

Programming In Java
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Lecture – 05
Java Applet Programming

So, we have run few programs and then how they can be composed in Java environment. So, initially you may find it difficult to cope with this, but you should not write lose your (Refer Time: 00:34) actually right, you have to be patience. And of course, if you have any difficulties while you are learning then you should I mean post your questions that difficulties and doubt. So, that you can at least you can understand.

Now, we have learn about some simple programs in fact, in Java there are two types of programming's is there they are called Java application and one is called Java applet. So, in today's lecture we will just have an idea about is not the details running details running will takes more time so, a very simple overview of Java Applet Programming.

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What is an applet?

Java programs are available in two flavors

Applet

- A **Java applet** is a program that appears embedded in a web document and applet come into effect when the browser browse the web page.

Application

- It is similar to all other kind of programs like in C, C++, etc. to solve a problem.

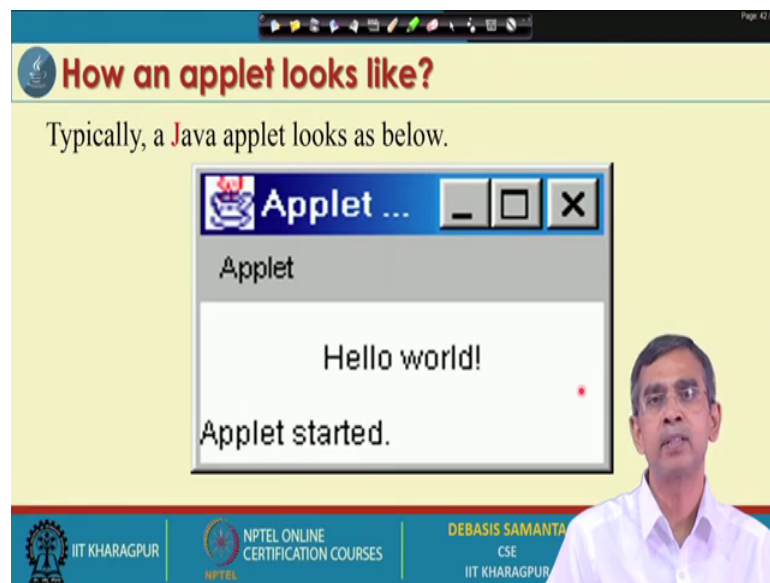
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So, far the Java applet programming is concerned so, basically yeah so, Java programming for applet. So, the idea about as I told you there are two types of programming, the application which you have already learnt. And then applications are most simplest simple programs actually those are basically in for example, C C++ python that you have already tested maybe, but the applet is a little bit a [difficu/difficult]

different type of programs. And then Java is a unique program language which is basically suppose to do that.

So, the name applet actually whenever you want to mention something small so, it is basically late. So, small application is called Java applet. So, it is basically Java applet is nothing, but a small program in Java and but more specifically these are small program is for writing graphical user interface related program.

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Now, so applet is basically a view also and then how we can create a view using Java that is the concept Java applet programming. And typically a Java applet will look like this and if you see the Java applet here is just look like a window. So, an applet is nothing but an window.

As the window is basically the one bar is call the title bar. And then there is a name of the windows and then these basically display area of the windows. So, this is the idea about an applet and then applet this is very simple version of an applet that I have shown you and here you can include image, then multimedia document text link what is not. So, this basically the display area, where we can include many components, that is required there in case of GI or windows programming.

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The slide is titled "How an applet looks like?". It features a yellow background with a blue header. The text "Typically, a Java applet looks as below." is centered. Below the text is a screenshot of a Java applet window titled "Calculator". The window has a standard Windows-style title bar with minimize, maximize, and close buttons. The menu bar includes "Edit", "View", and "Help". The calculator interface includes a display showing "0", a "Backspace" button, "CE" and "C" buttons, and a numeric keypad with buttons for digits 0-9, decimal point, and arithmetic operators. A small video feed of a man in a white shirt is visible in the bottom right corner of the slide. The footer contains logos for IIT KHARAGPUR, NPTEL ONLINE CERTIFICATION COURSES, and the name DEBASIS SAMANTA, CSE, IIT KHARAGPUR.

And then another example of applet if you can see it so, you know it this is basically look of a calculator it is also an applet. And although things are basically close pattern minimize pattern, then maximum pattern all these things are there. And then these applet contains a number of components for example, these are the component is called the button and then level and this is the one component is called the area, where it will display something. So, it is called a text field area and like this. So, this is an another example of applet that is there so, we will see exactly how using Java we can create our own applet.

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The slide is titled "Applet program writing". It features a yellow background with a blue header. The code is displayed in a white box with a light gray border. The code is as follows:

```
// Your first Java applet
// An applet to print Hello World
import java.applet.Applet;
import java.awt.Graphics;

public class HelloWorld extends Applet{
    public void paint(Graphics g){
        g.drawString("Hello World!",150,150);
    }
}
```

The "import" statements are circled in red. The footer contains logos for IIT KHARAGPUR, NPTEL ONLINE CERTIFICATION COURSES, and the name DEBASIS SAMANTA, CSE, IIT KHARAGPUR.

