JAVA SE

(CORE JAVA)

LECTURE-31

Today's Agenda

- Graphical User Interface in Java
- Introduction
- Packages available to develop GUI applications
- Applets in Java

Types of Applications

- In java, we can develop 2 types of applications

1. CUI – Command based User Interface applications. The one which we have been doing till date, such applications are good to understand basics of a language but are not used in real world scenario.

2. GUI – Graphical User Interface. These applications are developed and used in real world. They are user friendly and hence possibility of errors is also minimized.

Types of GUI application

- There are possibly 2 types of GUI based applications which can be developed in java

1. Applets :- Applets are small applications which are developed and compiled the way a normal java program is developed. But they are executed on a special software called Web Browser. The web browser has a built in JVM which is called as applet engine.

2. Applications :- Java programs which display output on windows desktop rather than DOS prompt. They have various graphical elements to receive input from the user.

Packages available to develop GUI application

- There are two packages available to develop GUI based applications

1. awt (Abstract Windowing Toolkit) :-

- Java introduced GUI applications through awt package, which contains all graphical components as classes.
- But in a hurry to compete Java lost its motto of platform independence in this package ,as awt uses graphical components from an Operating system which is against java's platform independence.
- Hence, an application might look different on different platforms.
- Package name is java.awt.

Packages available to develop GUI application

2. swing :-

- Every graphical component is present in form of classes and every component is programmed using Java.
- Hence, retaining java's platform independence policy.
- The look and feel of application will be same across every platform.
- Package name is javax.swing. "x" stands for extended.

* *Although package swing is way better than awt as it has much better scale of graphical components and is also platform independent. But to understand some key concepts of GUI programming we will initially use awt package and then switch to swing.*

Applets in Java

- Steps required to develop an applet :-

1. Writing the source code.
2. Compiling the source code.
3. Writing the .html file.
4. Running the browser through the .html file, which in turn will run the applet.

* To create .html file, one needs to learn HTML(Hyper Text Markup Language) using which the applet will run.

Applets in Java

Writing source code:-

"MyFirstApplet.java"

```
import java.awt.*;
import java.applet.*;
public class MyFirstApplet extends Applet
{
  public void paint(Graphics g)
  {
  g.drawString("Welcome to applet",100,100);
  }
}
```

* To create an applet your class should inherit Applet class(Java's predefined class) and override the method paint( ).

Applets in Java

Compiling source code:- Same as any java program.

Writing .html file:- A standard HTML page consists of tags, which tells the browser how the page should be displayed.

Standard HTML code for running applet –

```
<HTML>
 <HEAD>
  <TITLE> PAGE TITLE </TITLE>
 </HEAD>
 <BODY>
  <APPLET CODE="Name of the .class file"
                    WIDTH="in pixels"
                    HEIGHT="in pixels">
  </APPLET>
 </BODY>
</HTML>
```

*** Save the file with any name but with .html extension.**

Applets in Java

- To execute the applets there are 2 options

1. Use your web browser. Select the .html file which runs the applet and run it on your web browser. But applets are rarely supported by most of the browsers as they are considered as a threat for security. Like chrome no more supports applet. Mozilla firefox does support.

2. The other option to run your applet is by using the appletviewer. It is an in built support by java to run and test your applets.

