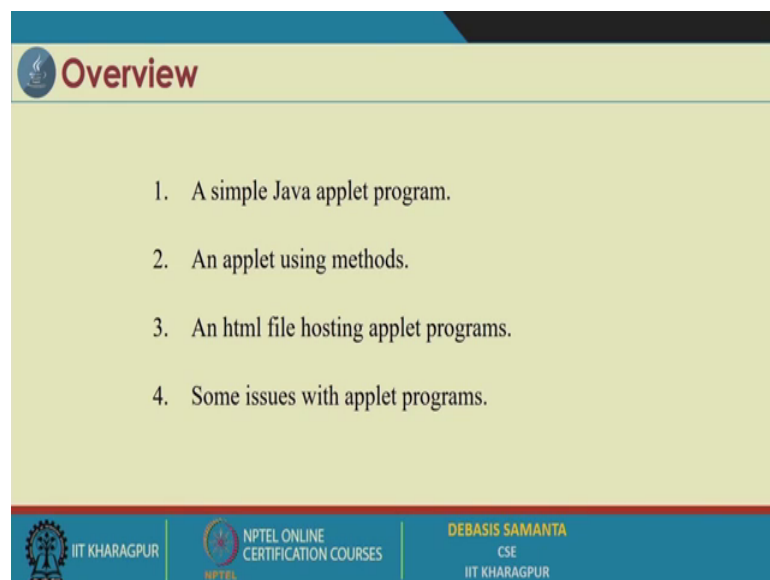**Programming in Java**
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Department of Computer Science and Engineering
Indian Institute of Technology, Kharagpur

Lecture - 37
Demonstration – XIII

Let us have a quick demonstration of few important facts so far the applet programming is concerned. So, in this demonstration we are going to demonstrate you few things about the different methods that can be included in an applet program.
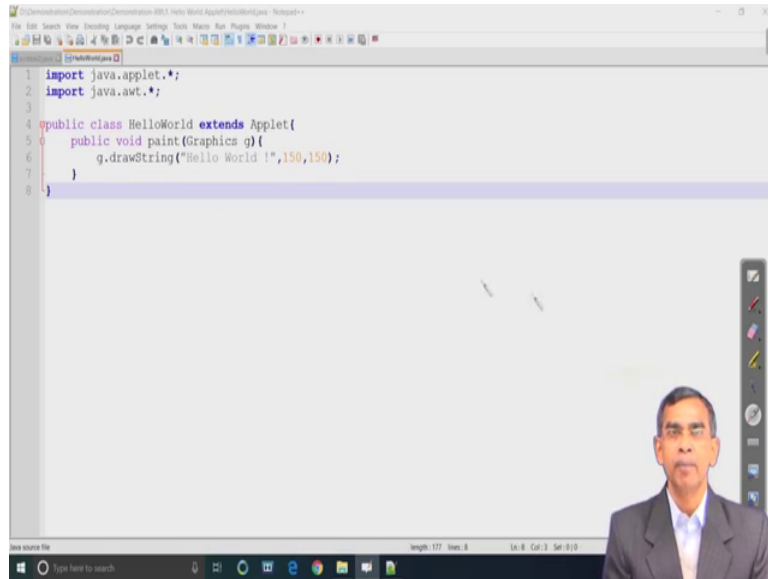
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Then we will see exactly the html file details, about the detailed html file needs some more time. So, that will be covered in our next demo and there are some issues very that is also we can say that interesting fact with the applet programming also will be covered here in this demonstration.

So, let us first have the first demo regarding the simple applet java execution. Applet execution is concerned we have already familiar to our HelloWorld, program. HelloWorld Applet, so as we know so far the applet program is concerned we have to import two packages, namely applet package and then awt package.

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So, in your import section these two packages should be there. If you do not import these two packages, you can face compilation error and in this applet as we will see exactly there are many more methods, but in this particular applet, current applet as we see only one method the paint method it is a vital method in any applet programming and this paint method includes, so this paint method includes drawstring and this is right.
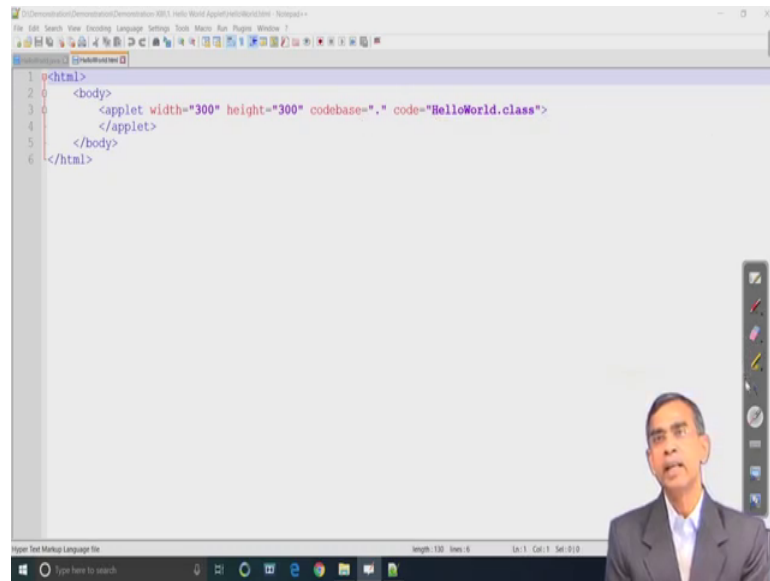
Student: Application.

Later

Student: No sir.