Now, so let us write a program for a simple applet, I want to write one applet, which basically we will display one message hello world we have already learn how a hello all can be displayed on the screen right in the window, command window command prompt. But, here it will display through an applet; that means, on window and within the window the string will be there. Now, here is a very small look of the program and here actually the where command can be placed. So, it is a basically command about the program.

So, that you usually whenever write program put as many commands as possible so, that you can understand later on or anybody can understand your program so, the command and these are the two essential import I told you that Java has lot of packages. If you want to use some package or packages, then they should be imported first. So, the import command here is basically to import all the packages that you want to use in your program. For Java applet programming the two packages are very essential one is called the Java dot applet and another is called Java dot awt. So, here you can see how one can import the two packages Java dot applet and Java dot awt.

And if I write again after name of the packages, then Java dot applet or Java dot awt a particular name it is actually a particular class, in Java dot applet there are many classes, but I want to use only one particular class so, I can mention dot applet. Similarly, in awt I want to mention only one package class call the graphic so, I use it. So, this way I can import package here we have used imported two packages and dot applet and then dot awt and two classes in that packages applet class and then graphics class.

So, this is about import statement, then there will be the class definition as I told you here is also the class definition, here the name of the class that I have discussed is here. The name of the class means this is the program that we are going to write; that means, here is a applet program having name hello world, but here one thing we have used it that extends see it is always a standard syntax, if you write an applet, then applet class that you are writing that mean this one should extend one package class call applet.

So, this is the standard syntax that you have to do it. So, this is basically defining the new class of your applet programs. Now, you can find the difference between in case of simple application we use, simple class hello world a p p and then within this right, but here we have to do it. And then these basically the closing and matching second braces

indicating that whatever the code that you want to include, the code indicates the what are the data and the methods that you want to include that should be enclosed within the closing and beginning brackets.

Now, in this in this program we have only one what is called the function who have declared is called a method of course not function so method. So, the name of the method is paint, I have declared here one method public void paint I will discuss about what is the meaning of this later on you just simply take it that ok, this is the syntax that you have to follow while you writing the paint methods. So, paint and then this argument also you have to mention. So, here we declare one method called the paint method and this method in order to display on screen use this kind of syntax `g dot draw string`. So, this method is basically declare in graphics class; that means, this method is already known, you can just simply use it and this method will basically print a string on an applet.

And then this location indicates that where in the applet it will print is basically 150 150 means in the Cartesian location coordinate x location and y location. So, that if the applet is a 1000 by 1000 right, if it is a 1000 cross 1000 pixel, then is 150 and 150. So, here the `g dot string` will be displayed so, this is a concept here. So, this is basically simple one applet you can write that will display one string hello world on the applet.

Now, let us see how to run these applet how to of course, editing is editor come editor say notepad plus plus and then how this can be edit in shape and then compile and finally, it can be executed.

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Building an applet

Edit → Save → Compile

- Edit the code in the same fashion as an **application**
- The name of the applet will be same as the **public class** here

```
HelloWorld.java
```

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Now, the name of the applet should be same, as the convention that we have already used while you are saving this program as the same as the name of the class here, the name of the class is hello world. So, name of the file where you should save this program is hello world dot Java.

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Building an applet

Edit → Save → Compile

The program can be compiled in the same fashion as a Java application is compiled. That is,

```
javac HelloWorld.java
```

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So, you can save this program as hello world dot Java file and; obviously, in your working directory you can save it and then compilation, we have used Javac compiler to compile Java application the same is also valid for here, to compile a Java applet you use

the Javac command. So, and then you write Javac the name of the file that, you want to compile hello world dot Java in this case. So, it will compile these Java file into class file.

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Building an applet

Edit → Save → Compile

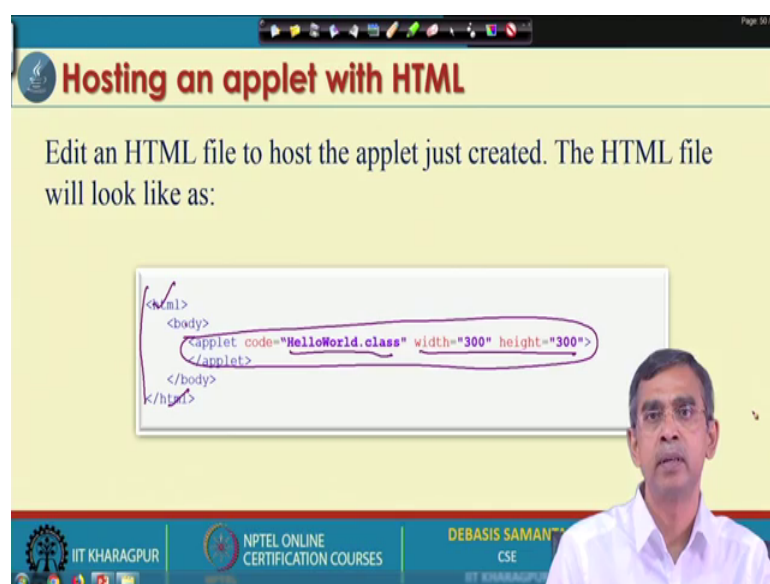
After the successful compilation, the `javac` will produce a file named

`HelloWorld.class`

The slide features a yellow background with a blue header and footer. The footer contains logos for IIT Kharagpur, NPTEL Online Certification Courses, and the presenter's name, Debasis Samant, CSE, IIT Kharagpur. A small video inset of the presenter is visible in the bottom right corner.

