

TinyBlog: Building a Web Interface with Seaside

1.1 Previous Week Solution

You can load the solution of the previous week using the following snippet:

```
Metacello new
  smalltalkhubUser: 'PharoMooc' project: 'TinyBlog';
  version: #week3solution;
  configuration: 'TinyBlog';
  load
```

Make sure that you Teapot server is stopped.

```
TBTeapotWebApp stop
```

1.2 A Web UI for TinyBlog with Seaside

The work presented in this exercise does not require the one on Voyage and MongoDB.

This week, we start with a web UI dedicated to display posts to users. Next week, we will develop another web UI for the blog owner to administrate the posts. In both cases, we will define Seaside components <http://www.seaside.st> which has a freely available book online here: <http://book.seaside.st>.

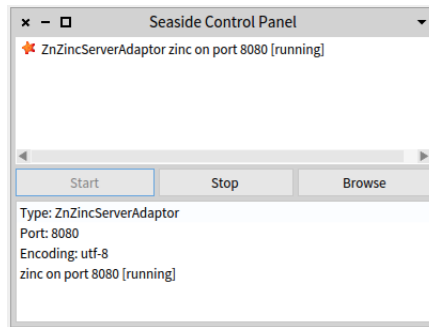


Figure 1.1 Start Seaside Server.

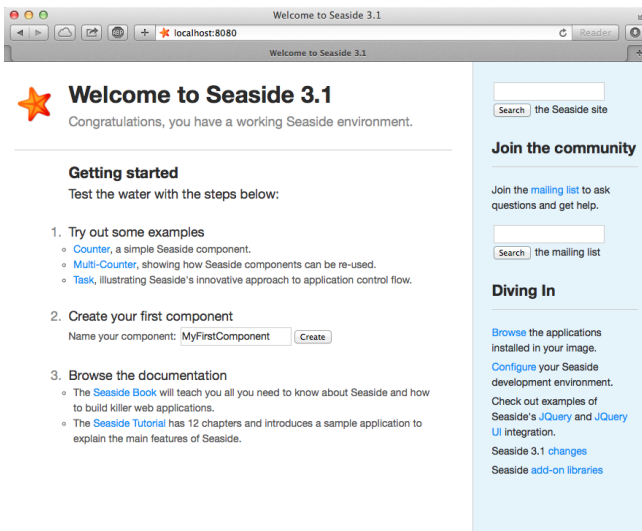


Figure 1.2 Accessing Seaside Home Page.

1.3 Start Seaside

There are two ways to start Seaside. The first one consists in executing the following code:

```
[ZnZincServerAdaptor startOn: 8080.
```

The second one uses the graphical tool named "Seaside Control Panel" (World Menu>Tools>Seaside Control Panel). In the contextual menu (right clic) of this tool, select "add adaptor..." and add a server of type ZnZincServer-Adaptor, then define the port number (e.g. 8080) it should run on (cf. figure 1.1). By opening a web browser on the URL <http://localhost:8080>, you should see the Seaside home page as displayed on Figure 1.2.

1.4 Entry Point for TinyBlog Web UI

Create a class named `TBApplicationRootComponent` which will be the entry point of the application.

```
[WComponent subclass: #TBApplicationRootComponent
  instanceVariableNames: ''
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

On class-side, we implement the `initialize` method in the 'initialization' protocol to declare the application to Seaside. We also integrate dependencies to the Bootstrap framework (CSS and JS files will be embedded in the application).

```
[TBApplicationRootComponent class >> initialize
  "self initialize"
  | app |
  app := WAAdmin register: self asApplicationAt: 'TinyBlog'.
  app
    addLibrary: JQDeploymentLibrary;
    addLibrary: JQUIDeploymentLibrary;
    addLibrary: TBSDeploymentLibrary
```

Once declared, you should execute this method with `TBApplicationRootComponent initialize`. Indeed, class-side `initialize` methods are executed at loading-time of a class but since the class already exists, we must execute it by hand.

We also add a method named `canBeRoot` to specify that `TBApplicationRootComponent` is not a simple Seaside component but a complete application. This component will be automatically instantiated when a user connects to the application.

