        [SIGNAL [EN]
      :EndTrap
      hex←↑{,⊘3↑([D,⊘A][16 16τω]}``bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

Hex←{

```

  debug↓0::'unexpected error'[SIGNAL 256
  εdebug↓0(1 22)::[SIGNAL [EN]
  bytes←'UTF-8'∘[UCS``]⇒[NGET ω 1]
  hex←↑{,⊘3↑([D,⊘A][16 16τω]}``bytes
}

```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[UCS``]⇒[NGET file 1]
      :Else
        [SIGNAL [EN]
      :EndTrap
      hex←↑{,⊘3↑([D,[A][16 16τω]} ``bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

Diagram illustrating the execution flow of the code:

- The `hex` function is defined with a `Trap` block.
- The `Trap` block contains a `Trap` block that calls `debug↓0` and `bytes←'UTF-8'∘[UCS``]⇒[NGET file 1]`.
- The `Trap` block also contains an `Else` block that calls `[SIGNAL [EN]`.
- The `Trap` block ends with `hex←↑{,⊘3↑([D,[A][16 16τω]} ``bytes`.
- The `Trap` block also contains an `Else` block that calls `'unexpected error'[SIGNAL 256`.
- The `Trap` block ends with `:EndTrap`.

The diagram shows the execution flow from the `hex` function to the `Trap` block, and then to the `Trap` block's `Trap` block. A red 'X' is placed over the `debug↓0` and `bytes←'UTF-8'∘[UCS``]⇒[NGET file 1]` lines, indicating an error or unexpected behavior. The error message is `debug↓0:::'unexpected error'[SIGNAL 256`.

Dfns

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘□UCS``>□NGET file 1
      :Else
        □SIGNAL □EN
      :EndTrap
    hex←↑{,⊘3↑(□D,□A)[16 16τω]}↑bytes
  :Else
    'unexpected error'□SIGNAL 256
  :EndTrap
  ▽
:EndNamespace
```

```
Hex←{
}
```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[UCS``]∘[NGET file 1]
      :Else
        [SIGNAL [EN
      :EndTrap
      hex←↑{,⊘3↑([D,[A][16 16τω]} ``bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

Hex←{

bytes←'UTF-8'∘[UCS``]∘[NGET ω 1

hex←↑{,⊘3↑([D,[A][16 16τω]} ``bytes

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap debug↓0(1 22)
        bytes←'UTF-8'∘[UCS]⇒[NGET file 1
      :Else
        [SIGNAL [EN
      :EndTrap
      hex←↑{,⊘3↑([D,[A][16 16τω]}"}bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

Hex←{

bytes←'UTF-8'∘[UCS]⇒[NGET ω 1

hex←↑{,⊘3↑([D,[A][16 16τω]}"}bytes

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,◊3↑(◊D,◊A)[16 16τω]}↑bytes
    :Else
      'unexpected error'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

Hex←{
 εdebug↓0(1 22)::◊SIGNAL ◊EN
 bytes←'UTF-8'◊'UCS'◊NGET ω 1
 hex←↑{,◊3↑(◊D,◊A)[16 16τω]}↑bytes

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◦[UCS`>[NGET file 1
      :Else
        [SIGNAL [EN
      :EndTrap
      hex←↑{,ϕ3↑([D,[A][16 16τω]}"}bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

Hex←{

```

  εdebug↓0(1 22)::[SIGNAL [EN
  bytes←'UTF-8'◦[UCS`>[NGET ω 1
  hex←↑{,ϕ3↑([D,[A][16 16τω]}"}bytes
}

```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◦[UCS]◦[NGET file 1
      :Else
        [SIGNAL [EN
      :EndTrap
      hex←↑{,⊘3↑([D,[A][16 16τw]}"}bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

Hex←{

```

  εdebug↓0(1 22)::[SIGNAL [EN
  bytes←'UTF-8'◦[UCS]◦[NGET ω 1
  debug↓0::'unexpected error'[SIGNAL 256
  hex←↑{,⊘3↑([D,[A][16 16τw]}"}bytes
}

```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◦[]UCS''>[]NGET file 1
      :Else
        []SIGNAL []EN
      :EndTrap
    hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
  :Else
    'unexpected error'[]SIGNAL 256
  :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  εdebug↓0(1 22)::[]SIGNAL []EN
  bytes←'UTF-8'◦[]UCS''>[]NGET ω 1

  debug↓0::'unexpected error'[]SIGNAL 256
  hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
}

