Programming in Java
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Lecture – 57
Case Study – II

So, this is another project that we are going to discuss. We have discussed two projects in the last session. In this section we will discuss three more projects. All these are the small projects in the same category like, but as you see as we go from one session of projects to next session of projects, the complexity will be little bit increased. So, all the projects that you have we have discussed we have learned about in the last session it is simple to solve that again the complexity will be little bit increased.

Now, in this projects we will again consider that the different favour of the Java programming can be used, utilized, so that you can really along much more about while you are involve in working with the project. Now, I will just discuss about the third project, here drawing images on canvas. Probably you have already have an idea about how the scribble can be there, so that user can draw some image using mouse pointer or like this. But here it is not exactly the same thing. Its bit different thing, but here the idea will be little bit in a phasor manner and then you can think about it.

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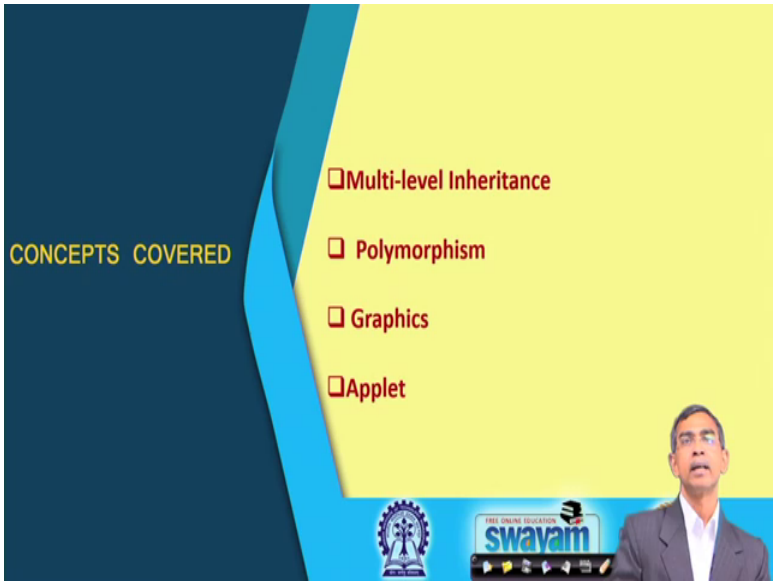

But if you can solve this problem definitely the lot of other different aspects of the programming like say multi-level inheritance, polymorphism, graphics, applet will be cover. So, this projects aims, so that it can cover all these concepts in Java programming. Now, let us have the idea about this project.

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Now, this project is basically drawing an image. The image is basically consists of the several geometrical objects, a point may be a geometrical object, a line may be, a triangle, a circle and ellipse or any polygon or some rectangle square like this one. Not only this geometrical object they can be filled with different colour, different style, their border or line can be also different colour, different style, like, like, like. So, this is basically the way a geometrical objects can be drawn and again if you see an image an image is nothing but a collection of several geometrical of a place in their appropriate positions. So, this way it basically completes an image.

So, here is an idea about that how the different geometrical objects can be defined, so that you can use to draw an image of your own. So, for these things our plan is to create a class called the geo object class. We will discuss about the class structures in details when you will discuss about how to solve this problem, how to deal with this project. And second thing is that, if you create the geometrical object using this geometrical objects how we can create an image that can be stored as a class structure and whenever an object is created of that class; that means, an image will be created and that image can

be again on execution it can display on the screen or it can be stored, later on you can use it redraw these things these one.

And then the final stage of this project you have to do the animation. So, a circle if it is there which is present there, initial it is a static, but you can move it; that means, a circle can move from left to right or top to bottom from one any direction to another direction like this one. So, all those things also can be done. So, this project is basically we will do all this things together. Now, let us see how step by step we can do towards this project implementation.

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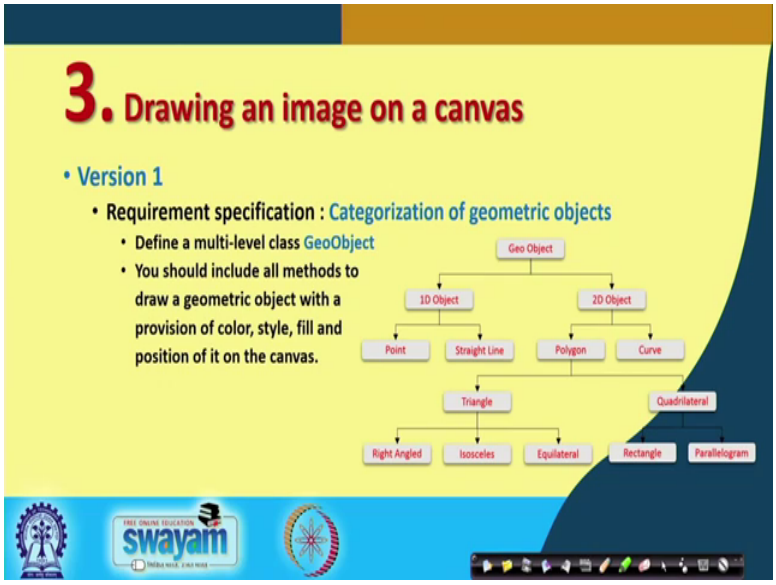

So, first thing that you should have the repository that all the objects of their different type and how to draw everything should be defined in your own class declaration. You can give the name of this class as a GeoObject.