```
[TBApplicationRootComponent class >> canBeRoot
  ^ true
```

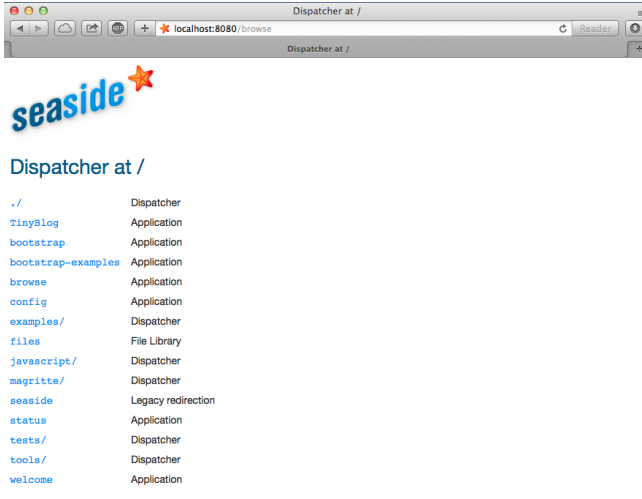


Figure 1.3 TinyBlog is a Registered Seaside Application.

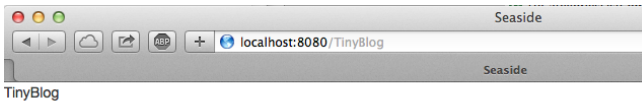


Figure 1.4 Your First Seaside Web Page.

You can verify that your application is correctly registered by Seaside by connecting to the Seaside server through your web browser, click on "Browse the applications installed in your image" and then see that TinyBlog appears in the list. Alternatively, you can visit `http://localhost:8080/TinyBlog`.

1.5 First Simple Rendering

Let's add an instance method named `renderContentOn:` in rendering protocol to make our application displaying something.

```
TBApplicationRootComponent >> renderContentOn: html
    html text: 'TinyBlog'
```

If you open `http://localhost:8080/TinyBlog` in your web browser, the page should look like the one on figure 1.4.

You can customize the web page header and declare it as HTML 5 compliant by redefining the `updateRoot:` method.

```
TBApplicationRootComponent >> updateRoot: anHtmlRoot
    super updateRoot: anHtmlRoot.
    anHtmlRoot beHtml5.
    anHtmlRoot title: 'TinyBlog'.
```

The `title: message` is responsible for setting the page title, as can be seen in your web browser's title bar. The `TBApplicationRootComponent` component is the root component of our application. It will not display a lot of things but will contain and display other components. For example, a component to display posts to the blog readers, a component to administrate the blog and its posts, ... Therefore, we decided that the `TBApplicationRootComponent` component will contain components inheriting from the abstract class named `TBScreenComponent` that we will now define.

1.6 Visual Components for TinyBlog

We are now ready to define multiple visual components for our application. The first chapters of <http://book.seaside.st> can help you and give more details than this tutorial if needed.

Figure 1.5 shows the different components to develop and where they are taking place.

TBScreenComponent Component

All components contained in `TBApplicationRootComponent` will be subclasses of the abstract class `TBScreenComponent`. This class allows us to factorize shared behaviors between all our components.

```
WComponent subclass: #TBScreenComponent
    instanceVariableNames: ''
    classVariableNames: ''
    package: 'TinyBlog-Components'
```

All components need to access the model of our application. Therefore, in the 'accessing' protocol, we add a `blog` method that returns an instance of `TBBlog` (here the singleton).

