

...a long and winding
tODE

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GLASS/GemTools (2007)

- GemStone, Linux, Apache, Seaside, Smalltalk
 - a VMware Appliance
- GemTools
 - OmniBrowser based development environment for GLASS

GemTools (2011)

- OmniBrowser starting to fade
- GemTools continued to exhibit poor WAN performance and really needed to be replaced!

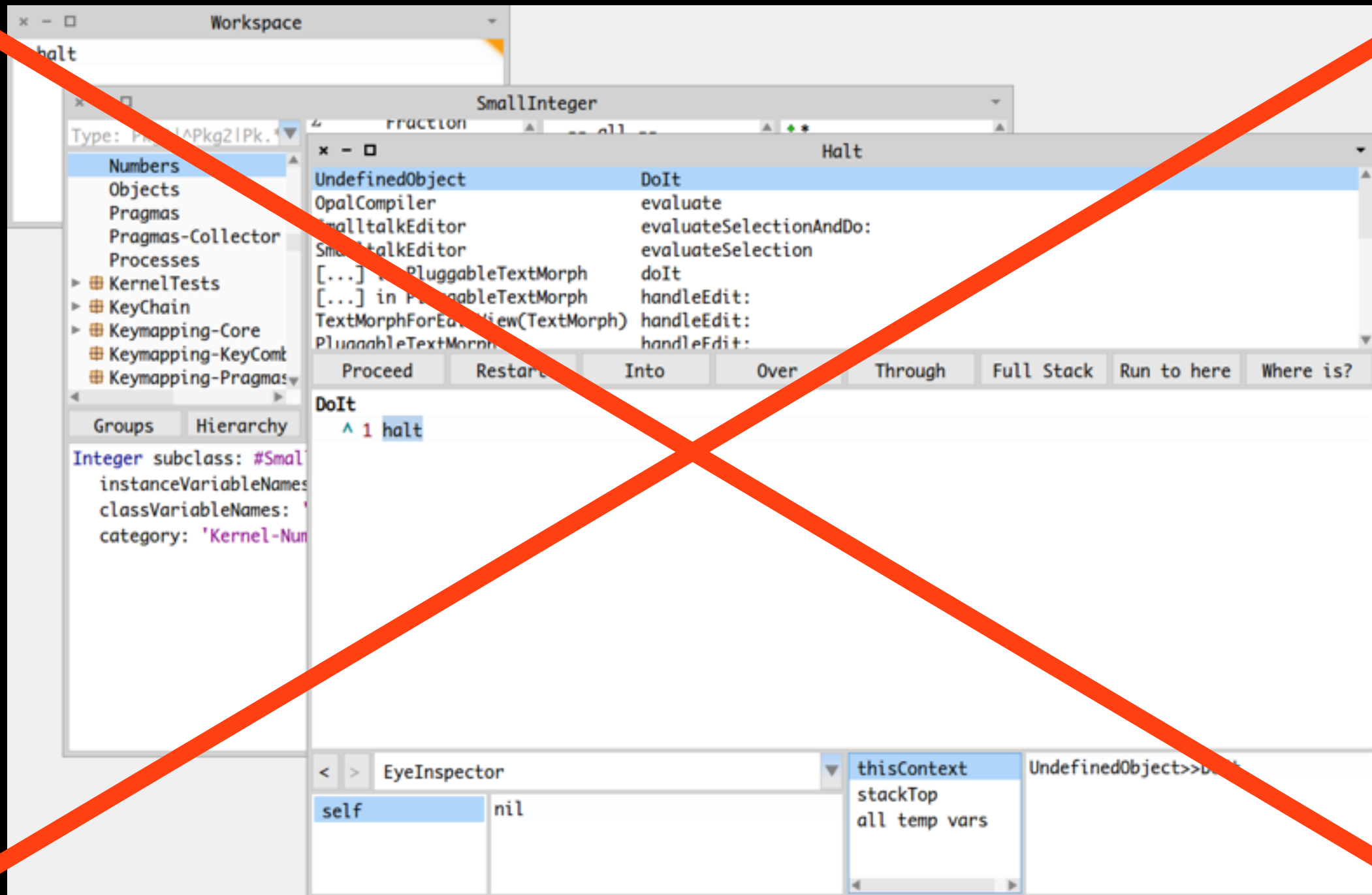
the Object-centric Development Environment (2011)