Now, once this class is declared. So, this class and then an object of this class can be used to create your own image. Here is an example about how an image will look like.

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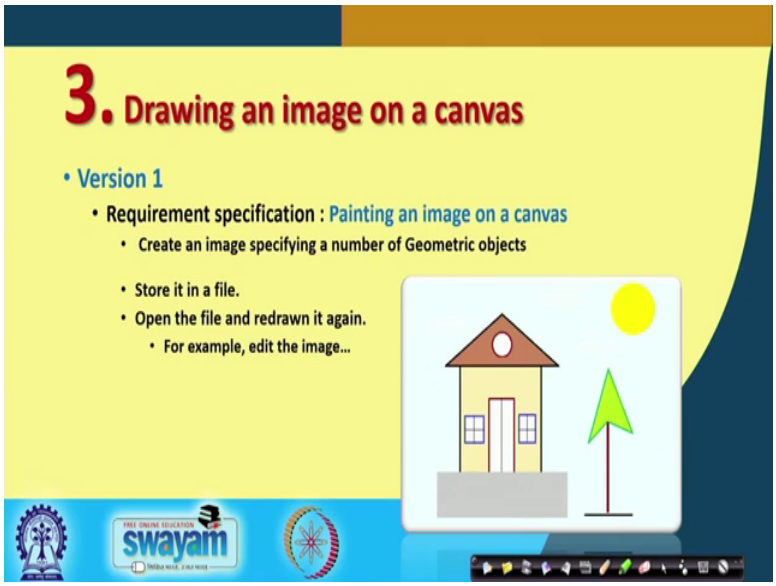

As you see in this example and image consist of many structure say suppose this is the one rectangle and this is also another rectangle, but the difference from this rectangle to this rectangle their positions, their style. Here for example, the line by which this rectangle is drawn with no colour, but the filling is some other colour, here filling is different colour and this is the circle, this is also another circle. So, this the different geometrical objects composed an image. So, this is basically we can say that image.

Now, these geometrical objects can be created by using any one class which you have already defined belongs to the geo object class and geo object class can be obtained by means of multilevel inheritance, multiple inheritance as the idea it is given there in the form of a inheritance tree. And such an image therefore, is a in the form of a class not a bits farm or image or not a dot jpeg form or pdf form or ing form like the or png form. It is just simply a class. And this class can be executed, so that you can see the image actually. So, this is the idea about the painting an image on a canvas. And in the canvas, here is basically a frame or panel you can think about in that case a little bit awt units to be followed here.

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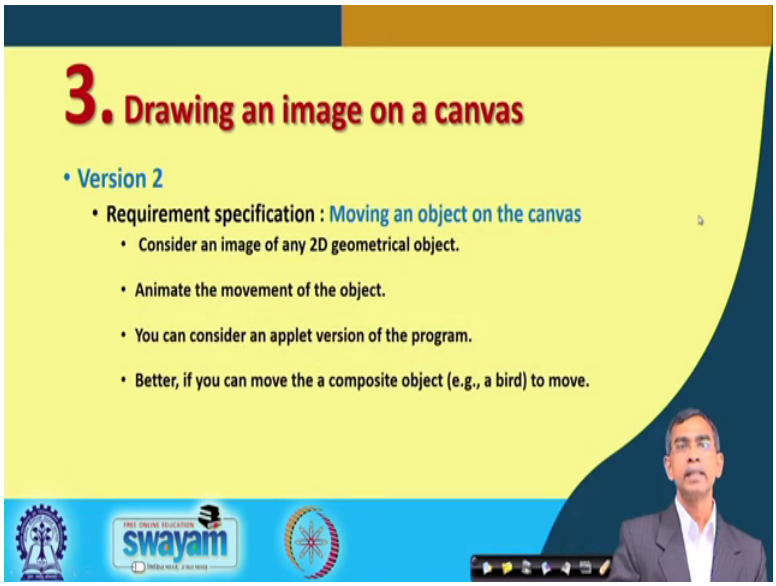

Now, so this is the idea about how and image can be created. Our next idea about that how the movement of an object on the canvas can be added into this one; so, this is the second phase of your project here you can create any one image initially you should consider only one a simple image may be a circle.