```
TBScreenComponent >> blog
    "Return the current blog. In the future we will ask the
    session to return the blog of the currently logged in user."
    ^ TBLog current
```

Inspect now the `blog` object returned by `TBLog current` and verify that it contains some posts. If it does not, execute: `TBLog createDemoPosts`.

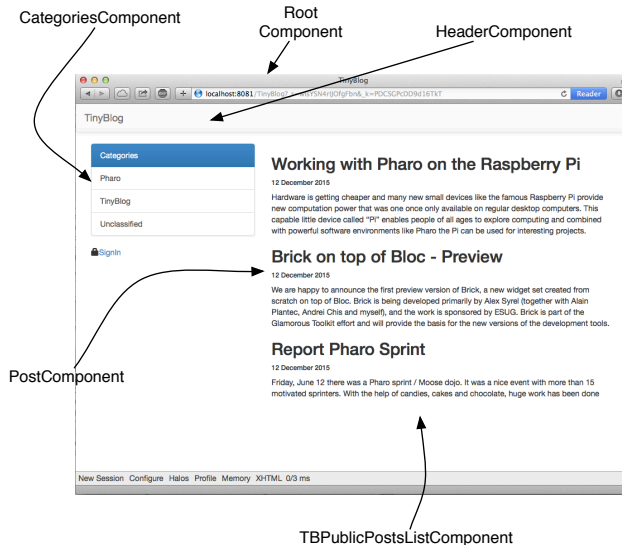


Figure 1.5 TinyBlog Components.

In the future, if you want to manage multiple blogs, you will need to modify this method and use information stored in the active session to retrieve the current user/blog (cf. `TBSession` later on).

1.7 Bootstrap for Seaside

The Bootstrap library is accessible from Seaside as we will see. If you access the Seaside Bootstrap application in your web browser (**bootstrap** link in the list of Seaside application or directly through <http://localhost:8080/bootstrap>) you can see several examples as shown in figure 1.6.

If you click on the **Examples** link at the bottom of the web page you can see some graphical elements and their respective code to integrate them in your application (cf. figure 1.7).

Bootstrap

The Seaside Bootstrap library code and documentation is available here: <http://smalltalkhub.com/#!/~TorstenBergmann/Bootstrap>. There is also an online demo here: <http://pharo.pharocloud.com/bootstrap>. This library is already loaded in the PharoWeb image used in this tutorial.

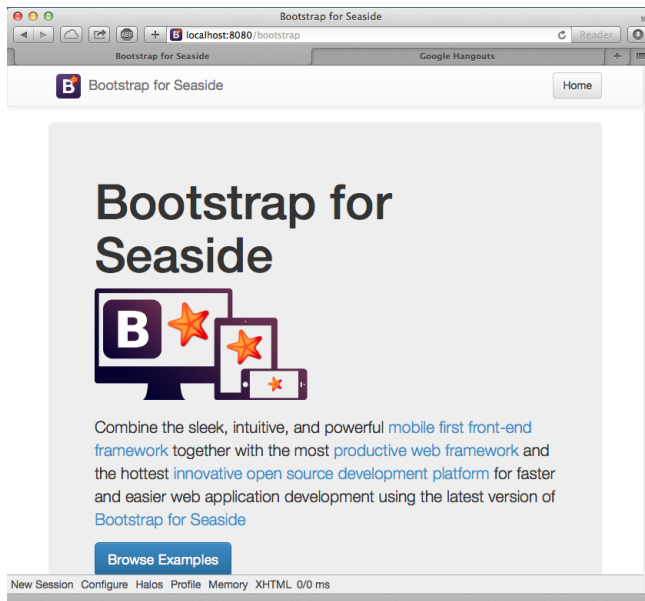


Figure 1.6 Bootstrap Library.

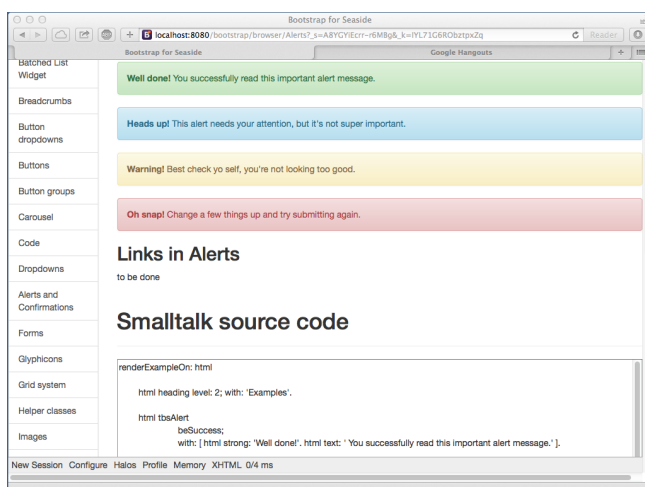


Figure 1.7 Bootstrap Elements and their code.

1.8 Definition of TBHeaderComponent

Let's define a component to display the top of all components in our application.

```
WComponent subclass: #TBHeaderComponent
  instanceVariableNames: ''
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

The 'rendering' protocol contains the `renderContentOn:` method that displays our application header.

```
TBHeaderComponent >> renderContentOn: html
  html tbsNavbar beDefault with: [
    html tbsNavbarBrand
      url: '#';
      with: 'TinyBlog' ]
```

Our header is a simple navigation bar of Bootstrap (See Figure 1.8)

By default, in Bootstrap navigation bars, there is a link on `tbsNavbarBrand`. Since we consider that useless in our application, we used a '#' anchor. Now, when the user clicks on the title link, nothing happens.