So, it will create a class file, the name of the class file will be same as the name of the file in Java except the extension dot class. It is a same as in case of application that we have learned.

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Hosting an applet with HTML

Edit an HTML file to host the applet just created. The HTML file will look like as:

```
<html>
<body>
  <applet code="HelloWorld.class" width="300" height="300">
</applet>
</body>
</html>
```

The slide features a yellow background with a blue header and footer. The footer contains logos for IIT Kharagpur, NPTEL Online Certification Courses, and the presenter's name, Debasis Samant, CSE, IIT Kharagpur. A small video inset of the presenter is visible in the bottom right corner. The HTML code is displayed on a whiteboard with a purple circle highlighting the `code="HelloWorld.class"` attribute.

Now, I will come to the discussion of running I mean how to execute this class file. Here is the difference from the application to the applet running, in case of applet in case of application we use Java command is basically interpreter which basically executive your program, but in this case Java we cannot use it, whether we can use applet viewer instead of Java we should use applet viewer.

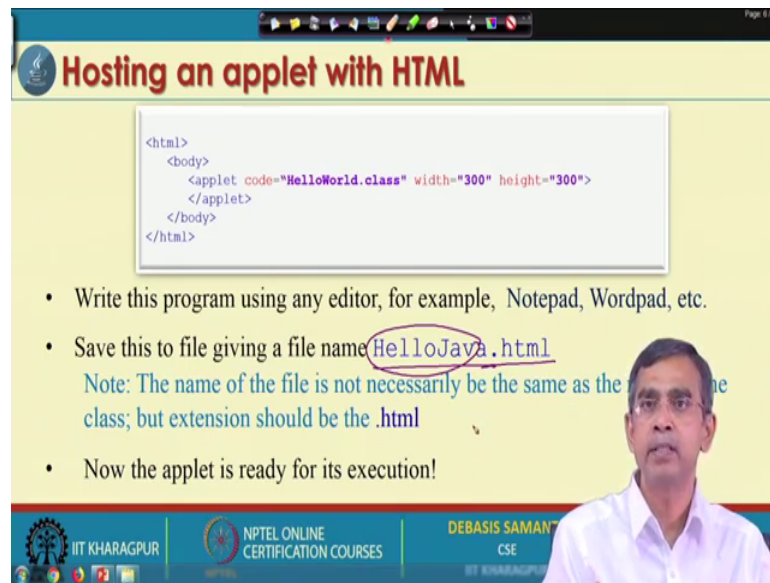
But applet viewer can run only an HTML file, this means that the class file that you have created should be stored in an HTML file. Now, here is a typical look of an HTML file I do not know whether you know about the HTML file and then HTML tags and everything. But, if you do not know absolutely it is not is a matter of concern, you will learn it shortly once you learn many other applets and then run it then. There is a basic syntax that you should follow basic structure that you should follow in order to embed your class file into an HTML file.

And here is basically the HTML file look like. So, this is the beginning of the tag this is the ending of the tag as HTML construct is there, these are body; that means, this is a body of the HTML and here is the syntax that you should follow to MBT or dot class file. So, applet code and then hello world dot class, this is the file that you have created I mean compiled by writing your Java applet program.

And this is the concept that how large the applet you want to display. So, it is 300 300 indicates that if your total screen size is 1000 1000, then out of this 1000 1000 on the portion 300 by 300 will take to view your applet, I mean display your applet on your computer screen. So, 300 300 is the size of the applets that will be displayed.

So, you have to write an HTML file and then write this code in the HTML file and save this program. Now, while you are saving this program, you can give a name of the file for this HTML, the name of that HTML file can be anything name of the file can be anything, but the extension should be HTML. So, here basically this is the applet embedded in an HTML file and then let us give the same name as the program file name that is means hello world, but in this case I have given the name for example, hello Java. So, in this case the name of the program is given as hello Java dot HTML.

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Hosting an applet with HTML

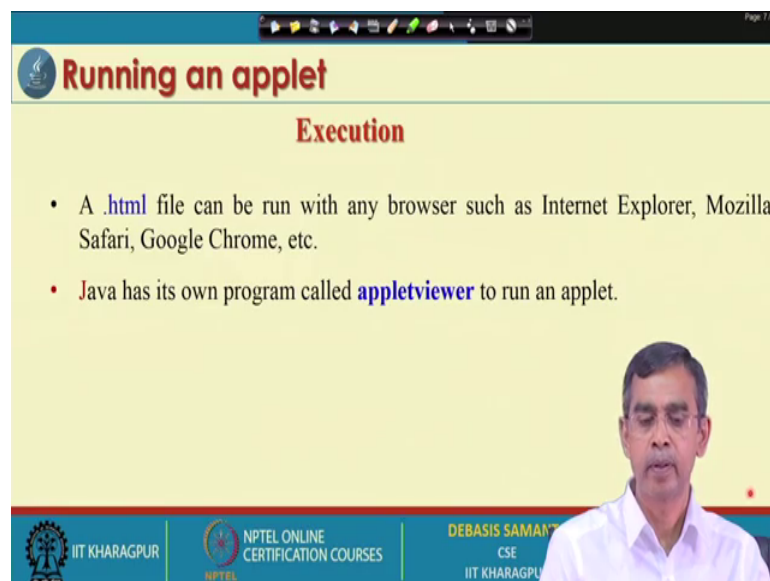
```
<html>
<body>
  <applet code="HelloWorld.class" width="300" height="300">
</applet>
</body>
</html>
```

