

Applets Programming

Enabling Application Delivery Via
the Web

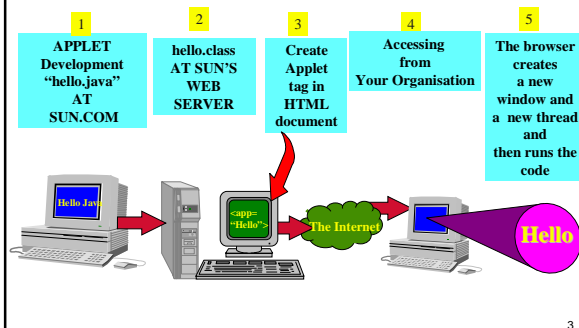
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Introduction

- Applets are small Java programs that are embedded in Web pages.
- They can be transported over the Internet from one computer (web server) to another (client computers).
- They transform web into rich media and support the delivery of applications via the Internet.

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Applet: Making Web Interactive and Application Delivery Media



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How Applets Differ from Applications

- Although both the Applets and stand-alone applications are Java programs, there are certain restrictions are imposed on Applets due to security concerns:
 - Applets don't use the main() method, but when they are load, automatically call certain methods (init, start, paint, stop, destroy).
 - They are embedded inside a web page and executed in browsers.
 - They cannot read from or write to the files on local computer.
 - They cannot communicate with other servers on the network.
 - They cannot run any programs from the local computer.
 - They are restricted from using libraries from other languages.
- The above restrictions ensures that an Applet cannot do any damage to the local system.

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Building Applet Code: An Example

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

public class HelloWorldApplet extends Applet {
    public void paint(Graphics g) {
        g.drawString ("Hello World of Java!", 25, 25);
    }
}
```

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Embedding Applet in Web Page

```
<HTML>
<HEAD>
<TITLE>
    Hello World Applet
</TITLE>
</HEAD>

<body>
<h1>Hi, This is My First Java Applet on the Web!</h1>
<APPLET CODE="HelloWorldApplet.class" width=500 height=400>
</APPLET>
</body>

</HTML>
```

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Accessing Web page (runs Applet)



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Applet Life Cycle

- Every applet inherits a set of default behaviours from the Applet class. As a result, when an applet is loaded, it undergoes a series of changes in its state. The applet states include:
 - Initialisation – invokes `init()`
 - Running – invokes `start()`
 - Display – invokes `paint()`
 - Idle – invokes `stop()`
 - Dead/Destroyed State – invokes `destroy()`

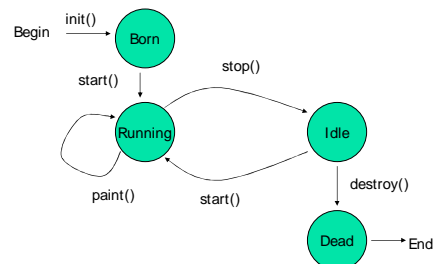
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Applet States

- Initialisation – invokes `init()` – only once
 - Invoked when applet is first loaded.
- Running – invokes `start()` – more than once
 - For the first time, it is called automatically by the system after `init()` method execution.
 - It is also invoked when applet moves from idle/stop() state to active state. For example, when we return back to the Web page after temporary visiting other pages.
- Display – invokes `paint()` – more than once
 - It happens immediately after the applet enters into the running state. It is responsible for displaying output.
- Idle – invokes `stop()` – more than once
 - It is invoked when the applet is stopped from running. For example, it occurs when we leave a web page.
- Dead/Destroyed State – invokes `destroy()` – only once
 - This occurs automatically by invoking `destroy()` method when we quite the browser.

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Applet Life Cycle Diagram



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Passing Parameters to Applet

```
<HTML>
<HEAD>
<TITLE>
  Hello World Applet
</TITLE>
</HEAD>
<body>
<h1>Hi, This is My First Communicating Applet on the Web!</h1>
<APPLET
  CODE="HelloAppletMsg.class" width=500 height=400>
  <PARAM NAME="Greetings" VALUE="Hello Friend, How are you?">
</APPLET>
</body>
</HTML>
```

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Applet Program Accepting Parameters

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

public class HelloAppletMsg extends Applet {

  String msg;

  public void init()
  {
    msg = getParameter("Greetings");
    if( msg == null)
      msg = "Hello";
  }

  public void paint(Graphics g) {
    g.drawString (msg,10, 100);
  }
}
```

This is name of parameter specified in PARAM tag;
This method returns the value of paramter.

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HelloAppletMsg.html



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What happen if we don't pass parameter? See HelloAppletMsg1.html

```
<HTML>
<HEAD>
<TITLE>
  Hello World Applet
</TITLE>
</HEAD>

<body>
<h1>Hi, This is My First Communicating Applet on the Web!</h1>
<APPLET
  CODE="HelloAppletMsg.class" width=500 height=400>
</APPLET>

</body>
</HTML>
```

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getParameter() returns null. Some default value may be used.



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Displaying Numeric Values

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

public class SumNums extends Applet {
  public void paint(Graphics g) {
    int num1 = 10;
    int num2 = 20;
    int sum = num1 + num2;

    String str = "Sum: "+String.valueOf(sum);
    g.drawString(str,100, 125);
  }
}
```

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SumNums.html

```
<HTML>
<HEAD>
<TITLE>
  Hello World Applet
</TITLE>
</HEAD>

<body>
<h1>Sum of Numbers</h1>
<APPLET CODE="SumNums.class" width=500 height=400>
</APPLET>
</body>
</HTML>
```

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Applet – Sum Numbers



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Interactive Applets

- Applets work in a graphical environment. Therefore, applets treats inputs as text strings.
- We need to create an area on the screen in which use can type and edit input items.
- We can do this using TextField class of the applet package.
- When data is entered, an event is generated. This can be used to refresh the applet output based on input values.

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Interactive Applet Program..(cont)

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

public class SumNumInteractive extends Applet {
    TextField text1, text2;
    public void init()
    {
        text1 = new TextField(10);
        text2 = new TextField(10);
        text1.setText("0");
        text2.setText("0");
        add(text1);
        add(text2);
    }
    public void paint(Graphics g) {
        int num1 = 0;
        int num2 = 0;
        int sum;
        String s1, s2, s3;

        g.drawString("Input a number in each box ", 10, 50);
        try {
            s1 = text1.getText();
            num1 = Integer.parseInt(s1);
            s2 = text2.getText();
            num2 = Integer.parseInt(s2);
        }
        catch (Exception e1)
        {}
    }
}
```

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Interactive Applet Program.

```
sum = num1 + num2;
String str = "THE SUM IS: "+String.valueOf(sum);
g.drawString(str, 100, 125);
}
public boolean action(Event ev, Object obj)
{
    repaint();
    return true;
}
}
```

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Interactive Applet Execution



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Summary

- Applets are designed to operate in Internet and Web environment. They enable the delivery of applications via the Web.
- This is demonstrate by things that we learned in this lecture such as:
 - How do applets differ from applications?
 - Life cycles of applets
 - How to design applets?
 - How to execute applets?
 - How to provide interactive inputs?

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