Programming for Web Pages - Java Applets

Topics to be Covered

1. Internet Basics
2. AWT and Applet Packages
3. Simple examples of Applets

URL References

Applets - http://java.sun.com/docs/books/tutorial/applet/overview/index.html

HTML - http://www.ncsa.uiuc.edu/General/Internet/WWW/HTMLPrimer.html

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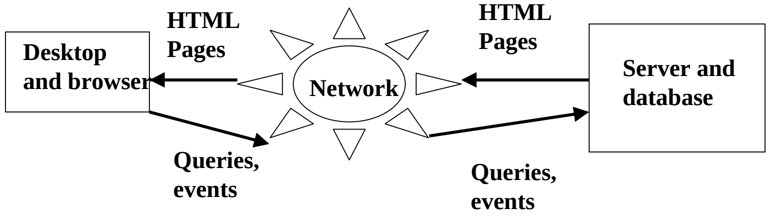
Context - Client/Server System Model

- Browsers run on local local or client machines.
- Browsers get their content from remote servers.
- Servers support 10’ or 10s of thousands of clients.
- How is functionality partitioned between client and server?
- Applets are functionality defined by the server as a part of a web page but executed by the client. Applets are downloaded with html files.



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Definitions:

1. HTML is the HyperTextMarkupLanguage
   A Markup Language is used to describe the contents of a document.
2. A protocol is a process for conducting interactions among entities with disjoint state.
3. The most common web protocol is the HyperText Transfer Protocol or http.
4. http is used to control the transmission of html files.
5. A Hyperlink is a reference to a Uniform Resource Locators or URL.
6. A URL is an address on the Internet for some html page.
7. An applet is a program embedded in a html file. The applet is executed by the computer on which the browser is running. The applet is deleted from the browser when the html file containing it is closed.
8. A plug-in is a program which is needed to display some element of an html page such as a video clip.
9. CGI Common Gateway Interface Script - Processes form prepared in html.

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Functions of Browsers

1. Interpret and display the content of pages defined in HTML.
2. Accept input from users
   Users click on hyperlinks, click buttons or choose items from menus.
   Users fill out forms
3. Interact with servers via http, ftp and other protocols.
4. Provide a context for the execution of plug-ins and applets.

Functions of Servers

1. Store web pages including html pages, pictures, videos, audio clips, etc.
2. Respond to requests from clients (browsers) for web pages or for services such as searches.
3. Create web pages for search results, CGI files, etc.
4. Perform housekeeping services on files, etc.

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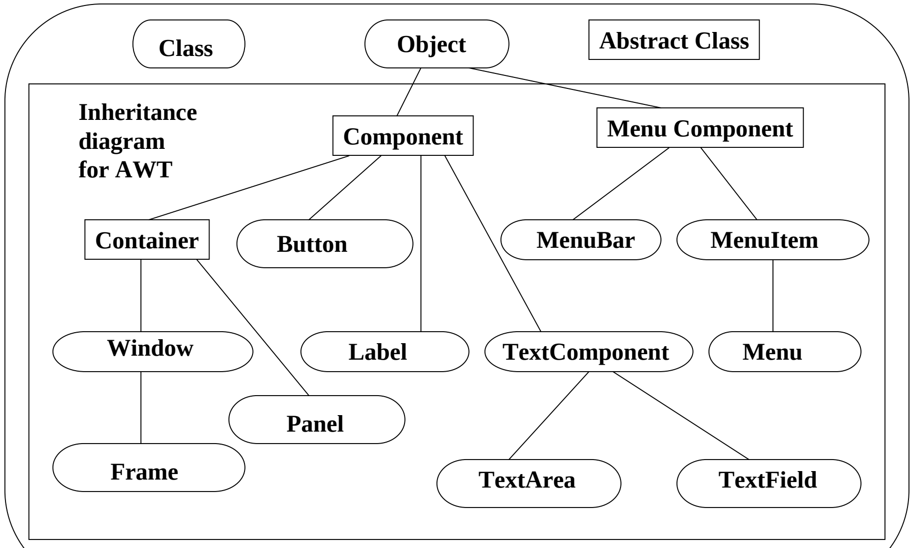

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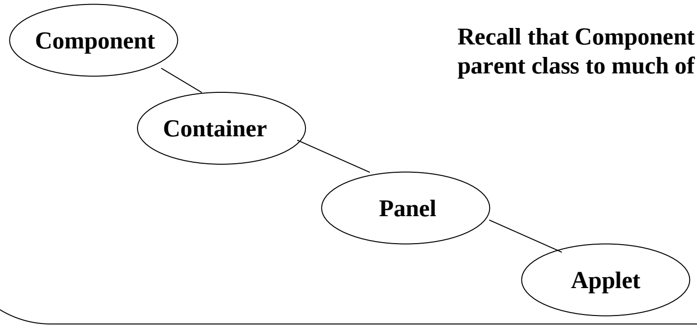
Background - AWT and GUI programming

Applets are functions added to browsers to perform local functionality. The usual role for an applet is to either enhance a display or interact with a user. Therefore, applet programming is largely GUI programming. The Java classes used as building blocks are either AWT classes or applet classes derived from AWT classes.



Recall that Component is a parent class to much of AWT.

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Package java.applet

Description

Provides the classes necessary to create an applet and the classes an applet uses to communicate with its applet context.

The applet framework involves two entities: the applet and the applet context. An applet is an embeddable window (see the Panel class) with a few extra methods that the applet context can use to initialize, start, and stop the applet.

The applet context is an application that is responsible for loading and running applets. For example, the applet context could be a Web browser or an applet development environment.