Ok. So, these paint methods include the drawstring methods and it basically display a string HelloWorld in the paint area at a particular location called 150 is the vertical and horizontal 150. So, this will display. So, these are the contexts already you have familiar to this kind of applet program anyway. So, this is the first applet program and very simple the most simplest applet program that we can have, but actual applet program is not so, simple that we learn in our course of demonstration anyway.
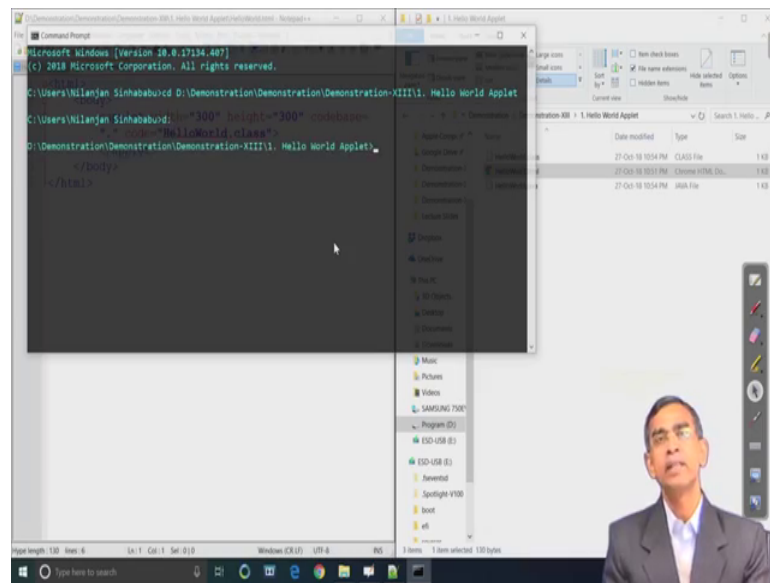
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And the two things there you have to write the applet code using the html, using the java syntax and then, this applet code needs to be hosted using an html page following the html syntax. So, two programming languages are involved; html and another is java. Html stands for hypertext markup language as it is a tag based and in html this is the html tag. It is there showing that is the html not necessary to be included here is an optional, but this is the optional here that applet tag, and this applet tag the two mandatory specification called the code specification and then, width and then height specification. And the code base is also there although it is not mandatory. So, code base if it is not mentioned explicitly, then it indicates that this class file, that means the java program and this html file itself belongs to the same directory.
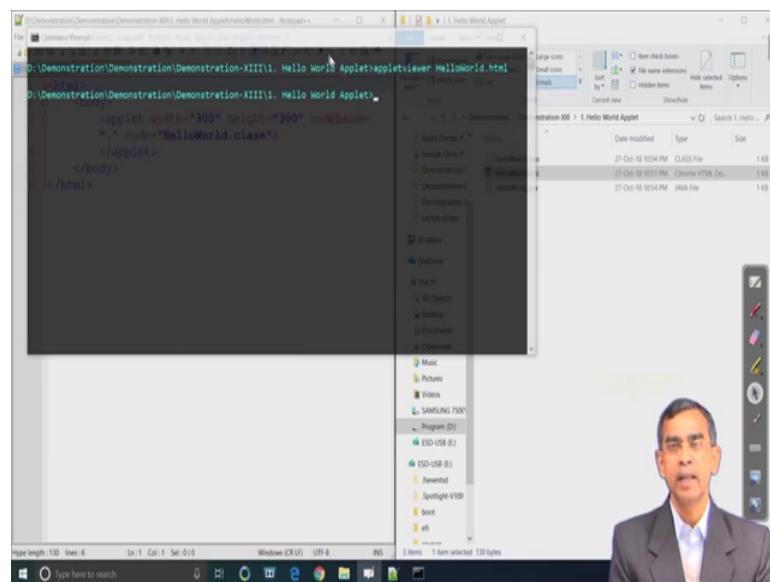
And we assume that this file and the dot, dot, this dot class file and the dot this html file if we save it, should be in the same directory and then we can use any applet viewers.

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For example, if you use the applet viewer, the applet viewer and the name of the html file which basically hosts your class file and then it will display.

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The applet and then the whatever the paint method is defined accordingly it will do the job.

Here is an example as we see this is an applet view with a specification of width and height that we have given there in your html page shows the applet completely. So, this is the first and then simple most example that we can see for the applet programming

here. Now, our second example showing the different methods rather I should say the standard methods. There are few standard methods like init, then start, then paint stop and destroy. In this example we will see if these methods are mandatory or not, ok.

So, the methods are already defined in an abstract class called the applet. So, as you see this is the applet abstract class and as you know your this is the applet program you have to give the name of this class as a sample. So, it is the applet program and in this class basically inherits the abstract class called the applet which is defined in java dot applet packets. So, this class abstract class is called abstract because it has certain abstract methods like say init is the one abstract method. Init is the one abstract method and then here this is the start is another and then, paint is the another abstract method.

Init method does not require any parameters as an argument start also the same, but for the paint method it always should be accompanied with one parameter of type graphics. So, graphics is the class which is defined in java dot awt and then, z is an object of that. This parameter is required anyway. Now, this is the one method that we have discussed here and we have to this one this class, ok. So, this method if it is there, anyway no issue. So, this method if we there and this example will show that all these methods we have over written here and the method over written is basically in init method as we see. we just initialize the applet with background and foreground color.

The setback ground, setforeground these are the method is defined in java dot awt and then this is basically the string we have assigned, the string. The name of the sting is msg and then its value is this one and in the start method as you see the method which is already there in this init method will be appended by this one and here in the paint method it is there.

Now, this program say says that it has 3 methods and then, the order of execution as already we have discussed that init will be invoked first followed by the init, the start will be invoked and then, the print will be invoked in this order. Now, this order of execution if it is invoked so message will be fast initiate inside init, then it will be appended this message by inside start and then, in finally in the paint it will be again inside init followed by inside start and then, inside what is called the paint and then, this message will be then displayed by the paint method using this method drawstring into this applet area.

Now, so this is the order right if and also in the initialization we see background will be cyan and then, foreground. That means, the font will appear in the red color.