Now, animate the moment of the image. Now, here you can we have only known about the banner applet that we have discussed while we are discussing about applet. So, there we have also made it. So, the movement can be achieved by means of repeated use of update and repaint method that is there. So, I will I rather advice you to do it using an applet because it is easier. Later on the same thing also can be added into any frame or in a panel or in any other container class using awt or swing.

And better idea will be it is little bit difficult, but it is not as such so much difficult also that it is moving of a geometric object is easier, but moving an composite object; that means, a group of object may be say one circle and another box can move together. So, that is also can be done.

So, if you do it is basically moving an object it is there. For example, you can draw a bar using say few straight line and then point and then dot like and then the same can be moved together, so that it will appear an animation that a bar is moving like. So, this is the idea about moving an object on a image canvas and you really will be able to enjoy it if you can implement it, but it will little bit patience and then confidence is also required.

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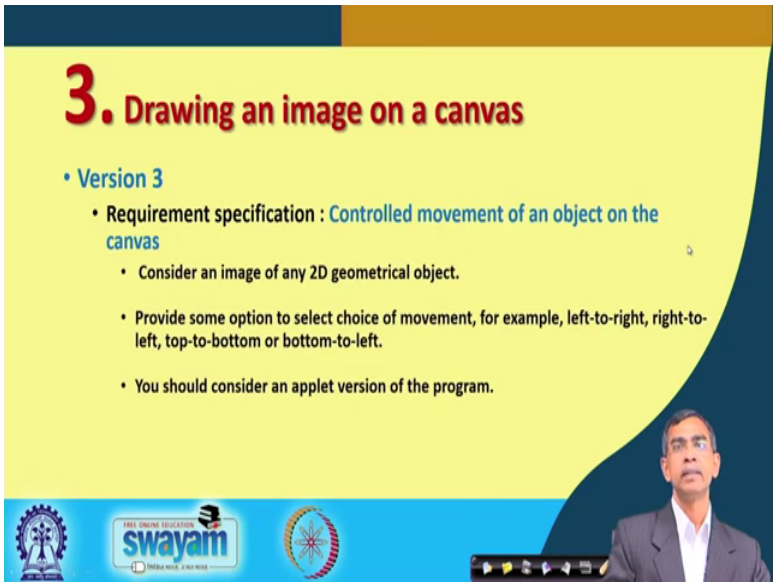

Now, I will discuss about the control movement of an object; in the previous fetch we have declared the movement in one direction only, but here you can fix that in this direction you can move as a simpler version you should take in a simple way that is a control movement in a specific direction. As I have mentioned from right to left or left to right, top to bottom or bottom to left like this.

So, an image is anywhere then you can give an instruction is an even can be generated. So, that if you click it then it will start moving and in a particular direction. So, here you can just think an applet program for that and then view of the applet you will look like this. So, this is basically the one area of the canvas we can say and this is basically the control area.

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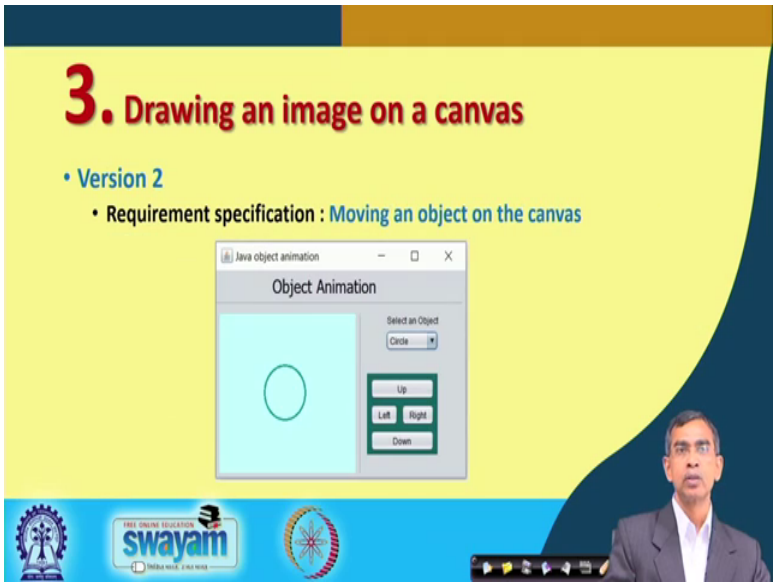

So, if the user selects up then what will happen this object will move up and then go there again come here. So, this is way it is just in a movement the in this direction. On the other hand, if it is the right then it will move from this direction to this direction and come here again this direction this direction and if you click again it will stop its moving.

So, here if, so if there are many other objects also you can select which objects you want to peruse the movement. Out of many objects some objects can be selected there is a choice, in this choice also it can you can give that movement of few more. So, if you choice a circle then you can select left, circle will move then another object may be ellipse and then move right. So, right will be there and so on, so on.

