Introduction to Morden Application Development

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Module – P14
Lecture - 32
Building a blog app

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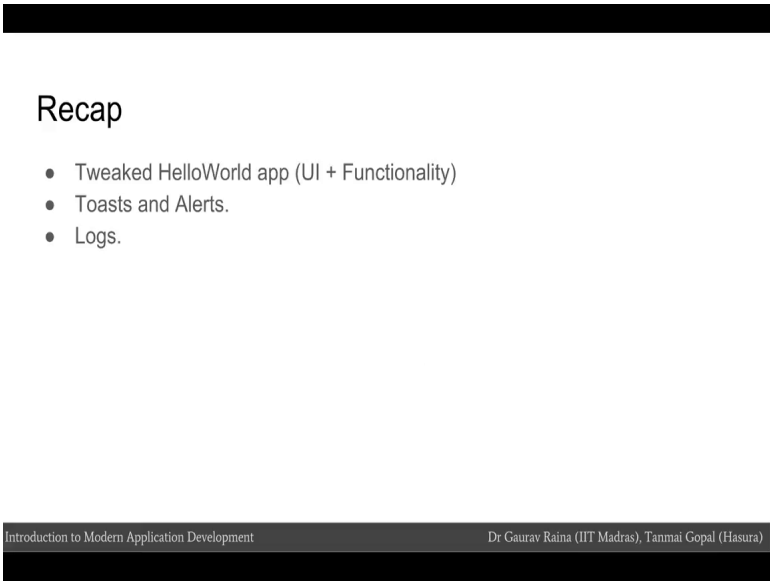

Hey everyone welcome to module P14. In the previous module we tweaked a HelloWorld application UI and functionality based on our needs. We used android widgets like toasts and alerts we also used logs to help us understand debug our code better.

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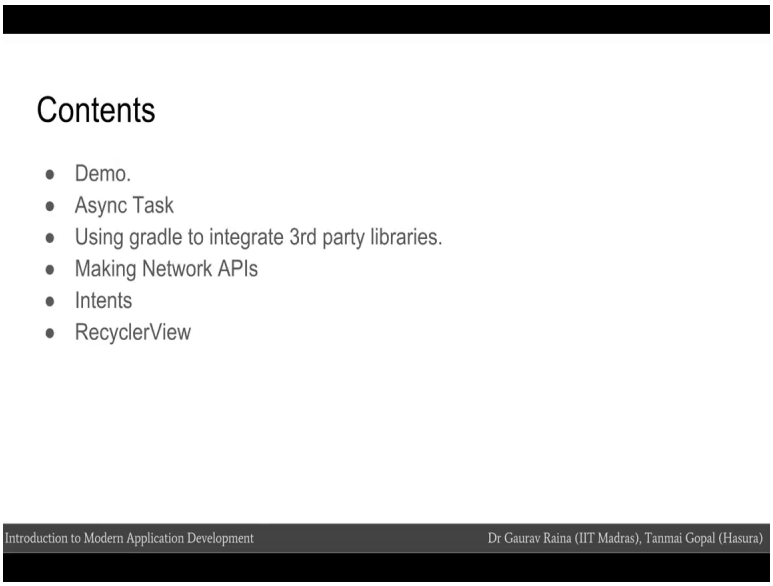

In this module we are going to build a very simple blog app which is going to have three different views issued to the user. The first one is going to present the user with the option to either sign in or register into the app.

The second page is going to show the user a list of articles and on clicking any those articles we will take them to a third view, which will be in the detailed blog page. We will be using the APIs that you have created in the previous modules while building your blog web app. While building this app we are going to have a look at something known as Async task, use the gradle to integrate third party libraries, make network API calls and use one of androids major app components called intents and finally, they are also going to use recycler views which is a very commonly used widget or view in a lot of android applications.

Let us start the creating a new android application, let us call it my blog clock next next empty activity, let us call this authentication activity, this will be the activity that is going to present the user the option to sign in or register let us finish and let android studio create your project ok.

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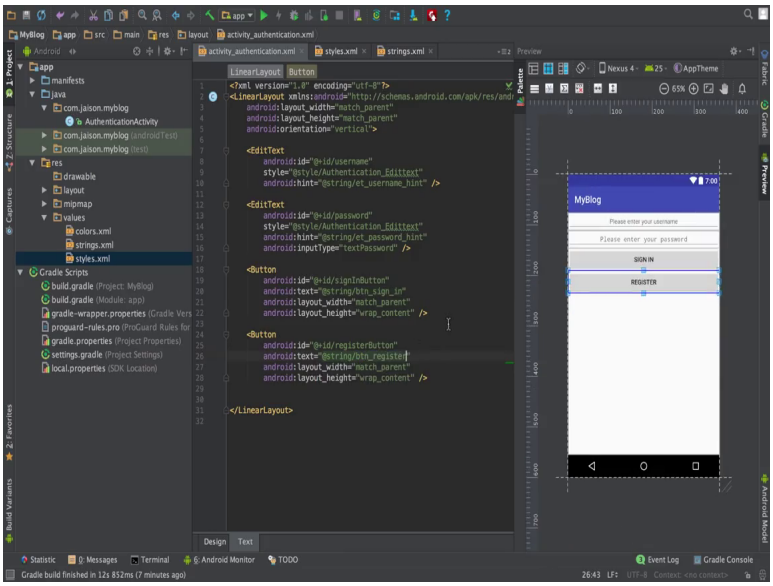

Now that our project is created, let us headover to activity under authentication. Let us remove this and user name is here set height as match parent width as match parent (Refer Time: 02:08) and let us also give it in orientation of vertical all right.

See now that (Refer Time: 02:19) let us add to edit text and width as match parent height as wrap content let us give this an id of username set a hint for this ok.

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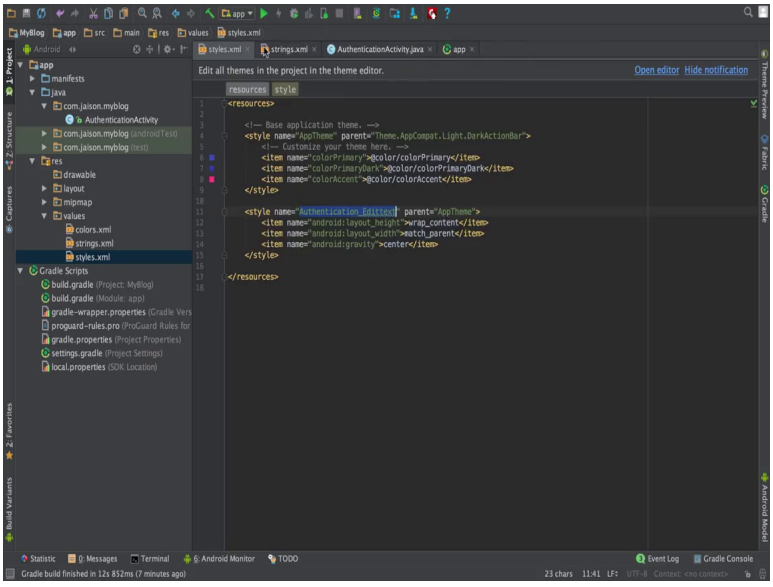

So, before we get to that we just add string e t underscore username underscore hint please enter your username similarly we will get a know password for the buttons. Let us

go back to activity under saw authentication, let us give this e t underscore username hint let us also set it is gravity to the center. So, that basically makes it convergent the text from to the center vertically horizontally.

Let us just actually let us use styles as well, since we know our user let us find the styles for authentication edit text, let it is parent be app theme. So, let us say name can be android layout underscore height can be wrap content, width can be match parent what else are we doing we have a gravity which is common as well gravity which can be at center. So, now, let us apply this style to our edit text, authentication edit text (Refer Time: 05:30) apart review and we can ideally delete all this ok.

Similarly, let us use the same ones for the password only difference password has is an input type, which can be text password and the hint to change to is e t underscore password hint all right. So, we have that now let us add a button, button width id would be sign in button and text on the button would be button underscore sign in. Similarly so this also would be advantageous to make a style. So, I am not I am just going to copy paste this. So, here just register button, button register, all right.