The screenshot displays the tODE Home web interface. At the top, there is a browser navigation bar with buttons for Back, Forward, Home, a help icon (?), Bookmark, East, and New Session 0. Below this is a header for 'tODE Home (TOHome)' with a menu of tabs: view, help, inspect, class, method, workspace, configuration, package, and tODE. The main content area is titled 'Projects (details):' and lists several project names: Bibliocello, Gofer, Grease, HelpSystem, JQueryWidgetBox, Kaliningrad, KomHttpServer, Metacello, MetacelloBrowser, RefactoringBrowser, Seaside30, SeasideJSON, SeasideRest, and tODE. Below the list are search fields: 'ProjectName' with a 'Find Project' button and a link to 'advanced search (Hint: use to find and load a project configuration)', and 'class name' with a 'Find Class' button. Further down are buttons for 'Create Project', 'load archived version', and 'reset configuration root', each with associated input fields and dropdown menus. The 'Bookmarks:' section shows a bookmark for 'tODE project page (external)'. The 'tOde operations:' section includes buttons for 'RESET root', 'RESET session', and 'Remove session '0''.

the Object-centric Development Environment

- difficult to implement IN Seaside a debugger to DEBUG Seaside
- had to know “too much Seaside” to implement tools
- shouldn't need Phd in client-side programming to write simple tools

the Object-centric Development Environment



the Object-centric Development Environment (2012)

The screenshot displays the Object-centric Development Environment (2012) interface, showing a class hierarchy, class details, method implementation, and a transcript window.

Hierarchy (6):

- Object
 - Collection
 - SequenceableCollection
 - CharacterCollection
 - String
 - Unicode7**

Project Classes:

- GRNotification
- GRDeprecatedApiNotifica
- SystemTransactionNotifica
- SystemAbortTransaction
- SystemBeginTransaction
- SystemCommitTransaction
- ExecBlock
- ExecutableBlock
- GRObjct
- GRCodec
 - GRLatin1GemStoneCodec
 - GRNullCodec
 - GRUtf8GemStoneCodec**
- GRCodecStream
 - GRNullCodecStream
 - GRTextOrBinaryCodecStre
 - GRUtf8CodecStream
- GRDelayedSend
- GRDelayedSendMessage
- GRBoundMessage
- GRUnboundMessage
- GRGemStoneRandomProvid
- GRInflector
- GRPackage

Class (5):

String subclass: 'Unicode7'

instVarNames: #()
classVars: #()
classInstVars: #()
poolDictionaries: #()
inDictionary: 'Globals'
category: 'User Classes'

Code: Unicode7>>decodeFromUTF8 (9):

```
decodeFromUTF8  
"Reiever already 7 bit ascii"  
^ self
```

Unicode7 (8):

```
add:  
addAll:  
addAllLast:  
at:equalsNoCase:  
at:put:  
codePointAt:put:  
compareTo:collator:  
decodeFromUTF8  
equals:collatingTable:  
equalsNoCase:  
greaterThan:collatingTable:  
insertAll:at:  
isEqualant:  
lessThan:collatingTable:
```

Unicode7 class:

```
withAll:
```

Implementors of decode: (10):

- GR
- C
- C
- ByteArray>>decodeFromUTF8
- C
- String>>decodeFromUTF8
- UT
- UT
- U

Implementors of decodeFromUTF8 (12):

- GR
- C
- C
- ByteArray>>decodeFromUTF8
- C
- String>>decodeFromUTF8
- UT
- UT
- U

