CHAPTER 8

Starting the SimpleSite Tutorial

Note You can download the source code for this chapter from `http://www.apress.com`.

You've now learned about many of the most important components of an application. The previous chapters have been fairly detailed, so don't worry if you haven't understood everything you've read or if you've skipped over one or two sections. Once you have used Pylons a little more, you will appreciate having all the information on a particular topic in one place, even if it seems a lot to take in on the first reading.

In this chapter, I'll recap many of the important points as I show how to create a simple web site from scratch so that you can see how all the components you've learned about in the preceding chapters fit together. The example will be created in a way that will also make it a really good basis for your own Pylons projects.

You'll use SQLAlchemy to store the individual pages in the site in such a way that users can add, edit, or remove them so that the application behaves like a simple wiki. Each of the pages will also support comments and tags, so you can use some of the knowledge gained in the previous chapter to help you create the application. You'll also use FormEncode and HTML Fill to handle the forms.

Later in the book you'll return to SimpleSite and add authentication and authorization facilities, and you'll add a navigation hierarchy so that pages can be grouped into sections at different URLs. You'll implement some JavaScript to animate messages and use some Ajax to populate one of the form fields. The application will also have a navigation hierarchy so that you can see how to create navigation components such as breadcrumbs, tabs, and navigation menus using Mako.

Figure 8-1 shows what the finished application will look like after the SimpleSite tutorial chapters (this chapter, Chapter 14, part of Chapter 15, and Chapter 19).

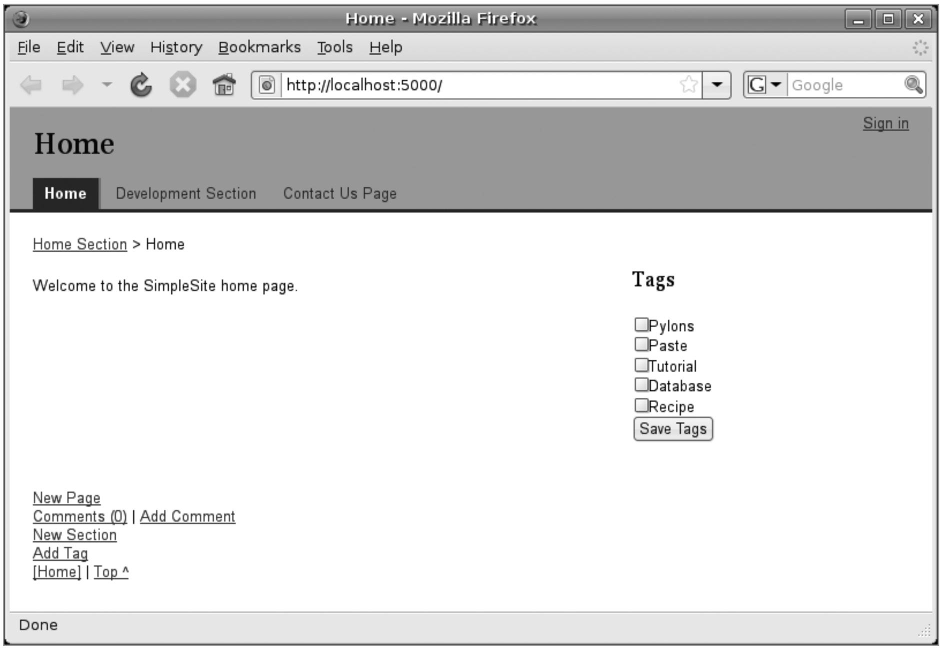


Figure 8-1. *The finished wiki with a customized front page*

Getting Started with SimpleSite

The first thing you need to do is create a new Pylons project called `SimpleSite`. You'll remember from Chapter 3 that the command to do this is as follows:

```
$ paster create --template=pylons SimpleSite
```

You'll use Mako and SQLAlchemy in this chapter, so in particular note that you need to answer `True` to the SQLAlchemy question so that SQLAlchemy support is included for you:

```
Selected and implied templates:
  Pylons#pylons  Pylons application template

Variables:
  egg:      SimpleSite
  package:  simplesite
  project:  SimpleSite
Enter template_engine (mako/genshi/jinja/etc: Template language) ['mako']:
Enter sqlalchemy (True/False: Include SQLAlchemy 0.4 configuration) [False]: True
Creating template pylons
```

All these options are configurable later, but it is easier to have Pylons configure them for you when you create the project.

Once the application template has been created, start the server, and see what you have:

```
$ cd SimpleSite
$ paster serve --reload development.ini
```

Note Notice that the server is started with the `--reload` switch. You'll remember that this means any changes you make to the code will cause the server to restart so that your changes are immediately available for you to test in the web browser.

If you visit `http://127.0.0.1:5000`, you will see the standard Pylons introduction page served from the application's `public/index.html` file as before.

Pylons looks for resources in the order applications are specified in the cascade object in `config/middleware.py`. You'll learn more about the cascade object in Chapter 17, but it causes static files such as the introduction page to be served in preference to content generated by your Pylons controllers for the same URL. You will want the SimpleSite controllers to handle the site's home page, so remove the welcome page HTML file:

```
$ cd simplesite
$ rm public/index.html
```

If you now refresh the page, the Pylons built-in error document support will kick in and display a 404 Not Found page to tell you that the URL requested could not be matched by Pylons.

You'll now customize the controller so that it can display pages. Each of the pages is going to have its own ID, which the controller will obtain from the URL. Here are some example URLs that the controller will handle:

```
/page/view/1
/page/view/2
... etc
/page/view/10
```

You'll also recall that Pylons comes with a routing system named Routes, which you saw in Chapter 3 and will learn about in detail in the next chapter. The default Routes setup analyzes the URL requested by the browser to find the controller, action, and ID. This means that to handle the URLs, you simply need a controller named `page` that has an action named `view` and that takes a parameter named `id`.

Let's create the page controller. Once again, Pylons comes with a tool to help with this in the form of a plug-in to Paste. You create the controller like this (notice that the command doesn't include the `create` part, which is used when creating a project template):

```
$ paster controller page
Creating /Users/james/Desktop/SimpleSite/simplesite/controllers/page.py
Creating /Users/james/Desktop/SimpleSite/simplesite/tests/functional/test_page.py
```

This creates two files—one for any tests you are going to add for this controller (see Chapter 12) and the other for the controller itself. The command would also add these files to Subversion automatically if your Pylons application were already being managed in a Subversion repository.

The `controllers/page.py` file that is added looks like this:

```
import logging

from pylons import request, response, session, tmpl_context as c
from pylons.controllers.util import abort, redirect_to

from simplesite.lib.base import BaseController, render
#import simplesite.model as model

log = logging.getLogger(__name__)

class PageController(BaseController):
    def index(self):
        # Return a rendered template
        #   return render('/template.mako')
        # or, Return a response
        return 'Hello World'
```

This is a skeleton controller that you'll customize to handle pages. The first few lines import some of the useful objects described in Chapter 3 so that they are ready for you to use. The controller itself has one action named `index()`, which simply returns a `Hello World` message.

Replace the `index()` action with a `view()` action that looks like this:

```
def view(self, id):
    return "Page goes here"
```

The Paste HTTP server should reload when you save the change (as long as you used the `--reload` option), so you can now visit the URL `http://localhost:5000/page/view/1`. You should see the message `Page goes here`.

The page isn't very exciting so far and isn't even HTML, so now I'll cover how to create some templates to generate real HTML pages.

Exploring the Template Structure

Most web sites have the following features:

- Header and footer regions
- Sign-in and sign-out regions
- Top-level navigation tabs
- Second-level navigation tabs
- A page heading
- Breadcrumbs
- Content
- A head region for extra CSS and JavaScript

The SimpleSite application will need all these features too, so the template structure needs to be able to provide them.

