CS 683 Emerging Technologies
Fall Semester, 2005
Doc 11 Containers & Events
Contents

References

Web Component Development with Zope 3, von Weiter-shausen

Comment about Programming
Coding - No Libraries

Write all code from scratch

You are in complete control

Only need to know the language

Slow as you write all code from scratch

```
primeCandidate = someInteger
possibleFactor = primeCandidate /2
while possibleFactor > 1:
   if primeCandidate % possibleFactor == 0:
      print primeCandidate, 'has factor', possibleFactor
      break
   possibleFactor = possibleFactor -1
else:
   print primeCandidate, 'is prime'
```

Direct Coding with Libraries

Use language and libraries

Faster development using libraries

Still mainly in control

Need to know about libraries (How?)

What happens if library does not

- Perform action you need
- Does something you don't want (Perl die)

```
import urllib2

webPage = urllib2.urlopen('http://www.eli.sdsu.edu')

print webPage.info()          #print http headers

for line in webPage:          #print out page contents
   print line,
```

Coding with a Framework

Code extends framework

Framework determines

- What can be done
- How things are done

Framework can save you a lot of time

Need to know what Framework allows before starting

```
import  java.awt.*;
class  HelloApplication  extends  Frame
  {
  public  void  paint(  Graphics  display  )
    {
    int startX  =  30;
    int startY  =  40;
    display.drawString(  "Hello World", startX, startY  );
    }
  }
```

Coding with a Complex Framework
Zope

- Interfaces
- ZCML
- TAL
- METAL
- Events
- Security
- Adapters
- Services
- i18n
- Metadata

One starts working in a complex system

Takes long time to understand the system

Steep learning curve

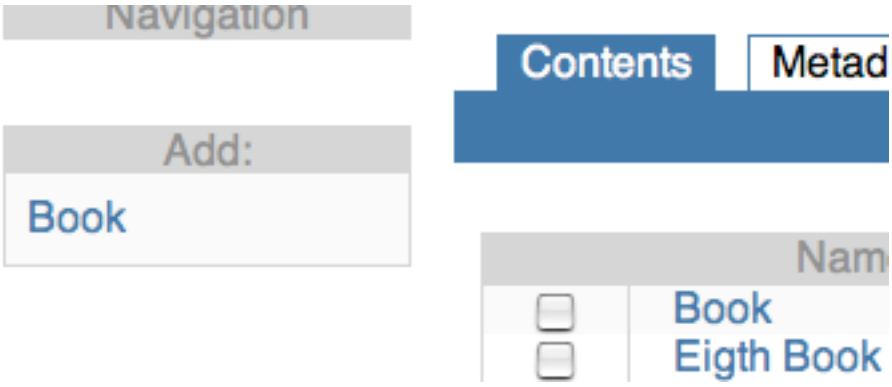
Issues above are common in professional programming jobs

Containers

Zope containers

- Contain things
- Have a name
- Have a reference to their container
- Can restrict what they contain

Example - Container that only Holds Books



bookstore/interfaces.py

```
from zope.schema import Field
from zope.app.container.interfaces import IContainer, IContained
from zope.app.container.constraints import ContainerTypesCon-
straint
from zope.app.container.constraints import ItemTypePrecondition

class IBookContainer(IContainer):

    def __setitem__(name, object):
        """Add a Book"""

    __setitem__.precondition = ItemTypePrecondition(IBook)

class IBookContained(IContained):

    __parent__ = Field(
        constraint = ContainerTypesConstraint(IBookContainer)
        )
```

bookstore/folder.py

```
from zope.interface import implements
from zope.app.container.btree import BTreeContainer
from zope.app.container.contained import NameChooser
from zope.app.exception.interfaces import UserError

from bookstore.interfaces import IBookContainer

class BookFolder(BTreeContainer):
    implements(IBookContainer)

class BookNameChooser(NameChooser):

    def checkName(self, name, object):
        if name != object.title:
            raise UserError(u"Given name & Book title do not match!")
        return \
            super(BookNameChooser, self).checkName(name, object)

    def chooseName(self, name, object):
        name = object.title
        print object
        print object.title
        self.checkName(name, object)
        return name
```

bookstore/book.py

```
from persistent import Persistent
from zope.interface import implements
from zope.schema.fieldproperty import FieldProperty
from bookstore.interfaces import IBook, IBookContained

from datetime import date

class Book(Persistent):
    implements(IBook, IBookContained)

    __name__ = __parent__ = None

    title = FieldProperty(IBook['title'])
    author =  FieldProperty(IBook['author'])
    date = FieldProperty(IBook['date'])

    def asString(self):
        return self.title + ';' + self.author + ';' + str(self.date)

    def __fromString(main, string):
        book = Book()
        attributes = string.split(';')
        book.title = unicode(attributes[0])
        book.author = unicode(attributes[1])
        dateStringParts = attributes[2].split('-')
        dateParts = map(int, dateStringParts)
        book.date = date(*dateParts)
        return book

    fromString = classmethod(__fromString)
```