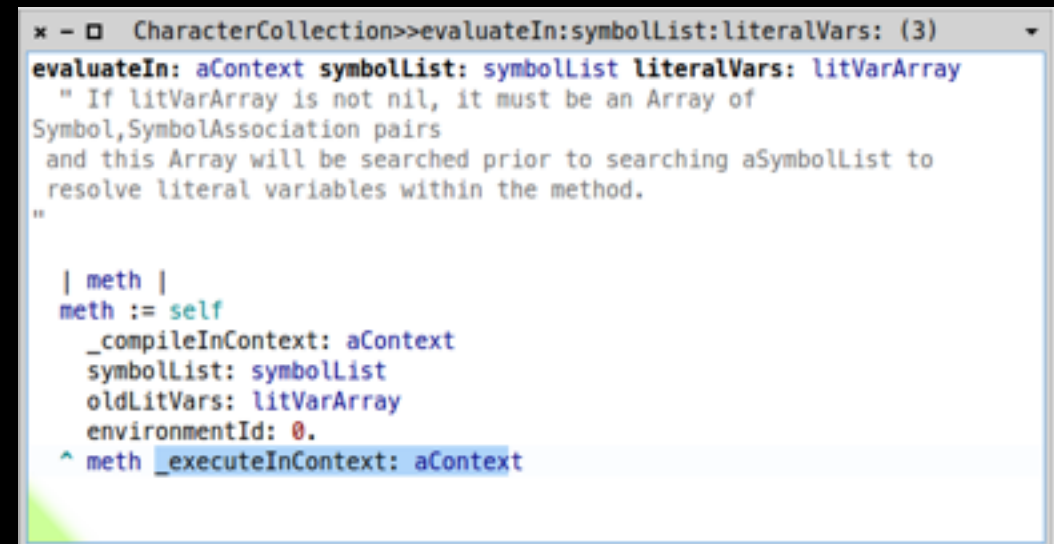
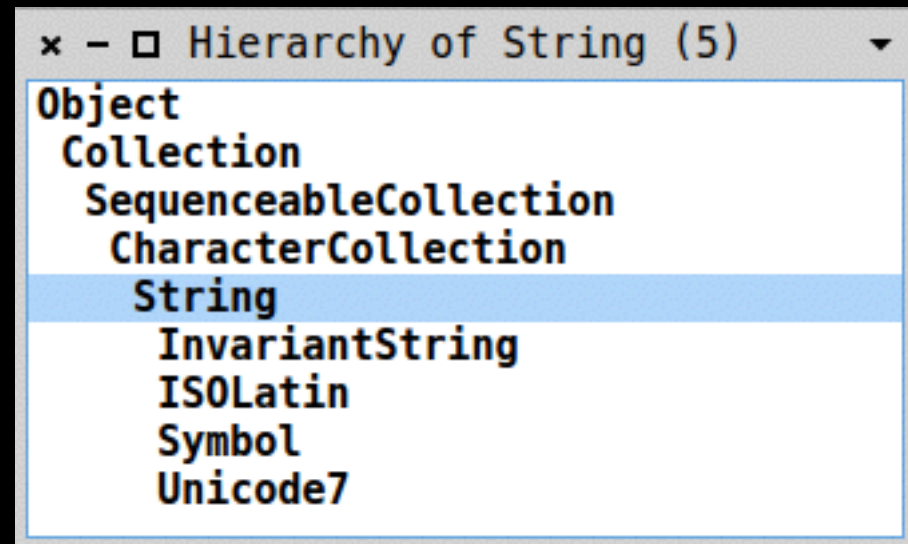
1: GemStone Evaluator:

```
topez > input topez  
topez > edit class UUID  
topez > set project Grease  
topez > edit prclasses  
topez >
```

Transcript:

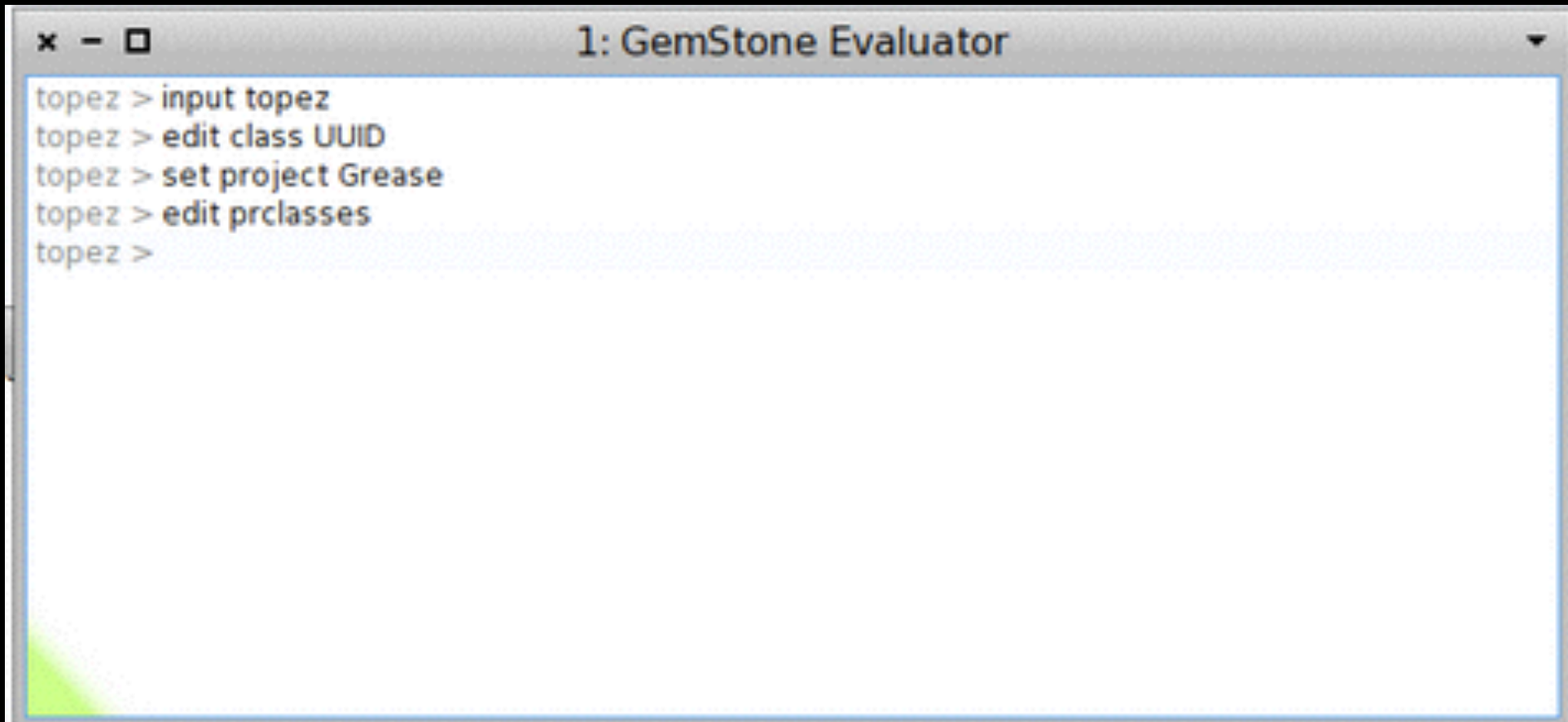
```
Loaded -> Topez-Common-Core-dkh.101 --- filetree:///opt/git/topez/packages --- cache  
Loaded -> Topez-Client-Core-dkh.107 --- filetree:///opt/git/topez/packages --- cache  
Loaded -> Topez-Client-Tests-Common-dkh.34 --- filetree:///opt/git/topez/packages --- cache  
Loaded -> Topez-Pharo-Common-dkh.83 --- filetree:///opt/git/topez/packages --- cache  
Loaded -> Topez-Client-GemStone-dkh.46 --- filetree:///opt/git/topez/packages --- cache  
Loaded -> Topez-Client-Tests-GemStone-dkh.26 --- filetree:///opt/git/topez/packages --- cache  
Loaded -> Topez-Client-Tests-Pharo-dkh.24 --- filetree:///opt/git/topez/packages --- cache  
...finished baseline---SNAPSHOT---an Array(24 October 2012 10:06:01 am) topez.image priorSource: 16688023  
---SNAPSHOT---an Array(24 October 2012 10:13:03 am) topez.image priorSource: 16733192
```

thin tODE client



- two window types in tODE: **list** and **text**
 - single pane windows mean minimum network round trips
 - window specification (contents/menus/actions) specified in a STON object
- all tool code is written in terms of server environment
- STON used to pass objects between client and server