You'll remember from Chapter 5 that Pylons uses the Mako templating language by default, although as is the case with most aspects of Pylons, you are free to deviate from the default if you prefer. This is particularly useful if you are building a Pylons application to integrate with legacy code, but since you are creating a new application here, you are going to use Mako.

Because you are going to need a few templates that will all look similar, you can take advantage of Mako's inheritance chain features you learned about in Chapter 5 and use a single base template for all the different pages. You'll also need to create some derived templates and some templates containing the navigation components.

You'll structure these templates as follows:

`templates/base`: All the base templates.

`templates/derived`: All the templates that are derived from any of the base templates. There is likely to be a subdirectory for every controller you create. Since Pylons has already created an `error` controller, you'll create a subdirectory for it, and you'll need a subdirectory for the `page` controller templates too.

`templates/derived/error`: Templates for the `error` controller to render error documents.

`templates/component`: Any components that are used in multiple templates.

This structure is useful because it keeps templates that serve different purposes in different directories. If you are following along by creating the application yourself, you should create these directories now.

Let's start by creating the base template. Save the following template as `templates/base/index.html`:

```
## -*- coding: utf-8 -*-

<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01//EN"
"http://www.w3.org/TR/html4/strict.dtd">
<html>
<head>
    <title>${self.title()}</title>
    ${self.head()}
</head>
<body>
    ${self.header()}
    ${self.tabs()}
    ${self.menu()}
    ${self.heading()}
    ${self.breadcrumbs()}
    ${next.body()}
    ${self.footer()}
</body>
</html>

<%def name="title()">SimpleSite</%def>
<%def name="head()"></%def>
<%def name="header()"><a name="top"></a></%def>
<%def name="tabs()"></%def>
<%def name="menu()"></%def>
<%def name="heading()"><h1>${c.heading or 'No Title'}</h1></%def>
<%def name="breadcrumbs()"></%def>
<%def name="footer()"><p><a href="#top">Top ^</a></p></%def>
```

This template should be fairly self-explanatory. It is a simple HTML document with eight defs defined. Each of the calls to `${self.somedef()}` will execute the def using either the definition in this base template or the definition in the template that inherits from it. The `${next.body()}` call will be replaced with the body of the template that inherits this one.

You'll also see that the `header()` and `footer()` defs already contain some HTML, allowing the user to quickly click to the top of the page. The `title()` def contains some code that will set the title to SimpleSite, and the `heading()` def will obtain its content from the value of `c.heading` or will just use `'No title'` if no heading has been set.

`## -*- coding: utf-8 -*-` has been added at the top of the file so that Unicode characters can be used when the template is saved as UTF-8 (you'll learn more about Unicode in Chapter 10).

Note If you prefer using the `strict_c` option to ensure that accessing an attribute of the template context global raises an exception if that attribute doesn't exist, you should change the content of the `heading` def to look like this:

```
<h1>${hasattr(c, 'heading') and c.heading or 'No Title'}</h1>
```

This ensures that the `heading` attribute exists before testing its value.

Now that the base template is in place, you can start creating the templates for the web site content. Create a new template in the `templates/derived/page` directory called `view.html`. This will be the template used by the `page` controller's `view` action. Add the following content to it:

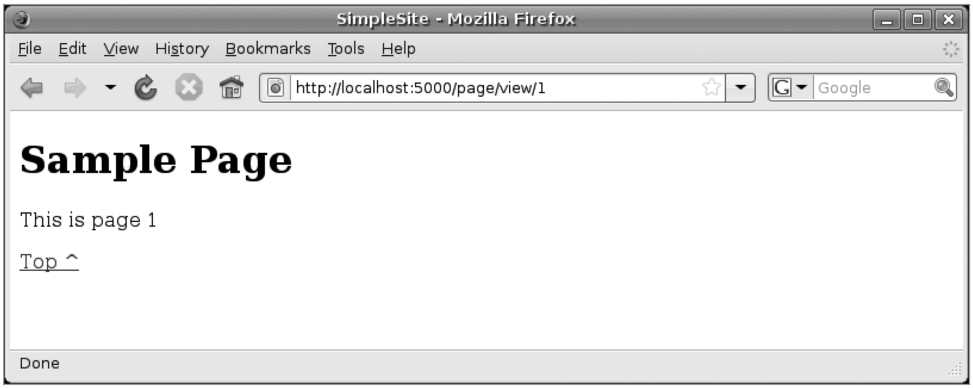
```
<%inherit file="/base/index.html"/>

${c.content}
```

You'll now need to update the `view()` action in the controller to use this template:

```
def view(self, id):
    c.title = 'Greetings'
    c.heading = 'Sample Page'
    c.content = "This is page %s"%id
    return render('/derived/page/view.html')
```

Now when you visit `http://localhost:5000/page/view/1`, you should see the page shown in Figure 8-2.


SimpleSite - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost:5000/page/view/1
Google
Done

Sample Page

This is page 1

Top ^

Figure 8-2. *A basic page being rendered from a template*

Using SQLAlchemy in Pylons

Now that you have the project's templates and controller set up, you need to start thinking about the model. As you'll recall from Chapter 1, Pylons is set up to use a Model View Controller architecture, and SQLAlchemy is what is most often used as the model. Chapter 7 explained SQLAlchemy in detail, but now you'll see how to apply that theory to a real Pylons project. If you haven't already done so you'll need to install SQLAlchemy 0.5 which is the version used in this book. You can do so with this command:

```
$ easy_install "SQLAlchemy>=0.5,<=0.5.99"
```

Let's begin by setting up the *engine*. Open your project's `config/environment.py` file, and after `from pylons import config`, you'll see the following:

```
from sqlalchemy import engine_from_config
```

You learned about engines in Chapter 7 when you created one directly. Pylons uses the `engine_from_config()` function to create an engine from configuration options in your project's config file instead. It looks for any options starting with `sqlalchemy.` in the `[app:main]` section of your `development.ini` config file and creates the engine based on these options. This means that all you need to do to configure SQLAlchemy is set the correct options in the config file.

Configuring the Engine

The main configuration option you need is `sqlalchemy.url`. This specifies the data source name (DSN) for your database and takes the format `engine://username:password@host:port/database?foo=bar`, where `foo=bar` sets an engine-specific argument named `foo` with the value `bar`. Once again, this is the same setting you learned about in Chapter 7 during the discussion of engines.

For SQLite, you might use an option like this to specify a database in the same directory as the config file:

```
sqlalchemy.url = sqlite:///%(here)s/databasefile.sqlite
```

Here `databasefile.sqlite` is the SQLite database file, and `%(here)s` represents the directory containing the `development.ini` file. If you're using an absolute path, use four slashes after the colon: `sqlite:////var/lib/myapp/databasefile.sqlite`. The example has three slashes because the value of `%(here)s` always starts with a slash on Unix-like platforms. Windows users should use four slashes because `%(here)s` on Windows starts with the drive letter.

For MySQL, you might use these options:

```
sqlalchemy.url = mysql://username:password@host:port/database
sqlalchemy.pool_recycle = 3600
```

Enter your username, your password, the host, the port number (usually 3306), and the name of your database.

It's important to set the `pool_recycle` option for MySQL to prevent "MySQL server has gone away" errors. This is because MySQL automatically closes idle database connections without informing the application. Setting the connection lifetime to 3600 seconds (1 hour) ensures that the connections will be expired and re-created before MySQL notices they're idle. `pool_recycle` is one of many engine options SQLAlchemy supports. Some of the others are listed at `http://www.sqlalchemy.org/docs/05/dbengine.html#dbengine_options` and are used in the same way, prefixing the option name with `sqlalchemy.`.