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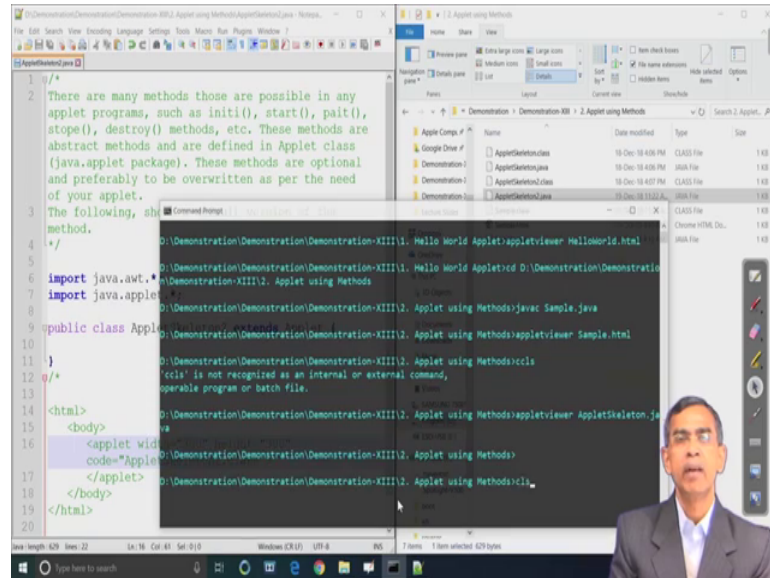
Now, let us run this program compilation with the java and then a hosting in an html file and then compilation, ok. We can compile using applet viewer. So, applet viewer then the name of the html file let the name of the html file is sample dot html and as you see fine just come here, ok. So, this applet as you see the foreground color is red font and then, background design and then this is basically this one as you see init method is executed fast that is why message is there, then the start method and then finally paint method. That is why this thing come into the paint method and ultimately it is showing there. So, the ordering is there inside, then start and then paint that is the important thing.

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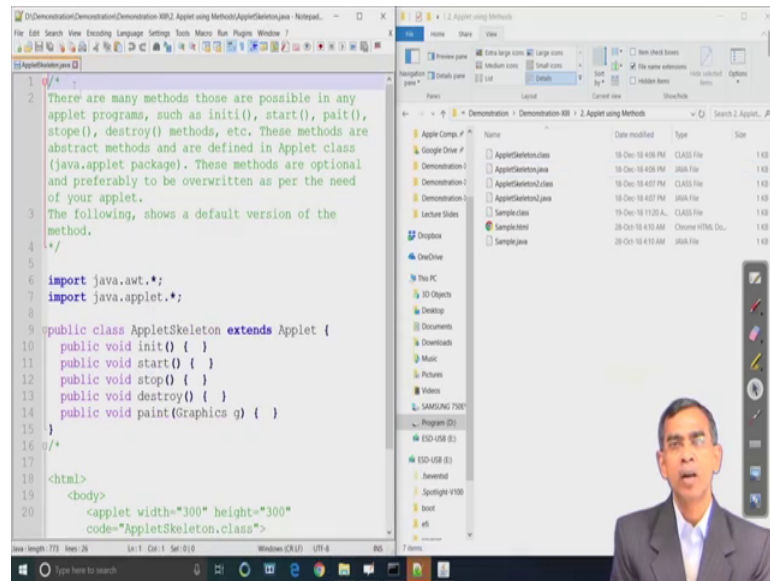
Now, let us again see as I said already that all these methods are not necessary to be defined by the programmer. It is mandatory. If you do not use this method also it will be there. Now in this case for example we have overwritten, however overwritten without any code the void this program is also one sort of overwriting and if we run this program again applet viewer and then, this program if you run it and we will see as you see this browser just little bit all right.

So, as you see here there is no setting so far, the initialization, background, foreground because we do not have any code. So far init method is concerned no start, no paint nothing is there and that is why it is a blank applet. So, is a that applet does not contain anything else.

Now, so here you have overwritten although there is no code, but here also we can write an applet program also without any code itself. So, I just want to comment all these methods there and then let us comment this program.
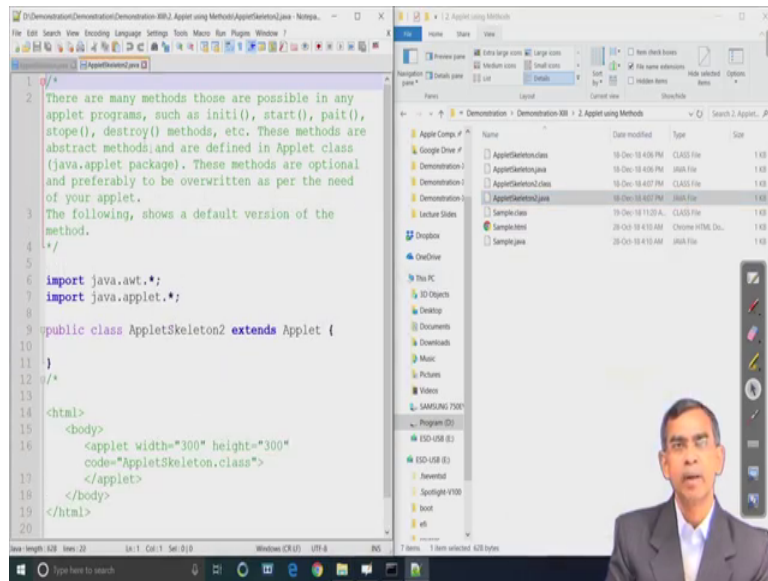
So, this is the one see this is also one applet program, however this program does not have any method definition, but still it is usable and this is a html file hosting this one applet skeleton two dot class. Now, we can see it, it will give it will not show anything, but applet will be browsed, applet will be open, applet will start, actually applet will start although without any valid execution valid content in it actually, fine.
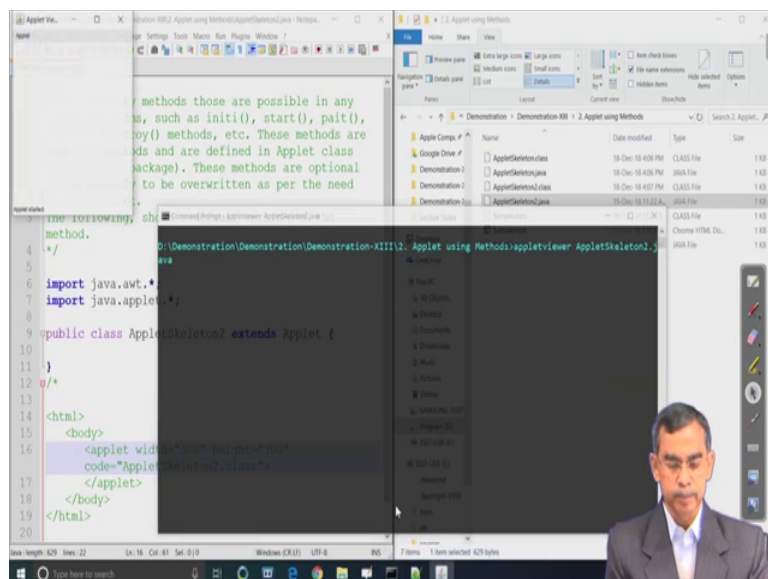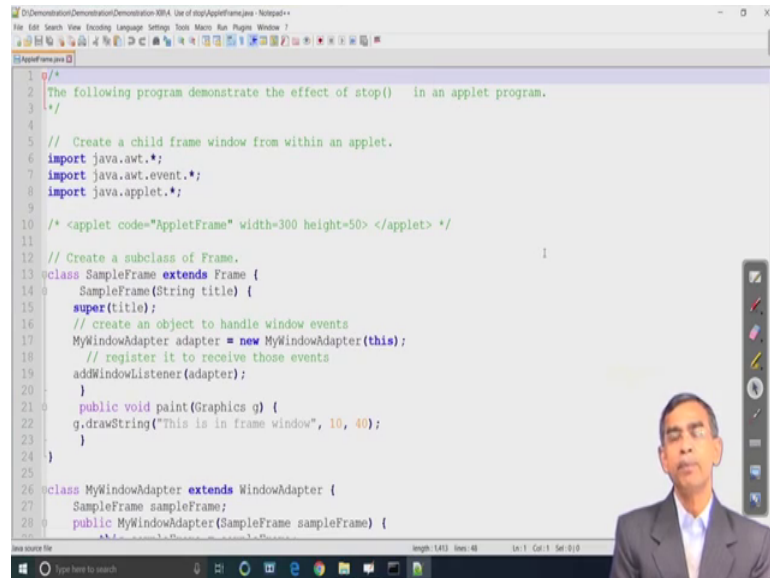
So, as you see the same thing. So, applet is running applet has started, but without any content in it now. So, we have discussed about 3 methods init start and then, paint

