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Chapter - 4 (16)

1) Define Applet. Life Cycle of an Applet

1. An applet is a Java program that runs in a Web browser. This is a first java program that can run over the network using the browser. It is typically embedded inside an HTML page.
In other words, we can say that Applets are small Java applications that can be accessed on an Internet server, transported over Internet, and can be automatically installed and run as a part of a web document.
After a user receives an applet, the applet can produce a GUI.

Advantages of an Applet
1. Secured.
2. It runs at client side so less response time.
3. It can be executed by browsers running under many platforms, including Linux, Windows, Mac OS etc.

Disadvantages
1. Plugin is required at client browser to execute applet.

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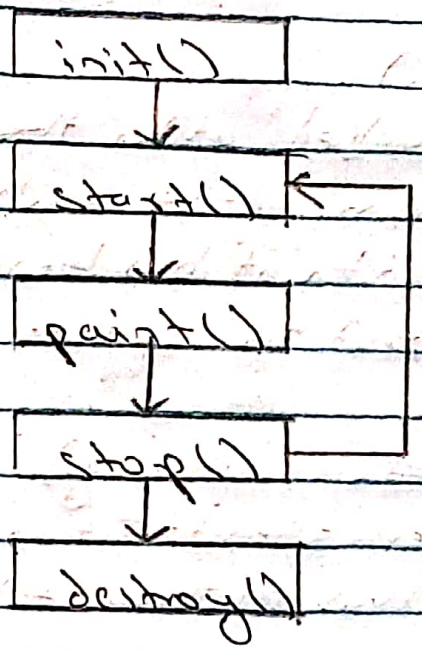
Life cycle of an applet (Applet Skeleton)




Lifecycle of Java Applet

1. Applet is initialized
2. Applet is started
3. Applet is painted
4. Applet is stopped
5. Applet is destroyed

For creating any applet java.applet.Applet class must be inherited. It provides 4 lifecycle methods of Applet. And, the java.awt.Component class provides 1 lifecycle method of applet i.e paint() They are explained below:-

i) public void init()

- It is the first method to be called. This is where variable are initialized. This method is called only

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```
// Applet skeleton

import java.awt.*;
import java.applet.*;

/* <applet code = "Applet skeleton" width=300
   height=100>
   </applet>
*/

public class AppletSkeleton extends Applet {
    public void init(){
        }
    public void start() {
        }
    public void stop() {
        }
    public void destroy() {
        }
    public void paint(Graphics g) {
    }
}
```

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2) Discuss the tags used in applet.

Global Attributes

- The <applet> tag supports all Global Attributes in HTML.

Specific Attributes

| Attribute name | Value | Description |
|---|---|---|
| 1. name | name | Defines the name for an applet. |
| 2. height | pixels | Specifies the height of an applet. |
| 3. width | pixels | Specifies the width of an applet. |
| 4. align | left, right, top, bottom middle, baseline | Specifies the alignment of an applet. |
| 5. border | pixels | Specifies the border around the applet panel. |
| 6. alt | text | Specifies an alternate text for an applet. |
| 7. archive | URL | Specifies the location of an archive file. |

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| | | | |
|---|---|---|---|
| 8. | hspace | pixels | It specifies the horizontal space around the applet. |
| 9. | vspace | pixels | It specifies the vertical space around the applet. |

3) Discuss about the Sandbox Security model with regard to Java Applet. What does security restriction means in applet?

Ans: Sandbox is a security measure in the Java development environment. The sandbox is a set of rules that are used when creating an applet that prevents certain functions when the applet is sent as part of a web page. When a browser requests a web page with applets, the applets are sent automatically and can be executed as soon as the page arrives in the browser. If the applet is allowed unlimited access to memory and operating system resources, it can do harm in the hands of someone with malicious intent. The sandbox creates an environment in which there are strict limitations on what system resources the applet can request or access. Sandboxes are used when executable code comes from unknown or untrusted sources and allow the user to run untrusted code safely.

The Java sandbox relies on a three-tiered defense. If any one of these three elements fails, the

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security model is completely compromised and vulnerable to attack.

i) byte code verifier
ii) applet class loader
iii) security manager

The common security restrictions of applet are as follows:-

i) Applets can never run any local executable program.
ii) Applets cannot communicate with any host other than the server from which they were downloaded.
iii) Applets cannot read from or write the local computer's file system.
iv) Applets cannot ~~that~~ ~~to~~ find out any information about the local computer, except for the Java version used, the name and version of the OS.
v) All windows that an applet pops up carry a warning message. This message is a security feature to ensure that users do not mistake the window for a local application.

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@ Message sharing btwn HTML & Applet

Or

4) How can a html file pass data to an applet? Explain with code tag.

→ <param> tag is used to pass the parameter value from HTML file to Applet code.
We can get any information from the HTML file as a parameter, for this purpose, Applet class provides a method named getParameter().

myapplet.html