For PostgreSQL, your DSN will usually look like this:

```
sqlalchemy.url = postgres://username:password@host:port/database
```

The options are the same as for MySQL, but you don't generally need to use the `pool_recycle` option with PostgreSQL.

By default, Pylons sets up the DSN `sqlalchemy.url = sqlite:///%(here)s/development.db`, so if you don't change it, this is what will be used. Whichever DSN you use, you still need to make sure you have installed SQLAlchemy along with the appropriate DB-API driver you want to use; otherwise, SQLAlchemy won't be able to connect to the database. Again, see Chapter 7 for more information.

Creating the Model

Once you have configured the engine, it is time to configure the model. This is easy to do; you simply add all your classes, tables, and mappers to the end of `model/__init__.py`. The SimpleSite application will use the structures you worked through in the previous chapter, so I won't discuss them in detail here.

Change `model.__init__.py` to look like this:

```
"""The application's model objects"""
import sqlalchemy as sa
from sqlalchemy import orm

from simplesite.model import meta

# Add these two imports:
import datetime
from sqlalchemy import schema, types

def init_model(engine):
    """Call me before using any of the tables or classes in the model"""
    ## Reflected tables must be defined and mapped here
    #global reflected_table
    #reflected_table = sa.Table("Reflected", meta.metadata, autoload=True,
    #                           autoload_with=engine)
    #orm.mapper(Reflected, reflected_table)

    # We are using SQLAlchemy 0.5 so transactional=True is replaced by
    # autocommit=False
    sm = orm.sessionmaker(autoflush=True, autocommit=False, bind=engine)

    meta.engine = engine
    meta.Session = orm.scoped_session(sm)

# Replace the rest of the file with the model objects we created in
# chapter 7

def now():
    return datetime.datetime.now()

page_table = schema.Table('page', meta.metadata,
    schema.Column('id', types.Integer,
        schema.Sequence('page_seq_id', optional=True), primary_key=True),
    schema.Column('content', types.Text(), nullable=False),
    schema.Column('posted', types.DateTime(), default=now),
    schema.Column('title', types.Unicode(255), default=u'Untitled Page'),
    schema.Column('heading', types.Unicode(255)),
)

comment_table = schema.Table('comment', meta.metadata,
    schema.Column('id', types.Integer,
        schema.Sequence('comment_seq_id', optional=True), primary_key=True),
    schema.Column('pageid', types.Integer,
        schema.ForeignKey('page.id'), nullable=False),
    schema.Column('content', types.Text(), default=u''),
    schema.Column('name', types.Unicode(255)),
    schema.Column('email', types.Unicode(255), nullable=False),
    schema.Column('created', types.TIMESTAMP(), default=now()),
)

pagetag_table = schema.Table('pagetag', meta.metadata,
    schema.Column('id', types.Integer,
        schema.Sequence('pagetag_seq_id', optional=True), primary_key=True),
    schema.Column('pageid', types.Integer, schema.ForeignKey('page.id')),
    schema.Column('tagid', types.Integer, schema.ForeignKey('tag.id')),
)
```

```
tag_table = schema.Table('tag', meta.metadata,
    schema.Column('id', types.Integer,
        schema.Sequence('tag_seq_id', optional=True), primary_key=True),
    schema.Column('name', types.Unicode(20), nullable=False, unique=True),
)

class Page(object):
    pass

class Comment(object):
    pass

class Tag(object):
    pass

orm.mapper(Comment, comment_table)
orm.mapper(Tag, tag_table)
orm.mapper(Page, page_table, properties={
   'comments':orm.relation(Comment, backref='page'),
   'tags':orm.relation(Tag, secondary=pagetag_table)
})
```

As I mentioned, this will look very familiar because it is a similar setup to the one you used in the previous chapter. There are some points to note about this code, though:

- The `MetaData` object Pylons uses is defined in `model/meta.py` so is accessed here as `meta.metadata`, whereas in the previous chapter the examples just used `metadata`.
- Pylons generated the `init_model()` function when the project was created. It gets called after the engine has been created each time your application starts from `config/environment.py` to connect the model to the database.

■**Caution** Pylons generates a project to use SQLAlchemy 0.4, but many users will want to use the newer SQLAlchemy 0.5 described in Chapter 7. They are very similar, but the `transactional=True` argument to `orm.sessionmaker()` in `init_model()` is deprecated. Instead, you should specify `autocommit=False`. This has the same behavior but will not generate a deprecation warning.

Creating the Database Tables

Pylons has a built-in facility to allow users who download your application to easily set it up. The process is described in detail in the later SimpleSite tutorial chapters (Chapters 14 and 19), but you'll use it here too so that you can easily set up the tables you need.

The idea is that users of your application can simply run `paster setup-app development.ini` to have the database tables and any initial data created for them automatically. You can set up this facility through your project's `websetup.py` file.

The default `websetup.py` file for a SQLAlchemy project looks like this:

```
"""Setup the SimpleSite application"""
import logging

from simplesite.config.environment import load_environment

log = logging.getLogger(__name__)

def setup_app(command, conf, vars):
    """Place any commands to setup simplesite here"""
    load_environment(conf.global_conf, conf.local_conf)

    # Load the models
    from simplesite.model import meta
    meta.metadata.bind = meta.engine

    # Create the tables if they aren't there already
    meta.metadata.create_all(checkfirst=True)
```

When the `paster setup-app` command is run, Pylons calls the `setup_app()` function and loads the Pylons environment, setting up a SQLAlchemy engine as it does so. It then binds the engine to the metadata and calls `metadata.create_all(checkfirst=True)` to create any tables that don't already exist.

Binding the metadata in this way connects the engine to the `metadata` object used by the classes, tables, and mappers in the model. You can think of it as a shortcut to set up the model without the complexity of a session.

You'll now customize the default code so that it also adds a home page to the database. Add the following to the end of the `setup_app()` function:

```
    log.info("Adding homepage...")
    page = model.Page()
    page.title=u'Home Page'
    page.content = u'Welcome to the SimpleSite home page.'
    meta.Session.add(page)
    meta.Session.commit()
    log.info("Successfully set up.")
```

You'll also need to add this import at the top:

```
from simplesite import model
```

■ **Note** The recommended way of adding an object to the SQLAlchemy session in SQLAlchemy 0.4 was to call the session's `save()` method. The session in SQLAlchemy 0.5 provides the `add()` method instead. Since this book covers SQLAlchemy 0.5, the examples will use the `add()` method.

To test this functionality, you should first make SimpleSite available in your virtual Python environment. Rather than installing SimpleSite as you would install a normal Python package, you can instead use a special feature of the `setuptools` package used by Easy Install called *development mode*. This has the effect of making other Python packages treat your Pylons project's source directory as if it were an installed Python egg even though it is actually just a directory structure in the filesystem.

It works by adding a `SimpleSite.egg-link` file to your virtual Python installation's site-packages directory containing the path to the application. It also adds an entry to the `easy_install.pth` file so that the project is added to the Python path. This is very handy because it means that any changes you make to the SimpleSite project are instantly available without you having to create and install the package every time you make a change. Set up your project in development mode by entering this command:

```
$ python setup.py develop
```

If you haven't specified `sqlalchemy.url` in your `development.ini` config file, you should do so now. Then you are ready to run the `paster setup-app` command to set up your tables:

```
$ paster setup-app development.ini
```

If all goes well, you should see quite a lot of log output produced, ending with the following lines and the message that everything was successfully set up:

```
12:37:36,429 INFO  [simplesite.websetup] Adding homepage...
12:37:36,446 INFO  [sqlalchemy.engine.base.Engine.0x..70] BEGIN
12:37:36,449 INFO  [sqlalchemy.engine.base.Engine.0x..70]➥
INSERT INTO page (content, posted, title, heading) VALUES (?, ?, ?, ?)
12:37:36,449 INFO  [sqlalchemy.engine.base.Engine.0x..70]➥
[u'Welcome to the SimpleSite home page.', '2008-09-12 12:37:36.449094',➥
 u'Home Page', None]
12:37:36,453 INFO  [sqlalchemy.engine.base.Engine.0x..70] COMMIT
12:37:36,460 INFO  [simplesite.websetup] Successfully set up.
```

Querying Data

Now that the home page data is in SQLAlchemy, you need to update the `view()` action to use it. You'll recall that you query SQLAlchemy using a *query* object. Here's how:

```
def view(self, id):
    page_q = model.meta.Session.query(model.Page)
    c.page = page_q.get(int(id))
    return render('/derived/page/view.html')
```

Notice that since the heading is optional, you are using the title as the heading if the heading is empty.