the Object-centric Development Environment (2012)



```
x - □ 1: GemStone Evaluator
topez > input topez
topez > edit class UUID
topez > set project Grease
topez > edit prclasses
topez >
```

object shell

- CLI for Smalltalk modeled on the UNIX shell
 - commands with posix-style argument handling
 - scripts implemented as Smalltalk workspaces callable from the CLI
 - directory structure based on objects instead of files

tODE object shell

```
x - □ 1: GemStone Shell: esug (esug:esug_ldi)
tode 1 > cd /home
[267589889 sz:9 TDObjectGatewayNode] /home/
tode 1 > ls
gsDevKitHome/ st* tode/ tpz* tutorials/
tode 1 > ./st
[58 sz:0 SmallInteger] 7
tode 1 > edit st
[274425345 sz:1 OrderedCollection] anOrderedCollection( /home/st/)
tode 1 >
```

```
x - □ /home/st/ (2)
[ :topez :objIn :tokens :command :commandNode | 3 + 4 ]
```

tODE object shell

```
x - □ 1: GemStone Shell: esug (esug:esug_ldi)
tode 1 >
tode 1 > browse --select='[:meth | meth className includesSubstring: 'Dictionary']` method at:put:
[273655809 sz:5 Set] aSet( TMethodDefinition(TwoLevelDictionary>>at:put:),
TMethodDefinition(StringKeyValueDictionary>>at:put:), TMethodDefinition(IntegerKeyV...
tode 1 >
```

```
x - □ Implementors of at:put: (2)
AbstractDictionary>>at:put:
Dictionary>>at:put:
  HttpFormDictionary>>at:put:
  KeyValueDictionary>>at:put:
  IdentityKeyValueDictionary>>at:put:
  GsMethodDictionary>>at:put:
  GsSessionMethodDictionary>>at:put:
  IdentityDictionary>>at:put:
  SymbolDictionary>>at:put:
  SymbolKeyValueDictionary>>at:put:
  IntegerKeyValueDictionary>>at:put:
  KeySoftValueDictionary>>at:put:
  StringKeyValueDictionary>>at:put:
  RcKeyValueDictionary>>at:put:
GRSmallDictionary>>at:put:
RBSmallDictionary>>at:put:
TwoLevelDictionary>>at:put:
```

tODE object shell

```
x - 1: GemStone Shell: esug (esug:esug_ldi)
tode 1 > man browse
[268269057 sz:10 TDManPage] NAME
  browse - Find and view classes and methods

SYNOPSIS
  browse [--scriptPath=<node-path>] [--help] [--select=<select-block>]
  ...
tode 1 >
```

```
x - NAME  browse - Find and view classes and methods  SYNOPSIS  browse [--scriptPat
NAME
  browse - Find and view classes and methods

SYNOPSIS
  browse [--scriptPath=<node-path>] [--help] [--select=<select-block>]
  [--staticList] <command> [<args>]

DESCRIPTION
  Browse is the primary command for finding and viewing classes
  and methods.

  The <command> is the name of a Browse command that invokes a
  specific development tool.

Commands:
  categories    List class categories
  category      Find and view lists of classes in a category
  configurations List configurations
  class         Find and view lists of classes
  diff          View differences between two methods
  list          View method definitions loaded from nodes
  method        Find and view lists of methods matching patterns
  package       Find and view lists of classes in a package
  packages      List packages
  project       Find and view lists of classes in a project
  references    Find and view lists of methods referencing certain artifacts
  sender        Find and view lists of methods sending particular messages
  source        Find and view strings in method source
  symbolDict    Find and view a list of classes in a symbol dictionary
  undeclared    View references to undeclared symbols
  variables     Find and view references to instance, class instance and class variables
  versions      Find and view versions of a method

Use `browse --help <command>` to read about a specific subcommand.

In general the Browse commands are available in popup menus under the `Browse`
submenu.
```