So, you can just simply control the even handling mechanism here. Although the simple even handling mechanism is there because here how many is a choice list and then this is the four buttons are there and you have to just, ok, button handling mouse even handling routine needs to be implemented there. So, you can try it and then it will given idea about how nice a program can be there which basically use for animation purpose also, but at this is at just for the beginners.

So, this is the fourth project in the today in this session second project, but all together is a fourth project that this is a secure message transmission. This is also an very interesting projects. Then you obviously, this project needs certain what is called the technological concept. Again this project is good for the students who are from electronics electrical

and computer science background because little bit security aspect learning is there security means how the cryptography, encryption, decryption and all other methods are there.

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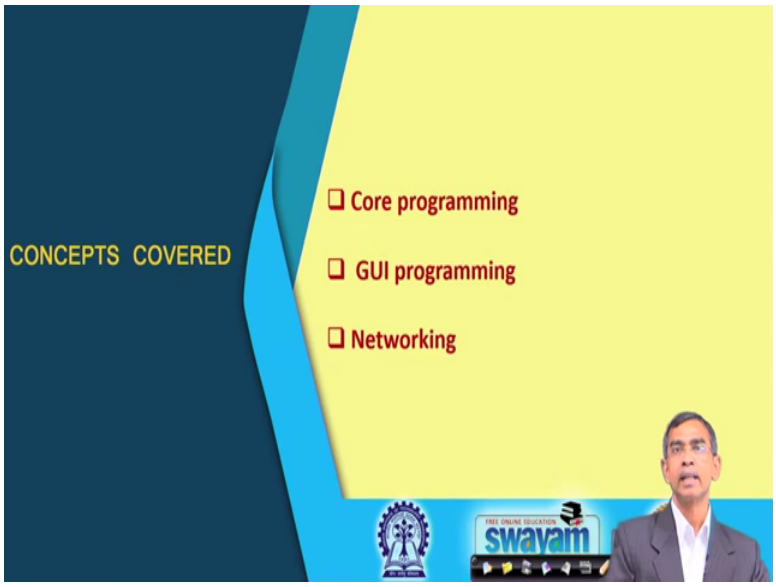

Now, let us see what are the skill set that you should have or the confidence level that you should have; you should be a good core programmer. That means, you know exactly good Java programming, syntax and others. Then GUI programming is also required, you have to develop certain graphically user interface, windows is required and finally, you should have a very good knowledge about the networking.

So, it will blend all three things together in these projects. So, if you can implement these projects so, this project has its own value of course, and apart from this you will be able to have a good confidence level, so far all this key concepts in Java programming each concerned.

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Now, let us have the idea about these projects. Now, this project is basically as I told you few technical things are involved, who is I have highlighted here you should have the encryption, decryption and then cryptographic key. And then also you should have some other ah networking all these things that is there.

Now, here is the what is the idea here? The idea is that a message whatever it is there that can be encrypted. Encrypted means it change, so that nobody can read it even open it they will not be able to get the meaning of this. So, this is the idea about the encryption and whenever you want to send a document say suppose the document written in war or pdf, I have no problem you can consider simply a text document in a rta for whatever it is there. So, using text editor, you can use it.

Now, the document will be encrypted from the sender. So, sender will do the encryption. And to do these things sender should use one key it is called cryptographic key. Similarly, the same document whenever it is received by another receiver, a documents will be decrypted; that means, converted in the original form and for this conversion called the description again we need some keys. May be the same key or different key now there is a concept that I am going to discuss about how the same key or different key can be used to use the encryption and decryptions are there. So, it is basically the idea of the cryptographic key.

So, if you do not have any idea about encryption, decryption and cryptographic concept. So, you should go through some elementary documents that will give you enough idea. You do not have to do the research in cryptography rather you have to know exactly what is the different methods are there, so that all these methods can be used and then you have to implement all those methods in a Java programming.

Even in the network in the internet also lot of readily available programs are there, even inputting Java also there you can download this programs. So, you can use, it you can little bit modify it and you can utilize in your program also. Absolutely, there is no harm for that.