To use this, you need to uncomment the following line at the top of the controller file:

```
#import simplesite.model as model
```

Now add some more imports the controller will need:

```
import simplesite.model.meta as meta
import simplesite.lib.helpers as h
```

Finally, you'll need to update the `templates/derived/page/view.html` template to use the `page` object:

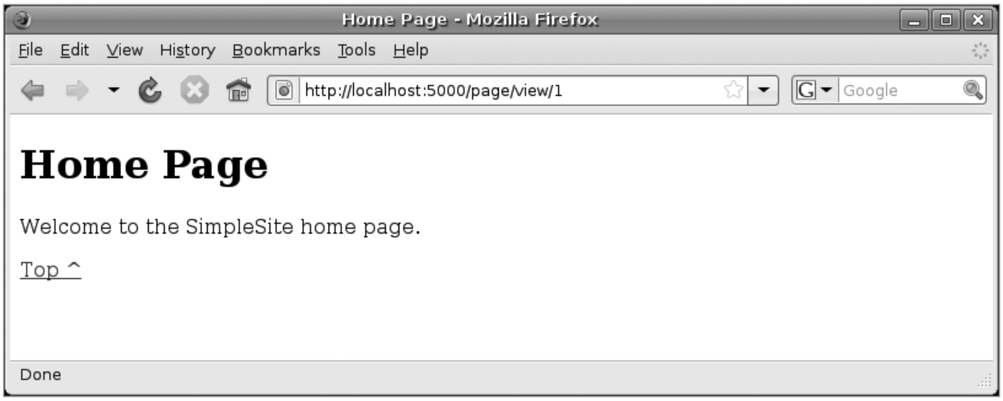
```
<%inherit file="/base/index.html"/>

<%def name="title()">${c.page.title}</%def>
<%def name="heading()"><h1>${c.page.heading or c.page.title}</h1></%def>

${c.page.content}
```

The new heading def will display the heading if there is one and the title if no heading has been set.

Visit `http://localhost:5000/page/view/1` again, and you should see the data loaded from the database (Figure 8-3). You'll need to restart the server if you stopped it to run `paster setup-app`.


Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost:5000/page/view/1
Google

Home Page

Welcome to the SimpleSite home page.

Top ^

Done

Figure 8-3. *A basic page being rendered with data from the database*

■ **Caution** Generally speaking, it is a good idea to try to keep your model and templates as separate as possible. You should always perform all model operations in your controller and never in a template. This is so that you, and other people working on your project, always know where changes to your model are happening so that code is easy to maintain.

To avoid the risk of a lazy programmer performing operations on the model from within a template, you might prefer not to pass model objects directly to the controller and instead pass the useful attributes. In this case, rather than passing `c.page`, you might instead pass `c.title`, `c.content`, and other useful attributes rather than the whole object. In this book, I'll be strict about only using model objects for read-only access in templates, so it is OK to pass them in directly.

Understanding the Role of the Base Controller

Every Pylons project has a base controller in the project's `lib/base.py` file. All your project's controllers are by default derived from the `BaseController` class, so this means that if you want to change the behavior of all the controllers in your project, you can make changes to the base controller. Of course, if you want to derive your controllers directly from `pylons.controllers.WSGIController`, you are free to do so too.

The SimpleSite base controller looks like this:

```
"""The base Controller API

Provides the BaseController class for subclassing.
"""
from pylons.controllers import WSGIController
from pylons.templating import render_mako as render

from simplesite.model import meta

class BaseController(WSGIController):
    def __call__(self, environ, start_response):
        """Invoke the Controller"""
        # WSGIController.__call__ dispatches to the Controller method
        # the request is routed to. This routing information is
        # available in environ['pylons.routes_dict']
        try:
            return WSGIController.__call__(self, environ, start_response)
        finally:
            meta.Session.remove()
```

All the individual controllers that you create with the `paster controller` command also import the `render()` function from this file, so if you want to change the templating language for all your controllers, you can change the `render()` import in this file, and all the other controllers will automatically use the new function. Of course, you will have to set up the templating language in your project's `config/environment.py` file too. This was described in Chapter 5.

Using a SQLAlchemy Session in Pylons

You've learned about SQLAlchemy sessions in some detail in Chapter 7, but now let's take a brief look at how sessions are used in Pylons.

The relevant lines to set up the session are found in your `model/__init__.py` file's `init_model()` function and look like this:

```
sm = orm.sessionmaker(autoflush=True, autocommit=False, bind=engine)

meta.engine = engine
meta.Session = orm.scoped_session(sm)
```

The `meta.Session` class created here acts as a thread-safe wrapper around ordinary SQLAlchemy session objects so that data from one Pylons request doesn't get mixed up with data from other requests in a multithreaded environment. Calling `meta.Session()` returns the thread's actual session object, but you wouldn't normally need to access it in this way because when you call the class's `meta.Session.query()` method, it will automatically return a query object from the correct hidden session object. You can then use the query object as normal to fetch data from the database.

Since a new session is created for each request, it is important that sessions that are no longer needed are removed. Because you chose to use a SQLAlchemy setup when you created the project, Pylons has added a line to remove any SQLAlchemy session at the end of the `BaseController` class's `__call__()` method:

```
meta.Session.remove()
```

This simply removes the session once your controller has returned the data for the response.

Updating the Controller to Support Editing Pages

To quickly recap, you've set up the model, configured the database engine, set up the templates, and written an action to view pages based on their IDs. Next, you need to write the application logic and create the forms to enable a user to create, list, add, edit, and delete pages.

You'll need the following actions:

`view(self, id)`: Displays a page

`new(self)`: Displays a form to create a new page `create(self)`: Saves the information submitted from `new()` and redirects to `view()`

`edit(self, id)`: Displays a form for editing the page `id`

`save(self, id)`: Saves the page `id` and redirects to `view()`

`list(self)`: Lists all pages

`delete(self, id)`: Deletes a page

This structure forms a good basis for a large number of the cases you are likely to program with a relational database.

view()

The existing `view()` method correctly displays a page but currently raises an error if you try to display a page that doesn't exist. This is because `page_q.get()` returns None when the page doesn't exist so that `c.page` is set to None. This causes an exception in the template when `c.page.title` is accessed.

Also, if a URL cannot be found, the HTTP specification says that a 404 page should be returned. You can use the `abort()` function to immediately stop the request and trigger the Pylons error documents middleware to display a 404 Not Found page. You should also display a 404 page if the user doesn't specify a page ID. Here's what the updated code looks like. Notice that the action arguments have been changed so that `id` is now optional.

```
def view(self, id=None):
    if id is None:
        abort(404)
    page_q = meta.Session.query(model.Page)
    c.page = page_q.get(int(id))
    if c.page is None:
        abort(404)
    return render('/derived/page/view.html')
```

■ **Tip** When you are testing a condition that involves `None` in Python, you should use the `is` operator rather than the `==` operator.