method and then, there order of execution and also we have mentioned that all these methods are preferably to be overwritten, but not necessary. Now our next example showing the use of stop method in an applet 4, right.

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So, stop method as you know that this method will stop execution of an applet and will see exactly one another form of the applet programming here and we declare first a frame is basically the concept of awt.

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Although awt is not covered and so, let us assume that this basically a frame will be created and then, frame will be displayed and this frame used one event called the windows adapter event, ok.
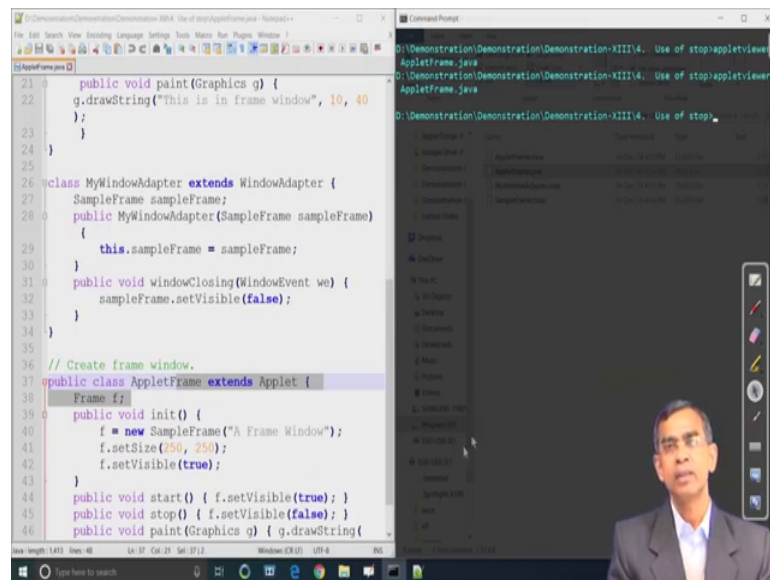
Let us assume that this code basically it will create a frame, that frame can be created by an applet. Our next part of the program code that is basically including this one frame. So, here this is the main program main applet program we can say here, ok. So, this is the main program here that applet frame is a extend applet. So, this is the applet frame is our main applet program. We have the init code here.

The method, this method basically create a frame, the frame which is already discussed earlier and then, the name of the frame object is f, the frame objects and we have just a frame window a message that will be appeared on the title on the top of the frame and this is the size of the frame that will be there and then said visible this is the one concept that is required to make the frame visible and then, start method.

As you see it is very simple set visible true. That means, we make it and then stop it basically f dot set visible false. So, whenever we just stop, we invoke the stop method in there.