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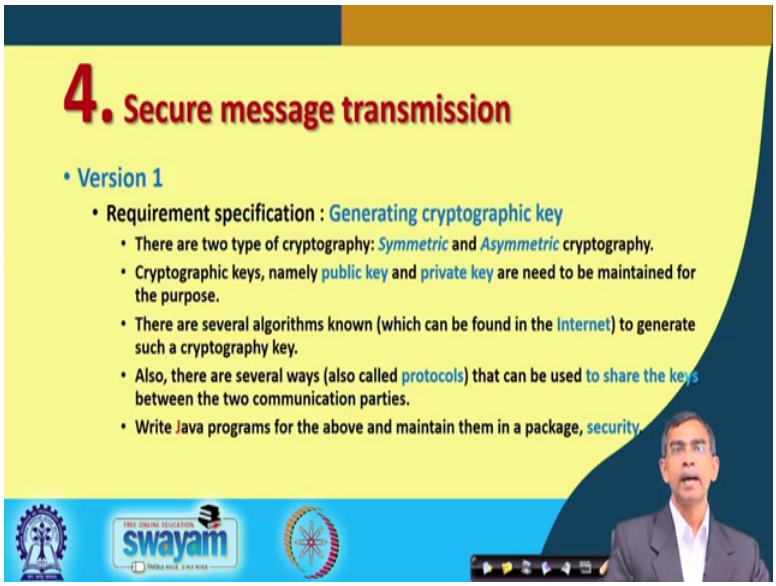

Now, I will discussed about the steps that you should follow. As a first step we have to decide about the cryptographic key. So, there are two type of cryptographic key, one is called the symmetric. Symmetric cryptographic key means the key which is used for encryption the same key will be used for decryption. So, this is called the symmetric key cryptography. In this case both sender and receiver should have this key and an algorithm for both encryption and decryption.

On the other hand there is a another method that sender we will use one key which is private to the sender only sender knows only, but receiver does not know it. On the other hand, sender will communicate to each counterpart by a key it is called the public key and using this public key the receiver will be able to encrypt it.

Now, there is again different type of algorithms are for possible like say RSA algorithm, DSA algorithm, like. So, using all those algorithm the asymmetric key cryptographic can be there. Here again you have to know exactly how the key can be generated both the two keys, public key and private key, those are not same different and they can be shared among the two parties also and all those things are there. And their again keys sharing key generation for asymmetric there any protocols. For example, Diffie Hellman protocol, electric of cryptography protocol, DSA protocol, so many other protocols are there. So, you have to little bit learn about all those things methods are there techniques are there you have to implement in your Java environment.

And then you can develop all those things; that means, all the algorithms for encryption, how the key can be generated, how the key can we shared, all these things you develop as a program and you know in Java program means is a class all these class for you can stored in a package. Let us give the name to this package as a security.

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Now, here is an idea about how your framework will work so that you can develop ultimately a system. I have just given a picture for your own understanding. So, here a sender who wants to send some document. So, this is the document. So, basically sender will use a key, that is a cryptographic key whether is a same or different that you think about then encryption this algorithm.

So, you need how this key can be generated how this technique can be done. So, these two methods you have to learn it, and document can be any document word document or note pad document or pdf document or image document, absolute no issue that algorithm we will take care about it.

Now, so this algorithm take a document with the help of key will create one file it is called the encrypted file. The same file will be sent to the net. So, there is a socket program you can think about. So, a socket we will take this encrypted file and then socket we will send it to the sender, receiver. So, this is the receiver, receiver has another socket program at his machines. So, these two machines are different. They are connected through the net. So, these are the two socket, one the receiver socket and then server socket we will just ok, will be used for the communication purpose and any protocol datagram protocol or TCP I protocol you can follow through transmit whatever the large document may be.

Now, this then they at the say receiver end there is a program or algorithm is a class program, Java program you can say which basically decrypt the document which has been received. And so, and for this decryption another key will be used cryptographic key may be same or different whatever it is there. So, using this key the algorithm will decrypt it and then finally, it will reach the, receive the documents and this document we will be opened by the user.

Now, so this is the idea about the system that you have to develop and you have understood that, you have to use it programming core programming and bit networking also involved and also graphical user interface also needs to be there. And in the version one you can just simply then generate the cryptographic key and in the second version you can do is basically the graphical user interface.

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And here how the graphical user interface you will look like I have displayed here. So, there will be just this is the view of a GUI windows program, and here if you click the upload document it will basically just ok, go to the browser and then it will select the directory and in this select the any file can be selected and then open it.

So, it will just display that this file has been successfully selected. And then you can keep the encryption algorithm button it is if you click this, so it will basically follow the algorithm and also it will take the cryptographic key and then it will be basically create an encrypted file and encrypted file can be again send. So, you can see the ID, you can give the URL address or local machine number or such thing and if you select it thus it will go to the send receiver. The receiver window; that means, this is the program that we have discussed about is a GUI program. It can be embedded in a socket and then socket this is the GUI is basically punch in a socket program actually.

And this is another socket program at the receiver end. Receiver end once this program is there then it will basically whatever the message that he has received will be there. So, this is basically one inbox sort of thing. In this inbox he can select one and then he can select this decrypt. In this once this encryption is then is a decrypt. So, these decrypt we will basically convert the encrypted file into decrypt decryption one and then finally, it is open.