---

new()

You also need a template for pages that don't already exist. It needs to display a form and submit it to the `create()` action to create the page. Most of the functionality to display the form will take place in the templates. Here's what the action looks like; add this to the controller:

```
def new(self):
    return render('/derived/page/new.html')
```

Thinking ahead, the `edit()` action will also display a form, and it is likely to have many of the same fields. You'll therefore implement the fields in one template where they can be shared and create the form itself in another.

First let's create the fields in `templates/derived/page/fields.html`. Here's what the file looks like:

```
${h.field(
    "Heading",
    h.text(name='heading'),
    required=False,
)}
${h.field(
    "Title",
    h.text(name='title'),
    required=True,
    field_desc = "Used as the heading too if you didn't specify one above"
)}
${h.field(
    "Content",
    h.textarea(name='content', rows=7, cols=40),
    required=True,
    field_desc = 'The text that will make up the body of the page'
)}
```

Remember that `h` is simply another name for your project's `simplesite.lib.helpers` module and that it is available in both the templates and the controllers. In this case, you're using a helper called `field()` that generates the HTML for a row in a table containing a label for a field and the field itself. It also allows you to specify `field_desc`, which is a line of text that appears immediately below the HMTL field, or `label_desc`, which is for text appearing immediately below the label. Specifying `required=True` adds an asterisk (`*`) to the start of the label, but it doesn't affect how the controller handles whether fields are actually required.

To use the `field` helper, you need to first import it into the `helpers` module. You'll also use `form_start()` and `form_end()`, so let's import them at the same time. At the top of `lib/helpers.py`, add the following:

```
from formbuild.helpers import field
from formbuild import start_with_layout as form_start, end_with_layout as form_end
from webhelpers.html.tags import *
```

Notice that you are using a package called FormBuild here. You could equally well code all your field structures in HTML, but FormBuild will help create a structure for you. FormBuild actually contains some extra functionality too, but you will use it only for its `field()`, `start_with_layout()`, and `end_with_layout()` helpers in the book. At some point in the future, these helpers are likely to be added to the Pylons WebHelpers package. Install FormBuild like this:

```
$ easy_install "FormBuild>=2.0,<2.99"
```

You should also add it as a dependency to your project by editing the `setup.py` file and adding FormBuild to the end of the `install_requires` argument, and updating the SQLAlchemy line to look like this:

```
install_requires=[
    "Pylons>=0.9.7",
    "SQLAlchemy>=0.5,<=0.5.99",
    "Mako",
    "FormBuild>=2.0,<2.99",
],
```

Next you need the form itself. Like the `view.html` page, this can be based on the `/base/index.html` page using Mako's template inheritance. Here's how `/derived/page/new.html` looks:

```
<%inherit file="/base/index.html" />
<%namespace file="fields.html" name="fields" import="*"/>

<%def name="heading()">
    <h1 class="main">Create a New Page</h1>
</%def>

${h.form_start(h.url_for(controller='page', action='create'), method="post")}
    ${fields.body()}
    ${h.field(field=h.submit(value="Create Page", name='submit'))}
${h.form_end()}
```

This template imports the defs in the `fields.html` file into the `fields` namespace. It then calls its `body()` def to render the form fields. `h.form_start()` and `h.form_end()` create the HTML `<form>` tags as well as the `<table>` tags needed to wrap the rows generated by each call to `h.field()`.

You'll also need to add the `url_for()` helper to `lib/helpers.py`. This is a function from Routes that you'll learn about in Chapter 9. For the time being, it is enough to know that it takes a controller, action, and ID and will generate a URL that, when visited, will result in the controller and action being called with the ID you specified. Routes is highly customizable and is one of the central components Pylons provides to make building sophisticated web applications easier. Add this line to the `import` statements in `lib/helpers.py`:

```
from routes import url_for
```

You can now test the form by visiting `http://localhost:5000/page/new`.

When the user clicks the Create Page button, the information they enter is submitted to the `create()` action, so you need to write that next.

create()

The `create()` action needs to perform the following tasks:

- Validate the form
- Redisplay it with error messages if any data is invalid
- Add the valid data to the database
- Redirect the user to the newly created page

Let's start by creating a FormEncode schema to validate the data submitted. You need to import `formencode` at the top of the page controller and then import `htmlfill`, which will be used by the `edit()` method later in the chapter:

```
import formencode
from formencode import htmlfill
```

Next define the schema, which looks like this:

```
class NewPageForm(formencode.Schema):
    allow_extra_fields = True
    filter_extra_fields = True
    content = formencode.validators.String(
        not_empty=True,
        messages={
            'empty':'Please enter some content for the page.'
        }
    )
    heading = formencode.validators.String()
    title = formencode.validators.String(not_empty=True)
```

Setting the `allow_extra_fields` and `filter_extra_fields` options to `True` means that FormEncode won't raise `Invalid` exceptions for fields such as the Create Page button, which aren't listed in the schema, but will filter them out so that they don't affect the results.

You'll notice that `title` and `content` are required fields because they have `not_empty=True` specified. You'll also notice that the `content` field has a customized error message so that if no text is entered, the error `Please enter some content for the page.` will be displayed. Notice also that although you specified `not_empty=True` in the `formencode.validators.String` validator, the key corresponding to the message is the string `'empty'`. This might catch you out if you expected the key to be `'not_empty'`.

To handle the validation and redisplay of the form if there are any errors, you'll use the `@validate` decorator you learned about in Chapter 4. This requires another import:

```
from pylons.decorators import validate
```

You want it to redisplay the result of calling the `new()` action if an error occurs, so this is how you use it:

```
@validate(schema=NewPageForm(), form='new')
def create(self):
    ...
```

Calling an action wrapped by `@validate` using a GET request will bypass the validation and call the action anyway. You need to make sure this doesn't pose a security risk in your application. You could prevent this by testing whether a GET or a POST is being used in the body of the action. You can determine the request method using `request.method`, or Pylons provides another decorator called `@restrict` that you can use.

Let's use the new decorator and add the body of the action to create the page:

```
@restrict('POST')
@validate(schema=NewPageForm(), form='new')
def create(self):
    # Add the new page to the database
    page = model.Page()
    for k, v in self.form_result.items():
        setattr(page, k, v)
    meta.Session.add(page)
    meta.Session.commit()
    # Issue an HTTP redirect
    response.status_int = 302
    response.headers['location'] = h.url_for(controller='page',
        action='view', id=page.id)
    return "Moved temporarily"
```

You'll also need another import:

```
from pylons.decorators.rest import restrict
```

If the data entered is valid, it will be available in the action as the dictionary `self.form_result`. Here you're using a trick where you can iterate over the dictionary and set one of the page attributes for each of the values in the schema. Finally, you save the page to the session and then commit the changes to the database. You don't need to explicitly call `meta.Session.flush()` because the Pylons session is set to automatically flush changes when you call `meta.Session.commit()` (this was the `autoflush=True` argument to `sessionmaker()` in the model). Once the page has been flushed and committed, SQLAlchemy assigns it an `id`, so you use this to redirect the browser to the `view()` action for the new page using an HTTP redirect.

Issuing an HTTP redirect to the `view()` action is preferable to simply returning the page because if a user clicks Refresh, it is the `view()` action that is called again, not the `create()` action. This avoids the possibility that the user will accidentally add two identical pages by mistake by resubmitting the form.

This can cause other problems; for example, how do you pass information obtained during the call to `create()` to the `view()` action called next? Because the two pages are generated in two separate HTTP requests, you need to use a session to store information that can be used across the requests. You'll learn about this later in the chapter.

This is a good point to test your new application. If the server isn't already running, start it with the `paster serve --reload development.ini` command. Visit `http://localhost:5000/page/new`, and you should see the form. If you try to submit the form without adding any information, you will see that the validation system repopulates the form with errors.