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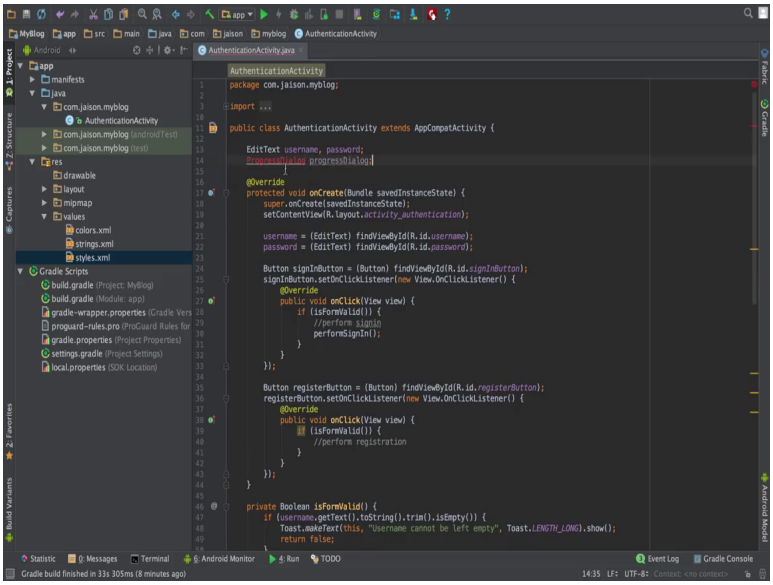

So, now we have our view made let us access this view in our activity edit text we have username password let us say username equals edit text find similarly we have password let us access our buttons a few buttons sign in button, I guess we can import the value for

button we have. So, now, we have our buttons and our edit texts reference into our activity let us handle the click for both buttons ok.

So, now one thing that we want to check when the buttons are clicked is whether the username or password fields are empty, if it is empty then we should show an alert to the users saying that neither username nor password fields should be left empty. So, let us see how we can do that. Let us create another function which termed as Boolean and called is form valid what this method does is it check whether the username or password is empty. So, we can do is username dot get text dot to string dot trim is empty and return false.

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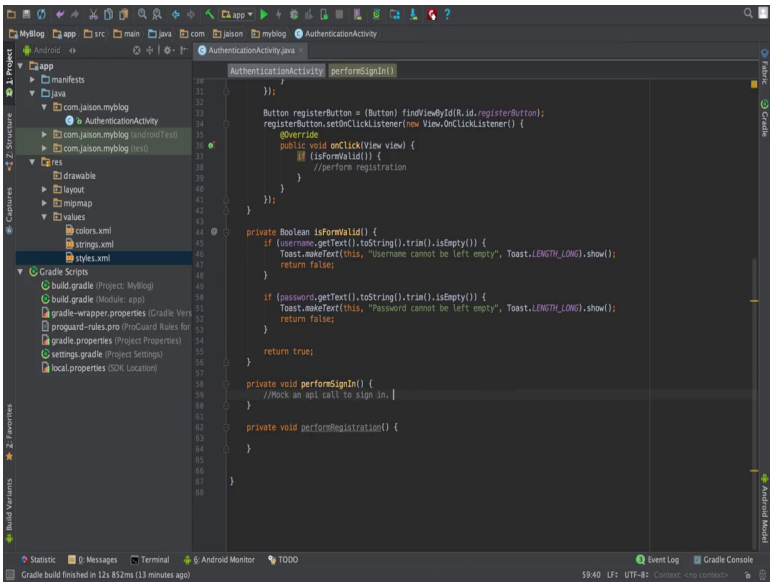

Similarly, if password dot get text dot to string dot trim is empty false and return true (Refer Time: 08:44). Now in case if any of these are empty let us show a toast to the user left empty it is a toast length of long. Let us show this toast and similarly for password we show toast all right. Now we do is basically check if form is valid and if it is perform sign in similarly we do same thing for registration. So, let us create two more methods called perform sign in ok.

Now, before we get to using the network API calls, let us try to mock a sign in operation by this I mean that when sometimes when in developing application, it can so happen that the API calls are not ready or have not been created. So, in scenarios like this instead of blocking your development you can mock or stimulate such a process so that you can

carry out the development until the APIs are right. So, let us see how we can do that here. So, when the user clicks on the sign in button let us perform let us call the perform sign in method, and over here let us mock an API call to sign in.

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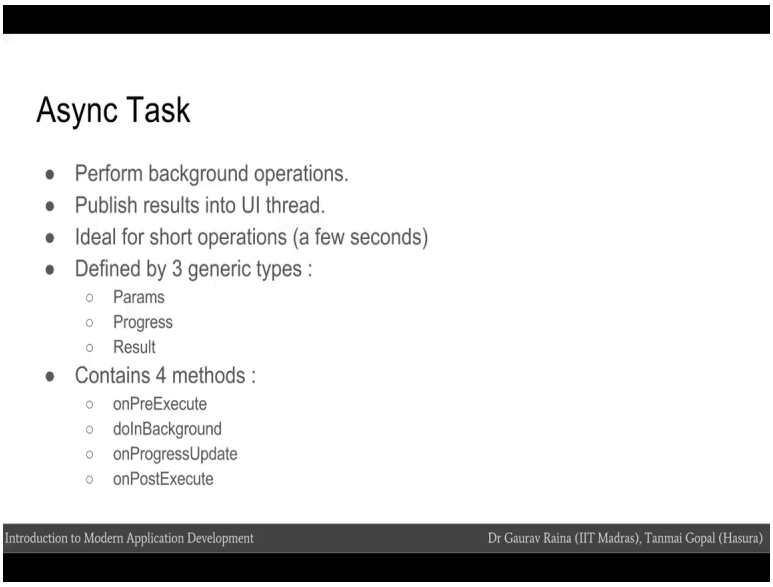

So, for this we are going to use something known as Async task, let us see what those are. Async task help us perform background operations and then publish the result onto the UI thread. In android the UI thread is the main thread and is never supposed to perform any heavy operations. So, operations like network calls image processing etcetera are done on a background thread. Async task help in this, the ideal for short task which last a few seconds, it is defined by three generic types params, progress and result and it contains four major methods the first one being onpreexecute which is called before the task to be done begins, it is called on the UI thread and can be used to set up the task or show something like a profis bar to the user to indicate that something has been done.

Next comes do in background which is called right after onpreexecute and it is called on a background thread. The task to be performed happens here, one of the three generic types params is sent as a argument to this method. Next comes onprogressupdate which is called on the UI thread after a call to the method called publish progress which takes the type progress as is argument. Onprogressudate can be used to show progress to the user for instance print logs or animated progress path and finally, we have onpostexecute

which is invoked on the UI thread at after the background computation finishes, the result of the background computation is passed to this step as a parameter, which is a result param.

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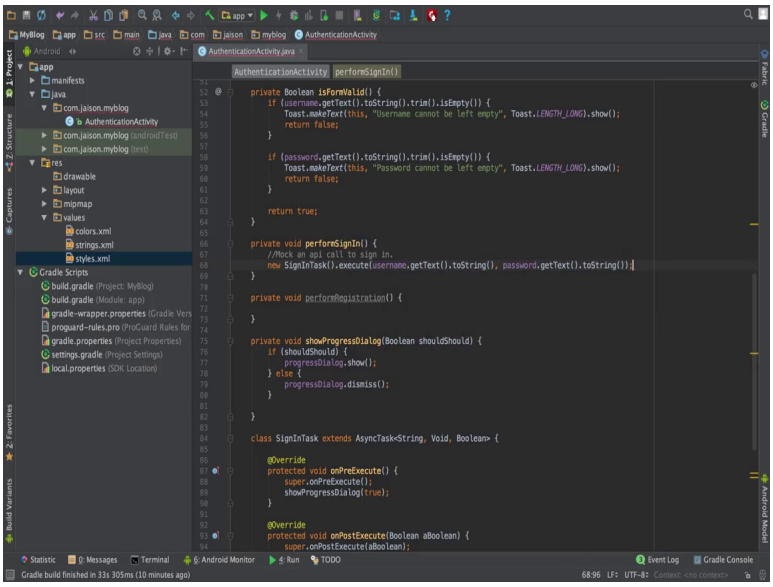

So, now let us use Async task inner application. So, let us start by creating a task called sign in task; sign in task which extends Async task as you can see it is looking for three types one is params progress in result. So, a param in this case would be string we should do string using a name and password, we do not really need a progress update for this task and finally, our result would be a Boolean indicating whether the call was successful or not. So, let us do that string void and Boolean and they are suitable in prompt if input or implement the methods click ok.

