

# Toward efficient source code sharing on the Web

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## ABSTRACT

The Web is one of the useful references for developers to find pieces of code that represent what they need nowadays. In addition, we can find websites that contain not only source code but also detailed explanations of the code. In these websites, explanations are usually located above/below code, thereby users, who refer to these explanations, sometimes need to scroll a (browser) window to understand pieces of code reading the corresponding explanations. As a consequence, users have to temporarily memorize code and/or the corresponding expositions, wasting extra time. On the other hand, it is common to use wiki to edit a set of code and corresponding explanations. In most wiki systems, they prepare only one window to edit code and its explanations, therefore editors usually need to scroll the window to complete editing, also consuming extra time.

This paper proposes a special wiki system for reading and editing source code referring its explanations, called CodeWiki that provides multiple windows for editors to edit code and explanations. Besides, CodeWiki enables readers to click a link which will lead them to a window that contains corresponding explanations. As a consequence, readers and editors do not need to scroll a window, meaning that CodeWiki can prevent readers/editors from wasting extra time. We propose a prototype implementation of CodeWiki and show its usage.

## Categories and Subject Descriptors

J.1 [Computer Applications]: Education

## General Terms

Design

## Keywords

collaborative reading and editing, Wikis

## 1. INTRODUCTION

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With the growth of web based services, it has been common to refer to the Web to find what we want. Even for students for programmers, reviewing the Web for finding pieces of code that they want to learn or refer to is now usual. These websites usually contain explanations about pieces of code because showing only the code is a bit difficult for readers to understand. On the other hand, these websites are usually created and edited using Wiki [2] that serves as a means for quickly expressing ideas and share information. Wiki allows users to create and edit a hypertext on the fly [1]. Since the Wiki [3] provides special tags, which are easier than (X)HTML tags, editors can express their ideas quickly. However the expressiveness of editing is limited because of the limited kinds of tag. Therefore explanations may be located far from its corresponding pieces of code because wikis do not prepare tags to display contents in parallel. As a consequence, readers sometimes need to scroll a window to see pieces of code and the corresponding explanations, wasting extra time and preventing their understanding. In addition, current wikis usually provide a single window for editing contents, thereby editors may also need to scroll a window to complete editing when pieces of code occupy the single window, consuming extra time and leading to mistakes.

This paper proposes a special wiki for writing source code and its explanations, called CodeWiki that provides multiple windows for editors to edit pieces of code and its corresponding explanations: one is for pieces of code and another is for explanations, omitting scrolling a window and reducing unexpected mistakes. Besides, CodeWiki enables readers to click pieces of code with a link which will open a new window for the corresponding explanations. As a consequence, readers and writers do not need to scroll a window, reducing extra time. For this behavior, CodeWiki defines and provides special tags, and generate a link that connects pieces of code to the corresponding explanations. We proposes a prototype implementation of CodeWiki and show its usage.

## 2. AN OVERVIEW OF CODEWIKI

CodeWiki provides three additional functions to overcome current problems: multiple forms, special tags and opening explanations on the fly.

### 2.1 Introducing multiple forms

Adding additional structures (*e.g.*, a set of new tags) to current wikis is an option to reduce scroll a window. Once editors write pieces of code and corresponding explanations

<pre>public class Test { public static void main(String[] args) {   [1]   Foo foo = new Foo();   [/1]   [2]   System.out.println(foo.hello("Alice"));   [/2] } }</pre>	<pre>[1] Create an Foo object using new keyword [/1] [2] Invoke hello method passing String "Alice" [/2]</pre>
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Figure 1: An example of using new tags.

using the new structure in a single window, a wiki shows the pieces of code and corresponding explanations in parallel, reducing scrolling a window for readers. However, adding new structures forces editors to edit content with freedom that is an advantage of wikis compared to traditional markup languages (e.g., HTML). Therefore the new structures combined with other solution can be a potential solution to fulfill the requirement. Wiki-template [1] defines the core structural elements of a wiki page for an editor as a set of named source texts, which is similar to separate forms in HTML. CodeWiki borrows this idea from wiki-template, that is CodeWiki prepares two windows for editing as shown in Figure 1: the left side is for editing only source code and the right side is for editing only explanations. Once editors saves their editing, the CodeWiki engine generates a web content by combining source code and explanations.