- Write this program using any editor, for example, Notepad, Wordpad, etc.
- Save this to file giving a file name HelloJava.html
Note: The name of the file is not necessarily be the same as the class name; but extension should be the .html
- Now the applet is ready for its execution!

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Now, you can note that the name of the class is hello world, but I have given the different name it is ok, even you can give x dot HTML a b c dot HTML team dot HTML any name. So, here it is not necessary to maintain the same name as the file name and then class name not necessary, you can make any name, but the extension should be dot html. So, that HTML can be browsed by any browser. So, once you save this program as an HTML file, then you are ready to run this program; then you are ready to run this program.

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Running an applet

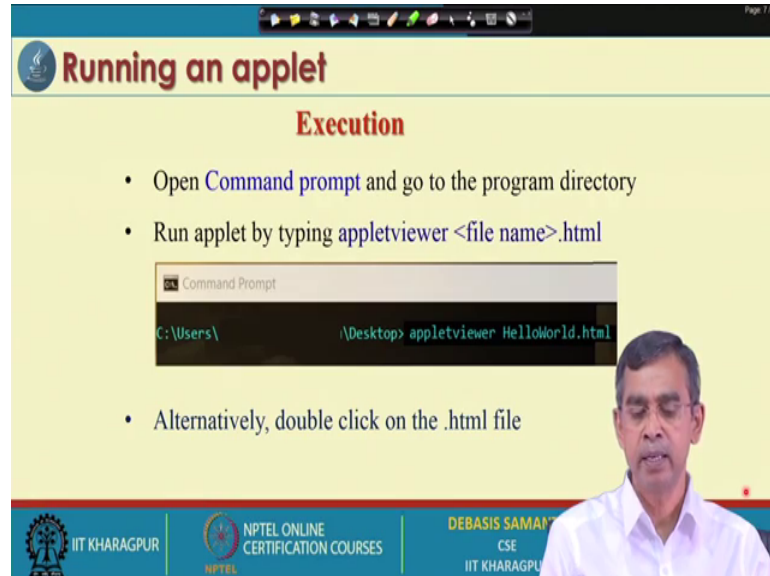
Execution

- A .html file can be run with any browser such as Internet Explorer, Mozilla, Safari, Google Chrome, etc.
- Java has its own program called **appletviewer** to run an applet.

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I told you in order to run this program, you should use applet viewer. So, use the applet viewer as a command and then you just run the program as an applet viewer.

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Running an applet

Execution

- Open **Command prompt** and go to the program directory
- Run applet by typing `appletviewer <file name>.html`

```
Command Prompt
C:\Users\ > \Desktop> appletviewer HelloWorld.html
```

- Alternatively, double click on the .html file

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So, here is the command is that applet viewer and then this is the name of the file that you have created say for example, hello Java dot HTML.

So, here for example, hello world these are name of the HTML file. So, if you write it then this file will be executed on execution, you can see the output on execution you can see the output.

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Running an applet

Execution

Applet ...

Applet

Hello world!

Applet started.

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The output will look like this. So, hello world this is the string that it will print here and this is the 300 cross 300 size and, this is a location 150 150 of the point, where it will start painting the text. So, you have learn about how a simple applet can be created and then the same can be executed.

So, I should advise you to test the this kind of applet programming as a first experience how to write the program. And there are many more things are involved while you are writing applet programming, I will just try to give I mention few important things here, many more things will be discussed, when will discuss applet in details. So, writing an applet needs lot of many other I mean exposure to many more things. So, it will take it is own time and we will learn it slowly, before going to learn many more details about the applet, I just want to have a brief overview about how what are the structure of an applet in general.