```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[]UCS``>[]NGET file 1
      :Else
        []SIGNAL []EN
      :EndTrap
    hex←↑{,⊘3↑([]D,[]A)[16 16τω]}``bytes
  :Else
    'unexpected error'[]SIGNAL 256
  :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  εdebug↓0(1 22)::[]SIGNAL []EN
  bytes←'UTF-8'∘[]UCS``>[]NGET ω 1

  debug↓0::'unexpected error'[]SIGNAL 256
  hex←↑{,⊘3↑([]D,[]A)[16 16τω]}``bytes
}

```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'°[]UCS``>[]NGET file 1
      :Else
        []SIGNAL []EN
      :EndTrap
    hex←↑{,⊕3↑([]D,[]A)[16 16τω]}↑bytes
  :Else
    'unexpected error'[]SIGNAL 256
  :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  εdebug↓0(1 22)::[]SIGNAL []EN
  bytes←'UTF-8'°[]UCS``>[]NGET ω 1

  debug↓0::'unexpected error'[]SIGNAL 256
  hex←↑{,⊕3↑([]D,[]A)[16 16τω]}↑bytes
}

```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◦[UCS``>[NGET file 1
      :Else
        [SIGNAL [EN
      :EndTrap
      hex←↑{,⊕3↑([D,[A][16 16τω]}"}bytes
    :Else
      'unexpected error'[SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  εdebug↓0(1 22)::[SIGNAL [EN
  bytes←'UTF-8'◦[UCS``>[NGET ω 1

  debug↓0::'unexpected error'[SIGNAL 256
  hex←↑{,⊕3↑([D,[A][16 16τω]}"}bytes
}

```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◦[]UCS''>[]NGET file 1
      :Else
        []SIGNAL []EN
      :EndTrap
    hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
  :Else
    'unexpected error'[]SIGNAL 256
  :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  εdebug↓0(1 22)::[]SIGNAL []EN
  bytes←'UTF-8'◦[]UCS''>[]NGET ω 1

  debug↓0::'unexpected error'[]SIGNAL 256
  hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
}

```


Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◦[]UCS''>[]NGET file 1
      :Else
        []SIGNAL []EN
      :EndTrap
      hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
    :Else
      'unexpected error'[]SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  debug↓0::'unexpected error'[]SIGNAL 256
  Read←{εdebug↓0(1 22)::[]SIGNAL []EN
    'UTF-8'◦[]UCS''>[]NGET ω 1}
  bytes←Read ω
  hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
}

```

Dfns

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◦[]UCS''>[]NGET file 1
      :Else
        []SIGNAL []EN
      :EndTrap
      hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
    :Else
      'unexpected error'[]SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  debug↓0::'unexpected error'[]SIGNAL 256
  Read←{εdebug↓0(1 22)::[]SIGNAL []EN
    'UTF-8'◦[]UCS''>[]NGET ω 1}
  bytes←Read ω
  hex←↑{,⊘3↑([]D,[]A)[16 16τω]}''bytes
}

```



Collection Error Information in Dfns

when time travel is possible

Collection error information in dfns

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘⊞UCS''⇒⊞NGET file 1
      :Else
        ⊞SIGNAL ⊞EN
      :EndTrap
      hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}''bytes
    :Else
      'unexpected error'⊞SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

Hex←{
  debug↓0::'unexpected error'⊞SIGNAL 256
  Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
    'UTF-8'∘⊞UCS''⇒⊞NGET ω 1}
  bytes←Read ω
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}''bytes
}
```

Collection error information

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊'NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,⊘3↑(◊D,◊A)[16 16τω]}↑bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'◊'NGET ω 1}
  bytes←Read ω
  hex←↑{,⊘3↑(◊D,◊A)[16 16τω]}↑bytes
}