The errors don't show up too well, so let's add some styles. Create the directory `public/css`, and add the following as `main.css`:

```
span.error-message, span.required {
    font-weight: bold;
    color: #f00;
}
```

You want to be able to use this style sheet in all the templates, so update the `head()` def of the `/templates/base/index.html` base template so that it looks like this:

```
<%def name="head()">
    ${h.stylesheet_link(h.url_for('/css/main.css'))}
</%def>
```

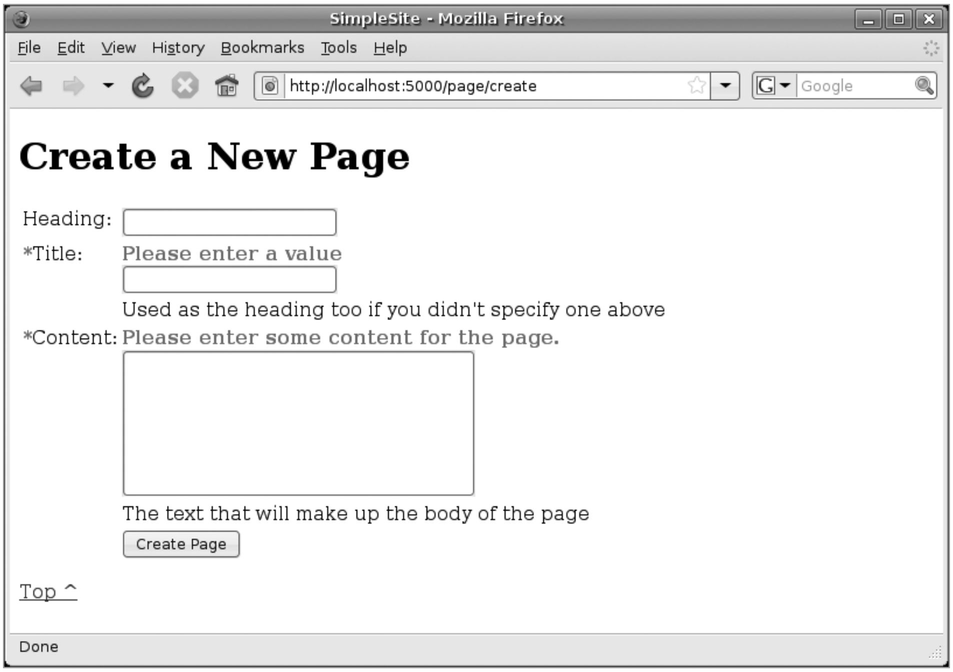
Once again, you'll need to import the `stylesheet_link()` helper into your `lib/helpers.py` file:

```
from webhelpers.html.tags import stylesheet_link
```

The helper takes any number of URLs as input and generates link tags for each. Any keyword arguments are added as attributes to each tag. For example:

```
>>> print stylesheet_link('style.css', 'main.css', media="print")
<link href="/stylesheets/style.css" media="print" rel="stylesheet"
    type="text/css" />
<link href="/stylesheets/main.css" media="print" rel="stylesheet"
    type="text/css" />
```

You should find that all the error messages appear in red, which will make any mistakes much more obvious to your users (see Figure 8-4). Why not go ahead and create a test page? If you enter any characters such as `<`, `>`, or `&`, you will find they are correctly escaped by Mako because they haven't been created as HTML literals. This means you can be confident that users of your application can't embed HTML into the page that could pose a cross-site scripting (XSS) attack risk, as explained in Chapter 4.


SimpleSite - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost:5000/page/create
Google
Done

Create a New Page

Heading:

*Title: Please enter a value

Used as the heading too if you didn't specify one above

*Content: Please enter some content for the page.

The text that will make up the body of the page

Create Page

Top ^

Figure 8-4. *The error message in red*

If you save the page with valid data, you'll see you are correctly redirected to the page you have created at the URL `http://localhost:5000/page/view/2`.

edit() and save()

Now that you've implemented the code to create new pages, let's look at the very similar code required to edit them. Once again, you'll have an action to display the form (in this case `edit()`) and an action to handle saving the code (in this case `save()`). The `edit()` action will need to load the data for the page from the model and then populate the form with the page information. Here's what it looks like:

```
def edit(self, id=None):
    if id is None:
        abort(404)
    page_q = meta.Session.query(model.Page)
    page = page_q.filter_by(id=id).first()
    if page is None:
        abort(404)
    values = {
        'title': page.title,
        'heading': page.heading,
        'content': page.content
    }
    return htmlfill.render(render('/derived/page/edit.html'), values)
```

Notice how this example uses FormEncode's `htmlfill` module to populate the form fields with the values obtained from the `page` object. The call to `render('/derived/page/edit.html')` generates the HTML, and the call to `htmlfill.render()` populates the values.

The `/derived/page/edit.html` template can also use the same fields you used in the `new.html` template. It looks very similar:

```
<%inherit file="/base/index.html" />
<%namespace file="fields.html" name="fields" import="*"/>

<%def name="heading()">
    <h1 class="main">Editing ${c.title}</h1>
</%def>

<p>Editing the source code for the ${c.title} page:</p>

${h.form_start(h.url_for(controller='page', action='save',
     id=request.urlvars['id']), method="post")}
    ${fields.body()}
    ${h.field(field=h.submit(value="Save Changes", name='submit'))}
${h.form_end()}
```

The only difference is that the form action points to `save` instead of `new`.

The `save()` action is also slightly different from the `create()` action because it has to update attributes on an existing page object. Here's how it looks:

```
@restrict('POST')
@validate(schema=NewPageForm(), form='edit')
def save(self, id=None):
    page_q = meta.Session.query(model.Page)
    page = page_q.filter_by(id=id).first()
    if page is None:
        abort(404)
    for k,v in self.form_result.items():
        if getattr(page, k) != v:
            setattr(page, k, v)
    meta.Session.commit()
    # Issue an HTTP redirect
    response.status_int = 302
    response.headers['location'] = h.url_for(controller='page', action='view',
        id=page.id)
    return "Moved temporarily"
```

Notice how this time attributes of the page are set only if they have changed. Remember when using FormEncode in this way, when the form is valid, the converted results get saved as the `self.form_result` dictionary, so you should get the submitted content from there rather than from `request.params`. Also, in this instance, the FormEncode schema for creating a new page is the same as the one needed for editing a page, so you are using `NewSchemaForm` again in the `@validate` decorator. Often you will need to use a second schema, though.

Why not try editing a page? For example, to edit the home page, you could visit `http://localhost:5000/page/edit/1`.

list()

Add the `list()` action:

```
def list(self):
    c.pages = meta.Session.query(model.Page).all()
    return render('/derived/page/list.html')
```

The `list()` action simply gets all the pages from the database and displays them. Notice the way you use the template context object `c` to pass the page data to the template. Create a new file named `templates/derived/page/list.html` to display the list of pages:

```
<%inherit file="/base/index.html" />

<%def name="heading()">
    <h1 class="main">Page List</h1>
</%def>

<ul id="titles">
% for page in c.pages:
<li>
    ${page.title} [${h.link_to('visit', h.url_for(controller='page', action='view',
        id=page.id))}]
</li>
% endfor
</ul>
```

The `h.link_to()` helper is a tool for generating a hyperlink, of course you can also write the `<a>` tag out yourself if you prefer. To use it add the following import to the end of `lib/helpers.py`:

```
from webhelpers.html.tags import link_to
```

If you visit `http://127.0.0.1:5000/page/list`, you should see the full titles list, and you should be able to visit each page.

delete()

Users of the application might want to be able to delete a page, so let's add a `delete()` action.