Now, one more thing is that init is implicitly invoked, the start also implicitly invoked whatever the stock can be explicitly needs to be invoked in your applet. If you do not use it, then applet will go on starting I mean viewing displaying, its content like this one. Anyway in this applet method again paint is basically the simple. It will display this the string in your applet area. Now, if we run this program successfully compiled and then we are running this program and you will see exactly how the stop method come into the its effect. In earlier applet there was no stop method declaration. Now in this applet, we have used the stop method here we see that.
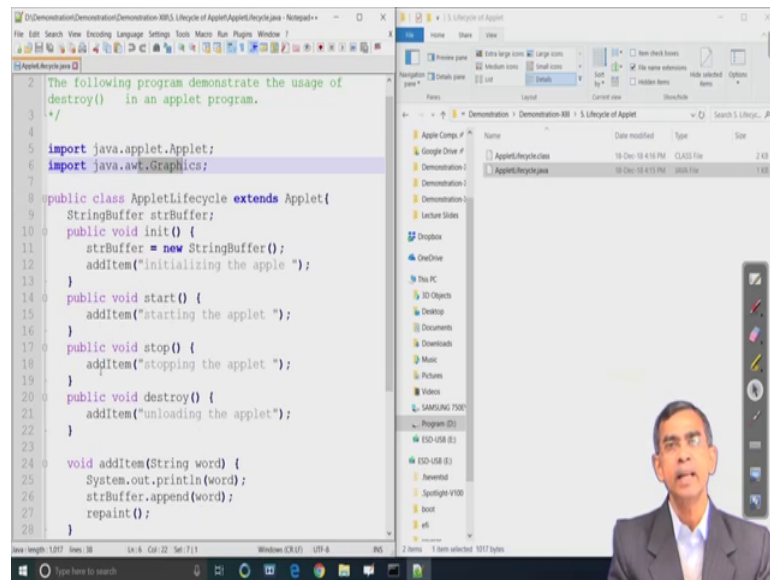
In this display as you see two things are there. Whenever you started this one, this is basically our usual applet. Applet started and this applet basically invoked another frame which is already in the applet init method. This is the frame and this is the title, it is applet that is called the this is the frame right and then, within this frame some string is there which is not displayable properly and this is basically the string that is painted by the paint method there.

So, now here the applet is now in starting and in execution is active applet we can say. Now, we can stop it. If we stop this one, then this frame will go on, but applet still is running. So, if you stop it here then it, so that frame is no more exists and it is stopped means we have to invoke it later on again running the same program. Now, here again applet as you see applet is still running and if we just click it, then is basically it will stop the applet execution. So, it is basically stopping the plate and here you can say applet is stopped here and then cursor returned to the control command here.

Now, on the other hand if we stop the applet, so applet that mean thread will stop everything all together. Automatically frame will be ceased to exist. I am stopping it here and you see both the frame as well applet now no more exist. So, this is basically the concept of stop. Stop is there in another context also. The stop method coming to the play say as you see html page hosting an applet view, if you stop if you close the html page, then what will happen this applet also will go out. Now, again if we run the same

applet, then the same applet will be displayed. So, that means stop does not make the does not mean that it is stopped permanently. It is just from memory. For temporarily it is not there, but in the memory it remains there.

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So, in order to move this applet completely from the memory, we have to call the disturb method. Our next example will explain this concept that how it can be clean completely from the main method, main memory. Now, here you see this is another example of applet as you see as you see here. So, this is the applet life cycle, this is the name of the applet program here, inherit the applet class and it is basically used a string and also it used add item on method.

The method is declared here in this part is basically just do two things. It print on the console area as well as print on the applet string using the repaint method and it has of the start. Start basically call add item using some string as an argument because this add item require a string to be passed. The stop also doing the same thing and then, destroy also doing the same thing. Call all three methods, called the add item method. Add item method basically display one string on the console control window, another is it display some string appending all the strings there in the applet area.
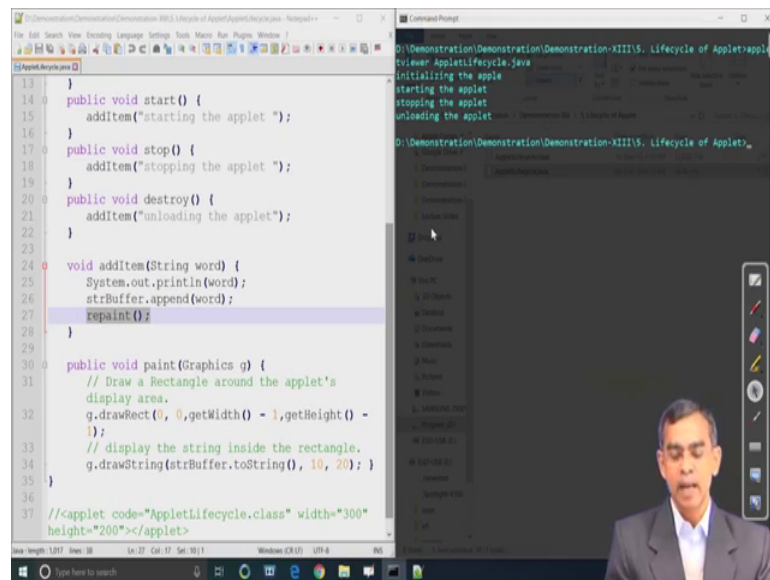
Now, so here it basically as you see here in this program we use four methods; init, start stop, destroy and then obviously paint method is there. All four methods are there in this particular applet example and then, paint method is basically draw a rectangle and then, within this rectangle it will draw a string within that like that. Now, let us see how this and then, the repaint method here again. Repaint means whatever the previous content it will be there, it will basically update and then the repaint in the fresh way.

Actually now if we run this program again using an applet.

Viewer let us see how it will look like this. Now here two things are there. You just I taken here just come into for this one here, now here there are two things that you should note it here.
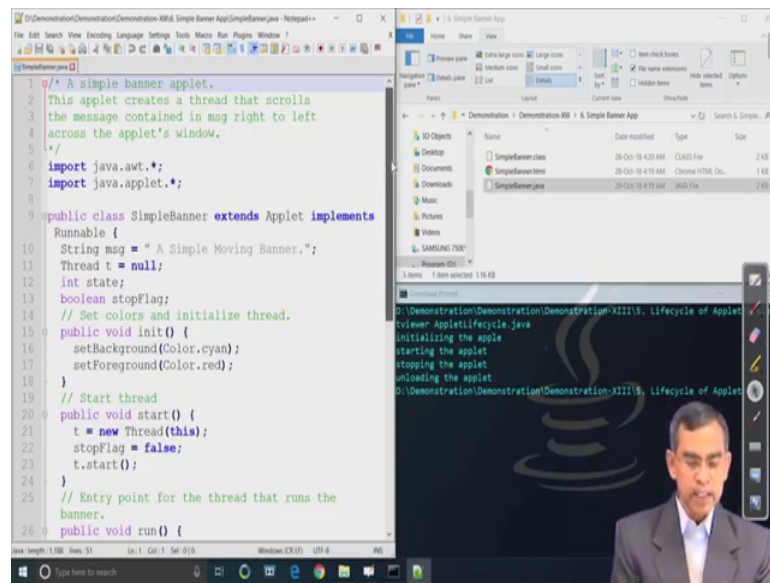
So, this is the console area and in the console area you can note it is giving this initializing the applet because of the init method that is there and then, also starting the applet because these two methods are called automatically whenever the applet has started and then it is also showing the appended text initializing the applet and then, starting the applet as you see.