```

Collection error information

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘⊞UCS''⇒⊞NGET file 1
      :Else
        ⊞SIGNAL ⊞EN
      :EndTrap
      hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}↑bytes
    :Else
      (error←⊞DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'⊞SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  debug↓0::'unexpected error'⊞SIGNAL 256
  Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
    'UTF-8'∘⊞UCS''⇒⊞NGET ω 1}
  bytes←Read ω
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}↑bytes
}

```

Collection error information

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊'◊NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,◊3↑(◊D,◊A)[16 16τω]}↑bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

```
Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'◊'◊NGET ω 1}
  bytes←Read ω
  hex←↑{,◊3↑(◊D,◊A)[16 16τω]}↑bytes
}
```

Collection error information

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊'NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,◊3↑(◊D,◊A)[16 16τω]}↑bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'◊'NGET ω 1}
  bytes←Read ω
  hex←↑{,◊3↑(◊D,◊A)[16 16τω]}↑bytes
}

```


Collection error information

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊'NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,◊3↑(◊D,◊A)[16 16τω]}↑bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'◊'NGET ω 1}
  bytes←Read ω
  hex←↑{,◊3↑(◊D,◊A!16 16τω)}↑bytes
}

```

Collection error information

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[UCS]⇒[NGET file 1]
      :Else
        [SIGNAL [EN]
      :EndTrap
      hex←↑{,⊘3↑([D,⊘A][16 16τω]}↑bytes
    :Else
      (error←[DMX]).(file bytes)←file bytes
      'unexpected error (see app.error)' [SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  debug↓0::'unexpected error' [SIGNAL 256
  Read←{εdebug↓0(1 22)::[SIGNAL [EN]
    'UTF-8'∘[UCS]⇒[NGET ω 1]}
  bytes←Read ω
  hex←↑{,⊘3↑([D,⊘A][16 16τω]}↑bytes
}

```

Collection error information

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'∘[UCS]⇒[NGET file 1]
      :Else
        [SIGNAL [EN]
      :EndTrap
      hex←↑{,⊘3↑([D,⊘A][16 16τω]}↑bytes
    :Else
      (error←[DMX]).(file bytes)←file bytes
      'unexpected error (see app.error)' [SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  debug↓0::'unexpected error' [SIGNAL 256
  Read←{εdebug↓0(1 22)::[SIGNAL [EN]
    'UTF-8'∘[UCS]⇒[NGET ω 1]
  }
  bytes←Read ω
  hex←↑{,⊘3↑([D,⊘A][16 16τω]}↑bytes
}

```

Collection

```
{a←1 ◊ 0::a ◊ a←2 ◊ $$$}0
```

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'>◊NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,⊘3↑(◊D,◊A)[16 16τw]}↑bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

```
Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'>◊NGET ω 1}
  bytes←Read ω
  hex←↑{,⊘3↑(◊D,◊A)[16 16τw]}↑bytes
}
```

Collection

```
{a←1 ◊ 0::a ◊ a←2 ◊ $$$}0
```

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'>◊NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,⊘3↑(◊D,◊A)[16 16τw]}↑bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

```
Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'>◊NGET ω 1}
  bytes←Read ω
  hex←↑{,⊘3↑(◊D,◊A[16 16τw]}↑bytes
}
```

Collection

```
{a←1 ◊ 0::a ◊ a←2 ◊ $$$}0
```

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'>◊NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,⊘3↑(◊D,◊A)[16 16τw]}↑bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

```
Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'>◊NGET ω 1}
  bytes←Read ω
  hex←↑{,⊘3↑(◊D,◊A[16 16τw]}↑bytes
}
```

Collection

```
{a←1 ◊ 0::a ◊ a←2 ◊ $$$}0
```

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'>◊NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,⊘3↑(◊D,◊A)[16 16τw]}↑bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

```
Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'>◊NGET ω 1}
  bytes←Read ω
  hex←↑{,⊘3↑(◊D,◊A[16 16τw]}↑bytes
}
```

Collection

```
{a←1 ◊ 0::a ◊ a←2 ◊ $$$}0
```

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'=>◊NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,◊3↑(◊D,◊A)[16 16τw]}↑bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

```
Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'=>◊NGET ω 1}
  bytes←Read ω
  hex←↑{,◊3↑(◊D,◊A[16 16τw]}↑bytes
}
```


Collection

```
{a←1 ◊ 0::a ◊ a←2 ◊ $$$}0
```

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'>◊NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,⊘3↑(◊D,◊A)[16 16τw]}↑bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