So, the method that must be implemented while extending Async task is doing background. Apart from that as I said we also have onpreexecute onpostexecute onprogressupdate. So, we will not be using onprogressupdate, but we will be using onpreexecute and onpostexecute. So, before we make the task we need to show an indicator to the user show him that that is something going on. So, let us make a class to show progress indicators. So, let us call it private void show progress dialog and this can be Boolean should show.

Let us also create a progress dialog, we have to import it and let us initialize it (Refer Time: 13:56). Let us give it a let us say indeterminate which should be a circulat progress

dialog and give it a message of please wait. In show progress dialog you check if you are supposed to show it we are supposed to show it show and dismiss all right. So, on pre execute that is before we begin our task let us show our progress dialog and after our execution is done let us hide our progress dialog.

In the doing background method we would be receiving two strings first one would be username, it should be strings of zero and the other one can be password is strings of 1; do something with this and return true or false all right now let us see how we can do this.

At perform sign in let us do new sign in task dot execute and let us say username dot get text dot to string, password dot get text dot to string all right. So, we will be getting the username and password over here.

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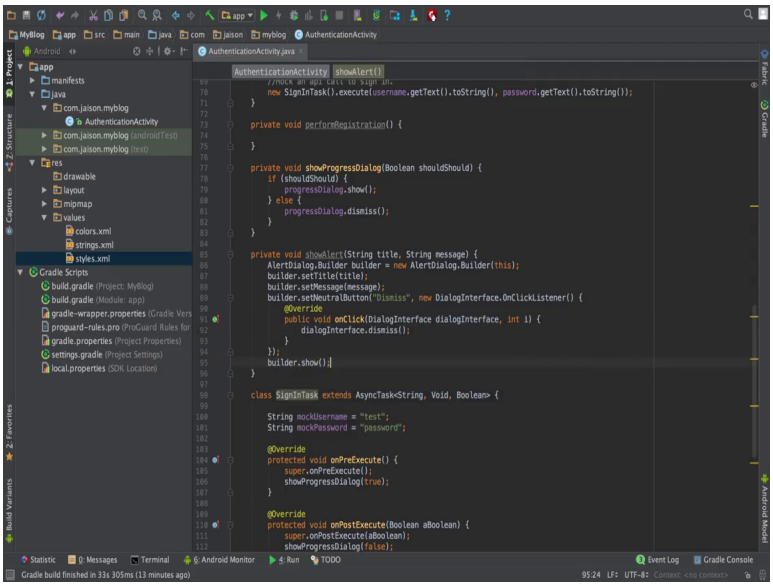

So, now since this is mock data let us make to mock value for mock username let us call this test and mock password let us call this password all right. So, what we are going to do here is we are going to check whether the username equals mock, whether username equals to the mock username and the password equals to the mock password and based on that we return true or false.

So, we say return username content equals mock username and username password content equals mock password all right, and over here is which true based on the result of

this sign in progress we should show alert to the user indicating whether this sign in has been successful or not. So, let us make a (Refer Time: 16:00) for that show alert which takes into here which takes the two parameters title and message let us set this up now title will be title, message will be message been sent, let us put one neutral button called dismiss which would dismiss the dialog an and sign in show the dialog all right.

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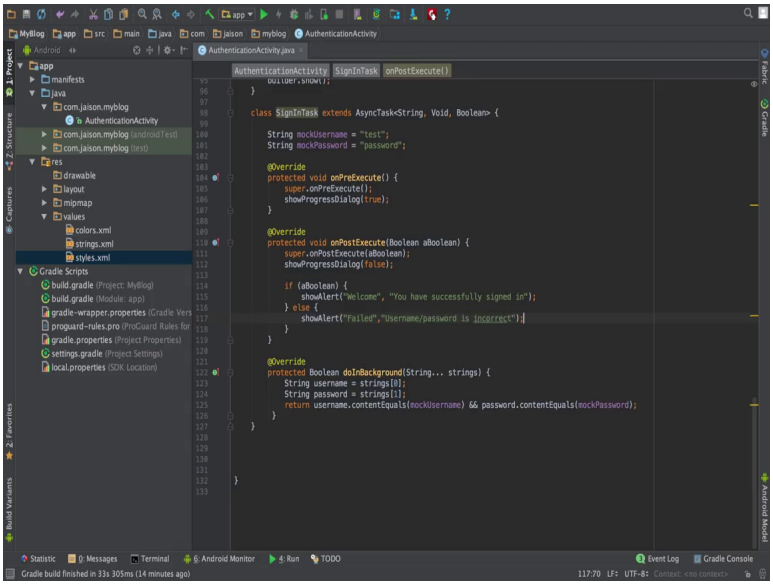

So, if it is true show alert saying welcome you have successfully signed in. If it failed username or password is incorrect all right. So, now, let us run our app and see this in action, first we try clicking an empty usernames enter something.

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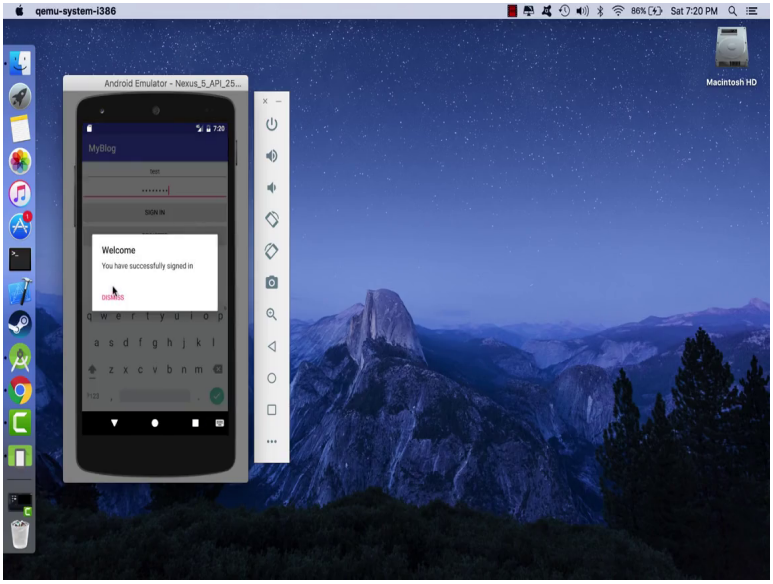

So, that is happening because the toast length is long. So, the next toast is shown only after the previous toast is dismissed. So, that works next let us enter a username and let us enter test and password it says successfully signed in. Although it did not show the progress part this is happening because our code is getting executed immediately.

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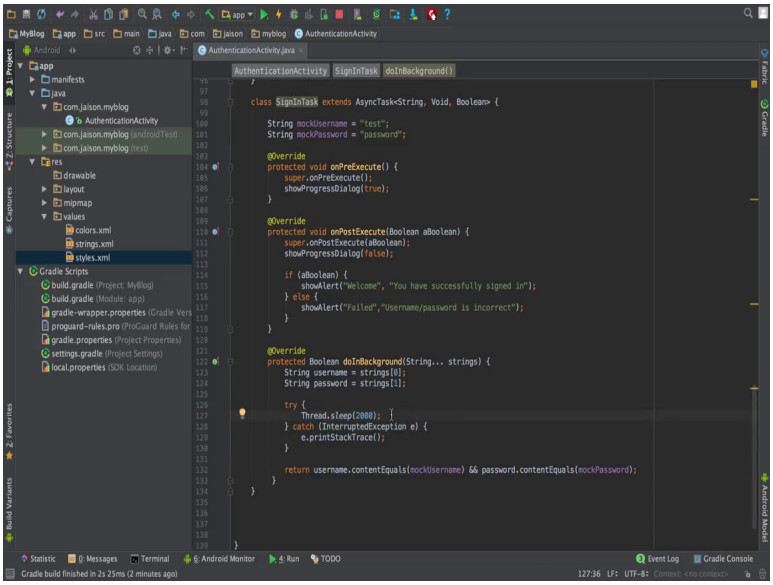

So, let us add something to make our threads sleep for about two seconds let us say thread dot sleep 2000 milliseconds which is seconds. Now as you can see android studio is prompting to surround this in a try and catch statement let us do that. So, now, what is

going to happen is that this operation is only going to be performed after two seconds. So, this return statement will only be called after two seconds and hopefully we should see our progress dialog one more thing we have to change is set indeterminate should be true. So, that the circular indication as the re (Refer Time: 19:50) ok.