Now, we do not have any destroy or call any methods are there. Now, if we stop it then the stop method will be in execution and this method will execution means, but a stop method will call the add item. So, add item will just display it, but as it will the applet will be no more once it is stopped. So, that will be no view actually. Now, let us stop it.

As you see here stopping the applet and then uploading the applet, those are the basically by virtue of call of the stop method and this is the by virtue of the destroy method. Now whenever you call this and console return to our main common from area, this indicates that applet is no more in memory and no more thread, nothing no more execution.

So, this basically says that how the destroy method can be invoked immediately after the stop method. Now destroy method can be called only the stop method is invoked.

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We cannot destroy method until a stop method is invoked.

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So, this example illustrates 5 different methods; init, start, paint, stop and the destroyed. There are few more methods are there update and repaint method and it is more fascinating to have a demo about the update and repaint method using a very interesting one applet is called the banner applet. Now here is the code for the banner applet, ok. It may be little bit difficult to understand, but if we are little bits meticulous about this, then

we can see what the contents are, the code elements, code things are there in this program.

Now, here these are the import section as usual and here is the name of the applet. Now you see extends applet is, but this banner applet needs a thread to be executed. So, it implements runnable thread and you know the thread means we have to declare a thread and then, we have to define the run method. Now, here a thread is declared in the start method. As you see here, this is the start method where a thread is created and this thread is basically thread of the entire applet is basically itself a thread here.

So, this is parameter to this thread. So, this thread is now created thread, instance is created and now t dot start means thread has started its execution. So, init method will basically change the background and foreground automatically invoked, start also will be automatically invoked by virtue of this, the thread will be automatically in execution and then whenever the thread is executed, then it basically execute the code that is defined in the run method.

So, run is basically accompanies the thread class since the run method that is the runnable interface, the overeaten method here a little bit. This is a tricky code, right. We should not explain much about how these code works actually.

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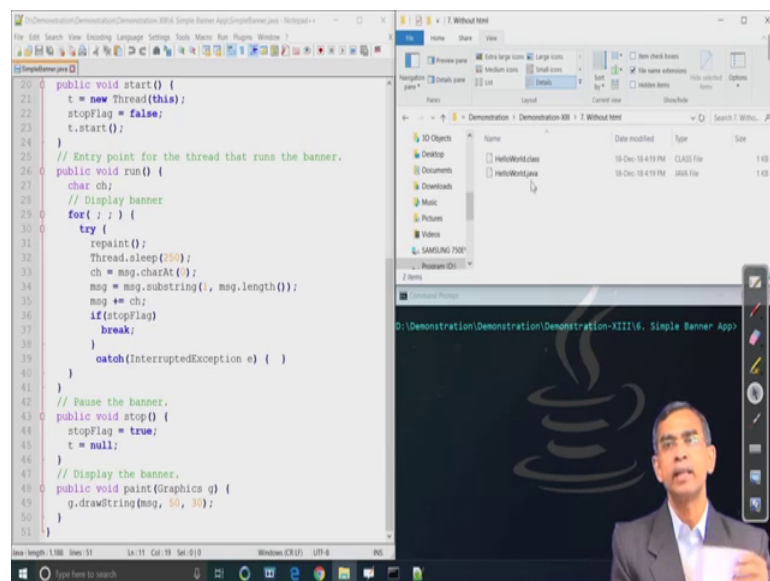
It basically select one character from the string which needs to be mark quick actually. That means, string will move and then that string will be painted and then, repaint and update will be invoked. So long this thread will be in execution, this thread is basically execution and intermittently the thread goes on sleep state for 250 milliseconds. It is just for perception of your views that one character is displayed.

The next sub string of the character will come, it will be again repainted, update the things I mean area and then, again repaint, update, repaint going on and this process will go and then if we do not close it, it will continue. So, stop method is there and then event can be maintained for that if we just click button here is no event like that anyway. So, it is stop means we just stopped whatever the procedure we have discussed here. So, stop means the banner will or starts a complete and its execution.

Now, let us see have the demo of this applet class here. Only here the run method is bit difficult to understand, otherwise everything is very simple ok. I am just enlarging this applet window little bit, so that we can understand about it. Now, here our applet is in execution as you see. So, applet started and here you see the banner is working the state that the string is moving a simple banner come there. Again a simple this is a banner actually look like actually the display digital display look like banner you know. So, it is basically in the applet that you can do it and then background, foreground it is already by the init method.

Now, so here our thread is still it in execution and then, in order to stop this thread we just simply close it. So, now we come control return to our execution I mean in the execution in the runtime manager. That means applet has stopped now. So, this is the one example the banner example that we have planned it and then, we see that how this is possible using writing a simple applet program here.
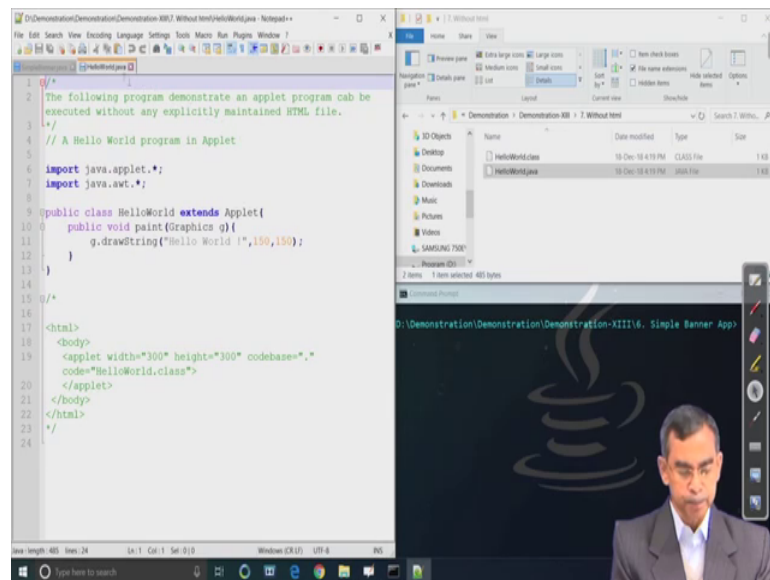
And then one basic thing so far the applet programming is concerned is, hosting using an html page. We have an idea about applet programming. So far the applet program is concerned different methods the standard methods are there.