bookstore/configure.zcml

```
<configure xmlns="http://namespaces.zope.org/zope">

<interface
    interface=".interfaces.IBook"
    type="zope.app.content.interfaces.IContentType"
/>

<!-- Folder -->
  <content class=".folder.BookFolder">
    <implements

interface="zope.app.annotation.interfaces.IAttributeAnnotatable
        zope.app.container.interfaces.IContainerNamesContainer"
        />
    <require
        permission="zope.View"
        interface="zope.app.container.interfaces.IReadContainer"
        />
    <require
        permission="zope.ManageContent"
        interface="zope.app.container.interfaces.IWriteContainer"
        />
  </content>

  <adapter
      for=".interfaces.IBookContainer"
      provides="zope.app.container.interfaces.INameChooser"
      factory=".folder.BookNameChooser"
      />
<include package=".browser" />
<include package=".text" />

</configure>
```

bookstore/browser/configure.zcml

```
<configure
   xmlns="http://namespaces.zope.org/zope"
   xmlns:browser="http://namespaces.zope.org/browser"
   >
<browser:menu
     id="alternate_views"
     title="Menu showing different ways to view an object"
     />

  <browser:addform
     schema="bookstore.interfaces.IBook"
     content_factory="bookstore.book.Book"
     label="Add a Book"
     name="AddBook.html"
     permission="zope.ManageContent"
     set_before_add="title"
     />

  <browser:addMenuItem
     title="Book Folder"
     class="bookstore.folder.BookFolder"
     permission="zope.View"
     />

  <browser:containerViews
      for="bookstore.interfaces.IBookContainer"
      contents="zope.ManageContent"
      index="zope.View"
      add="zope.ManageContent"
      />

  <browser:resource name="bookstore.css" file="bookstore.css" />
</configure>
```

Events

Zope supports events

Code can be registered to know when events occur

Code is called when the event occurs

Code can trigger an event

Zope Events

IObjectCreatedEvent	IObjectMovedEvent	IBeforeTraversalEvent
IObjectCopiedEvent	IObjectAddedEvent	IEndRequestEvent
IObjectModifedEvent	IObjectRemovedEvent	IMailEvent
IObjectAnnota-tionsModifiedEvent	IDatabaseOpenedE-vent	IMailSentEvent
IObjectContentModi-fiedEvent	IProcessStartingEvent	IMailErrorEvent

Sending an Event

```
from zope.interface import implements
from zope.event import notify
from zope.app.annotation.interfaces import IAnnotations
from zope.app.event.objectevent import ObjectAnnota-
tionsModifiedEvent

from worldcookery.interfaces import IRating

KEY = "worldcookery.rating"

class Rating(object):
    implements(IRating)

    def rate(self, rating):
        ratings = self.mapping['ratings']
        ratings.append(float(rating))
        self.mapping['average'] = sum(ratings)/len(ratings)
        notify(ObjectAnnotationsModifiedEvent(self.context))
```

Receiving an Event
bookstore/mail/book.py

```
import email.Charset
email.Charset.add_charset('utf-8', email.Charset.SHORTEST,
None, None)

from datetime import datetime
from email.MIMEText import MIMEText
from zope.app import zapi
from zope.app.mail.interfaces import IMailDelivery

def notifyAdded(book, event):
    return emailNotifications(book)

def emailNotifications(book):

    subject = "'%(name)s' was added" % {'name': book.title}
    message = MIMEText(book.asString().encode('utf-8'), 'plain',
'utf-8')
    message['Subject'] = subject
    message['From'] = 'whitney@rohan.sdsu.edu'
    message['To'] = 'whitney@cs.sdsu.edu'
    message['Date'] = datetime.now().strftime('%a, %d %b %Y
%H:%M:%S %z')
    mailer = zapi.getUtility(IMailDelivery, 'bookstore-delivery')
    mailer.send("whitney@rohan.sdsu.edu",
["whitney@cs.sdsu.edu"],
                message.as_string())
```

bookstore/mail/configure.zcml

```
<configure
    xmlns="http://namespaces.zope.org/zope"
    xmlns:mail="http://namespaces.zope.org/mail"
    >

  <mail:smtpMailer
      name="bookstore-mailer"
      hostname="cs.sdsu.edu"
      port="8025"
      />

  <mail:queuedDelivery
      name="bookstore-delivery"
      permission="zope.SendMail"
      queuePath="mail-queue"
      mailer="bookstore-mailer"
      />

  <subscriber
      for="bookstore.interfaces.IBook
          zope.app.container.interfaces.IObjectAddedEvent"
      factory=".book.notifyAdded"
      />
</configure>
```

bookstore/browser/configure.zcml

```
<browser:addform
    schema="bookstore.interfaces.IBook"
    content_factory="bookstore.book.Book"
    label="Add a Book"
    name="AddBook.html"
    permission="zope.ManageContent"
    set_before_add="title author date"
    />
```

Added to bookstore/configure.zcml

```
<include package=".mail" />
```