Command to run – appletviewer <html file name>.html

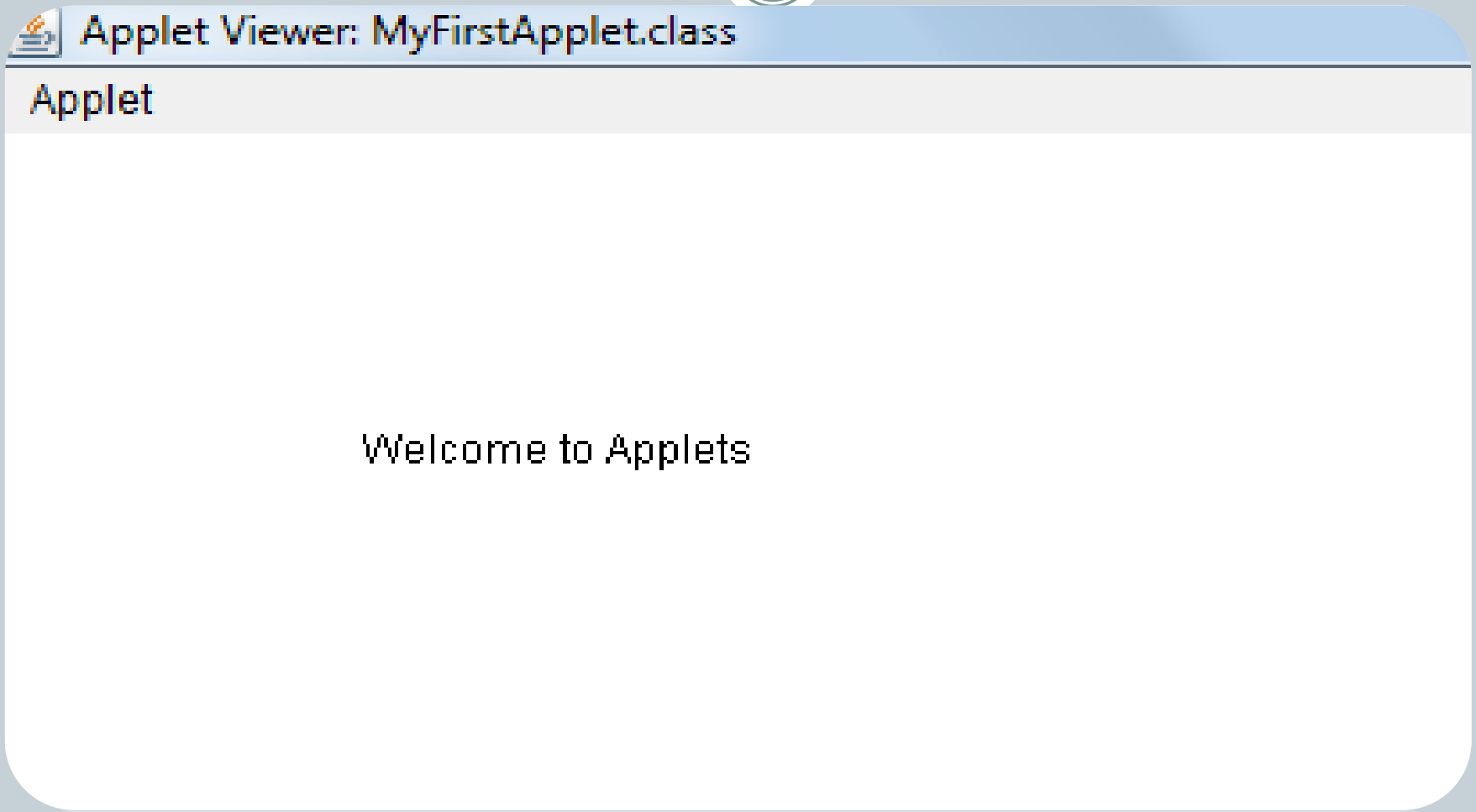
Applet Example 1

“AppletDemo1.html”