Let us check this out let us say test password as you can see we have a progress indicator which is shown for two seconds as said username or password failed. I think that is because I have entered the I think there is a type one password (Refer Time: 20:11). It says you have successfully logged in and in case we enter something else it says username password is incorrect fine. So, now, we know how to mock data and carry on the develop let us now move on to making network API calls to make network API calls in our android app we are going to use a third party library called retrofit. Let us head on to square dot github dot io slash retrofit and you can read through this to understand how it works to integrate it we are going to use gradle and just copy that line go into your build dot gradle the app level build dot gradle file and place it.

So, this is to add retrofit as library to our app. Secondly, we are going to deal with json objects to make our requests and responses, to convert our requests and responses to and from json we are going to use a library called Gson, retrofit provides support for Gson and let us integrate that as well.

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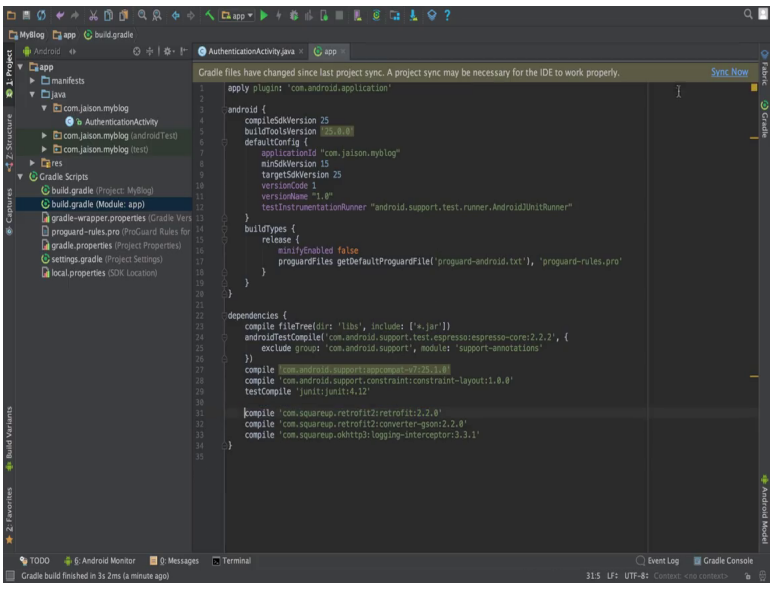

And finally, to log our API calls we are going to use something known as the log in interceptor. So, now, sink your project, gradle will download these libraries and integrated into our project ok.

Now, that is come let us understand what this means. A library name in gradle is separated into three parts which is group id colon artifact id colon version. So, here the group id is com dot square up dot retrofit two, the artifact id is retrofit and the version is 2.0 all right. So, now, that the libraries are been added let us get started with building a retrofit track.

First thing is retrofit provides an API interface to make our API calls. So, let us create an interface first let us call it API interface all right, this is it next let us create a manager which will handle the API calls first let us call it API manager class all right. Now here let us create a private static instant of API interface, then create a method called create API interface and finally, get a for API interface here we should check if API interface is null if it is null.

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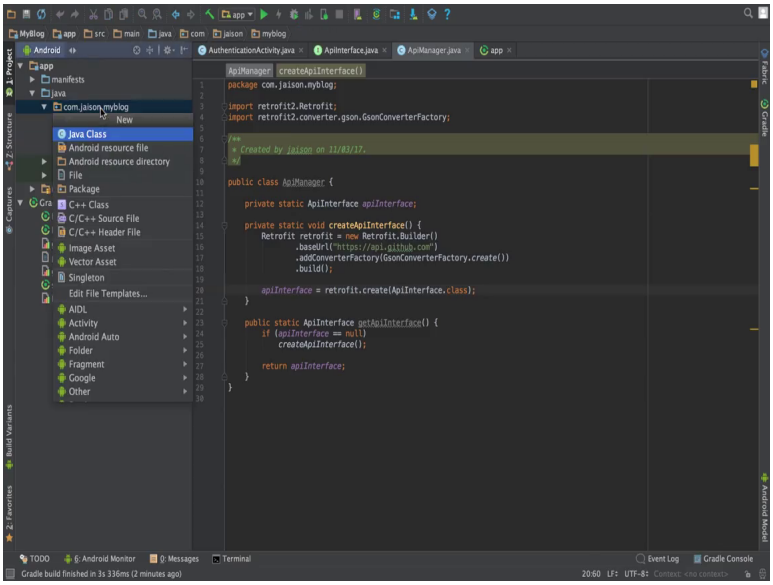

We should create oops static create API interface and then return API interface let us see how we can create the API interface.

So, let us head back to the documentation and this is how it work. So, input is this one converter factory for free using this is a base ULR which we will change later and here

API is service API interface is equal to API interface dot class all right. So, now, that we have set this up let us create another class to statically handle all of our ULRs.

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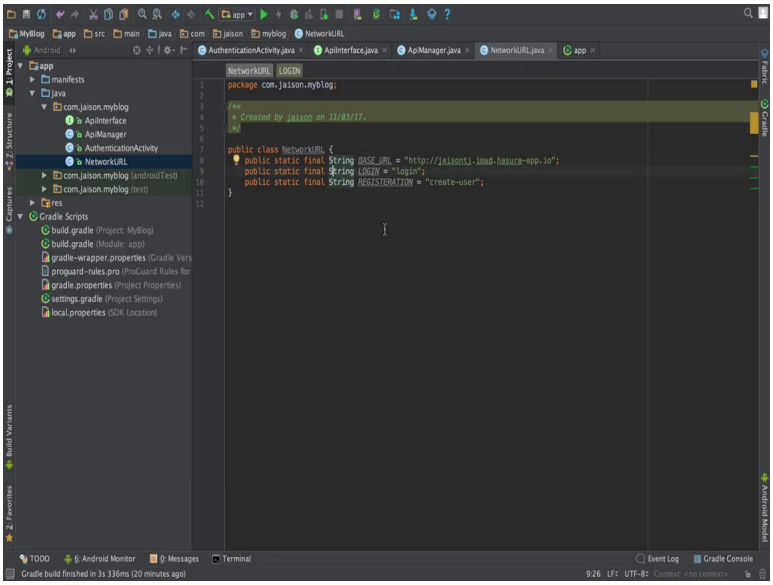

Let us call it network URL public static string base URL which in this case would be the base URL of your Gson project. So, in my case it would be jsontj dot imad dot hasura app dot I add that you do not need this slash. So, mutually remove this slash.

Next first create a log in URL would be those login as you have create the APIs and registration was create user let us have a look at how our login and the registration API look like. So, the login API is as follows the URL that we are about to hit is this one the end point slash login.

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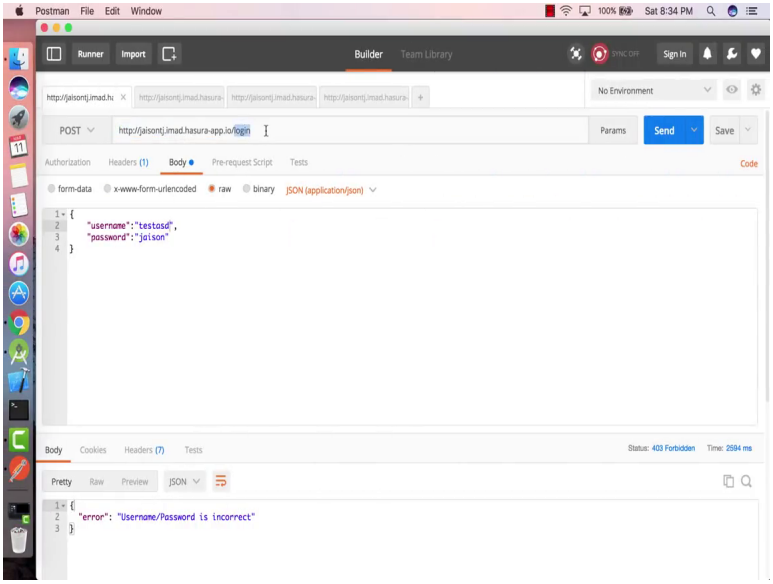

Which is a post request with a json body of type username with two keys username and password with the respective values and it gives the response to us in json which is either say error username password is incorrect or if you were to send in the right username and password it would send your response with a key message. And which has you have logged in successfully. Similarly registration is also the same same type of API which send in a request body of username and password which is of type json it is a post request, and the response is also the same it would either say error or it would say message and you have successfully logged in.