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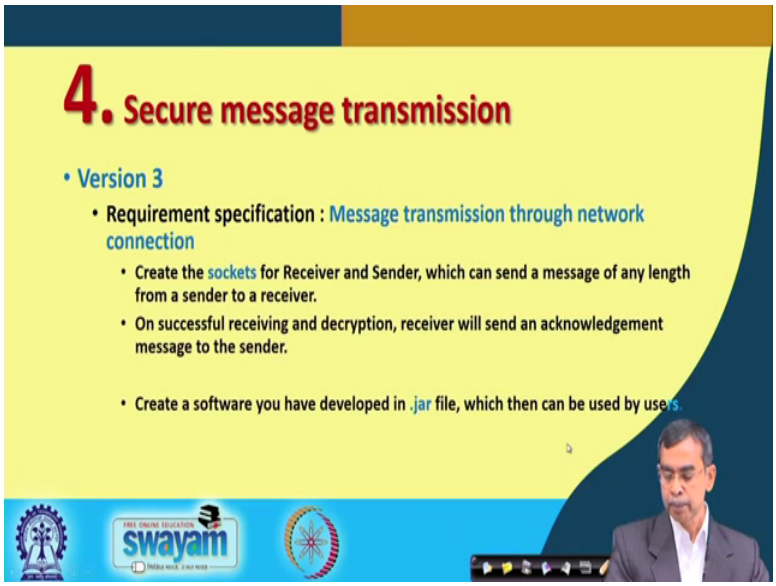

So, these are the two windows, at the server size, at the sender size, as the receiver size needs to be implemented. So, here windows programming, also socket programming and then the algorithm to be implemented together in at the both end. Now, then the message transmission through network the network implementation is to be there and you know exactly how the networking is possible using this one, two sides of client can be there and then once the receiver receives a message it will send an acknowledgement to the sender.

Now, all the system that you have developed is stored in a secure file better you can put into the jar file and this jar file is installable in any other users machine, and using installation of these jar file or using these jar file any people can send the document to anyone and any people also receive the document sent by someone and then use it as an encryption and decryption also.

Even you can plug in with your email system also. So, before sending or attaching, you can encrypt it and then the receiver also can decrypt it using your same program. So, plugging with your own program with the other program also possible that is another lessons that you have to learn about it, anyway. So, forget about the plug in and others you just simply used for a standalone system that is there.

Now, let us discuss about another projects is a fifth project. And as the name at the title of the project is basically you have little bit idea about the bank transaction while we are

discussing about multithreading in this course. It is basically heavily used based on this concept transaction system, but using multithreading, but in addition to this threading also it will considers few more Java programming aspects like GUI programming also, networking and then JDBC.

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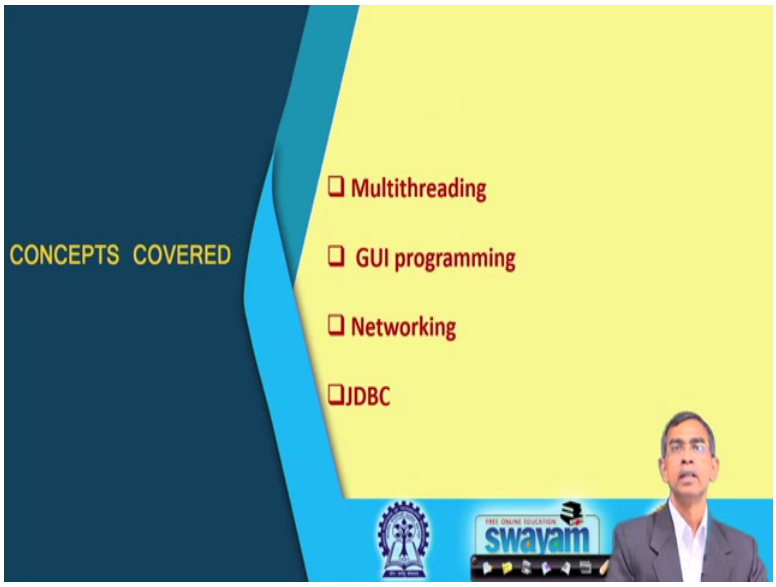

So, this is the another little bit complex program or heavy program compared to the last four program that we have discussed about because so many skill sets are there. If you do it one by one then it will basically all this projects are planned in that order only. So, slowly as we go from next project the complexity will be little bit high. Anyway, so this is the project where you should have the knowledge or learning capability about all these four aspects.