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The slide is titled "Applet revisited" and contains the following code snippets:

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

public class HelloWorld extends Applet{
    public void paint(Graphics g){
        g.drawString("Hello World!",150,150);
    }
}
```

```
<html>
<body>
<applet code="HelloWorld.class"width="300" height="300">
</applet>
</body>
</html>
```

The Applet Viewer window shows the output: "Hello World!" and "Applet started."

So, typically the structure that we have learnt so, far is basically writing a program in Java syntax. So, essentially while you are dealing with applet programming so, three things are there. So, the first thing is a your program that you should write following some Java syntax and, then program will look like this.

And then second thing that you have to embed the program using an HTML file which look like this form. So, these are the two things are obvious state that you have to follow. And then running this kind of things using an applet viewer and this will look like this

output. So, these are the three things. So, far the Java applet programming is concerned the basic steps that you should follow.

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The slide, titled "Basic structure of an applet", illustrates the components of a Java applet class. It is divided into four parts:

- Part 1:** Import Section
- Part 2:** `public class NewAppletName extends Applet {`
- Part 3:** Variable declaration(s)
- Part 4:** Method(s) for object interaction declared and defined here, which includes a sub-section for "Java code to accomplished a task".

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Now, apart from this basic steps there are many more things involved, while you have to develop your Java applet. And then basically the how a complete Java program Java applet you look like this. Is basically many more things are involved there I just want to highlight the important things that is there. So, while you write a Java applets the first thing that you should write the input, as I told you in our program that we have experienced now. So, there basically import Java dot applet dot applet class and then Java dot awt dot graphic class these are the things like. So, it is there import section you have to mention what are the things that you have to import it.

And I wants the input is there then main body of the applet class, as a main body first we have to start with the naming of the applet so, that name you have to give one name of your own. And these are the things that you have to always fix public class always you have to give it, there is no other thing that you can write if you do not write then there will be compilation error. So, without any hesitation you just right that public class and then give the name of your class and, then your class should extends the applet so, this is also another extends.

So, this is your own and this is the standard that you have to follow always and, then what about the code that you want to use in your program, you should write within the

starting and then closing brackets. So, these are the second part I can say. And then within this part they are may required some variable to declare. So, if you need some variable that is required in your applet programming, then you define all these things here. And then the different methods that is required to build your applet should mention their. So, there are all together four parts, that you have to think about while you are writing applet in java.

So, regarding the different parts we will discuss one by one, but in todays lecture we will try to discuss about basic things and mainly what are the different methods that can be there, here I want to mention again one thing is that any method should not be included there, there are certain free defined methods, you can only use them. However, the methods you can fill them that mean methods are fixed, but they are body you can write with some codes that is required for your applet.

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The slide, titled "Basic structure of an applet", illustrates the components of a Java applet. On the left, a diagram shows the structure of a class: an "Import Section" (Part 1), a class declaration "public class NewAppletName extends Applet {" (Part 2), a "Variable declaration(s)" (Part 3), and a "Method(s) for object interaction: declared and defined here" (Part 4) containing "Java code to accomplish a task". On the right, a code snippet shows a concrete example:

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

public class HelloWorld extends Applet{
    public void paint(Graphics g){
        g.drawString("Hello World!", 150, 150);
    }
}
```

The slide also features the IIT Kharagpur logo, NPTEL Online Certification Courses branding, and the name of the presenter, Debasis Samant, CSE, IIT Kharagpur.

So, these are the things are there now, let see what are the different methods are there in this applet programming obviously, the method that we have discussed already with our own applets, has only one method the name of the method is paint. So, this method is there you cannot change the name of this method, in any way you cannot write any other method of your own name there. So, this is a fix method that you have to use it the paint with. Other than this paint method there are few more methods are there, which needs to

be written in your program Java applet the methods are called here for example, we have listed the three methods one is init, another is start and then stop.

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The slide is titled "Basic methods in applet" and lists three methods:

- `public void init()`
 - To initialize or pass input to an applet
- `public void start()`
 - The `start()` method is called after the `init()` method, it starts an applet
- `public void stop()`
 - To stop a running applet

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And there is another 2 methods are there, we will discuss about destroy and then paint.

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The slide is titled "Basic methods in applet" and lists two methods:

- `public void paint (Graphics g)`
 - To draw something within an applet
- `public void destroy()`
 - To remove an applet from memory completely

A code snippet is shown in a white box:

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

public class HelloWorld extends Applet{
    public void paint(Graphics g){
        g.drawString("Hello World!",150,150);
    }
}
```

The slide also features a video feed of a speaker in the bottom right corner and logos for IIT KHARAGPUR, NPTEL ONLINE CERTIFICATION COURSES, and DEBASIS SAMANT CSE IIT KHARAGPUR at the bottom.

So, all together only 5 methods those you can use in your applet. So, five methods have their own meaning, the start method is basically to start running an applet, sometimes we have to control applet view. So, in that case if you want to control then you start,

sometimes you have to also close the applet which are there in one program you can use 3 4 applets.

So, sometime we have start one applet close another and like this. So, in that case you use start and close stop method and then paint method already you have used it if you want to draw something on the applet area, then you call the paint method and the in the body you can write anything like. And destroy method if you want to remove an applet from your program. So, you can use the destroy method while they are running. So, destroy will kill the applet view forever in a program execution. So, these are the different methods are there and, I will just highlights or explain one method call the init method.

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```
// Use of init() method in an applet //  
  
import java.applet.Applet;  
import java.awt.Graphics;  
  
public class HelloWorld extends Applet(  
    public void init() {  
        resize(200,200);  
    }  
  
    public void paint(Graphics g){  
        g.drawString("Hello World!",150,150);  
    }  
}
```

So, let us see the init method how it can be reconfigured in your applet programming. Now, here let us look at the low code these are import section already we have learned about it. And then this is the name of the applet called hello world and in our earlier program this code was not there. Now, I want to use this code where this code this part of the code already it was there. So, it is fine now let us see what is the [imp/impact] impact of this code so, here basically init one method I have called these basically call another method resize is a one method which is defined in awt it is already there.