Debugger

```
× - □ CharacterCollection>>evaluateIn:symbolList:literalVars: (3)
evaluateIn: aContext symbolList: symbolList literalVars: litVarArray
  " If litVarArray is not nil, it must be an Array of
  Symbol,SymbolAssociation pairs
  and this Array will be searched prior to searching aSymbolList to
  resolve literal variables within the method.
  "

  | meth |
  meth := self
  _compileInContext: aContext
  symbolList: symbolList
  oldLitVars: litVarArray
  environmentId: 0.
  ^ meth _executeInContext: aContext

× - □ GsProcess(oop=274504705, status=debug, priori
1. Halt(AbstractException)>>_signalWith: @5 line 25
2. Halt class(AbstractException class)>>signal @3 line 5
3. SmallInteger(Object)>>halt @2 line 5
4. Executed Code
5. String(CharacterCollection)>>evaluateIn:symbolList:li
6. [] in TDSHELLTool>>eval @6 line 13
7. OrderedCollection(Collection)>>do: @5 line 10
8. TDSHELLTool>>eval @3 line 9
9. TDSHELLTool class(TDAbstractDevTool class)>>performCo
10. TDSHELLTool class(TDAbstractDevTool class)>>performC
11. [] in TDSHELLTool class>>eval @2 line 5
12. TDSHELLTool class(ExecBlock)>>cull:cull:cull:cull: @
13. TDTopezServer>>evaluateCommand:objIn: @18 line 22
14. TDTopezServer>>evaluateSTONCommand: @8 line 6
15. Executed Code
16. UndefinedObject(GsNMethod class)>>_gsReturnToC @1 li

× - □ 1: GemStone Shell: esug (esug:esug_ldi)
Welcome to tODE.
- Enter `help` for information on logging into GemStone.
- Enter `man --all` for information on tODE commands.
- Enter `project list` to get busy...
tode 1 > eval `1 halt`
a Halt occurred (error 2709)
tode 1 >

× - □ String(CharacterCollection)>>evaluateIn:symt
. -> String(CharacterCollection)>>evaluateIn:s
(context) -> aGsNMethod
(self) -> '1 halt'
aContext -> nil
symbolList -> aSymbolList( aSymbolDictionary( #'TDMetac
litVarArray -> anArray( )
meth -> aGsNMethod
.t1 -> nil
```

Debugger/Browser nesting

The screenshot displays a Smalltalk IDE interface with several panes:

- Hierarchy of Characters:** Shows a class hierarchy starting from `Object` down to `CharacterCollection`, which inherits from `SequenceableCollection`.
- CharacterCollection (6):** Shows instance variables for `CharacterCollection`, including `indexableSubclass: 'CharacterCollection'`, `instVarNames: #()`, `classVars: #()`, `classInstVars: #()`, `poolDictionaries: #()`, `inDictionary: 'Globals'`, and `category: 'Kernel'`.
- Instance for CharacterCollection:** Shows the current instance's state, including `debugItIn: literalVars:`, `evaluateIn: literalVars:`, `evaluateIn: symbolList: literalVars:`, `Accessing`, `_at:`, `numArgs`, and `Adding`.
- Class for CharacterCollection:** Shows the class's methods, including `findFirstInString: inSet: start:`, `newFrom:`, `squeak`, `readFrom:`, `Deprecated`, and `fromServerTextFile:`.
- Execution Stack:** Shows the current execution stack, including `CharacterCollection>>evaluateIn: symbolList: literalVars: (9)`, `GsProcess(oop=274495489, status=debug, priority=0)`, and `String(CharacterCollection)>>evaluateIn: symbolList: literalVars: (1)`.
- GemStone Shell:** Shows the command prompt with the command `eval '1 halt'` and the resulting error message `a Halt occurred (error 2709)`.