I want to mention one more thing is that in addition to these are the standard methods, we can use you can include many other methods defined by the user, user defined method as well as the method can be inherited from other api class also, ok. So, those are the things is possible and that is there regarding the different methods that user can define, we in the different application context all those things will be again discussed once we know many more things regarding applet programming and awt programming, ok.
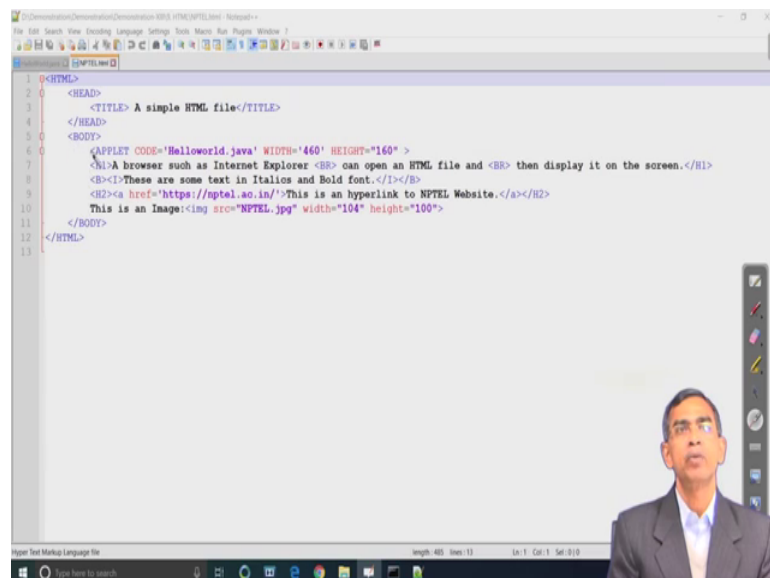
So, that will be discussed then. Now, just I want to think is that two important things there. Two programming rather I should say one is that java programming. By means of java programming we can define our class file that can be the code in our applet and then html right. That means, that that class file should be embedded into the html there.

Now, what exactly an html file is there. Html is there, html as you know html stands for hypertext markup language. It is a basically a language specification that a browser can understand this code and browser can understand this html code by understanding or by recognizing the tag. So, html is basically is a collection of html tags and here we can see the different tags and then tags has the starting and closing what is called a syntax.

For example, html the starting syntax within the angular brackets as we see and is a closing is this one, then whatever the portion that will be within this starting and closing is basically the portion of this tag and your html page. The browser actually this basically can be executed by a browser, browser can open this html page and tagged by tag, it can interpret what exactly the content.

Now, here in this example as you see html within html again another tag body and then, within this body as you see some other tag is called the applet. Now this is a very typical one look like, but html is not that all the tags is necessary or mandatory. There are all those tags are optional also. Now here is an example that we can go how a typically simple html page usually look like without any applet code in it here.
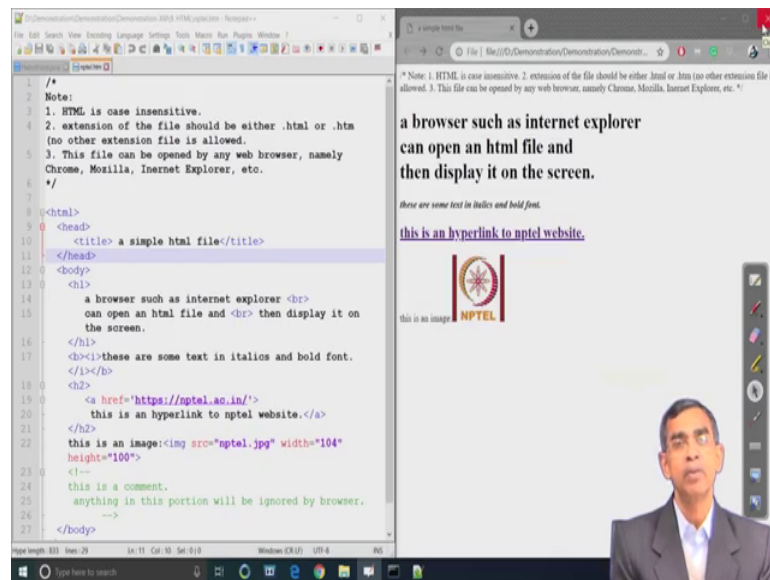
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This is a typical look of a simple html file which include many other important things are there. As you see here title is another tag head is another tag body is another tag within the body applet is there now.

Here you can see this is the title and these are the simple text within his, right. Html will not be able to process it. Simply it will just pass it to the displayer, it will just as a string only whenever html not able to pass it is just string contents as a string and then, these are head title h1.

These are different html tags for the different meanings those know the html. They can understand about it anyway. I do not know want to discuss about the meaning of each tag and whatever it is there and the comment can be post in html tag using this notation and then, this can be opened by applet viewer also, but applet viewer can recognize only applet code. All other things those are there applet viewer is these are not recognizable to applet viewer.

But html page can be better recognized by any browser. So, any browser in our machine say chrome or browser here I am just opening this one using our chrome browser you just where is the html file is stored, go there and double click automatically the default browser which is there in. Your system will be invoked to open it as you see this is the html content and this content will be interpreted by our browser here and display it and you see the html image is there which basically image is there.