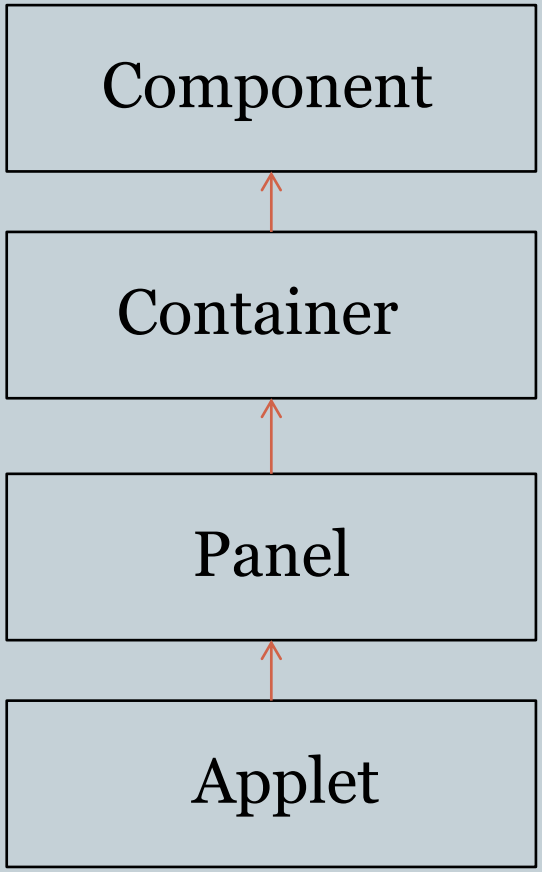
```
<html>
<head>
<title>My Applet</title>
</head>
<body>
<applet code="MyFirstApplet.class" width=“200"
  height=“200">
</applet>
</body>
</html>
```

** Go to the location where file is saved through command prompt and run using applet viewer.*

Output


Applet Viewer: MyFirstApplet.class
Applet
Welcome to Applets

Applet Hierarchy



Life Cycle of an Applet

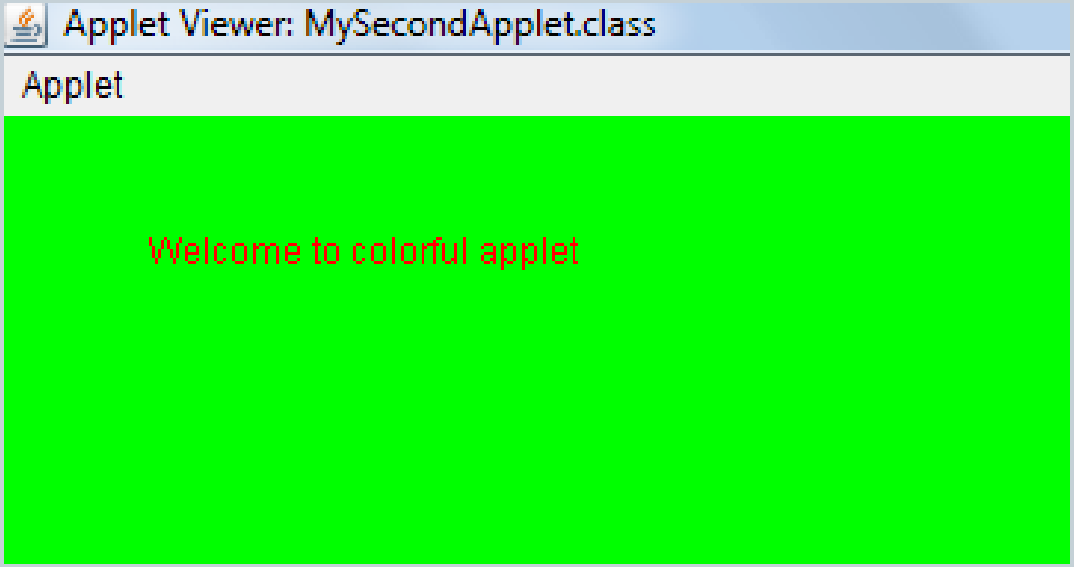
1. **init(): public void init() –** when page(website) is opened for first time.
2. **start(): public void start() –** to make the applet active, the init() method calls start() method.
3. **paint(Graphics):public void paint(Graphics) –** called every time when focus is on page i.e. anything is written of changed.
4. **stop(): public void stop() –** called when page is closed or new window is openned.
5. **destroy(): public void destroy() –** called when the browser is closed or history is cleared.

- init( ), start( ), stop( ) and destroy( ) belong to class Applet.
- Whereas, paint( ) belongs to class Component.