So, this resize method I call an 200 200 what is the idea about is that. So, whatever the applet size if you mention in your HTML, you can note that in HTML we use usually

what should be the size of your applet view say 300 300, but after the CPU call and init method with resize as 200 200. So, a applet size will be automatically resize to 200 200 view there. So, so idea about resize command is there. Now, let see the output if you use resize through init method and if you do not use it how it will work for you.

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Basic methods in applet

```
// Use of init() method in an applet //  
import java.applet.Applet;  
import java.awt.Graphics;  
  
public class HelloWorld extends Applet{  
    public void init() {  
        resize(200,200);  
    }  
  
    public void paint(Graphics g){  
        g.drawString("Hello World!",150,150);  
    }  
}
```

```
<html>  
<body>  
<applet width="300" height="300" code="HelloWorld.class">  
</applet>  
</body>  
</html>
```

Applet started
Hello Wc
Applet started

So, here is the method the view without any resize. So, this is the program this is the applet the 300 and 300s are default size that we have mentioned and then the output will look like this. So, here basically 300 by 300 is the applet without any resize.

But, if you use the resize method that mean these code is used and again you use the applet, this is the HTML file, then the applet that will appear with the smaller size. So, resize is basically will allow a programmer to control the size of the applet as it is there. So, this is one example of resize in init method use of init method, there is another one use of init method. So, that applet how we can given input to an applet, because while applet is running it is a basically via HTML and then how input to an applet be given there. So, input to an applet if you want to give then you should give via HTML itself.

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The screenshot shows a video lecture titled "Input passing to an applet". The main content is a code editor displaying the following Java code:

```
// Use of init() to pass value through HTML to applet //  
  
import java.applet.*;  
import java.awt.*;  
  
public class RectangleTest extends Applet {  
    int x, y, w, h;  
    public void init () {  
        x = Integer.parseInt(getParameter (" xValue" ));  
        y = Integer.parseInt(getParameter (" yValue" ));  
        w = Integer.parseInt(getParameter (" wValue" ));  
        h = Integer.parseInt(getParameter (" hValue" ));  
    }  
  
    public void paint ( Graphics g ) {  
        g.drawRect (x, y, w, h);  
    }  
}
```

The code is presented in a white box with a light blue border. The presenter, a man in a white shirt, is visible in the bottom right corner of the video frame. The video player interface includes a title bar at the top, a toolbar, and a footer with logos for IIT Kharagpur, NPTEL Online Certification Courses, and Debasis Samant CSE.

So, here also the init method can be used for this purpose. Now, here let us look at the code of another use of init method which is basically being used here to input pass an input to an applet while applet is running. Now, if you see the code little bit carefully. So, these are the imports as usual and it basically imports applet and awt and dot star is basically another way of importing; that means, it will import everything. If you are not sure about which particular class is responsible for your applet program, then you can instead right dot star that means all the classes will be imported into your applet program.

In this case the name of the class that I have given is rectangle test, name of the rectangle and this program basically is meant for drawing a rectangle on the applet. So, for this the method that is required is g.drawRect, it is already defined in the graphics package. And then it will basically draw and this basically needs 4 parameters x y w h. So, the idea about is that if this is the applet view and then x y is a coordinate; that means, from where the applet rectangular will start and this the w and this is a h. So, x y and this is the w and then h. So, this is the specification that is required. So, we have to pass the input while we call g.drawRect and the four parameters that are required here x y w and h to be passed.

And then we want to get the value x y w h from the applet itself. So, for this we can write the init method. So, this is the init method we have written here and then code in the init method is there. This is a typically I mean some code it is required, here the idea it is that

say there is a integer passing, it is declare it is already there in Java dot line package basically it will pass the value that is there in the applet and then store as an integer. So, this is the standard syntax in Java. And get parameter is basically get a value from the HTML code. So, this is a get parameter method and then that parameter where in HTML code, it is written as x value. So, in HTML code if there are certain parameter which is defined as x val y val w val h val, they well be retrieved from the HTML file process it and store them as an x y w h in this case as an input to the parameter applet.

So, this is the idea about how the input can be given to the applet. Now, let see the so this is the program your new applet program where it will read x y w h from the HTML file and then it will draw a rectangle. Now, let us see how the HTML file will be in this case. So, what is the change in their HTML file is there.

(Refer Slide Time: 28:20)

The slide is titled "Input passing to an applet". Below the title, it says "Corresponding HTML document containing this applet and providing parameter values will be :". A code block contains the following HTML code:

```
<applet code = "RectangleTest" width = 150 height = 100 >  
< param name = "xValue" value = 20 >  
< param name = "yValue" value = 40 >  
< param name = "wValue" value = 100 >  
< param name = "hValue" value = 50 >  
</applet >
```

The presenter's video feed shows a man in a white shirt speaking. The slide footer includes logos for IIT KHARAGPUR, NPTEL ONLINE CERTIFICATION COURSES, and DEBASIS SAMANTA CSE.