Inspector (navigator)

```
x - □ Inspect anArray( ( each.isFemale ), (each.numberOfChildren > 3)
.      -> Adam Francis Henrichs
..     -> anIdentitySet( Nic Kentland Addams, Adam Kentland Ad
(class)@ -> IXPerson
(oop)@   -> 180889857
antiqueCollection@ -> anIXAntiqueCollection[$428]
birthday@ -> 11/17/1955
birthTime@ -> 07:50:08
daughters@ -> aSet( Casey Mary Henrichs)
father@   -> Martin Kentland Henrichs
firstName@ -> 'Adam'
gender@   -> #'male'
isFemale@ -> false
isMale@   -> true
isMarried@ -> true
lastName@ -> 'Henrichs'
middleName@ -> 'Francis'
mother@   -> Sally Eloise Addams
nilField@ -> nil
numberOfChildren@ -> 2
sons@     -> aSet( Casey Charles Henrichs)
spouses@  -> nil
stringField@ -> 'flüße'
tags@     -> aSet( 'reading', 'magic', 'soccer', 'chess', 'cookin
unicodeField@ -> 'flüße'
```


git support

| Project Name | Commit Hash | Branch | URL |
|--------------------|--------------|---------------|-------------|
| + gsDevKitHome | 2446371 | [esug2014] | \$GS_HOME |
| + IndexTutorial | 2446371 | [esug2014] | filetree:// |
| Tode | 4fd9f0e | [dev] | filetree:// |
| FileTree | 2bd9ad5 | [gemstone2.4] | github://c |
| GLASS | 0.231 | [beta] | /export/or |
| GLASS1 | b7fea1d | [dev] | filetree:// |
| Gofer | 1.0.5.2 | [release] | http://sea |
| GoferProjectLoader | 1.0-alpha2.2 | [development] | http://sea |
| Grease | bc87401 | [master] | github://C |
| GsCore | 0.249 | [development] | /export/or |
| GsMisc | 0.243 | [release] | http://sea |
| GsMonticello | 0.244.2 | [release] | /export/or |
| GsOB | 0.242.1 | [release] | /export/or |
| GsSqueakCommon | 0.9.4 | [release] | http://sea |

- Browse
- Git**
 - branches
 - checkout
 - clone
 - diff
 - diff (cached)
 - fetch
 - pull
 - reset
 - status
- changes
- load
- log
- merge
- push
- revert
- save
- skew diff
- skew save

- Project
- Configuration
- Object
- Window

- Browse**
 - baseline
 - configuration
 - project entry
 - categories
 - classes
 - dirty packages
 - packages
 - repositories
 - tests
- Git
- changes
- load
- log
- merge
- push
- revert
- save
- skew diff
- skew save

- Project
- Configuration
- Object
- Window

git commit log browsing

```
x - □ c MetacelloMCProjectSpec>>ensureProjectLoaded (destination)['
loading
ensureProjectLoaded
  "Ensure that the MetacelloProject is loaded in image.
  projectClass == nil or requested version non-existent warrants a
project package load."

  "answer true if the projectClass exists"

  (self projectClass == nil
+   or: [
+     self versionOrNil == nil
+     or: [ (loader notNil or: [ self isMutable ]) and: [ self
loader ignoreImage ] ] ])
-   or: [ self versionOrNil == nil or: [ self loader ignoreImage ] ])
  ifTrue: [
    | pc |

```

```
x - □ History for MetacelloMCProjectSpec (9)
27122fa 1 year, 1 month ago move hasConflictWithBaseline
b3d41a8 1 year, 1 month ago Issue #181: initial test ca
19eef27 1 year, 4 months ago Issue #136: fine tune dist
23f420e 1 year, 5 months ago have to account for immuta
da3cdd1 1 year, 5 months ago proposed bugfix for Issue
64c2839 1 year, 6 months ago checkpoint ... write from
6cfed26 1 year, 11 months ago Issue #128: move more me
8432126 1 year, 11 months ago Issue #128: initial cut
4412143 2 years, 1 month ago fix a recently introduced
4d122a3 2 years, 1 month ago fix problem with project
1513727 2 years, 1 month ago baselines need to be ensu
cb79cb7 2 years, 1 month ago Issue #84: implementation
e7d2bee 2 years, 1 month ago Issue #30: implement repo:
34f7060 2 years, 1 month ago Issue #30: implement cache
2a6e3a2 2 years, 1 month ago Issue #40: work on getting
197d8bc 2 years, 1 month ago Issue #40 & Issue #42: imp
7b8886a 2 years, 1 month ago Issue #40: proposed imple