Usually, clicking on an application title brings back the user to the web application home page.

1.9 Header Use

It is not desirable to instantiate the `TBHeaderComponent` each time a component is called. So, we add an instance variable named `header` in the `TBScreenComponent` component and initializes it in its `initialize` method.

```
WComponent subclass: #TBScreenComponent
  instanceVariableNames: 'header'
  classVariableNames: ''
  package: 'TinyBlog'

TBScreenComponent >> initialize
  super initialize.
  header := TBHeaderComponent new.
```

Composite-Component relationship

In Seaside, subcomponents of a component must be returned by the composite when sending it the `children` message. So, we must define that the `TBHeaderComponent` instance is a children of the `TBScreenComponent` component in the Seaside component hierarchy (and not in the Pharo classes hierarchy). We do so by specializing the method `children`.

1.10 Using the Screen Component in our Application

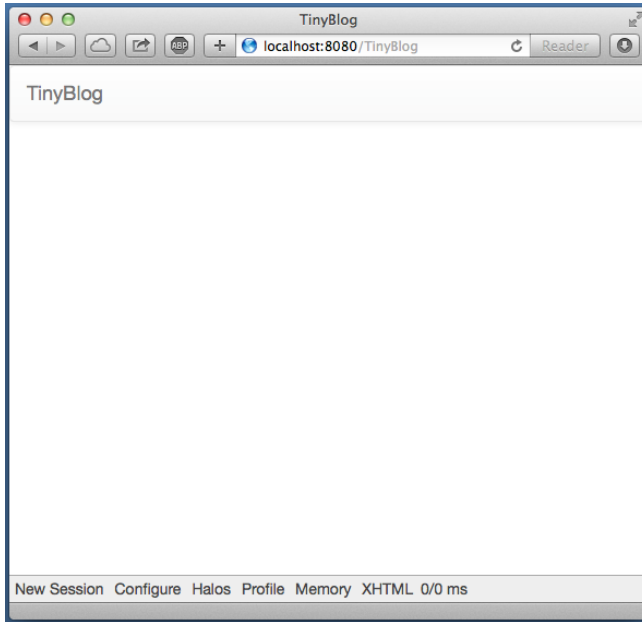


Figure 1.8 TinyBlog Application with a Header Navigation Bar.

```
TBScreenComponent >> children
  ^ OrderedCollection with: header
```

In the `renderContentOn:` method ('rendering' protocol), we can now display the subcomponent (the header):

```
TBScreenComponent >> renderContentOn: html
  html render: header
```

1.10 Using the Screen Component in our Application

Temporarily, we will directly use the `TBScreenComponent` while we develop other components. So, we instantiate it in `initialize` method and store it in the instance variable `main`.

```
TBApplicationRootComponent >> initialize
  super initialize.
  main := TBScreenComponent new.

TBApplicationRootComponent >> renderContentOn: html
  html render: main
```

We declare the containment relationship by returning `main` as children of `TBApplicationRootComponent`.

```
[ TBAApplicationRootComponent >> children
  ^ { main }
```

If you refresh your application in a web browser, you should obtain what is depicted on Figure 1.8.

Possible Enhancements

The blog name should be customizable using an instance variable in the TB-Blog class and the application header component should display this title.

1.11 List of Posts

We will now display the list of all posts - which is the primary goal in fact. Remember that we speak about the public access to the blog here and not the administration interface that will be developed later.

Let's create a TBPostsListComponent inheriting from TBScreenComponent:

```
[ TBScreenComponent subclass: #TBPostsListComponent
  instanceVariableNames: ''
  classVariableNames: ''
  package: 'TinyBlog-Components'
```

Add a temporary renderContentOn: method (in the 'rendering' protocol) to test during development (cf. Figure 1.9).

```
[ TBPostsListComponent >> renderContentOn: html
  super renderContentOn: html.
  html text: 'Blog Posts here !!!'
```

Add this new component in the root application component:

```
[ TBAApplicationRootComponent >> initialize
  super initialize.
  main := TBPostsListComponent new.
```

Modifying this method is not a good practice so we add a setter method to dynamically change the component to display in the future. But, we keep that by default the TBPostsListComponent component will be displayed.

```
[ TBAApplicationRootComponent >> main: aComponent
  main := aComponent
```

1.12 A Post Component

Now we will define TBPostComponent to display the details of a post. Each post will be graphically displayed by an instance of TBPostComponent which will show the post title, its date and its content.

