Don Bosco Institute of Technology, Kurla(W)
Department of Electronics and Tele-Communication Engineering
ECL304 - Skill Lab: C++ and Java Programming
Sem III
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Title: Applets

Learning Objective:

Students will learn about the Applet concept

Learning Outcome:

Understanding designing GUI using Applets in Java

1) What is Applet?

Ans: Applet is a special type of program that is embedded in the webpage to generate the dynamic content. It runs inside the browser and works at client side. They are used to provide interactive features to web applications and can be executed by browsers for many platforms. They are small, portable Java programs embedded in HTML pages and can run automatically when the pages are viewed. When a user views an HTML page that contains an applet, the code for the applet is downloaded to the user's machine. A JVM is required to view an applet.

An applet is a Java program that runs in a Web browser. An applet can be a fully functional Java application because it has the entire Java API at its disposal.

There are some important differences between an applet and a standalone Java application, including the following −

An applet is a Java class that extends the java.applet.Applet class.

A main() method is not invoked on an applet, and an applet class will not define main().

Applets are designed to be embedded within an HTML page.

When a user views an HTML page that contains an applet, the code for the applet is downloaded to the user's machine.

A JVM is required to view an applet. The JVM can be either a plug-in of the Web browser or a separate runtime environment.

The JVM on the user's machine creates an instance of the applet class and invokes various methods during the applet's lifetime.

Applets have strict security rules that are enforced by the Web browser. The security of an applet is often referred to as sandbox security, comparing the applet to a child playing in a sandbox with various rules that must be followed.

Other classes that the applet needs can be downloaded in a single Java Archive (JAR) file.

There are some advantages as well as disadvantages of the applets which are given below:

Advantage of Applet

There are many advantages of applet. They are as follows:

- It works at client side so less response time.
- Secured
- It can be executed by browsers running under many plateforms, including Linux, Windows, Mac Os etc.

Disadvantage of Applet

- Plugin is required at client browser to execute applet.

There are two types of applets that a web page can contain.

- Local Applet
- Remote Applet

- **Local Applet**

Local Applet is written on our own, and then we will embed it into web pages. Local Applet is developed locally and stored in the local system. A web page doesn't need the get the information from the internet when it finds the local Applet in the system. It is specified or defined by the file name or pathname. There are two attributes used in defining an applet, i.e., the codebase that specifies the path name and code that defined the name of the file that contains Applet's code.

- **Remote Applet**

A remote applet is designed and developed by another developer. It is located or available on a remote computer that is connected to the internet. In order to run the applet stored in the remote computer, our system is connected to the internet then we can download run it. In order to locate and load a remote applet, we must know the applet's address on the web that is referred to as Uniform Recourse Locator(URL).

Hence, in short applet can be defined as a special type of program that is embedded in the webpage to generate the dynamic content. It runs inside the browser and works at client side.

2) Life cycle of an applet.

The applet life cycle can be defined as the process of how the object is created, started, stopped, and destroyed during the entire execution of its application. It basically has five core methods namely init(), start(), stop(), paint() and destroy().These methods are invoked by the browser to execute.

Along with the browser, the applet also works on the client side, thus having less processing time.

Four methods in the Applet class gives you the framework on which you build any serious applet −

init − This method is intended for whatever initialization is needed for your applet. It is called after the param tags inside the applet tag have been processed.

start − This method is automatically called after the browser calls the init method. It is also called whenever the user returns to the page containing the applet after having gone off to other pages.

stop − This method is automatically called when the user moves off the page on which the applet sits. It can, therefore, be called repeatedly in the same applet.

destroy − This method is only called when the browser shuts down normally. Because applets are meant to live on an HTML page, you should not normally leave resources behind after a user leaves the page that contains the applet.

paint − Invoked immediately after the start() method, and also any time the applet needs to repaint itself in the browser. The paint() method is actually inherited from the java.awt.

We will see these methods in detail as given below:

public void init(): is used to initialized the Applet. It is invoked only once.

public void start(): is invoked after the init() method or browser is maximized. It is used to start the Applet.

public void stop(): is used to stop the Applet. It is invoked when Applet is stop or browser is minimized.

public void destroy(): is used to destroy the Applet. It is invoked only once.

➢ Applet Life Cycle Working

The Java plug-in software is responsible for managing the life cycle of an applet.

An applet is a Java application executed in any web browser and works on the client-side. It doesn't have the main() method because it runs in the browser. It is thus created to be placed on an HTML page.

The init(), start(), stop() and destroy() methods belongs to the applet.Applet class.

The paint() method belongs to the awt.Component class.

In Java, if we want to make a class an Applet class, we need to extend the Applet

Whenever we create an applet, we are creating the instance of the existing Applet class. And thus, we can use all the methods of that class.

3) Create Hello World applet.

Following is a simple applet named HelloWorldApplet.java −

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

public class HelloWorldApplet extends Applet {
  public void paint (Graphics g) {
    g.drawString ("Hello World", 25, 50);
  }
}
```

These import statements bring the classes into the scope of our applet class −

```
java.applet.Applet
java.awt.Graphics
```

Without those import statements, the Java compiler would not recognize the classes Applet and Graphics, which the applet class refers to.

Invoking an Applet

An applet may be invoked by embedding directives in an HTML file and viewing the file through an applet viewer or Java-enabled browser.

The <applet> tag is the basis for embedding an applet in an HTML file. Following is an example that invokes the "Hello, World" applet −

```
<html>
  <title>The Hello, World Applet</title>
  <hr>
  <applet code = "HelloWorldApplet.class" width = "320" height = "120">
```

```
    If your browser was Java-enabled, a "Hello, World"
    message would appear here.
  </applet>
  <hr>
</html>
```

How to run an Applet?

There are two ways to run an applet

1. By html file.

2. By appletViewer tool (for testing purpose).

The Applet Class

Every applet is an extension of the java.applet.Applet class. The base Applet class provides methods that a derived Applet class may call to obtain information and services from the browser context.

These include methods that do the following −

Get applet parameters

Get the network location of the HTML file that contains the applet

Get the network location of the applet class directory

Print a status message in the browser

Fetch an image

Fetch an audio clip

Play an audio clip

Resize the applet

Additionally, the Applet class provides an interface by which the viewer or browser obtains information about the applet and controls the applet's execution. The viewer may −

Request information about the author, version, and copyright of the applet

Request a description of the parameters the applet recognizes

Initialize the applet

Destroy the applet

Start the applet's execution

Stop the applet's execution

The Applet class provides default implementations of each of these methods. Those implementations may be overridden as necessary.

The "Hello, World" applet is complete as it stands. The only method overridden is the paint method.