```

```
x - □ Changes for [23f420e] MetacelloMCProjectSpec (10)
c MetacelloMCProjectSpec>>ensureProjectLoaded (destination)
c repository/Metacello-MC.package/MetacelloMCProjectSpec.class/methodProperties.json (destination)
```

the Object-centric Development Environment (2014)

The screenshot displays the Object-centric Development Environment (ODE) interface, which is organized into several panes:

- Categories:** A list of project categories including `BaselineOfTode`, `Tode-AST-Extensions`, `Tode-BatchEdit-Tool`, `Tode-GemStone-Server-1`, `Tode-Server-TestTestTo`, `Topez-Common-Core`, `Topez-Common-Tests`, `Topez-Server-3x-DebugT`, `Topez-Server-Core`, `Topez-Server-DebugTool`, `Topez-Server-ProcessTo`, and `Topez-Server-TestDebu`.
- Classes in:** A list of classes including `MCTextWriter`, `MCDiffyTextWriter`, `TDCommandGetOpts`, `TDCommandLine`, `TDInteraction`, `TDChoice`, `TDConfirm`, `TDInform`, `TDText`, `TDMultiLineText`, `TDOpReference`, `TDSessionDescription`, and `TodeClientFlement`.
- Hierarchy of TDC:** Shows the class hierarchy starting from `Object` and including `TDCommandLine`.
- TDCommandLine (6):** Details for the `TDCommandLine` class, including its superclass (`Object`), instance variables (`commandLine`, `redirectTarget`, `tokens`, `argPtrs`), and methods (`hasSubCommand`, `classVars`, `classInstVars`, `poolDictionaries`).
- instance for TDC:** Lists instance variables for a `TDCommandLine` instance, including `--accessing`, `command`, `commandLine`, `redirectTarget`, `subCommand`, `--obsolete`, `getSubCommandLongOpts:short`, and `getSubCommandOpts:do:argsDc`.
- class for TDC:** Lists class variables for a `TDCommandLine` class, including `--instance creation`, `commandLine:redirectTarget:`, `--parsing`, `line:forEachCommand:`, `--private`, `isolate:`, and `scan:delim:`.
- TDCommandLine>>rawTokens (9):** Shows the `rawTokens` method implementation: `rawTokens tokens ifNil: [tokens := self tokenize: self commandLine]. ^ tokens`.
- Senders of commandLine (10):** Lists senders of the `commandLine` message, including `TDAbstractDevTool>>getSubcommandOptsMixedLongShort:`, `TDGemStoneTool>>olview`, `TDCommandLine>>getOpts:subOpts:optionsAndArguments:`, `TDCommandLine>>printOn:`, `TDCommandLine>>rawTokens`, `TDCommandLineTestCase>>test20`, and `TDTopezServer>>evaluateTopezScriptCommand:`.
- Terminal:** A terminal window titled "1: GemStone Shell: esug (esug:esug_ldi)" showing the `tode` environment. It displays a welcome message and instructions, followed by the command `project list` and its output: `[18 sz:0 SmallInteger] 2`.
- Projects (2):** A list of projects including `gsDevKitHome`, `IndexTutorial`, `Tode`, `FileTree`, `GLASS`, `[GLASS1]`, `Gofer`, `GoferProjectLoader`, `Grease`, `GsCore`, `GsMisc`, `GsMonticello`, `GsOB`, and `GsSqueakCommon`.

Status

- tODE was “released” as pre-alpha in June
 - I still need to write more documentation
 - roughly 1/2 of the commands will be rewritten
- this fall a Senior project at Hasso Plattner Institut will port tODE client to Squeak

GsDevkit (alpha)

- Open Source Development Kit for GemStone/S 64 Bit
 - GitHub project: <https://github.com/GsDevKit/gsDevKitHome>
 - set of installation and management scripts
 - Pharo/Squeak compatibility layer (GLASS)
 - support Seaside, Magritte, Pier, Zinc and other projects ported to GemStone/S
 - “FREE for commercial use” license
 - 2CPU, 2GB SPC, 50G repository

Resources

- GemTalk Systems
 - <http://gemtalksystems.com/>
- GsDevKit GitHub project
 - <https://github.com/GsDevKit/gsDevKitHome#open-source-development-kit-for-gemstones-64-bit->