Ok. So, now, let us handle this in our let us start by creating our authentication requests and response pojos, pojos stands for plain java objects. So, let us call it authentication request since both are login and our create user request body is the same we can use the same authentication request body in our.

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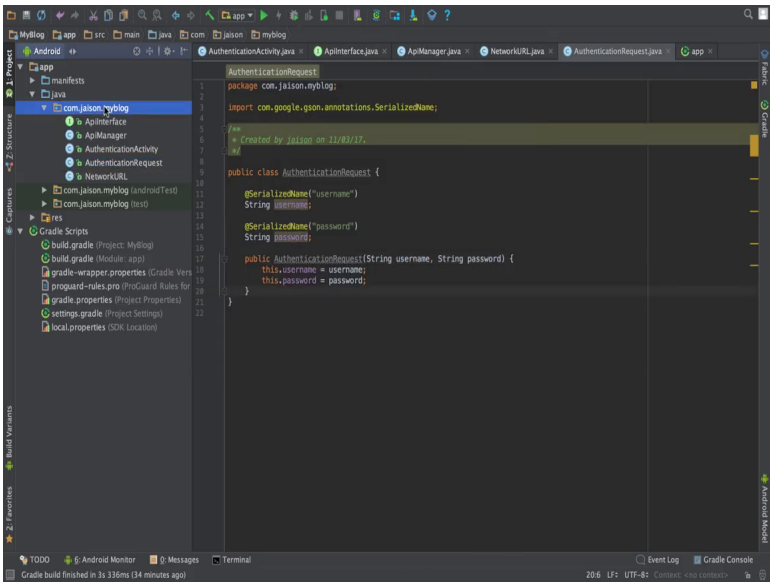

The serialized name is the name for the json, name for the json keys should be username should be a password. Let us create a constructor all right.

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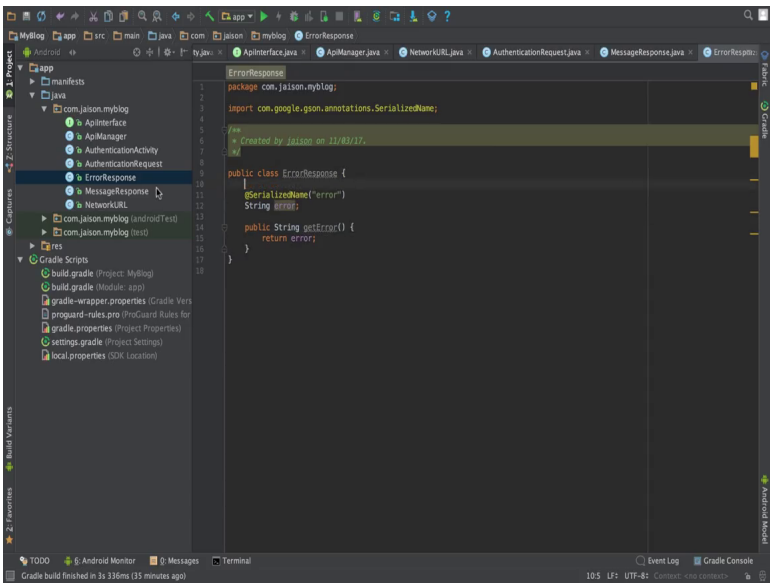

Now, next let us create let us just create an object to handle the message response and other one to handle the error response and another one for the error response. Now that is done let us now create these APIs in our API interface. So, the login request is a post request let us call let us access this at login and call is an object to (Refer Time: 27:39) retrofit it takes in a generic type. So, the response over here for our login API would be

the message response let us import this and a let us call this method login which takes in a body of type authentication request ok.

Similarly, registration were also be the same, another thing that we need to do is to go back to API manager and change this to our base URL this we run our app let us put a login interceptor in place so that we can see logs of all the API calls made by our app. So, this we need to create an http login interceptor let us call interceptor, and let us set this login interceptor level to body you can see what each of these stands for by going into the method.

Next is create an http client and add the interceptor to this and then finally, build it. So, here let us add this to our client (Refer Time: 29:09) object. So, now, we have our login interceptor also set in place.

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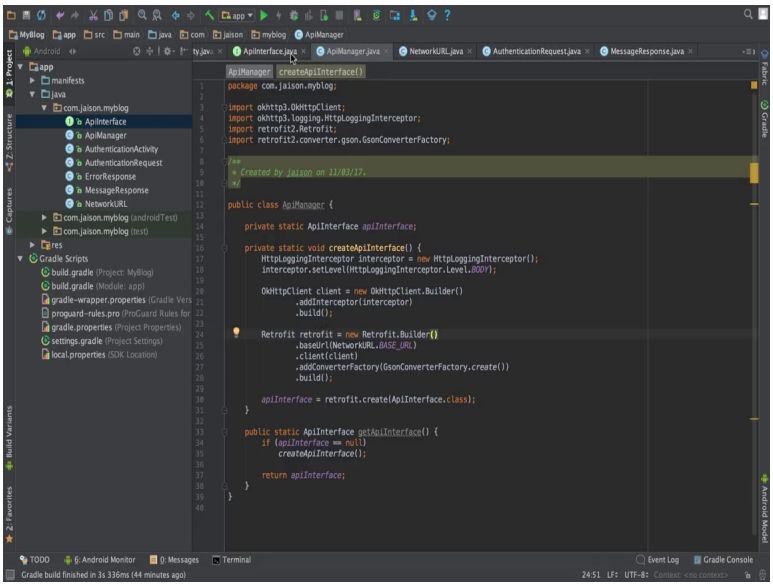

Now let us make this API calls in our authentication activity let me choose all of these tabs. Let us now go to a perform sign in method let us take these out and let us call our API manager get the API interface and call the log in and then pass the authentication request body with username and password.

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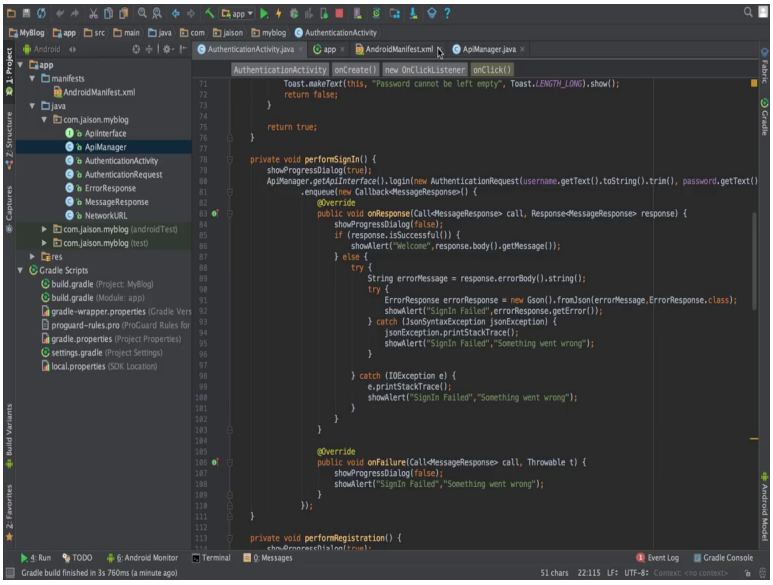

Once that is done let us enqueue this request and handle it in their call back and the call back provided by retrofit, which basically is two interface methods call on response and on failure on failure gets called when the request has failed in the sense that maybe the internet connection is not working or something (Refer Time: 30:16) and if the API call gets any response from the server, the on response method gets called it is our duty in the on response method to check whether the response was successful and what this tells what this is successful method does is checks if this status code of the response is between 200 or 300, and if it is not then it is then it returns a false for is successful.

So here we will show an alert saying welcome or we can even access the body of the response, which should be of type message response else, if the API call failed to some changes in which ideally should be if the username or password is incorrect in this case we we need to convert the response into the error response body. So, that we would be using Gson you would be doing this accessing the error message given by the response object error body string.