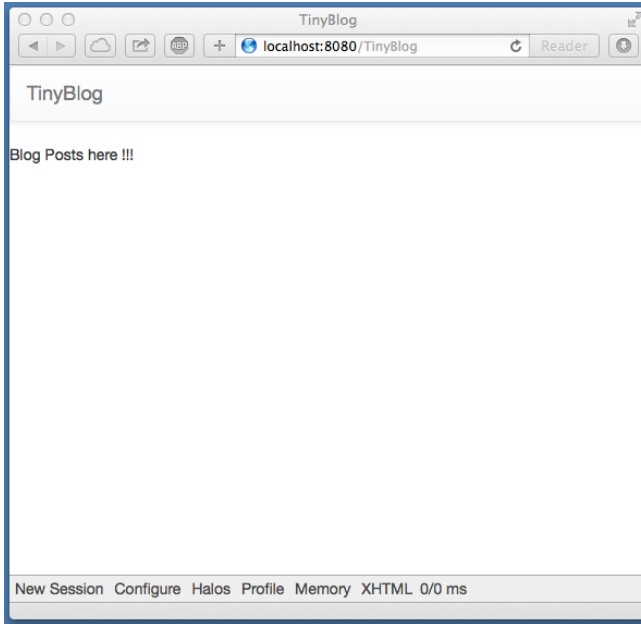


Figure 1.9 TinyBlog with a First List of Posts Component.

```

[ WAComponent subclass: #TBPPostComponent
  instanceVariableNames: 'post'
  classVariableNames: ''
  package: 'TinyBlog-Components'

[ TBPPostComponent >> initialize
  super initialize.
  post := TBPPost new.

[ TBPPostComponent >> title
  ^ post title

[ TBPPostComponent >> text
  ^ post text

[ TBPPostComponent >> date
  ^ post date

```

The `renderContentOn:` method defines the HTML rendering of a post.

```

[ TBPPostComponent >> renderContentOn: html
  html heading level: 2; with: self title.
  html heading level: 6; with: self date.
  html text: self text

```

About HTML Forms

Next week, we will develop the administration web UI using Magritte and this will demonstrate that it is not common at all to manually develop components as we explained above. Indeed, Magritte is used to describe model data and then offers automatic Seaside component generators. As we will see, all the code of the previous section could be done just with:

```
TBPostComponent >> renderContentOn: html
    "DON'T WRITE THIS YET"
    html render: post asComponent
```

1.13 Display Posts

To display all visible posts in the database, we just need to modify the `TBPostsListComponent` >> `renderContentOn: method:`

```
TBPostsListComponent >> renderContentOn: html
    super renderContentOn: html.
    self blog allVisibleBlogPosts do: [ :p |
        html render: (TBPostComponent new post: p) ]
```

Refresh your web browser and you should get an error.

1.14 Debugging Errors

By default, when an error occurs in a web application, Seaside returns an HTML page with the error message. You can change this message or during development, you can configure Seaside to open a debugger directly in Pharo IDE. To configure Seaside, just execute the following snippet:

```
(WAAdmin defaultDispatcher handlerAt: 'TinyBlog')
    exceptionHandler: WADebugErrorHandler
```

Now, if you refresh the web page in your browser, a debugger should open on Pharo side. If you analyze the stack, you should see that we forgot to define the following method:

```
TBPostComponent >> post: aPost
    post := aPost
```

You can define this method in the debugger using the **Create** button. After that, press the **Proceed** button. The web application should now correctly renders what is shown in Figure 1.10.

