

# Safarà – The 21<sup>th</sup> Century Editor

ESUG Innovation Technology Awards 2008

Luigi Panzeri

National Research Council  
IMATI, Pavia – Italy

[panzeri@imati.cnr.it](mailto:panzeri@imati.cnr.it)

Lukas Renggli

Software Composition Group  
University of Bern, Switzerland

[renggli@iam.unibe.ch](mailto:renggli@iam.unibe.ch)

June 29, 2008

## Abstract

Safarà is the missing editor of the Smalltalk IDE. The Safarà framework aims to provide a dialect agnostic and user-interface independent model of an extensible editor component. It should support in-image code editing to the level of today most powerful editors like Emacs, TextMate, and JEdit. Safarà aims to provide a fully object-oriented environment adding sophisticated editing capabilities to the traditional Smalltalk code browsers, as well as other application domains such as DSL editors, e-mail readers, web browsers, etc.

**Keywords.** Software Development Tools, Text Editor, Domain Specific Languages

## 1 Description

Safarà is a new editor component for the Smalltalk development environment. It provides built-in facilities for syntax-highlighting, auto-completion, text-expansion, text-folding, bookmarks, unlimited undo/redo, configurable keyboard bindings, etc. Furthermore Safarà aims to be highly extensible and freely configurable, so that it cannot only be used to edit Smalltalk code but any other textual or domain-specific language.

Safarà is inspired by a combination of different approaches based on classical literature about text editing [Fin99] and modern software design [ABW98] and conventions [Bec97]. Basic features and editing philosophy are inspired by the Emacs text editor, but not in terms of terminology and user interface conventions.

Safarà is currently developed in [Squeak](#) in a test-first approach. Safarà is sponsored by [Google Summer of Code 2008](#) as part of [The Squeak Project](#). A first release is scheduled by the end of August 2008. A running demo will be available at that time too.

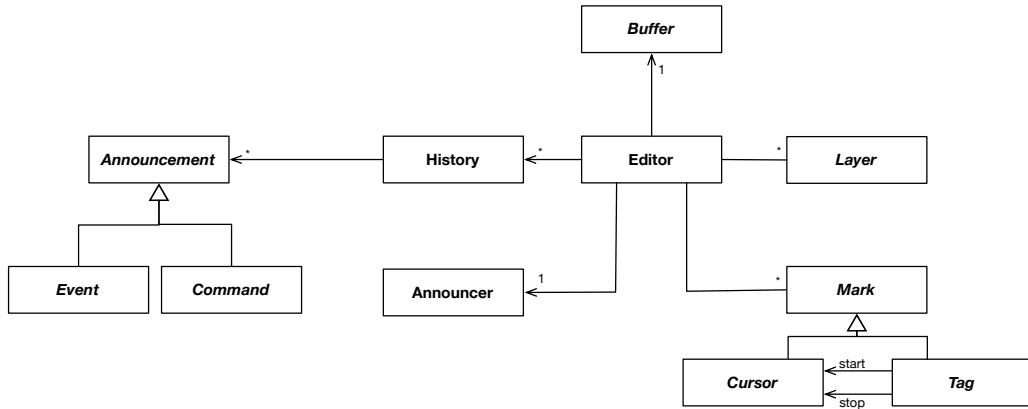


Figure 1: UML class diagram of Safarà.

## 2 Implementation

Figure 1 depicts the core object model of the Safarà editor framework. The object model does not depend on a specific user interface, and is completely separated from any view related code. As a first step we plan to build a morphic view that nicely integrates with the OmniBrowser framework [BDPW07].

**Buffers.** The buffer holds a sequence of editable objects. Usually this is a string of characters. Different implementations of the buffer, will be able to optimize for specific editing scenarios.

**Layers.** Layers are the central extension point of Safarà. Layers can be added and removed dynamically at runtime. Layers add functionality such as context dependent menus, text selection strategies, syntax highlighting, text folding, automatic indentation, etc.

**Languages.** A specific layer extension with a set of syntactic rules and related actions provides support for different languages. Syntactic rules are either specified using *parse-tree matchers* or regular expressions.

**Marks.** A *Cursor* is a pointer into the text, a *Tag* is a pointer to a range of text. Cursors and tags automatically move as text is inserted or deleted. Marks are used internally to represent the currently selected text and the location of the input-cursor. Marks are further used by layers to annotate parts of the text with custom objects. For example syntax highlighting information is added as a tag with color information, that is eventually used by the view to appropriately display the text.

**History.** Each edit operation is represented as an undoable command object. Commands are implemented as a subclass of *Announcement* and therefore interested parties can react to the execution by subscribing to specific events. The history object keeps a list of recently executed commands to be able to properly undo editing operations.

## 3 Impact

The editing capabilities are very weak in all today Smalltalk environments. With Safarà the community will gain a powerful editor that integrates well with the existing Smalltalk tools and that provides a better integrated development experience. Safarà does this by mixing the flexibility of the Smalltalk language with new helpers, that in many other languages are considered mandatory nowadays. The editor will not only be useful to Smalltalk developers, but thanks to its flexibility can enrich a wide variety of other applications. Furthermore Safarà will help lowering the barriers for new developers and will be helpful in advertising Smalltalk.

## 4 Links

The Safarà project is hosted on [SqueakSource](#), where you can find the complete source base. The community has a development [mailing-list](#) and a [subversion repository](#) with additional documentation about the software design.

## 5 License

Safarà is an Open Source software distributed under the MIT license, that grants unrestricted copy, redistribution, usage and embedding in both free and proprietary software.

## References

- [ABW98] Sherman R. Alpert, Kyle Brown, and Bobby Woolf. *The Design Patterns Smalltalk Companion*. Addison Wesley, 1998.
- [BDPW07] Alexandre Bergel, Stéphane Ducasse, Colin Putney, and Roel Wuyts. Meta-driven browsers. In *Advances in Smalltalk — Proceedings of 14th International Smalltalk Conference (ISC 2006)*, volume 4406 of *LNCS*, pages 134–156. Springer, August 2007.
- [Bec97] Kent Beck. *Smalltalk Best Practice Patterns*. Prentice-Hall, 1997.
- [Fin99] Craig A. Finseth. *The Craft of Text Editing*. Springer-Verlag New York, Inc., New York, NY, USA, 1999. <http://www.finseth.com/craft/>.