So, here the HTML code will be same as earlier HTML body tag and everything, only the code that is required here, basically applet code this is the code that needs to be executed and you can write the dot class also dot class. And then this is a width and height that you have specified that window size and here param name x val and this value equals to 20; that means, you want to say that this is a parameter name x value whose value is 20 this is a typical HTML code that occupy x value is now val 20 40 150 for y value w value h value respectively.

So, this is the HTML code that you have to write in order to pass the values, from an HTML to the applet code it is there. So, once these HTML code is there you run this code as usual using applet viewer applet viewer.

(Refer Slide Time: 29:20)

```
<applet code = " RectangleTest" width = 150 height = 100 >
  < param name = xValue value = 20 >
  < param name = yValue value = 40 >
  < param name = wValue value = 100 >
  < param name = hValue value = 50 >
</applet >
```

So, applet viewer can be run here and if you run this HTML code using applet viewer, it will display the applet look like this. So, it will draw the rectangle which x y coordinate with this one and w is this one and h is this one. So, applet will be drawn. Now let us run the same program, but we changing the deferent value. So, if you want to change the value definitely you have to negotiate the HTML file there.

So, in HTML file here 20 40 150 is written, if you give the different value so, different rectangular will be drawn accordingly. Now, let see how the new HTML file can be with the new set of values and then corresponding HTML can be drawn.

(Refer Slide Time: 30:03)

The slide is titled "Input passing to an applet". It displays the following HTML code in a white box:

```
<applet code = "RectangleTest" width = 150 height = 100 >  
< param name = xValue value = 30 >  
< param name = yValue value = 30 >  
< param name = wValue value = 30 >  
< param name = hValue value = 30 >  
</applet >
```

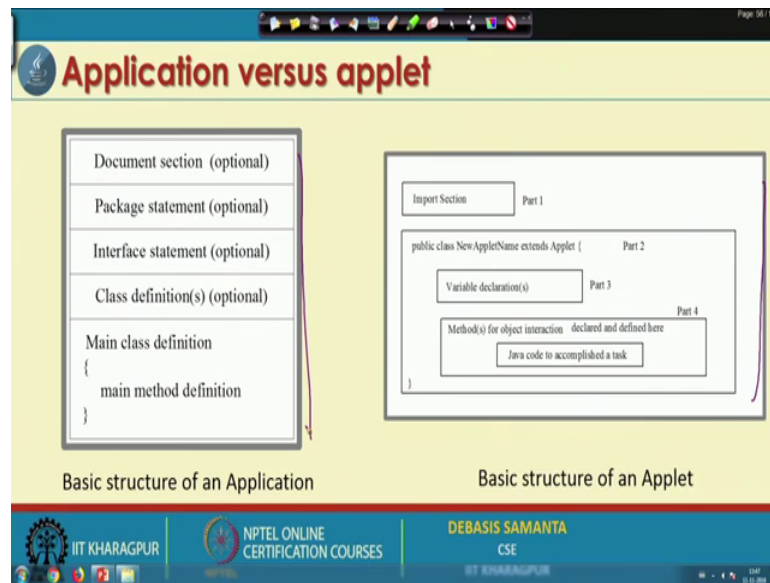
Handwritten red circles highlight the values 30 in the parameter lines. To the right, a small window titled "Applet Viewer" shows a white rectangle on a black background. The slide footer includes logos for IIT Kharagpur, NPTEL Online Certification Courses, and Debasis Samant, CSE.

So, here again I have rewritten the HTML file here with the different values 30 13 in this case and then corresponding applets will look like this. So, you can change of change, while you taste it and then writing the different values and then you can run by means of applet viewer, you will be able to see that how the different shape it is there.

Now, if I ask you that how to in addition to the in addition to drawing a rectangle, if I want to print one message here that this is my rectangle, how you can do that, you do not have to do anything here especially only the thing that you have to use that you use in the paint method some other value like. So, for example, in the paint method here in the paint method for example, here right. If you want to draw a message on the applet so, what you can do is that instead of g.drawRect you use g.drawString this method and then you can type whatever the string that you want to do so, you just use this one.

So, this way in the paint method you can add any methods of your own to display whatever the content that you want to do it. So, this is the way that the applet can be developed and have a basic idea about how the applet can be developed and, then you can execute it using a HTML. So, here our objective was to how to write applet and then the same can be displayed on the screen ok.