1.15 Displaying the List of Posts with Bootstrap

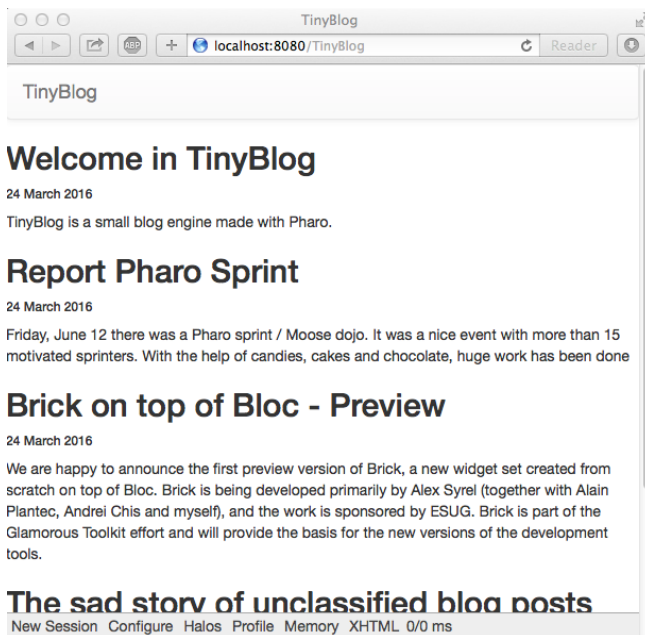


Figure 1.10 TinyBlog with a List of Posts.

1.15 Displaying the List of Posts with Bootstrap

Let's use Bootstrap to make the list of posts more beautiful using a Bootstrap container.

```
TBPostsListComponent >> renderContentOn: html
  super renderContentOn: html.
  html tbsContainer: [
    self blog allVisibleBlogPosts do: [ :p |
      html render: (TBPostComponent new post: p) ] ]
```

Your web application should look like Figure 1.11.

1.16 Displaying Posts by Category

Posts are classified into categories. By default, a post is classified into a special category named "Unclassified" if nothing is specified.

We will now create a new component named `TBCategoriesComponent` to manage the list of categories.

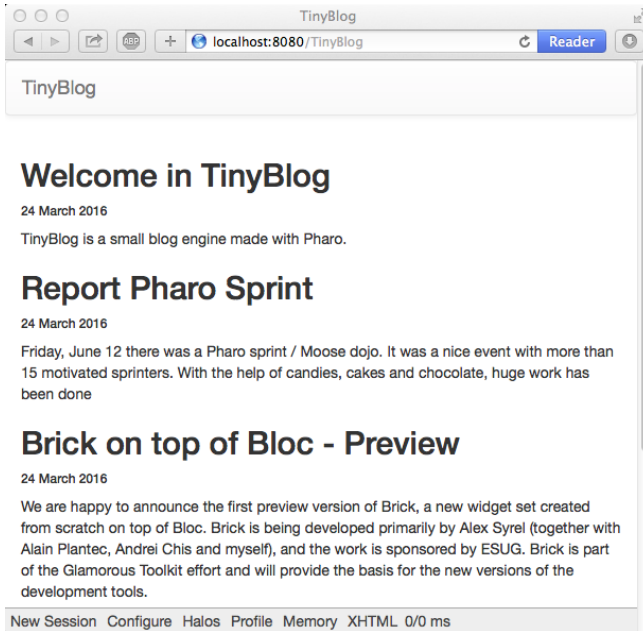


Figure 1.11 TinyBlog with a Bootstrap List of Posts.

Category Component Definition

TBCategoriesComponent is responsible to display the list of all categories available in the database (the model) and also to select one category. This component should be able to communicate with the TBPostsListComponent to pass it the currently selected category.

```
WComponent subclass: #TBCategoriesComponent
  instanceVariableNames: 'categories postsList'
  classVariableNames: ''
  package: 'TinyBlog-Components'

TBCategoriesComponent >> categories
  ^ categories

TBCategoriesComponent >> categories: aCollection
  categories := aCollection

TBCategoriesComponent >> postsList: aComponent
  postsList := aComponent

TBCategoriesComponent >> postsList
  ^ postsList
```

On class-side, we define a creation method.

```
TBCategoriesComponent class >> categories: aCollectionOfCategories
    postsList: aTBScreen
    ^ self new categories: aCollectionOfCategories; postsList:
        aTBScreen
```

The `selectCategory: method (protocol 'action')` communicates the currently selected category to the `TBPostsListComponent`.

```
TBCategoriesComponent >> selectCategory: aCategory
    postsList currentCategory: aCategory
```

In `TBPostsListComponent`, we now add an instance variable to store the current category.

```
TBScreenComponent subclass: #TBPostsListComponent
    instanceVariableNames: 'currentCategory'
    classVariableNames: ''
    package: 'TinyBlog-Components'
```

```
TBScreenComponent >> currentCategory
    ^ currentCategory
```

```
TBScreenComponent >> currentCategory: anObject
    currentCategory := anObject
```