```
Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'>◊NGET ω 1}
  bytes←Read ω
  hex←↑{,⊘3↑(◊D,◊A)[16 16τw]}↑bytes
}
```

Collection

```
{a←1 ◊ 0::a ◊ a←2 ◊ $$$}θ
```

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,⊘3↑(◊D,◊A)[16 16τw]}◊bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

```
Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'◊NGET ω 1}
  bytes←Read ω
  hex←↑{,⊘3↑(◊D,◊A)[16 16τw]}◊bytes
}
```

Collection

`{a←1} ♦ 0::a ♦ a←2 ♦ $$$}0`

1

```
:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,◊3↑(◊D,◊A)[16 16τw]}◊bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace
```

```
Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'◊NGET ω 1}
  bytes←Read ω
  hex←↑{,◊3↑(◊D,◊A!16 16τw)}◊bytes
}
```

Collection

{a←1 ◊ 0::a ◊ a←2 ◊ \$\$\$}0

1

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊NGET file 1
      :Else
        ◊SIGNAL ◊EN
      :EndTrap
      hex←↑{,◊3↑(◊D,◊A)[16 16τw]}◊bytes
    :Else
      (error←◊DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◊SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  debug↓0::'unexpected error'◊SIGNAL 256
  Read←{εdebug↓0(1 22)::◊SIGNAL ◊EN
    'UTF-8'◊'UCS'◊NGET ω 1}
  bytes←Read ω
  hex←↑{,◊3↑(◊D,◊A[16 16τw]}◊bytes
}

```

Collection

{a←1 ◊ 0::a ◊ a←2 ◊ \$\$\$}0

1

```

:Namespace app
  debug←0
  ▽ hex←Hex file;bytes
    :Trap debug↓0
      :Trap εdebug↓0(1 22)
        bytes←'UTF-8'◊'UCS'◊NGET file 1
      :Else
        ◻SIGNAL ◻EN
      :EndTrap
      hex←↑{,⊘3↑(◻D,◻A)[16 16τw]}↑bytes
    :Else
      (error←◻DMX).(file bytes)←file bytes
      'unexpected error (see app.error)'◻SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex←{
  debug↓0::'unexpected error'◻SIGNAL 256
  Read←{εdebug↓0(1 22)::◻SIGNAL ◻EN
    'UTF-8'◊'UCS'◊NGET ω 1}
  bytes←Read ω
  hex←↑{,⊘3↑(◻D,◻A)[16 16τw]}↑bytes
}

```

Collection

1 { a ← 1 ◊ 0 :: a ◊ a ← 2 ◊ \$\$\$ } 0

```

:Namespace app
  debug ← 0
  ▽ hex ← Hex file; bytes
    :Trap debug ↓ 0
      :Trap ε debug ↓ 0 (1 22)
        bytes ← 'UTF-8' ◊ UCS'' => NGET file 1
      :Else
        ◻ SIGNAL ◻ EN
      :EndTrap
      hex ← ↑ {, ◻ 3 ↑ (◻ D, ◻ A) [16 16 τ ω]} bytes
    :Else
      (error ← ◻ DMX). (file bytes) ← file bytes
      'unexpected error (see app.error)' ◻ SIGNAL 256
    :EndTrap
  ▽
:EndNamespace

```

```

Hex ← {
  debug ↓ 0 :: 'unexpected error' ◻ SIGNAL 256
  Read ← { ε debug ↓ 0 (1 22) :: ◻ SIGNAL ◻ EN
    'UTF-8' ◊ UCS'' => NGET ω 1 }
  bytes ← Read ω
  hex ← ↑ {, ◻ 3 ↑ (◻ D, ◻ A) [16 16 τ ω]} bytes
}

```

Collection error information

```
Hex←{
  debug↓0::'unexpected error'⊞SIGNAL 256
  Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
    'UTF-8'⊞UCS''⊞NGET ω 1}
  bytes←Read ω
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}bytes
}
```

Collection error information

```
Hex←{
  debug↓0::'unexpected error'⊞SIGNAL 256
  Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
    'UTF-8'⊞⊞UCS''⊞⊞NGET ω 1}
  bytes←Read ω
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}⊞bytes
}
```