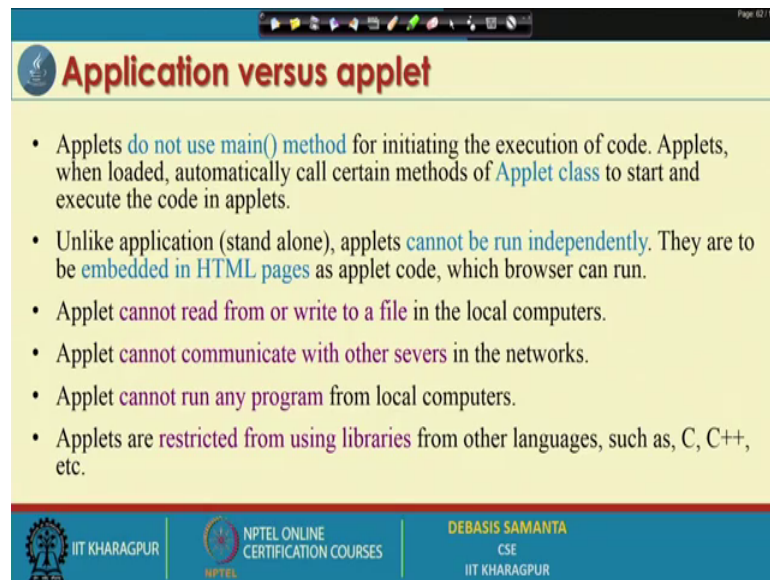
(Refer Slide Time: 32:28)



So, we have learn about applet now; obviously, there are I mean certain differences between application and applet. And as a first look they have the two different structures and as you see here these are structure of an usual applet look like and here is a structure of a applet and this is a structure of an application. And in case of application you should declare one class call the main class and in main method, but you can see in case applet there is no main method.

Now obviously, it has implication will learn about this later on. And then so, this is the one important different that in case of application one class is there, which includes the main method, but in case of applet there is no need of main method. And another difference is that an application can include any user defined method; that means, user can give some name of the method and then use it. But, in case of applet other than some specific methods user cannot give any methods. So, these are the key differences between the two in addition to their, there are few more difference there are few more differences also.

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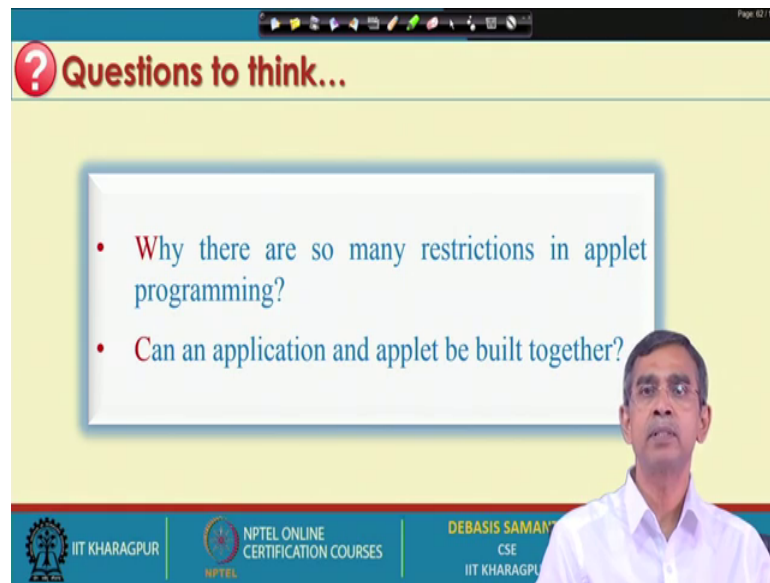
The slide is titled "Application versus applet" and contains a list of six bullet points. The footer includes logos for IIT KHARAGPUR, NPTEL ONLINE CERTIFICATION COURSES, and the name DEBASIS SAMANTA, CSE, IIT KHARAGPUR.

- Applets **do not use main() method** for initiating the execution of code. Applets, when loaded, automatically call certain methods of **Applet class** to start and execute the code in applets.
- Unlike application (stand alone), applets **cannot be run independently**. They are to be **embedded in HTML pages** as applet code, which browser can run.
- Applet **cannot read from or write to a file** in the local computers.
- Applet **cannot communicate with other servers** in the networks.
- Applet **cannot run any program** from local computers.
- Applets are **restricted from using libraries** from other languages, such as, C, C++, etc.

So, other than the naming and the main class and the main methods that applets need to be embedded in an HTML page to try out its execution, whereas an application does not require. And so, far input/output is concerned; obviously, an application will allow to read any input from any source, from keyboard, from file, or whatever it is there, but as you see in the case of an applet, this kind of input is not direct input is not possible. If you want to give any input, then you should give all the input via an HTML file. And few more salient differences between the two things that an applet cannot communicate to other applet or other browser or other machine.

Whereas, an application will be able to communicate that is; obviously, recover for network programming, internet programming, then JDBC (Java Data Base Connectivity) and elsewhere, but an applet cannot do that. And an applet also cannot run any program written maybe in any other language or any other application from the local computer. So, whereas, an application can do that and, an applet also not able to interface with any other programming languages program written in any other programming languages.

(Refer Slide Time: 35:18)



? Questions to think...

- Why there are so many restrictions in applet programming?
- Can an application and applet be built together?

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So, these are the differences; obviously, the reasons are there why all these are the differences. All these are the differences because the purpose of these two programs are different, that is why the developer makes the differences for us and definitely all these questions on the answer to all these question that may why so, many restrictions in applets are there will be in due course of time. And then obvious another question is that whether we can build and application and applet together. So; obviously, what is your idea is that no applet and application are the two separate entity they cannot be build together. Anyway so, we will discuss all these things and many more other things in next lectures guys.

Thank you.