So, image is displayed and then link hyperlink it is there. So, link means it go to this one. So, link is if you go to the link, if the machine is connected it will automatically go to the

NPTEL web sites. From this browser automatically is a hyperlink it is there and then, it will be executed.

Now, so another thing is that html browser, your chrome browser in this case cannot recognize this part that is there because they are not embedded within any html specific code. So, it is basically coming there in this here and here is a title you see a simple html and the browser you can see the title bar.

Actually it is showing a simple html page is there. So, these are basic concept of html display it is there and one thing is that all these tags are basically not case sensitive. You can write in capital letter or small letter. Absolutely it is not an issue. It will run it. So, html browse html page is case in sensitive and obviously, if there is any mistake in the tag that html will not be able to recognize as you say, then means it has just simply ignored.

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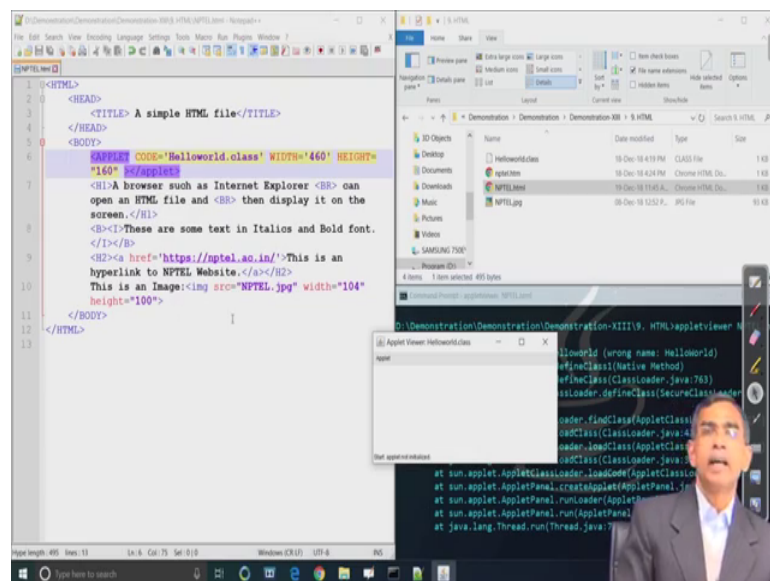
But the next part will be it goes there. So, it is interpreted successfully. If something is not correct, then the rest thing, which are there correct thing will be executed there, ok.

So, this is about this and then one important tag that can be included in this html file is applet code and then, if this code is there and applet viewer can recognize this one only, but applet viewer will not be able to understand this one now. So, now we have used this applet code and then applet viewer can process it, however it will not process any other

things that is there because other tags those are there in html page is not executive to applet.

Now, let us run this applet viewer as you see it will not give the same impact as the browser has given it to us. So, I am running this html pages applet viewer then right ok. As you see applet class is not there, that is why it was not executing hello world class. So, here applet viewer has could not be able to display this class file because in the same html file where this program is there, it is not there for dot java is not correct. You have to do the dot class, ok.

Now, dot we have changed this one save it and then, the dot dot class file is there. There are some mistakes there. So, we have included in the code file dot Java. Dot java cannot be interpreted by the applet viewer. So, it did not give any output actually now we have changed it. So, as you see this hello world class is giving there are some mistakes are there anyway. So, it is basically the applet viewer can recognize this code, but it can again if the earlier without any applet code our browser or successfully display it.

Now let us see using this applet code if we again run this app chrome this html file what will happen, ok. So, now here you can see our chrome browser cannot interpret it. Applet code is basically simply ignore it, however other has been there.

So, it is basically the applet viewer and then, browser as a point I just want to mention here is that the current browsers those are available at the moment, they do not support the applet code now a days.

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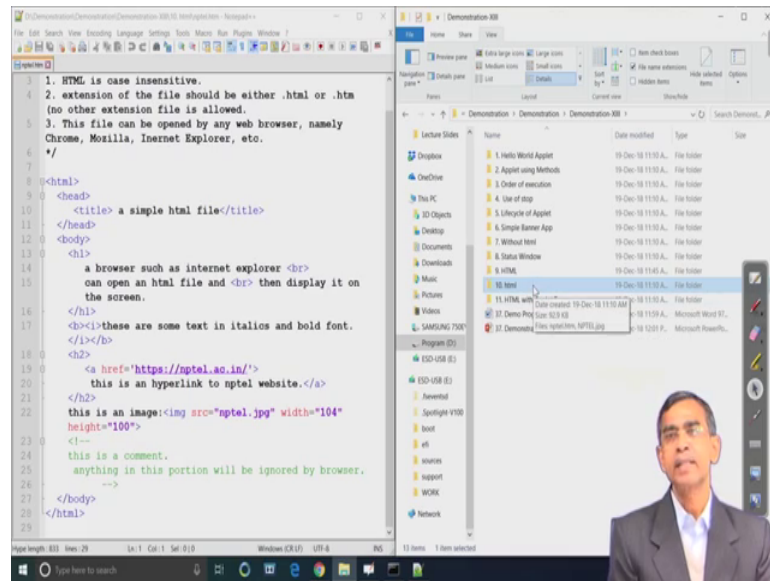
If in your machine i internet explorer person 4 and lower onwards is available, they can be supported and then browser that IEEE the internet explorer browser can recognize this one, but person 4 upwards or not that is not support is possible, however there are few browsers they are called java enabled browsers like Netscape navigator and then, hot Java.

They can do it, they can support everything whatever the html tags including the applet they can browse it properly and more specifically Mozilla also which in a restrictive manner if you use certain plugin code, for that plugin is available in the free plugin in the net. You can install it and then, that Mozilla with this plugin can process both all the html tags as well as applet tags always and again html 5 version onwards applet becomes obsolete of applet. You can use the object tag. Their object tag is very similar to applet tag.

That includes our today's first demonstration on applet programming. Our next demonstration on applet programming 2 in our next module onwards and then, we will discuss another programming concept in java.

Thank you very much.