Since this string method throws a throws an io (Refer Time: 31:28) exception we have to wrap this in a try catch statement let us do that. Once we have done this what is next convert this error message into or json; for this two we have to wrap the method in try catch statement and do a error response error response equals new Gson dot from json string json would be error message and type would be error response dot class. So, now, we have our error response, let show alert to user saying sign in failed and error response dot get error sign in failed error response.

In case there is an exception let us print that stack trace and show the alert to the user saying sign in failed something went wrong similarly over here and one more here.

Another thing that we need to add is the progress indicator. So, show progress dialog true and highlight here. Since I registration call is also same let us do the same thing for here I am going to copy this and paste it here replace this with registration everything else would be the same except registration failed and let us. So, now, and also let us add the perform registration method into here perform registration all right well let us run the app and see let us type in some an username and password (Refer Time: 33:58) as you can see the app has crashed.

Let us see why that is the android monitor and it says no class def found error failed resolution of http internal platform. So, you may know that there is something to do with the http log in inceptor, let us see this mostly would be because of mismatch in the version as 3.4.1 would be the latest one. A simple Google search would reveal this to you let us rerun the app now, let us do the same thing again the app crashed again let us see why this is this time. It says security exception permission denied missing internet connection. So, this means that we have forgot to add the internet permission in our android (Refer Time: 34:53). So, let us do that let us add uses permission android name internet and that is it and let us run the app again.

Let us try this time it says username or password is incorrect and sign in failed. Let us check out our logs. So, as you can see we have made a post request to login end point with this json object and response has been 403 with error username or password is incorrect now try a registration API. So, let us create a new account let us call it jaison password can be jaison and let us click on register. So, it says something went wrong now that should not really happen. So, let us see why this happened it says http failed socket timeout exception it means that the socket is timing out. So, let us increase the timeout duration in our client. So, say connect timeout can be one and time unit dot minutes similarly we have read timeout which will be one time unit minutes and write timeout one time unit minutes.

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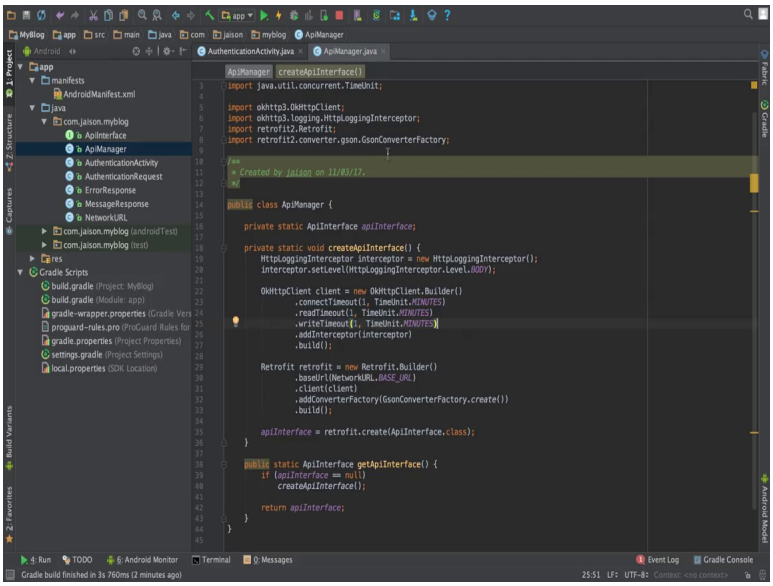

So, this basically sets the connection read and write timeout to one minute let us read on the app now let us try our registration API again. So, now, the error says that the duplicate key value violates unique constraint. So, I guess I have already created a user with a name jaison. So, let us create a another user named imad and with the password imad, so this user ok.

So, this API call works as well we can check the response it says user successfully created 200 response and post perfect let us try sign in with the same details. So, everything works now. So, on successful sign in let us now create a new activity to be shown to the user which will show him a list of articles. So, that right click over here go to activity click on empty activity let us call this activity blog list activity or rather article list activity click on finish. Another thing that we did not notice is that android studio will automatically add this activity into our (Refer Time: 37:39) this is very important in case this is not added here the app will not run and it will be crashed.

Let us go back to our authentication activity and create a new method called navigate to article list activity. To open up a new activity we need to use something known as intents.

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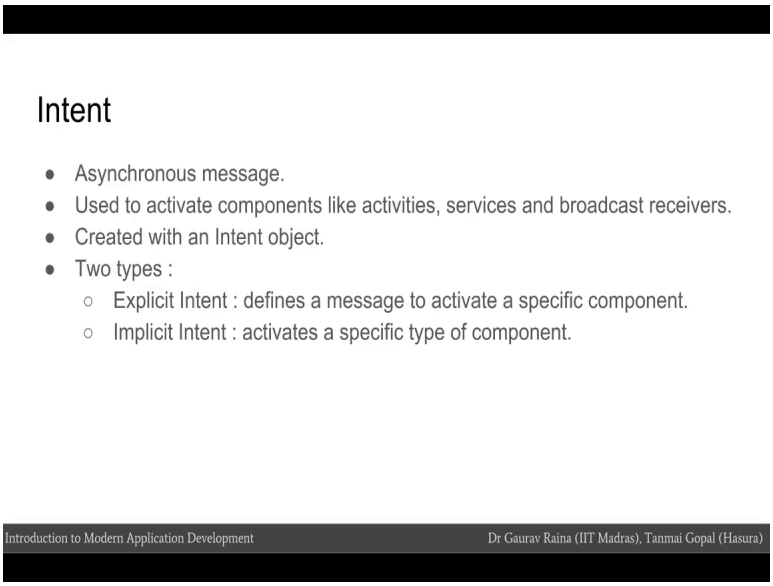

Components like activities are activated by an asynchronous message called intent, an intent is created with the intent object there are two types of intents explicit intents and implicit intents. When we explicitly specify an action for example, in our app opening up the article list activity on successful sign, in this action is performed with the help of an explicit intent. Of the other hand if you wanted to capture an image using the camera you would use an implicit intent to specify the intent to capture an image, and the android system will find the app like I do this for you either in your app or outsider app.

Let us create an intent to start our article list activity, if you pass in the context and then you pass in the class definition of the activity that you want to start, and then call the start activity method and pass the intent into it. Also let us go to our successful sign in hazard and replace the alert with navigator article list activity method all right.

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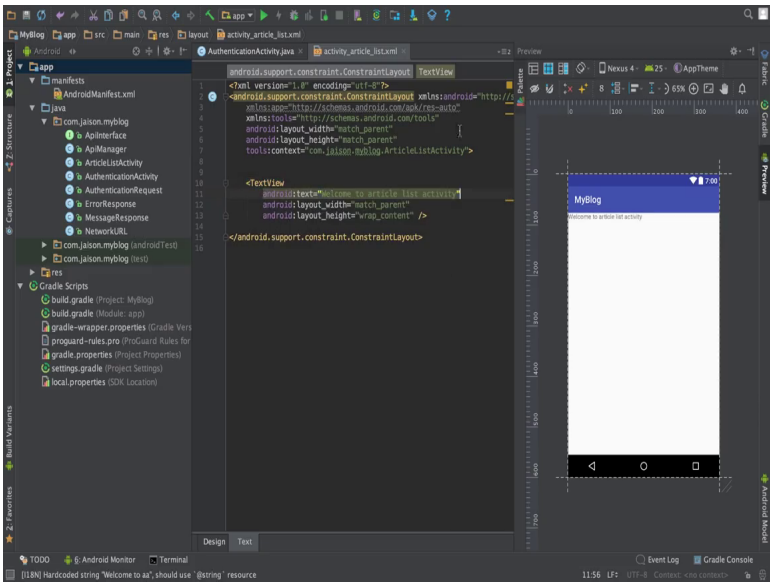

So, now, let us just add a text here, just to see there is a (Refer Time: 39:17). So, now, let us run our app let us use imad and imad as a username password which we registered with earlier let us click on. So, that works our article list activity is going to show a list of articles that is used as added each item in this list is going to be shown inside a card view the article name written on it.