1.17 Category Rendering

We add a rendering method ('rendering' protocol) to display one category. A category is rendered as a link and that makes this category the current one if the user clicks on it.

```
TBCategoriesComponent >> renderCategoryLinkOn: html with: aCategory
    html tbsLinkifyListGroupItem
        callback: [ self selectCategory: aCategory ];
        with: aCategory
```

Finally, the `renderContentOn: method` of the `TBCategoriesComponent` is now straightforward, it just iterates over all categories and renders them using bootstrap brushes:

```
TBCategoriesComponent >> renderContentOn: html
    html tbsListGroup: [
        html tbsListGroupItem
            with: [ html strong: 'Categories' ].
        categories do: [ :cat |
            self renderCategoryLinkOn: html with: cat ]]
```

It remains to display the list of categories in the root application component and refresh the list of displayed posts regarding the currently selected category.

1.18 Refreshing the List of Posts

We have to modify some methods of `TBPostsListComponent`.

First, the `readSelectedPosts` method returns the posts to display. If the current category is `nil`, it means that the user did not select any category yet and all visible posts of the database are displayed. If the user has selected a category, only posts of this category are displayed.

```
TBPostsListComponent >> readSelectedPosts
  ^ self currentCategory
    ifNil: [ self blog allVisibleBlogPosts ]
    ifNotNil: [ self blog allVisibleBlogPostsFromCategory: self
currentCategory ]
```

Then, the method that renders the list of posts can be modified as follows:

```
TBPostsListComponent >> renderContentOn: html
  super renderContentOn: html.
  html render: (TBCategoriesComponent
    categories: (self blog allCategories)
    postsList: self).
  html tbsContainer: [
    self readSelectedPosts do: [ :p |
      html render: (TBPostComponent new post: p) ] ]
```

An instance of `TBCategoriesComponent` is rendered on the web page and allows users to select a category (See Figure 1.12).

1.19 Look and Layout

We will improve the layout of `TBPostsListComponent` using a responsive design for the list of posts. It means that the CSS will adapt the component size and placement based on the available space.

Components are displayed inside two Bootstrap containers in a row and two columns. Column width is determined according to the resolution (viewport) of the displaying device. The 12 columns of the Bootstrap grid are splitted between the list of categories and list of posts. If a low resolution is used, the list of categories will be above the list of posts (each lists will occupy 100% of the width of the container).

```
TBPostsListComponent >> renderContentOn: html
  super renderContentOn: html.
  html tbsContainer: [
    html tbsRow showGrid;
    with: [
      html tbsColumn
        extraSmallSize: 12;
        smallSize: 2;
```

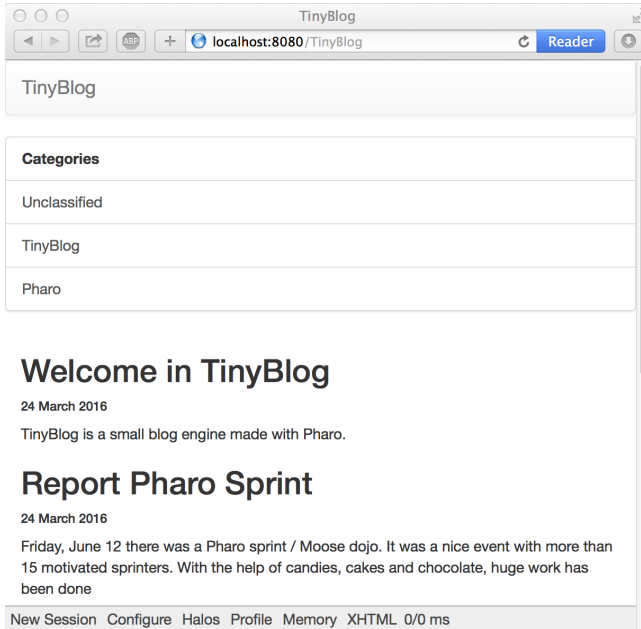



Figure 1.12 Select a Category to Filter Posts.

```

        mediumSize: 4;
        with: [
            html render: (TBCategoriesComponent
                categories: (self blog allCategories)
                postsList: self) ].
    html tbsColumn
        extraSmallSize: 12;
        smallSize: 10;
        mediumSize: 8;
        with: [
            self readSelectedPosts do: [ :p |
                html render: (TBPostComponent new post: p) ] ] ] ]

```

You should now obtain the same look as in Figure 1.13.