Add the following action to the page controller:

```
def delete(self, id=None):
    if id is None:
        abort(404)
    page_q = meta.Session.query(model.Page)
    page = page_q.filter_by(id=id).first()
    if page is None:
        abort(404)
    meta.Session.delete(page)
    meta.Session.commit()
    return render('/derived/page/deleted.html')
```

This page searches for the page to be deleted and aborts with a 404 Not Found HTTP status if the page doesn't exist. Otherwise, the page is deleted using the `Session` object, and the changes are committed.

Add the `templates/derived/page/deleted.html` template with the following content to display a message that the page has been deleted:

```
<%inherit file="/base/index.html" />

<%def name="heading()">
    <h1 class="main">Page Deleted</h1>
</%def>

<p>This page has been deleted.</p>
```

Later in the chapter you'll see how you can use a session and a *flash message* to display a simple message like this on a different page rather than needing to create a template for it.

At this point, you have a very simple (yet perfectly functional) web site for creating pages and editing their content. There is clearly more that could be done, though, so now it's time to turn your attention to other aspects of the SimpleSite application you are creating.

Updating the Footer

Now that the basic structure of the controller is in place, the users of SimpleSite will need a quick and easy way of adding, editing, and deleting the pages without having to enter the appropriate URLs in the browser address bar.

Modify the `derived/page/view.html` template so that it includes some links in the page footer:

```
<%inherit file="/base/index.html"/>

<%def name="title()">${c.page.title}</%def>
<%def name="heading()"><h1>${c.page.heading or c.page.title}</h1></%def>

${c.page.content}

<%def name="footer()">
## Then add our page links
<p>
  <a href="${h.url_for(controller='page', action='list', id=None)}">All Pages</a>
| <a href="${h.url_for(controller='page', action='new', id=None)}">New Page</a>
| <a href="${h.url_for(controller='page', action='edit',
        id=c.page.id)}">Edit Page</a>
| <a href="${h.url_for(controller='page', action='delete',
        id=c.page.id)}">Delete Page</a>
</p>
## Include the parent footer too
${parent.footer()}
</%def>
```

Notice that the `h.url_for()` call for both a new page and to list all pages has `id=None` specified. You'll learn about Routes in Chapter 9, but for now you simply need to know that by default Routes automatically fills in values for routing variables based on the ones that were used to route the request to the current controller and action. This is not a recommended behavior, and you'll learn how to change it in Chapter 9. The `new()` and `list()` actions don't take an `id`, but unless you specify `id=None`, Routes fills in the `id` of the current page.

If you view a page, you will now see the links you need are present.

Using Pagination

If you want to display large numbers of items, it isn't always appropriate to display them all at once. Instead, you should split the data into smaller chunks known as *pages* (not to be confused with the web site pages I've been talking about) and show each page of data one at a time. This is called *pagination*, and providing an interface for the user to page through the results is the job of a *paginator*.

As an example, imagine what would happen if lots of people started adding pages to the site. You could quickly get, say, 27 pages, which might be too many to display comfortably in a single list. Instead, you could use a paginator to display the web site pages ten at a time in each page in the paginator. The first page of results would show web site pages 1–10, the second would show 11–20, and the last would display 21–27.

The user also needs some way of navigating through the different pages of results. The Pylons WebHelpers come with a `webhelpers.paginate` module to make pagination easier, and it provides two solutions to allow the user to navigate the pages of data. The first is called a *pager*, and it produces an interface like the one shown here. The single arrows take you backward or forward one page of results at a time, and the double arrows take you straight to the first or last page.

```
<< < 11-20 of 27 > >>
```

The second navigation tool is called the *navigator* and produces an interface that looks like this:

```
[1] [2] [3]
```

This allows you to click directly on the page of results you want to view.

Let's update the `list()` action to use the paginator. First import the paginator module into the page controller:

```
import webhelpers.paginate as paginate
```

Then update the `list()` action to look like this:

```
def list(self):
    records = meta.Session.query(model.Page)
    c.paginator = paginate.Page(
        records,
        page=int(request.params.get('page', 1)),
        items_per_page = 10,
    )
    return render('/derived/page/list.html')
```

There is also a subtlety in this example which you could easily miss. The `paginate.Page` class has built-in support for SQLAlchemy so in this case, rather than simply providing the paginator with a standard list of Python objects, we are passing in an SQLAlchemy query object. This allows the paginator to only select the records it needs from the database for the page of results it is displaying.

It is unfortunate that the records you are paginating here are pages when the word *page* is also used to describe a set of records displayed by the paginator. In this case, the `page` variable retrieved using `request.params` is referring to the paginator page, not the `id` of a page record.

The `list.html` template also needs updating to use the paginator. Here's what it looks like:

```
<%inherit file="/base/index.html" />

<%def name="heading()"><h1>Page List</h1></%def>

<%def name="buildrow(page, odd=True)">
    %if odd:
        <tr class="odd">
    %else:
        <tr class="even">
    % endif
        <td valign="top">
            ${h.link_to(
                page.id,
                h.url_for(
                    controller=u'page',
                    action='view',
                    id=unicode(page.id)
                )
            )}
        </td>
        <td valign="top">
            ${page.title}
        </td>
        <td valign="top">${page.posted.strftime('%c')}</td>
        </tr>
</%def>

% if len(c.paginator):
<p>${ c.paginator.pager('$link_first $link_previous $first_item to $last_item of➥
$item_count $link_next $link_last') }</p>
<table class="paginator"><tr><th>Page ID</th><th>Page Title</th><th>Posted</th></tr>
<% counter=0 %>
% for item in c.paginator:
    ${buildrow(item, counter%2)}
    <% counter += 1 %>
% endfor
</table>
<p>${ c.paginator.pager('~2~') }</p>
% else:
<p>
    No pages have yet been created.
    <a href="${h.url_for(controller='page', action='new')}">Add one</a>.
</p>
% endif
```

As you can see, the paginator is set up at the bottom of the template, but for each record the `buildrow()` def is called to generate a representation of the page.

When you click any of the navigation components in the paginator, a new request is made to the `list()` action with the ID of the paginator page. This is sent via the query string and passed as the `page` argument to `paginate.Page` to generate the next set of results.

The nice thing about the Pylons paginator implementation is that it can be used to page any type of information, whether comments in a blog, rows in a table, or entries in an address book. This is because the rendering of each item in the page can be handled in your template so that you have complete control over the visual appearance of your data.

To test the paginator, you might need to create a few extra pages and try setting the `items_per_page` option to `paginate.Page()` to a low number such as 2 so that you don't have to create too many extra pages.

Here are the variables you can use as arguments to `.pager()` in the template:

`$first_page`: Number of first reachable page

`$last_page`: Number of last reachable page

`$current_page`: Number of currently selected page

`$page_count`: Number of reachable pages

`$items_per_page`: Maximum number of items per page

`$first_item`: Index of first item on the current page

`$last_item`: Index of last item on the current page

`$item_count`: Total number of items

`$link_first`: Link to first page (unless this is the first page)

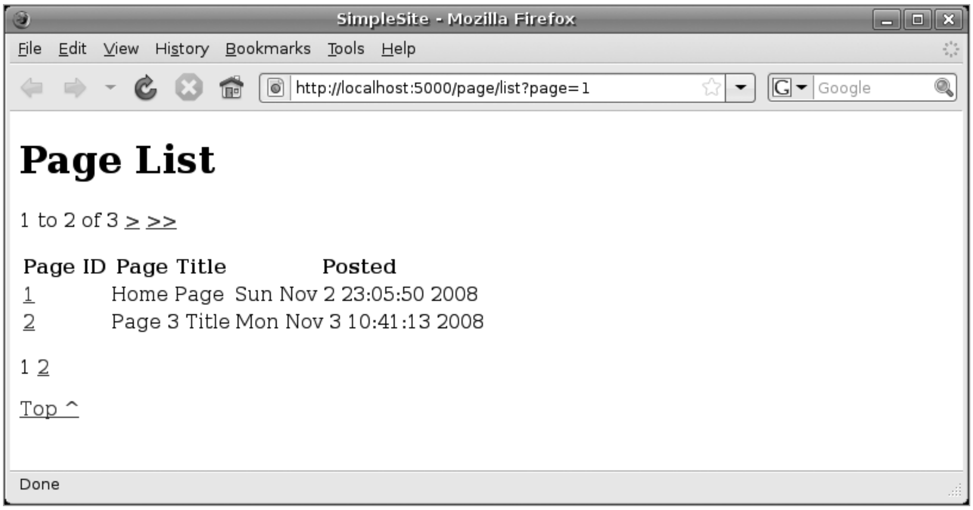
`$link_last`: Link to last page (unless this is the last page)

`$link_previous`: Link to previous page (unless this is the first page)

`$link_next`: Link to next page (unless this is the last page)

Because these variables look a bit like Mako variables, you might be tempted to think you can put other template markup in the format string to `.pager()`, but in fact you can use only these variables.