Changing Color in Applet

"MySecondApplet.java"

```
import java.awt.*;
import java.applet.*;
public class MySecondApplet extends Applet
{
public void init()
{                                R, G, B
Color c1=new Color(0,255,0);
setBackground(c1);
Color c2=new Color(255,0,0);
setForeground(c2);
}
public void paint(Graphics g)
{
g.drawString("Welcome to colorful applet",50,50);
}
}
```



Changing Color in Applets

Alternate way :- Both these methods belong to Component class.

setBackground(Color.red);

setBackground(Color.green);

Java's color objects

Color. red
Color. green
Color. blue
Color. yellow
Color. pink
Color. orange
Color. white
Color. black
Color. magenta
Color. grey

Changing Fonts of an Applet

- To change fonts, java provides us with a method called **setFont( )**, which belongs Graphics class. Its prototype is

public void setFont(Font) – The argument passed is Font class object, whose constructor accepts 3 arguments

public Font(String fontname, int style, int size) –

fontname – Name of the font

style – Represents font style, which can be any of the 3 static final members. Font.BOLD, Font.ITALIC, Font.PLAIN .

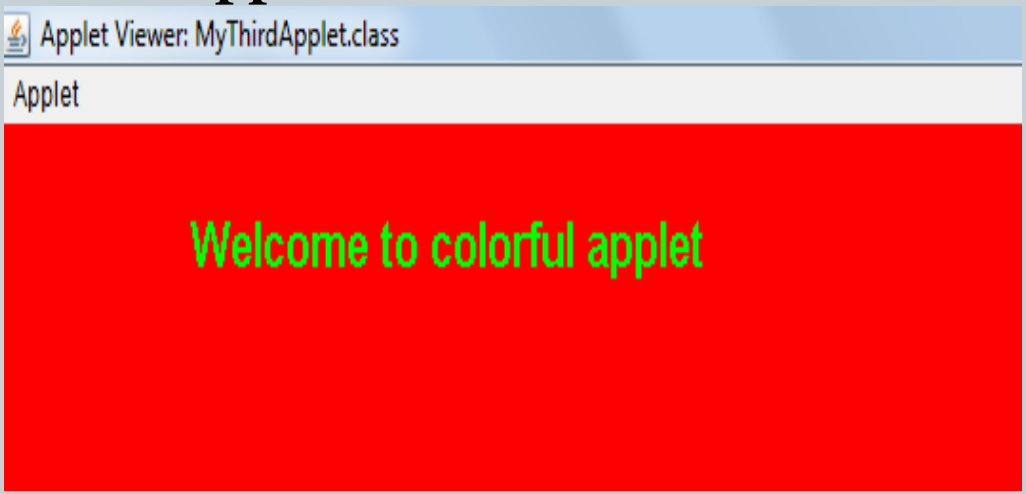
size – represents font size in pixels.

*Since setFont() is Graphics class method, it can be called from the paint() method.

Changing Fonts of an Applet

"MyThirdApplet.java"

```
import java.awt.*;
import java.applet.*;
public class MyThirdApplet extends Applet
{
public void init( )
{
setBackground(Color.red);
setForeground(Color.green);
}
public void paint(Graphics g)
{
Font f=new Font("Arial", Font.BOLD, 22);
g.setFont(f);
g.drawString("Welcome to colorful applet",100,50);
}
}
```



Using the Status bar of Applet

- The status bar is a rectangular bar present at bottom of the browser window and is generally used by programmers to display some text regarding their code at runtime.
- It is very helpful when we develop event handling applications in java.
- To use the status bar and display some text on it, the class Applet provides us a method **showStatus( )** whose prototype is –

  public void showStatus(String)

Passing parameters to the Applet

- Passing parameters to an applet can be done in 2 steps –

1. Set tag called <param> in the html file and it should be sub tag of <applet>.

   <param name="number" value="10">

2. After setting the tag in html file, we can retrieve the value in our applet using the method getParameter() belonging to the Applet class.

   String str=getParameter("number");

   System.out.println(str); ⟶ **10**

End Of Lecture 31

Thank You

For any queries mail us @: scalive4u@gmail.com
Call us @ : 0755-4271659, 7879165533

Agenda for Next Lecture:

1. **Event Handling.**