When you select a category, the list of posts is correctly refreshed. However, the current category is not highlighted. To introduce this feature, we modify the following method:

```

TBCategoriesComponent >> renderCategoryLinkOn: html with: aCategory
    html tbsLinkifyListGroupItem
        class: 'active' if: aCategory = self postsList currentCategory
        ;
        callback: [ self selectCategory: aCategory ];
        with: aCategory

```

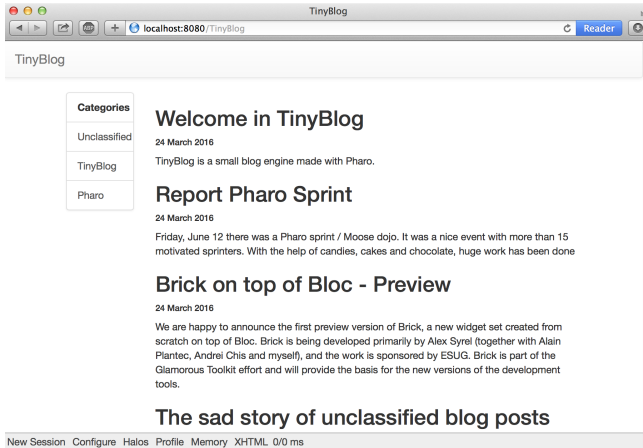


Figure 1.13 TinyBlog with a Responsive Design.

The application works well but you must not keep the current implementation of `TBPostsListComponent >> renderContentOn: html`. This method is too long and cannot be easily reused. Propose a solution.

1.20 Our Solution: Small Methods

```
TBPostsListComponent >> renderContentOn: html
    super renderContentOn: html.
    html
        tbsContainer: [
            html tbsRow
                showGrid;
                with: [ self renderCategoryColumnOn: html.
                        self renderPostColumnOn: html ] ]

TBPostsListComponent >> renderCategoryColumnOn: html
    html tbsColumn
        extraSmallSize: 12;
        smallSize: 2;
        mediumSize: 4;
        with: [ self basicRenderCategoriesOn: html ]

TBPostsListComponent >> basicRenderCategoriesOn: html
    ^ html render: (TBCategoriesComponent
        categories: self blog allCategories
        postsList: self)

TBPostsListComponent >> renderPostColumnOn: html
    html tbsColumn
```

1.21 Possible Enhancements

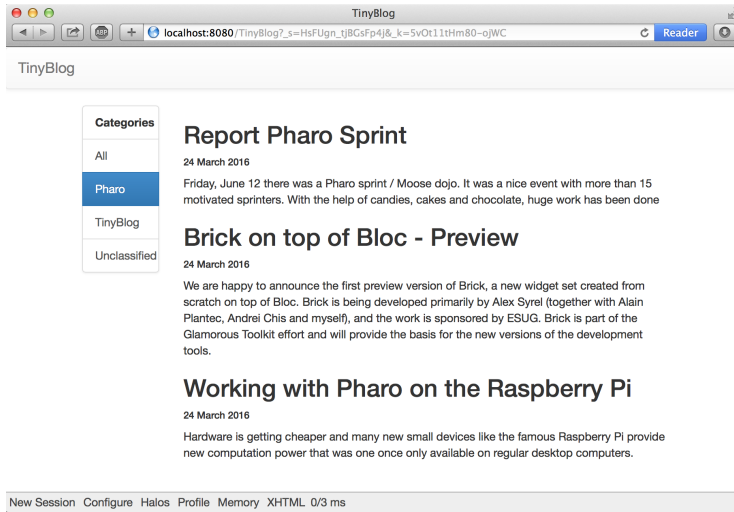


Figure 1.14 Final TinyBlog Public UI.

```
extraSmallSize: 12;
smallSize: 10;
mediumSize: 8;
with: [ self basicRenderPostsOn: html ]

TBPostsListComponent >> basicRenderPostsOn: html
^ self readSelectedPosts do: [ :p |
    html render: (TBPostComponent new post: p) ]
```

We are now ready to define a administrative UI for TinyBlog.

1.21 Possible Enhancements

For example, you can:

- sort categories by name
- add a link named 'All' in the list of categories to display all visible posts regardless of their category

Figure 1.14 shows the final application you may have developed.