Figure 8-5 shows a page generated with the paginator-enhanced code.


SimpleSite - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost:5000/page/list?page=1
Google
Done

Page List

1 to 2 of 3 > >>

Page ID	Page Title	Posted
1	Home Page	Sun Nov 2 23:05:50 2008
2	Page 3 Title	Mon Nov 3 10:41:13 2008

1 2

Top ^

Figure 8-5. *The paginator in action*

Formatting Dates and Times

To get the date to display in the way it does in the paginator column, you made use of the fact that Python `datetime.datetime` objects have a `strftime()` method that turns a date to a string based on the arguments specified. You used `%c`, which tells the `strftime()` method to use the locale's appropriate date and time representation. The display format is highly customizable, though, and takes the options documented in Table 8-1.

Table 8-1. *Python Date and Time Formatting Directives*

Directive	Meaning	Notes
`%a`	Locale's abbreviated weekday name.	
`%A`	Locale's full weekday name.	
`%b`	Locale's abbreviated month name.	
`%B`	Locale's full month name.	
`%c`	Locale's appropriate date and time representation.	
`%d`	Day of the month as a decimal number [01,31].	
`%H`	Hour (24-hour clock) as a decimal number [00,23].	
`%I`	Hour (12-hour clock) as a decimal number [01,12].	
`%j`	Day of the year as a decimal number [001,366].	
`%m`	Month as a decimal number [01,12].	
`%M`	Minute as a decimal number [00,59].	
`%p`	Locale's equivalent of either a.m. or p.m.	
`%S`	Second as a decimal number [00,61].	The range really is `0` to `61`; this accounts for leap seconds and the (very rare) double leap seconds.
`%U`	Week number of the year (with Sunday as the first day of the week) as a decimal number [00,53]. All days in a new year preceding the first Sunday are considered to be in week 0.	
`%w`	Weekday as a decimal number [0(Sunday),6].	
`%W`	Week number of the year (with Monday as the first day of the week) as a decimal number [00,53]. All days in a new year preceding the first Monday are considered to be in week 0.	
`%x`	Locale's appropriate date representation.	
`%X`	Locale's appropriate time representation.	
`%y`	Year without century as a decimal number [00,99].	
`%Y`	Year with century as a decimal number.	
`%Z`	Time zone name (no characters if no time zone exists).	
`%%`	A literal `%` character.	

Using Sessions and a Flash Message

One of the problems with the setup you have so far is that no notification is displayed to confirm that changes have been successfully saved after you've edited a page. As was hinted at earlier in the chapter, you can solve this problem by using Pylons' session-handling facilities to display a *flash message*.

Session handling is actually provided in Pylons by the Beaker package set up as middleware, and it can be configured in your `development.ini` file. By default, session information is stored in a `sessions` directory within the directory specified by the `cache_dir` option. This means that by default sessions are stored in your project's `data/sessions` directory.

Start by importing the session object into the page controller:

```
from pylons import session
```

The session object exposes a dictionary-like interface that allows you to attach any Python object that can be pickled (see http://docs.python.org/lib/module-pickle.html) as a value against a named key. After a call to session.save(), the session information is saved, and a cookie is automatically set. On subsequent requests, the Beaker middleware can read the session cookie, and you can then access the value against the named key.

In the save() action, you simply need to add the following lines before the redirect at the end of the action:

```
session['flash'] = 'Page successfully updated.'
session.save()
```

Now the message will be saved to the flash key. Then in the base template, you'll need some code to look up the flash key and display the message if one exists. Add the following to the end of templates/base/index.html:

```
<%def name="flash()">
    % if session.has_key('flash'):
    <div id="flash"><p>${session.get('flash')}</p></div>
    <%
        del session['flash']
        session.save()
    %>
    % endif
</%def>
```

Now add this in the same template before the call to ${next.body()}:

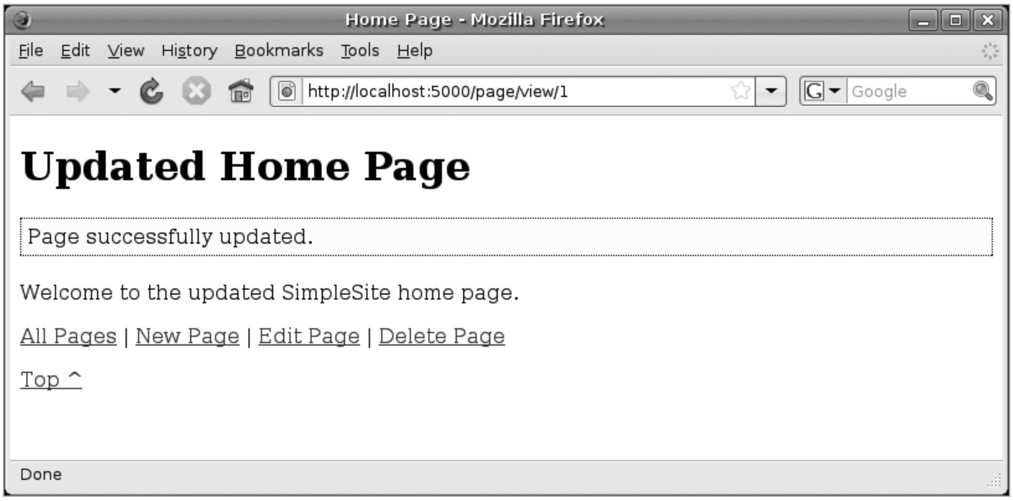
```
${self.flash()}
```

Let's also add some style so the message is properly highlighted. Add this to the public/css/main.css file:

```
#flash {
    background: #ffc;
    padding: 5px;
    border: 1px dotted #000;
    margin-bottom: 20px;
}
#flash p { margin: 0px; padding: 0px; }
```

Now when the save() action is called, the message is saved in the session so that when the browser is redirected to the view() page, the message can be read back and displayed on the screen.

Give it a go by editing and saving a page (see Figure 8-6).


Home Page - Mozilla Firefox
File Edit View History Bookmarks Tools Help
http://localhost:5000/page/view/1
Google

Updated Home Page

Page successfully updated.

Welcome to the updated SimpleSite home page.

All Pages | New Page | Edit Page | Delete Page

Top ^

Figure 8-6. *The flash message in action*

You can find more information about Pylons sessions at `http://docs.pylonshq.com/sessions.html`.

Summary

That's it! You have created a very simple working web page editor. Now, although the site so far does everything you set out for it to do and forms a very good basis for any application you might create yourself, you'll probably agree it isn't overly exciting. In the rest of the book, you'll change that by adding a comment system, a tagging facility, a navigation hierarchy, a hint of Ajax, and a set of navigation widgets. By the end of the book, you'll have a template project that will serve very well as a basis for many of your own projects, and you will understand many of the key principles you will need to write your own Pylons applications.