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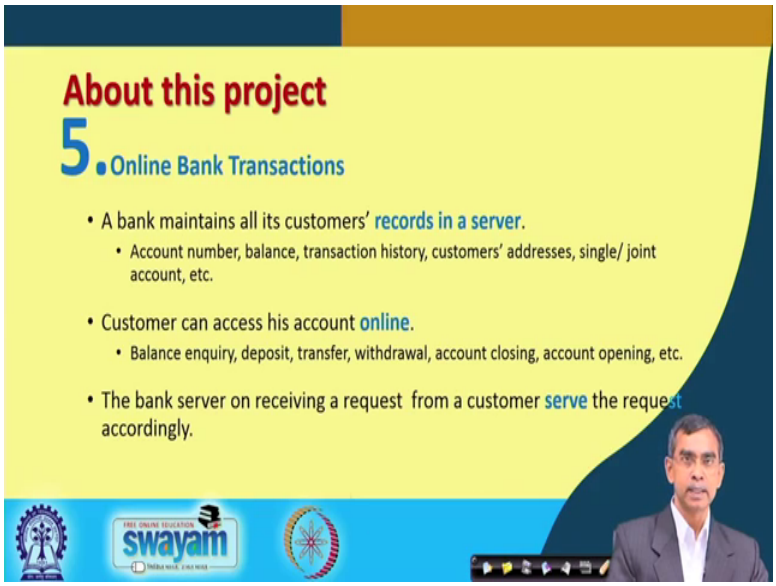

Now, let us see what is idea of the project. It is very simple idea, as you know so for the banking or any finance organization there is the one server which maintains the database and the database includes the records of all the customers. So, basically customer ID, the account number, the customer name, customer address, accounts and also the history of transaction all these things are there. So, you can plan a database for that. A tables that are relevant to this one and then so, you have to prepared one database for this.

Anyway so, a bank we will maintain all customer records in a database server. And then customer can access his accounts online. Online means login password should be there by which the customer will should be first authenticated, once the authentication is first his information will go to the database and accordingly database will give that different facilities or the operations like balance enquiry, or if you wants to deposit amount or withdrawal amount and everything.

So, here actually no physical money is involved, the logical some things is there because you have to just practice it how such a things are there and whenever the hardware can be interfaced with this physically it can be there. In actual cases the banking system will be there any way. So, it is like this one.

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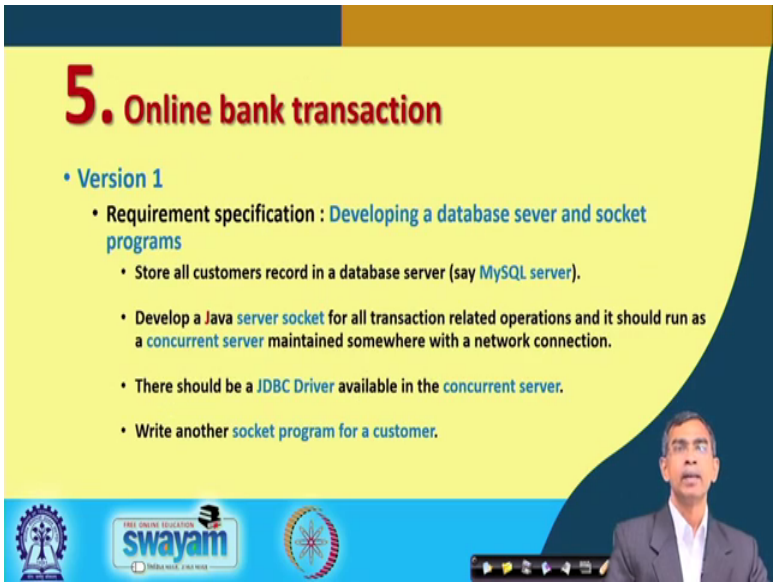

Now, let us see the different steps that you should follow one by one, so that you can implement this ah project very comfortably. So, first you have to develop one database server you can use in this course MySQL, other then MySQL in this SQL or oracle server also anyone, no issue you can use it. And JDBC also needs to be archived in your program jar file is there available we have already discussed about how the database JDBC connectivity can be done, here you can use it.

As a programs, so far the programs are concerned, so in this project we have to develop for sever sockets. Server socket means this will basically handle with the database and everything. So, that can be considered as a concurrent server because this server should be ready to receive many request at the same time and therefore, it can process. As a result of concurrent server you can implement a multithreading concept here. So, several threads are to be executed whenever there is a request received from a client in a distance from the distance location.

And then there will be another socket programs for the customer. So, the two sockets here is the customer size. So, customer can be from his own machine or from his own mobile, can run the sockets, the sockets will run then through the sockets customer can place the request and then accordingly it will be executed.