Collection error information

```
Hex←{
```

```
  debug↓0::  
  Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN  
    'UTF-8'⊞⊞UCS''⊞⊞NGET ω 1}  
  bytes←Read ω  
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}↑bytes  
}
```

Collection error information


```
Hex←{
  (data←⎕NS ⍉).file←ω

  debug↓0::
  Read←{εdebug↓0(1 22)::⎕SIGNAL ⎕EN
    'UTF-8'∘⎕UCS''>⎕NGET ω 1}
  bytes←Read ω
  hex←↑{,⍉3↑(⎕D,⎕A)[16 16↑ω]}bytes
}
```

Collection error information

```
Hex←{
  (data←⊞NS ⊖).file←ω


  debug↓0::
  Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
        'UTF-8'◦⊞UCS''>⊞NGET ω 1}
  bytes←Read ω
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}bytes
}
```



Collection error information


```
Hex←{
  (data←⊞NS ⊖).file←ω

  debug↓0::
  Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
    'UTF-8'⊞⊞UCS''⊞⊞NGET ω 1}
  data.bytes←Read ω
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16↑ω]}↑data.bytes
}
```




Collection error information

```
Hex←{
  (data←[]NS 0).file←ω
  Handler←{([]THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug↓0::
  Read←{εdebug↓0(1 22)::[]SIGNAL []EN
    'UTF-8'◦[]UCS''>[]NGET ω 1}
  data.bytes←Read ω
  hex←↑{,03↑([]D,[]A)[16 16↑ω]}data.bytes
}
```



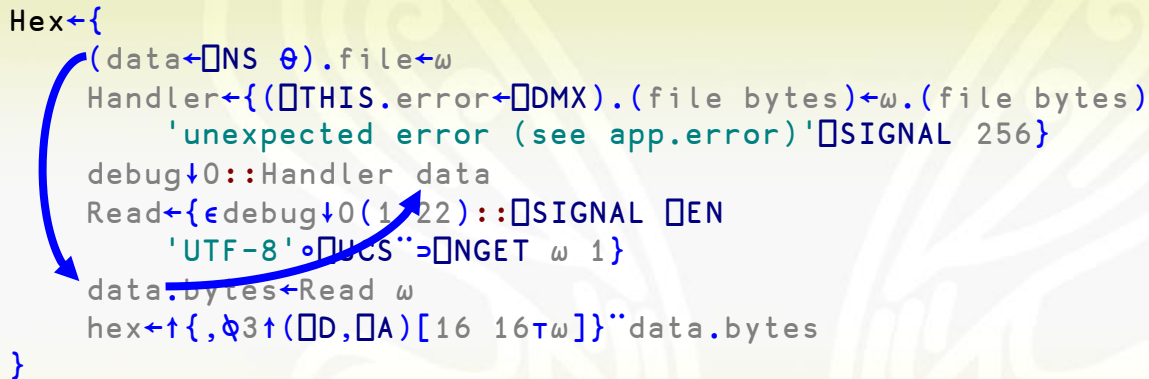
Collection error information

```
Hex←{
  (data←⊞NS ⊖).file←ω
  Handler←{(⊞THIS.error←⊞DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'⊞SIGNAL 256}
  debug↓0::Handler data
  Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
    'UTF-8'⊞UCS''⊞NGET ω 1}
  data.bytes←Read ω
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16↑ω]}data.bytes
}
```



Collection error information

```
Hex←{
  (data←NS Θ).file←ω
  Handler←{(THIS.error←DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)' SIGNAL 256}
  debug↓0::Handler data
  Read←{εdebug↓0(1 22)::SIGNAL EN
    'UTF-8' UCS→NGET ω 1}
  data.bytes←Read ω
  hex←↑{,Q3↑(D,A)[16 16τω]}data.bytes
}
```



Collection error information

```
Hex←{
  (data←NS Θ).file←ω
  Handler←{(THIS.error←DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'⊢SIGNAL 256}
  debug↓0::Handler data
  Read←{εdebug↓0(1→22)::SIGNAL EN
    'UTF-8'⊢UCS''⊢NGET ω 1}
  data.bytes←Read ω
  hex←↑{,⊘3↑(D,A)[16 16τω]}↑data.bytes
}
```