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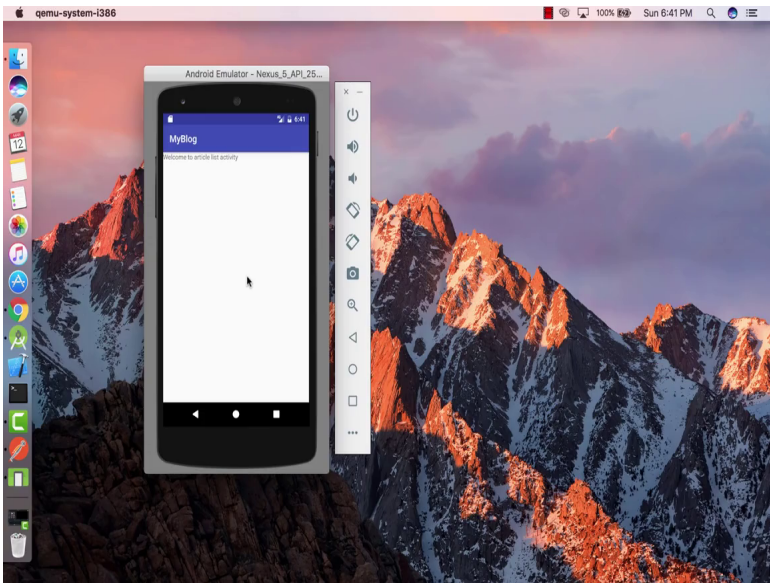

For this we need to integrate two libraries using gradle, one is called a recycler view and other one is called the card view. The card view was introduced as part of the android

material design which came after under lollipop. So, let us see how we can do that both the recycler view and the card view are the part of the android support library. So, what you do that is simply type in compile android 1.0 similarly let us add the card view and let us sync. So, that is done.

As you can see the these libraries are highlighted by android studio. So, what it means is that it is the android studios trying to say that there is a newer version of these libraries which are available which is 25.2.0. So, let us instead use the latest version and sync with (Refer Time: 40:41) again ok.

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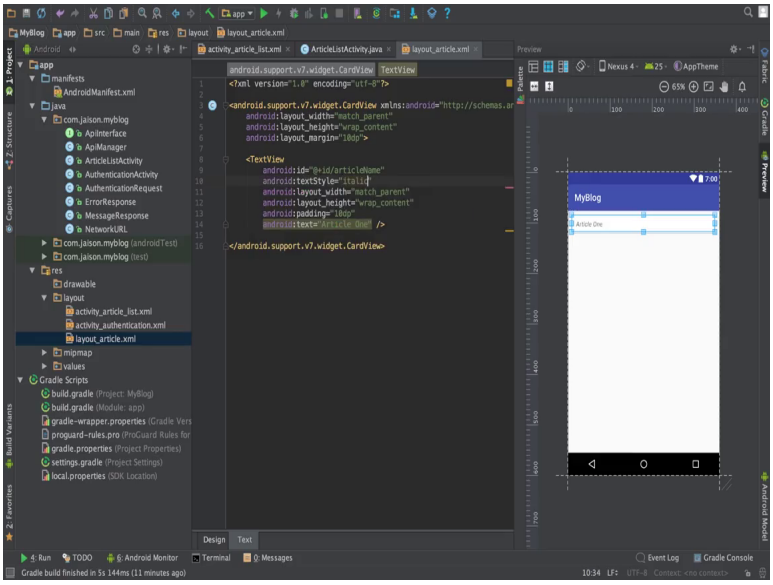

So, now that is done let us add the recycler view to our as you see showing a list let us also add an id to this, let us reference this in our activity now let us close this and let us go here.

So this is a recycler view recycler view before we start using the recycler view let us make the view for the item that is going to be repeated in the list, for that let us go to our resources could layout and let us make a new layout resource and I will call it layout underscore article underscore layout no let us call it layout underscore article it is a linear layout a vertical linear layout, as I add our card view to this card view and let us copy this you can take out this and then let us add this card view under this all right.

So, and let us change it is I to wrap content. So, now, we have linear layout which is vertical inside which we can add a (Refer Time: 42:16) we do not need a linear layout we just need a text view. So, we just now show the title let us add the width be match parent and the height be wrap content id be article name. So, now, let us put a dummy value of article one. Let us add a margin to this of 10 dp and let us add a pad into this of 10 dp is not that looks much better, we can add a style text, style and have it bold, bold let us put the color primary dark ok.

Insider view, view is a view holder pattern and so those of you who are interested to know what a view holder pattern is and I am going to add a link to an explanation of view holder part in the slides. So, now, let us create a view holders let us call it article item view holder which extends recycler view dot view holder android studio will prompt us to implement a (Refer Time: 43:52) methods which in this case is constructor which is called super and over here.

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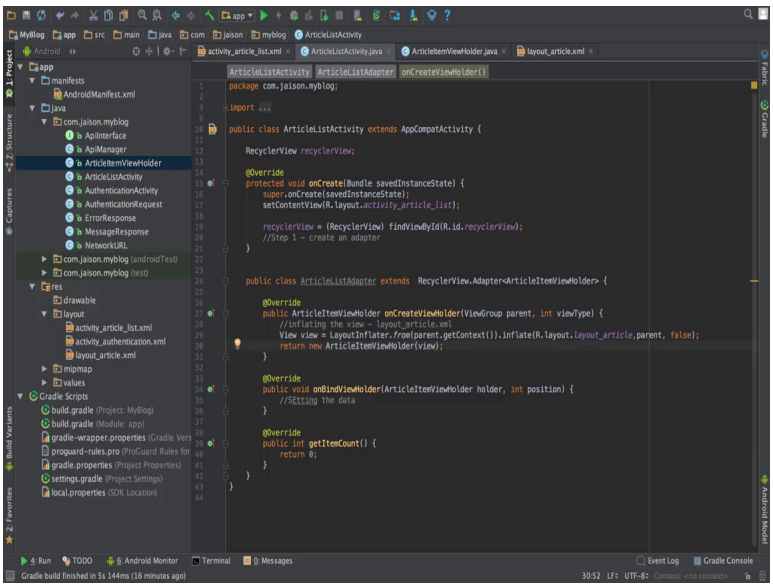

Let us have a reference to the text view article name, and let us (Refer Time: 43:58) our text view here saying text view item view dot find view by id dot article name all right.

So, view holder is also very now let us look at how to implement a recycler view there are two steps to implementing a recycler view; step one is to create an adaptor let us do that let us call this article list adaptor which extends recycler view dot adaptor and as you can see it access a view holder which is the article item holder, and let us implement the

methods all right and let us have a look at all these methods. The first one is on create view holder which basically ask us to return an object of type article item view holder this is where we inflate the layout that which is created.

Next one is on time view holder this method is called after the view has been bound to the list, this is that we would be setting the data and this is where inflating the view which would be layout underscore article dot xml and finally, you get item count is basically you have to tell the recycler view how many items we have in this list all right. So, let us see how we do this for this we set view let us import view equal layout inflater from parent dot get context inflate r dot layout dot layout underscore article, and we return a article item view holder all right. So, basically we are passing the inflated view to the article item view holder which is then getting a reference to r to the which is used inside the view.

Next is unbind view holder, this is how we set the data before we do that let us make some mock details. So, let us create a list of articles and let us say holder dot article name dot set text would be article list dot get, article list of position. Online view holder gives us a view holder as an argument along with the exposition. So, we are basically setting the name of the article based on a position also let us return the count as the length of article list all right. So, our adaptor has been set let us set this to our recycler view set adaptor new article list of adaptor all right step two is to set a layout manager.

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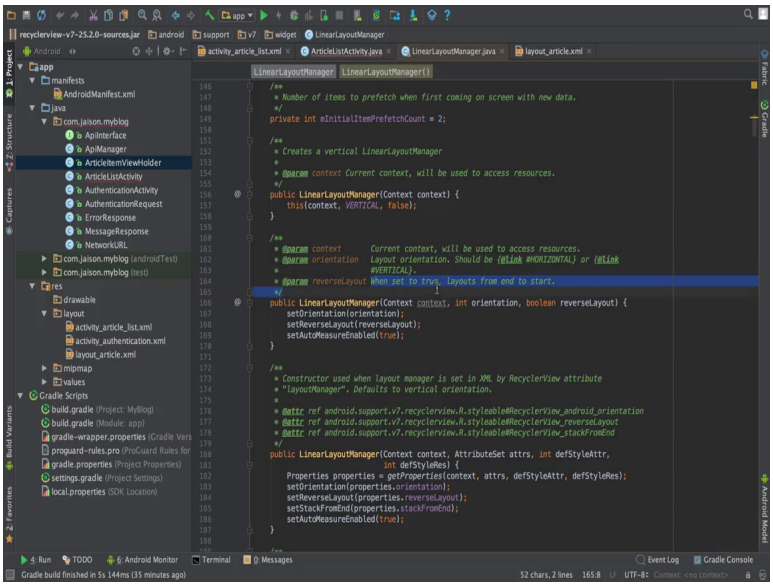

So, there are different type of layout manager, but for this tutorial we are going to use linear layout manager let us say what it needs linear layout manager takes in two parameters when your; as it constructor one is the context the other one is the orientation and a Boolean flag indicating whether it is a reverse layout. So, as you can see the context and the current context that will be used the layout orientation can be two it can be either horizontal or vertical in this case we will be using vertical, and the reverse layout basically when it is set to true the layout starts from the end to start it will be listed in the opposite of order in which it is given.