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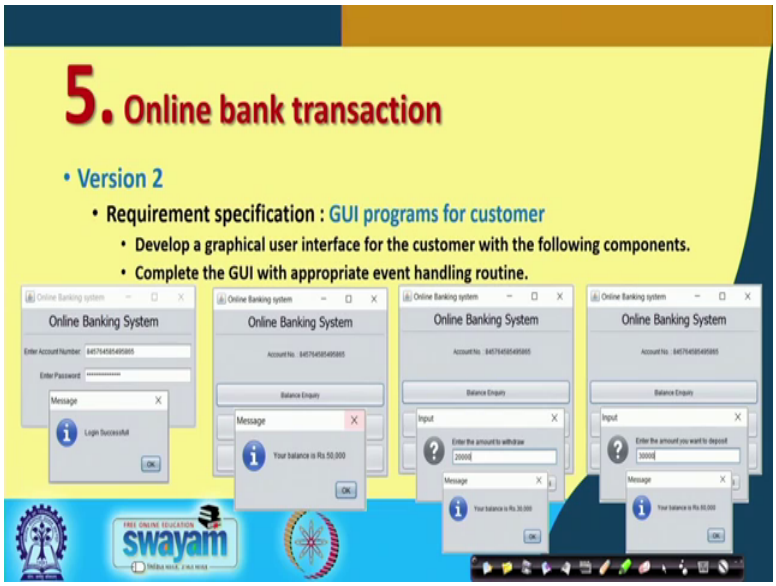

So, these are the things are there. Now, here again a little bit GUI components also involved. As you see here, the first GUI interface for the login and password which will look like trivial form as you are familiar to this one you have to do it. So, once the login element is there login ID and then password is entered and then press 1. So, if the login is successful it will basically can go to the next step that it will basically see that what operation you need.

So, after these things it will basically, once the login is successful the online banking system will appear to the user and if it is a failure it will deny to access it. Now, here again balance enquiry if we click the balance enquiry it will just ok, because login account number and everything fast after authentication is done. So, it will ok, connect to the server and then that server will basically consult with the database server, get the information and then display it here.

And then once it is there the next will be may say withdraw. Say similarly, withdraw it will basically ask about what amount you want to withdraw. If you give in, so then after the withdraw operation is successful it will give a message successful message. And then the deposit, similarly deposit it is there if, so after the successful deposition it will give the balance and all these things are there.

So, you have to just simply develop this kind of screen with dialogue box and you have known you have learnt or using Java swing also how all those things can be developed.

So, you just even handling, mechanism, the interface you have to develop and then it will just do the socket programming, the networking and then JDBC the database handling are to be there.

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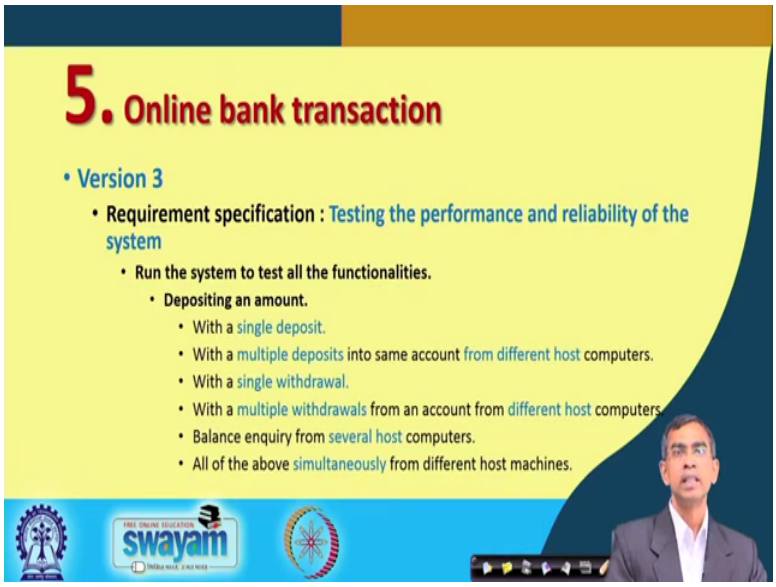

So, this is basically the idea about this one. And then once you develop this program and this is a particular program whether you see whether this program is a very much robust and then perform perfectly as it should be here. So, here are the different test that you can accomplish. So, that you can just run the program, several sockets, client sockets from the several points and then execute and try to access the database as well as the concurrent server simultaneously.

So, here I have mentioned with a single deposit with multiple deposit, both say deposits as well as withdrawal at the same time and then there are so many other variation that you can do, so testing. You can include in your friend also in your the in this testing, and then you can do it and then get the results it is really if you can do it and then we it will improve your confidence like anything.

So, these are the things that we have discussed about. The three projects in this session and then best idea would be if you can do alone, so do it. If you cannot then best idea is that you can do as a team, right. So, you can include some of your friends into the team and then discuss how to solve it, what to do, what are the difference are there and then you can do it together. First two programs you can do alone, but whenever the

complexities because different components are there, better that you can do in a two manner. And then teamwork is very important because whenever we have to use in a software development firm right you have to work as a team. So, from this time onwards you should practice these things.

So, thank you for attention.

Thank you.