Capsules

what `□`SIGNAL leaves



Capsules

```
:Namespace test
  ▽ inner
    :Trap 0
      □ SIGNAL 256
    :Else
      □ ← 'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

Capsules

```
:Namespace test
  ▽ inner
    :Trap 0
      □ SIGNAL 256
    :Else
      □ ← 'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

```
test.inner
```

Capsules

```
:Namespace test
```

```
  ▾ inner
```

```
    •Trap 0
```

```
      □SIGNAL 256
```

```
    :Else
```

```
      □←'trapped inside!'
```

```
    :EndTrap
```

```
  ▾
```

```
:EndNamespace
```

```
test.inner
```

Capsules

```
:Namespace test
  ▽ inner
    •Trap 0
      □SIGNAL 256
    :Else
      □'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

```
test.inner
ERROR 256
test.inner
^
```

Capsules

```
:Namespace test
```

```
  ▽ inner  
    :Trap 0  
      □ SIGNAL 256  
    :Else  
      □ ← 'trapped inside!'  
    :EndTrap  
  ▽  
:EndNamespace
```

```
test.inner  
ERROR 256  
test.inner  
^
```

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      □←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      □SIGNAL 256
    :Else
      □←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

```
test.inner
ERROR 256
test.inner
^
```

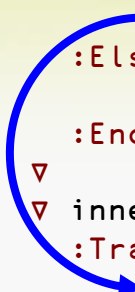
Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      []←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      []SIGNAL 256
    :Else
      []←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

```
test.inner
ERROR 256
test.inner
^
test.outer
```


Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      □←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      □←SIGNAL 256
    :Else
      □←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```



```
test.inner
ERROR 256
test.inner
^
test.outer
```

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      □←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
  Trap 0
  □←SIGNAL 256
  :Else
    □←'trapped inside!'
  :EndTrap
  ▽
:EndNamespace
```

```
test.inner
ERROR 256
test.inner
^
test.outer
```

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      □←'trapped outside!'
    :EndTrap
  ▽ inner
  ▽ inner
    :Trap 0
      □←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

```
test.inner
ERROR 256
test.inner
^
test.outer
trapped outside!
```

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      □←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      □SIGNAL 256
    :Else
      □←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      □←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      □SIGNAL 256
    :Else
      □←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```



□SIGNAL 256

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      ⚡←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      {⚡SIGNAL ω}256
    :Else
      ⚡←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```



{⚡SIGNAL ω}256

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      []←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      {[]SIGNAL ω}256
    :Else
      []←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      []←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      {[]SIGNAL ω}256
    :Else
      []←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

test.inner

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      []←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      {[]SIGNAL ω}256
    :Else
      []←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

test.inner

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      □←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      {□SIGNAL ω}256
    :Else
      □←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

```
test.inner
trapped inside!
```

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      []←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      {[]SIGNAL ω}256
    :Else
      []←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

```
test.inner
trapped inside!
```

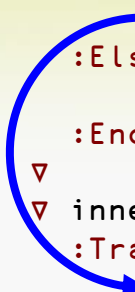
Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      []←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      {[]SIGNAL ω}256
    :Else
      []←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

```
test.inner
trapped inside!
test.outer
```

Capsules

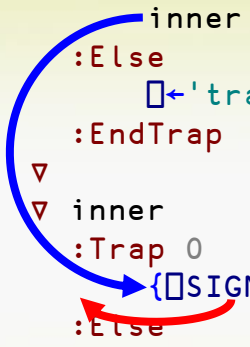
```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      []←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      []←{[]SIGNAL ω}256
    :Else
      []←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```



```
test.inner
trapped inside!
test.outer
```

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      []←'trapped outside!'
    :EndTrap
  ▽ inner
  ▽ inner
    :Trap 0
      {[]SIGNAL ω}256
    :Else
      []←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```



```
test.inner
trapped inside!
test.outer
```

Capsules

```
:Namespace test
  ▽ outer
    :Trap 0
      inner
    :Else
      []←'trapped outside!'
    :EndTrap
  ▽
  ▽ inner
    :Trap 0
      {[]SIGNAL ω}256
    :Else
      []←'trapped inside!'
    :EndTrap
  ▽
:EndNamespace
```