```
<html>
<body>
<applet code="UseParam.class" width="300"
    height="300">
<param name="msg" value="welcome to
    applet">
</applet>
</body>
</html>
```

UseParam.class

```
import java.applet.Applet;
import java.awt.Graphics;
public class UseParam extends Applet {
    public void paint (Graphics g) {
        String str = getParameter("msg");
        g.drawString(str, 50, 50);
    }
}
```

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5) Explain how to display an image in an applet.

Ans: In applet, images are displayed using drawImage() method. This method is supplied by the Graphics object, which is passed to paint() method.

Example

AImage.java

```
import java.awt.*;
import java.applet.*;
public class AImage extends Applet
{
    Image img1;
    public void init()
    {
        img1 = getImage(getDocumentBase(),
                        "icon.png");
    }
    public void paint(Graphics g)
    {
        g.drawImage(img1,100,100,this);
    }
}
```

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Aimage.html

```
<html>
<applet code="Aimage.class" height=300
    width=300>
<\applet>
</html>
```

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6) Write an applet with the functionalities to play, stop & repeat the audio.

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

public class PlaySoundApplet extends Applet
implements ActionListener {
    Button play,stop;
    AudioClip audioClip;

    public void init() {
        play = new ~~Button~~ Button("Play in Loop");
        add(play);
    play.addActionListener(this);
    stop = new Button("Stop");
    add(stop);
    stop.addActionListener(this);
    audioClip = getAudioClip(getCodeBase(),
        "pick-your-song.wav");
    }

    public void actionPerformed(ActionEvent ae) {
        Button source = (Button) ae.getSource();
    if(source.getLabel() = "Play in Loop") {
        audioClip.play();
        }
    else if(source.getLabel() == "Stop") {
        } audioClip.stop();
} }
```

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7) How is Java application different from java applet. Differentiate

| Java Application | Java Applet |
|---|---|
| 1. An application is a stand-alone Java program which can be run independently on client/server without the need of a web browser. | 1. An applet is a form of Java program which is embeded with HTML page and loaded by a web server to be run on a web browser. |
| 2. The execution of program starts with the main() method. | 2. There is no requirement of main() method for the execution of the program. |
| 3. It can access local disk files/folders and network system. | 3. It doesn't have access to the local network, files & folders. |
| 4. It doesn't require any GUI. | 4. It must run within GUI. |
| 5. It is trusted application and doesn't require high security. | 5. It is untrusted and requires high-security constraints. |
| 6. It requires JRE for successful execution. | 6. It requires web browser like chrome, firefox for its successful execution. |
| 7. It can perform read and write operations on files stored on the local disk. | 7. It doesn't have access to local files so it cannot perform read & write operations. |

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8) Steps to convert applet to Java Application:

1. Delete the statement "import java.applet" package.
2. Replace extends Applet with frame.
3. Replace the init() method with constructor
4. Check the layout (for Applet, the default layout is flowlayout and for frame, it is Borderlayout
5. Add setXXX() method like ~~size~~ setSize() etc.
6. Add the main() method.
7. HTML is not required (delete it).

Program Example:

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9) Write down the steps for converting java application to java applet.

→ ~~steps~~ It is easy to convert a graphical Java application into an applet that you can embed in a web page.

The steps are listed below:-

i) Make an HTML page ~~to~~ with the appropriate tag to load the applet code.

ii) Supply a subclass of the JApplet class. Make this class public. Otherwise, the applet cannot be loaded.

iii) Eliminate the main method in the application. Do not construct a frame window for the application. Your application will be displayed inside the browser.

iv) Move any initialization code from the frame window constructor to the init method of the applet.

v) Remove the call to setSize; for applets, sizing is done with the width and height parameters in the HTML file.

vi) Remove the call to setDefaultCloseOperation: An applet cannot be closed, it terminates when the browser exits.

vii) Don't call setVisible(true). The applet is displayed automatically.

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D) Repaint Method

= Repaint method in java is available in java.applet.Applet class and is a final method which is used whenever we want to call update method along with the call to paint method, call to update method clears the current window, performs update and afterwards calls paint method.

Syntax:

```
package <packagename>;
    //class extending applet
public class <classname> extends Applet {
public method <methodName> (<arguments>) {
  repaint();   // calling repaint method when
  }                 required.
}
```

Repaint method is final method available in Applet class and that's why it cannot be overridden. Whenever repaint method is to be used it should be directly called from subclasses of Applet class. Repaint method is responsible for handling update to paint cycle of applet. Repaint method is an asynchronous method of applet class. When call to repaint method is made, it performs ~~require~~ request to erase and perform redraw of the component after a small delay in time.

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