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void destroy()
- Called by the browser or applet viewer to inform this applet that it is being reclaimed and that it should destroy any resources that it has allocated.

AppletContext getAppletContext()
- Determines this applet’s context, which allows the applet to query and affect the environment in which it runs.

void init()
- Called by the browser or applet viewer to inform this applet that it has been loaded into the system.

boolean isActive()
- Determines if this applet is active.

void start()
- Called by the browser or applet viewer to inform this applet that it should start its execution.

void stop()
- Called by the browser or applet viewer to inform this applet that it should stop its execution.

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What are applets?

1. Java classes which inherit from the Class Applet.
2. Class Applet inherits from Panel which inherits from Container which inherits from component so an applet inherits all of the methods from its parent classes (and interfaces).
3. Java classes which must be embedded in an AppletContext in order to execute. An AppletContext is an instance of a Panel.
4. Since Applet inherits from Panel it can contain other components.
5. Java classes replace "main" with "init." The "main" of a class is invoked by the Java RTS. The "init" of an applet is invoked by the program which executes the browser.
6. Applets typically display interactive buttons, text boxes, etc. to implement user interaction with users.
7. The other use of applets is animation on web pages.
8. Applets are typically event-driven programs. They create an interface or display and then monitor the interface for user supplier events.
9. Applets are also commonly used to provide animation for web pages.

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Applets have neither constructors nor mains. Instead an applet has a function "init."

<u>The role of the "init" method.</u>

The init method of a class usually creates the initial display and interface seen by a user. It typically instantiates and initializes objects from the AWT classes. "init' can be thought of as taking the place of a constructor and a main.

<u>The role of class methods.</u>

The other methods usually either "listen" for events where a user interacts with the interface and updates the display and the interface or drive animated displays in a time-driven mode.

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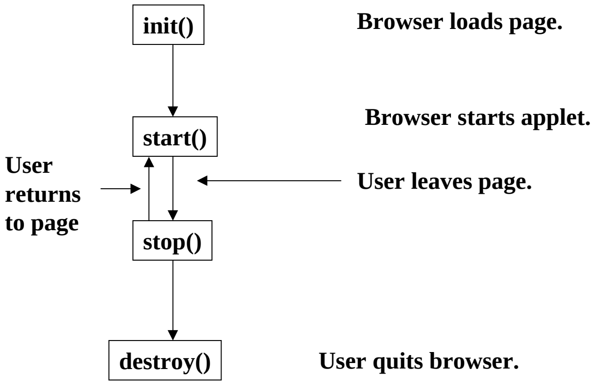

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```
<HTML>
<HEAD>
<TITLE> Simple Applet<TITLE>
</HEAD>
<BODY>
<applet code="FirstGUI.class" width=300 height=200>
</applet>
<BODY/>
</HTML>
```

FIRSTGUI.class is the Java program which will be executed when the browser opens the html file and displays the other information in the file.

Applets have a context (a Panel) in which they execute. In this case the Panel has width of 300 units and height of 200 units.

NOTE - show html page

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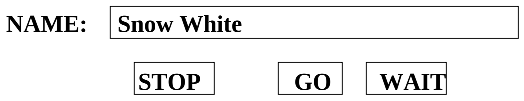
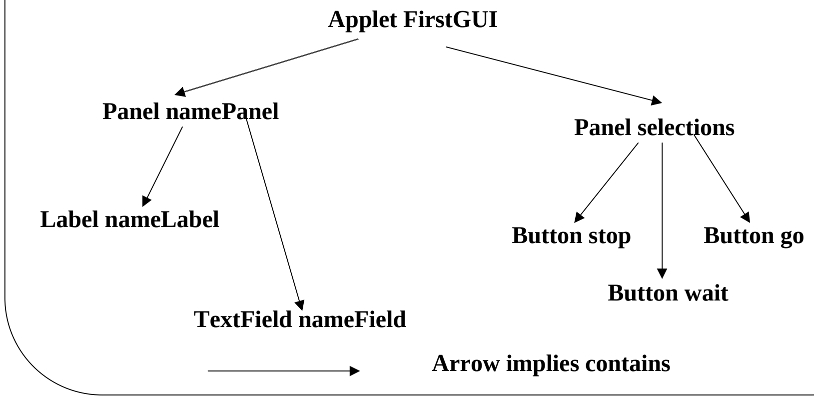
FirstGUI will display a labeled text box with a name and three buttons.




Applet FirstGUI

Panel namePanel

Panel selections

Label nameLabel

TextField nameField

Button stop

Button go

Button wait

Arrow implies contains

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```
import java.awt.*;
import java.applet.Applet;

public class FirstGUI extends Applet {

        public void init() {
        /* ******** Construct the name panel ******** */
         //Create the name panel, set background to white for visibility
         Panel namePanel = new Panel();
         namePanel.setBackground(Color.white);

         // Create each component of the name panel
         // and add it to the name panel
         Label nameLabel = new Label("Name:");
         namePanel.add(nameLabel);

         TextField nameField = new TextField("Snow white",30);
         namePanel.add(nameField);
```

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```
        // Add the name panel to the applet.
         add(namePanel);
         /* ******** Construct the selections panel ******** */
         // Create selections panel, set background to white
         Panel selections = new Panel();
         selections.setBackground(Color.white);
         // Create each component of the name panel and
         // add it to the selections panel
         Button stop = new Button("STOP");
         selections.add(stop);
         Button go = new Button("GO");
         selections.add(go);
         Button wait = new Button("WAIT");
         selections.add(wait);
         // Add the selections panel to the applet.
         add(selections);
        }
}
```