```
test.inner
trapped inside!
test.outer
trapped inside!
```

Capsules

```
Hex←{
  (data←[]NS Θ).file←ω
  Handler←{([]THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug↓0::Handler data
  Read←{εdebug↓0(1 22)::[]SIGNAL []EN
    'UTF-8'◦[]UCS''>[]NGET ω 1}
  data.bytes←Read ω
  hex←↑{,⊘3↑([]D,[]A)[16 16τω]}↑data.bytes
}
```


Capsules

```
Hex←{
  (data←[]NS 0).file←ω
  Handler←{([THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug↓0::Handler data
  Read←{εdebug↓0(1 22)::[]SIGNAL []EN
    'UTF-8'°[]UCS''>[]NGET ω 1}
  data.bytes←Read ω
  hex←↑{,03↑([D,[]A)[16 16τω]}↑data.bytes
}
```

Capsules

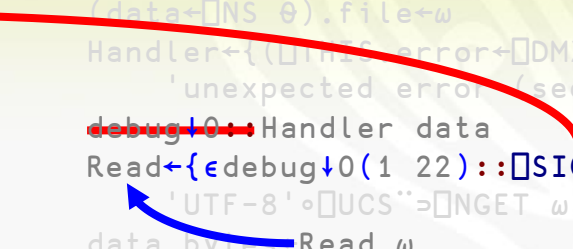
```
Hex←{
  (data←⊞NS ⊙).file←ω
  Handler←{(⊞THIS.error←⊞DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'⊞SIGNAL 256}
  debug↓0::Handler data
  Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
    'UTF-8'⊞UCS''⊞NGET ω 1}
  data.bytes←Read ω
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}⊞data.bytes
}
```

Capsules

```
Hex←{
  (data←[]NS 0).file←ω
  Handler←{([THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug←0 Handler data
  Read←{εdebug↓0(1 22)::[]SIGNAL []EN
    'UTF-8'°[]UCS''>[]NGET ω 1}
  data.bytes←Read ω
  hex←↑{,03↑([D,[]A)[16 16τω]}↑data.bytes
}
```

Capsules

```
Hex←{  
  (data←[]NS 0).file←ω  
  Handler←{([[]NS error←[]DMX).(file bytes)←ω.(file bytes)  
    'unexpected error (see app.error)'[]SIGNAL 256}  
  debug←0 Handler data  
  Read←{εdebug↓0(1 22)::[]SIGNAL []EN  
    'UTF-8'°[]UCS''°[]NGET ω 1}  
  data.bytes←Read ω  
  hex←↑{,03↑([[]D,[]A)[16 16τω]}↑data.bytes  
}
```



Capsules

```
Hex←{
  (data←[]NS 0).file←ω
  Handler←{([THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug↓0::Handler data
  Read←{εdebug↓0(1 22)::[]SIGNAL []EN
    'UTF-8'°[]UCS''>[]NGET ω 1}
  data.bytes←Read ω
  hex←↑{,03↑([D,[]A)[16 16τω]}↑data.bytes
}
```

Capsules

```
Hex←{
  (data←⊞NS ⊘).file←ω
  Handler←{(⊞THIS.error←⊞DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'⊞SIGNAL 256}
  debug↓0::Handler data

  data.bytes←Read ω
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}¨data.bytes
}
Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
  'UTF-8'⊞UCS¨>⊞NGET ω 1}
```

Capsules

```
Hex←{
  (data←⊞NS ⊘).file←ω
  Handler←{(⊞THIS.error←⊞DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'⊞SIGNAL 256}
  debug↓0::Handler data
```

```
data.bytes←Read ω
Hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}↑data.bytes
}
```



```
Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
  'UTF-8'⊞UCS">⊞NGET ω 1}
```

Capsules

```

Hex←{
  (data←[]NS 0).file←ω
  Handler←{([THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug↓0::Handler data

  data.bytes←Read ω
  hex←↑{,03↑([D,[]A)[16,16τω]}data.bytes
}
Read←{εdebug↓0(1 22)::[]SIGNAL []EN
  'UTF-8'°[]UCS"°[]NGET ω 1}

```


Capsules