## 2.2 Introducing Special tags

In CodeWiki, an editor writes pieces of code in left window while the corresponding explanations in right window. This means that editors need to connect an explanation to pieces of code explicitly because they are written in different window. In addition, editors sometimes need to specify the exact location to which explanations refer. To fulfill these requirements, CodeWiki provide new tags. A new tag forms a pair of `[_X]` and `[/_X]` where  $X = 1, 2, 3 \dots N$ . The explanations enclosed by this tag corresponds to pieces of code that are enclosed the same tag where  $X$  is equivalent. Figure 1 shows an example of using new tags. In this example, we use  $X=1$  and  $2$  as identifiers, meaning that the explanation enclosed by `[_X1]` and `[/_X1]` (i.e., Creation an Foo...) refers to pieces of code enclosed by `[_X1]` and `[/_X1]` (e.g., `Foo foo = ..`).

## 2.3 Appearing an explanation on the fly

As we have described, readers want to read pieces of code with its corresponding explanations without scrolling. However, not all readers always want to read all explanations because readers have their own purposes. Therefore it is not a good option to show all explanations from the beginning even if they are close to the corresponding pieces of code. Moreover too much information prevent readers from understanding.

To fulfill these requirements, CodeWiki displays explanations on the fly when readers click pieces of code that have a connection to corresponding explanations. Figure 2 is a screen-shot that shows how explanations appear using CodeWiki. There are no explanation that corresponds to pieces of code by default. Once readers click pieces of code, the corresponding explanations appear. When a couple of pieces of code where each pieces of code has different explanations are written sequentially, CodeWiki will change

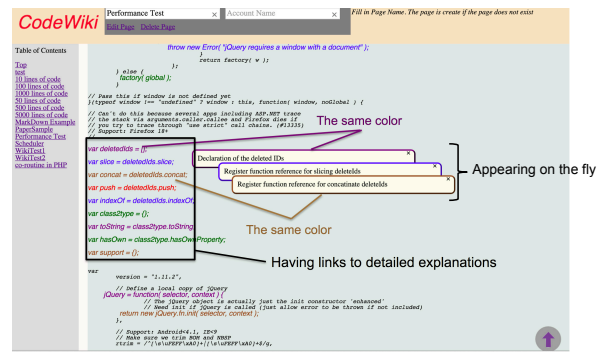


Figure 2: The main window of CodeWiki.

the each text color for readers to differentiate them. At the same time, the color of frame that encloses explanations is the same as that of corresponding pieces of code. It may sometimes happen that multiple explanations are overlapped because the explanation that corresponds to the last clicked pieces of code is shown foreground. In this case, readers can change the order by clicking explanations easily.

## 3. CONCLUSION

The Web has been one of the useful references for developers to find pieces of code. The websites usually contains pieces of code and corresponding explanations that are located above/below the code. Meanwhile, it is common to use the Wiki to share information easily. In most wikis, they provides only one window to edit contents, thereby editors need to write pieces of code and the corresponding explanation in the same window. Therefore, with current wikis, not only readers but also editors need to scroll a window to understand or write pieces of code and its explanations, wasting extra time.

This paper proposes a wiki called CodeWiki that focuses on editing and reading pieces of code with the corresponding explanations. CodeWiki provides multiple editing windows that separate content editing from structure editing: one is for editing pieces of code and another is for editing the corresponding explanations. At the same time, CodeWiki also provides a new tag that connects pieces of code to its corresponding explanations. As a result, CodeWiki enables editors to reduce scrolling a window when they edit contents. On the other hand, reading pieces of code with CodeWiki enables readers to show the corresponding explanations on the fly, enabling readers to choose whether they open explanations or not. As a consequence, readers are able to view pieces of code without scrolling window.

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