

Object Oriented Programming with Java

COMS M0103
2004

Lecture 18 -- Applets

Tim Kovacs
kovacs@cs.bris.ac.uk

Frederik Vercauteren
frederik@cs.bris.ac.uk

Overview

In this lecture we introduce applets -- Java applications which run in web browsers

Note: This lecture closely follows chapter 20 of 'Just Java' by Peter van der Linden (5th edition)

2

Three ways to Run Java

- Applications -- run from the command line or desktop
- Applets -- run in a browser or in appletviewer
- Servlets -- run on a web server

Notes:

- Applets have some restrictions for security reasons
- Most browsers have built-in Java 1.1 support, but often non-standard
- You can now add a Java 2 plug-in to your browser. See: <http://java.sun.com/products/plugin>
- Use appletviewer while developing code so you can see any error messages

3

Restrictions on Applets

For security applets cannot:

- contain native methods
- read or write files on the client (although they can read URLs)
- make network connections except with the server they came from
- start other applications

Otherwise it would be easy to e.g. write an applet which erases all the user's files

4

Applets and Applications Compared

The code for applets and applications is very similar

You can easily convert one to the other (unless you run into security restrictions)

Applet advantages:

- Java 1.1 applets will run on any computer. The user doesn't need to download, compile, configure, or install anything

Applet disadvantages:

- At the moment you can't assume Java 1.2 will work in applets
- Not all browsers handle Java 1.1 the same way

5

Alternatives to Applets

- Compatibility problems with applets have reduced their popularity
- The new 1.2 plug-in (and new browsers) may change this
- Servlets, JavaScript and Macromedia Flash are alternatives to applets

6

Adding an Applet to a Web Page

The HTML applet tag loads an applet when the HTML file is loaded

```
<applet code=myApplet.class width=30  
height=50>optional parameters</applet>
```

- height and width are required
- Use JApplet in Swing (requires appletviewer or Java 2 plug-in)
- The class file must not include a path
- Use the codebase= argument to give a URL to the class file's directory

7

Starting an Applet

Applications start in main() but applets are event-driven:

- init() is called the first time the page is loaded
- start() is called each time the page is loaded
- stop() is called when the browser loads a different page
- paint() is called when the browser wants the applet to draw itself
- destroy() is called when the browser thinks it won't return to the page

You make an applet by extending java.swing.JApplet

You often only need to override init() and paint(). Using threads, also override start() and stop()

8

Example: Message.java, Message.html

```
public class Message extends  
javax.swing.JApplet {  
    public void paint(java.awt.Graphics g) {  
        g.drawString("Yes!", 30, 10);  
    }  
}
```

This HTML tag will load the applet:

```
<applet code=Message.class width=200  
height=100> </applet>
```

Two ways to start it:

- appletviewer Message.html &
- Open Message.html in a web browser

9

Embedding Applet Tags in .java Files

While developing code it is convenient to put the applet tag in the .java file:

```
// <applet code=Message.class width=200 height=100>  
// </applet>
```

```
public class Message extends javax.swing.JApplet {  
    public void paint(java.awt.Graphics g) {  
        g.drawString("Yes!", 30, 10);  
    }  
}
```

- appletviewer ignores the text outside <> tags
- javac ignores the text following // comments
- So you can use both in the same .java file

10

Passing Parameters to Applets

The web page can pass the .class file information using tags:

```
<param name=namestring value=valuestring>
```

These tags come between the <applet> and </applet> tags:

```
<applet code=myClass.class width=200  
height=200>  
    <param name=author value="Frederik">  
    <param name=studentnumber value="123">  
</applet>
```

11

Reading Values from HTML

Applets read values using getParameter():

```
String s = getParameter("author");
```

All values are passed as Strings:

```
String s = getParameter("studentnumber");  
int studentNumber = Integer.parseInt(s);
```

This is the same way arguments are passed to main()

12

Web Resources on Applets

- java.sun.com/applets
- developer.java.sun.com/developer
- www.jars.com

13

Summary

- Applets run in browsers or appletviewer
- Most browsers only support Java 1.1, but a plug-in for 1.2 is available
- For security applets have some restrictions, e.g. they can't write files
- Applets are loaded when the HTML applet tag is encountered
 - You can put the applet tag in comments in the .java file for convenience while developing the applet

We can pass arguments to the applet from the HTML page

14

Test Yourself

- Applet
- Appletviewer
- HTML
- JavaScript
- Macromedia Flash
- Plug-in
- URL
- Servlet

15