```
Hex←{
  (data←[]NS 0).file←ω
  Handler←{([THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug↓0::Handler data

  data.bytes←Read ω
  hex←↑{,03↑([D,[]A)[16,16τω]}data.bytes
}
Read←{εdebug↓0(1 22)::[]SIGNAL []EN
  'UTF-8'°[]UCS">[]NGET ω 1}
```

Capsules

```
Hex←{
  (data←⊞NS ⊖).file←ω
  Handler←{(⊞THIS.error←⊞DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'⊞SIGNAL 256}
  debug↓0::Handler data

  data.bytes←Read ω
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}¨data.bytes
}
Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
  'UTF-8'⊞UCS¨>⊞NGET ω 1}
```

Capsules

```
Hex←{
  (data←[]NS 0).file←ω
  Handler←{([THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug↓0::Handler data

  data.bytes←{debug↓0::[]SIGNAL []EN
    Read ω}ω
  hex←↑{,03↑([D,[]A)[16 16τω]}↑data.bytes
}
Read←{εdebug↓0(1 22)::[]SIGNAL []EN
  'UTF-8'°[]UCS"°[]NGET ω 1}
```

Capsules

```
Hex←{
  (data←⊞NS ⊖).file←ω
  Handler←{(⊞THIS.error←⊞DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'⊞SIGNAL 256}
  debug↓0::Handler data

  data.bytes←{debug↓0::⊞SIGNAL ⊞EN
    Read ω}ω
  hex←↑{,⊞3↑(⊞D,⊞A)[16 16τω]}↑data.bytes
}
Read←{εdebug↓0(1 22)::⊞SIGNAL ⊞EN
  'UTF-8'⊞UCS"⊞NGET ω 1}
```


Capsules

```

Hex←{
  (data←[]NS 0).file←ω
  Handler←{([THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug↓0::Handler data

  data.bytes←{debug↓0::[]SIGNAL []EN
    Read ω}ω
  hex←↑{,03↑([D,[]A)[16 16τω]}↑data.bytes
}
Read←{εdebug↓0(1 22)::[]SIGNAL []EN
  'UTF-8'[]UCS">[]NGET ω 1}

```



Capsules

```

Hex←{
  (data←[]NS 0).file←ω
  Handler←{([THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug↓0::Handler data

  data.bytes←{debug↓0::[]SIGNAL []EN
    Read ω}ω
  hex←↑{,03↑([D,[]A)[16 6τω]}↑data.bytes
}
Read←{εdebug↓0(1 22)::[]SIGNAL []EN
  'UTF-8'[]UCS">[]NGET ω 1}

```

Capsules

```

Hex←{
  (data←[]NS 0).file←ω
  Handler←{([THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug↓0 Handler data

  data.bytes←{debug↓0::[]SIGNAL []EN
    Read ω}ω
  Hex←↑{,03↑([D,[]A)[16 6τω]}↑data.bytes
}
Read←{εdebug↓0(1 22)::[]SIGNAL []EN
  'UTF-8'[]UCS">[]NGET ω 1}

```

Capsules

```

Hex←{
  (data←[]NS 0).file←ω
  Handler←{([THIS.error←[]DMX).(file bytes)←ω.(file bytes)
    'unexpected error (see app.error)'[]SIGNAL 256}
  debug↓0 → Handler data
  data.bytes ← {debug↓0 :: []SIGNAL []EN
    Read ω}ω
  hex←↑{,03↑([D,[]A)[16 6τω]}↑data.bytes
}
Read←{εdebug↓0(1 22) :: []SIGNAL []EN
  'UTF-8'°[]UCS"°[]NGET ω 1}

```


Error Handling – Part 4

Debugging mode: `debug←0`

Adjustable trapping: `€debug↓0(1 22)`

Collecting info: `error←□DMX`

Be mindful of dfn error scopes!

Upcoming webinars

Aug 12	BAA	EGM (Extraordinary General Meeting)
Aug 19	---	
Aug 26	BAA	open session
Sep 2	Dyalog	TBA
Sep 9	BAA	open session
Sep 16	---	
Sep 23	BAA	open session
Sep 30	Dyalog	Error handling – pt. 5

Upcoming webinars

Aug 12	BAA	EGM (Extraordinary General Meeting)
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Sep 9	BAA	open session
Sep 16	---	
Sep 23	BAA	open session
Sep 30	Dyalog	Error handling – pt. 5

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