In our case we want the reverse layout to be false and the young orientation to be vertical. So, we are going to use the single constructor single argument constructor and we are simply to going to pass the context all right.

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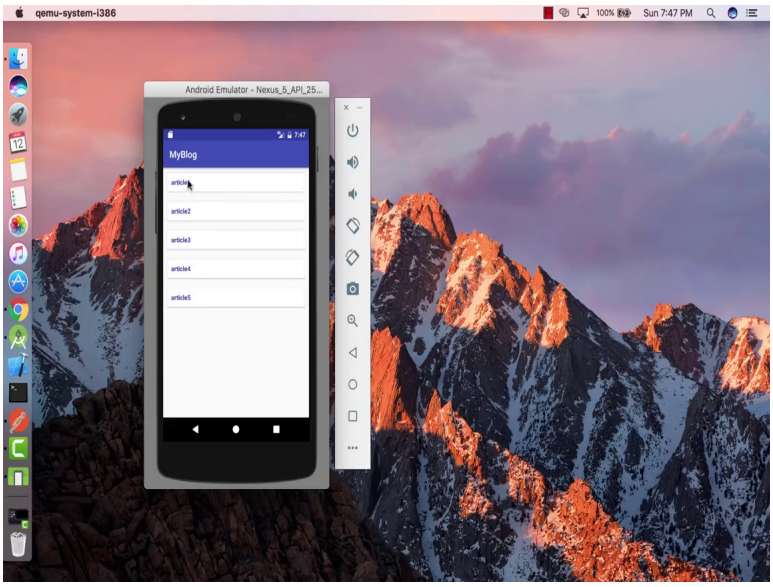

Now, let us run our app as you can see we have a list which stands from article one to article 5 which is shown inside a card and with the font and title that we have seen that.

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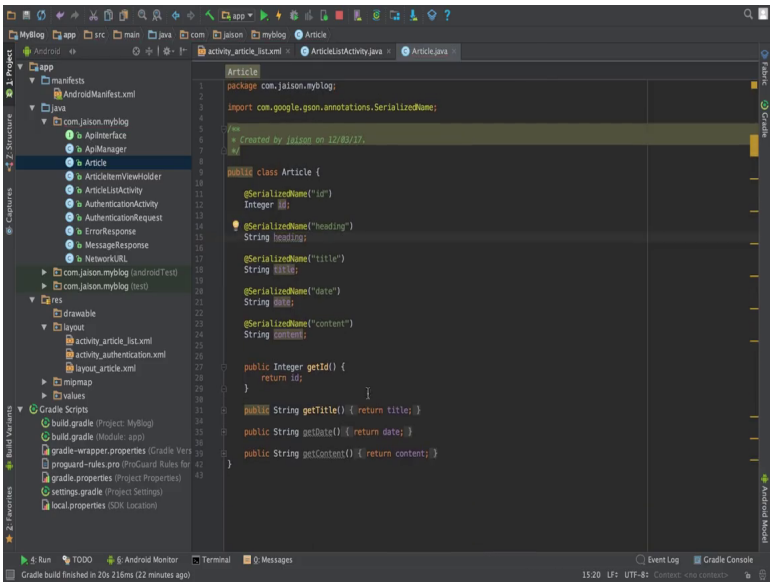

Let us now make use of the get article API call that we created for our web app, I have converted the response of the API call to an array of json objects of type article which we have id title heading date and content assets json keys, let us make a (Refer Time: 48:42) call it article I have already created one let us with get us for each of the value, and now let us go ahead of API interface and create this API call.

This is a get request also let us add this to our network q r let us call it get underscore articles among here get articles, the call would return the list of article and let us call it get articles. There is no body to be sent or let us say now that we have created a API call let us make using that nr article list activity, let us say API manager get API interface dot get articles dot enqueue new call back. There are two things that we can do now we get either keep the reference of the adaptor that we have set for the inceptor view and update it is value inside the adaptor and refresh the adaptor or simply set the adaptor after the responses come back.

A good way to do this is to hold a reference to the adaptor and reset the value of the adaptor. So, let us do that. So, call article list adaptor to list adaptor let us create a new one and let us toss that here let us then create another method in which article list adaptor called set data, which can be a list of article, let us delete this and let us do article list and let us do this recruit the data and yeah size and let us do a dot get position and let show get title. So, again start something on your article, I think there is a heading to be shown

as well let us add that and let us add that (Refer Time: 51:42) this as well and let us show the heading here instead of the title all right. So, I think that is done, now here let us show a progress indicator and hide them here all right.

So, now that we have the response as always you have to check if the response is successful if it is successful.

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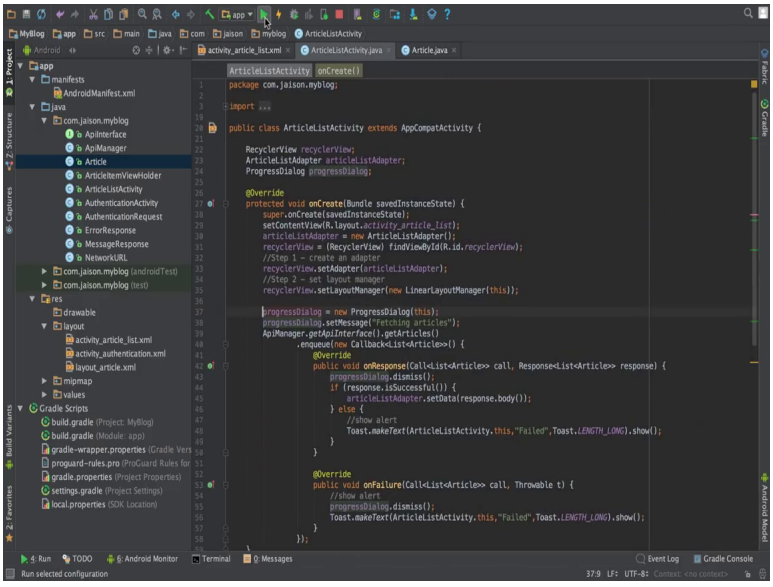

Let us set the data to be response dot body and in case it is not let us show alert let us show an alert. To be quick I am just going to add a toast here let us just add the progress indicator as well before we run the app (Refer Time: 52:51) dialog progress dialog and progress dialog dot set message please wait or let us call it fetching articles and dismiss or let us instead make it a (Refer Time: 53:17) variable all right.

So, that is done, now let us run the app and see now again oh we forgot to show the progress dialog and so, we forgot two things here one thing is to show the progress dialog which would be after we set the data we need to call an another method called notify data set changed, to notify the adaptor and reload the recycler view let runs the app again.

Let us sign in. So, now, we have articles 2 1 shown the order is such because this is the order in which we receive the data from our API call next thing that we have to do is handle the click on these cards, and also show ripple effect on the click. So, for that let us

head over to our layout underscore article first let us click the card view and id let us call it card view and then for the ripple effect let us say android foreground and let us call the selectable item background that is a one thing to be noted here is that the dimensions and the string that we are using here have to be replaced by this thing resources ok.

And now let us access that in our view holder, now that is done get back to on bind view holder method holder dot card view dot set let us say the to this and then simply show a toast and the card view is clicked, let us show this all right. So, let us runs our app and see this in action. One thing that you can do to avoid sign in each time is to go back to your authentication activity and simply call the navigate to article this activity over in your own create method since our get article is not an independent log in let us now see how (Refer Time: 55:58) function works all right.

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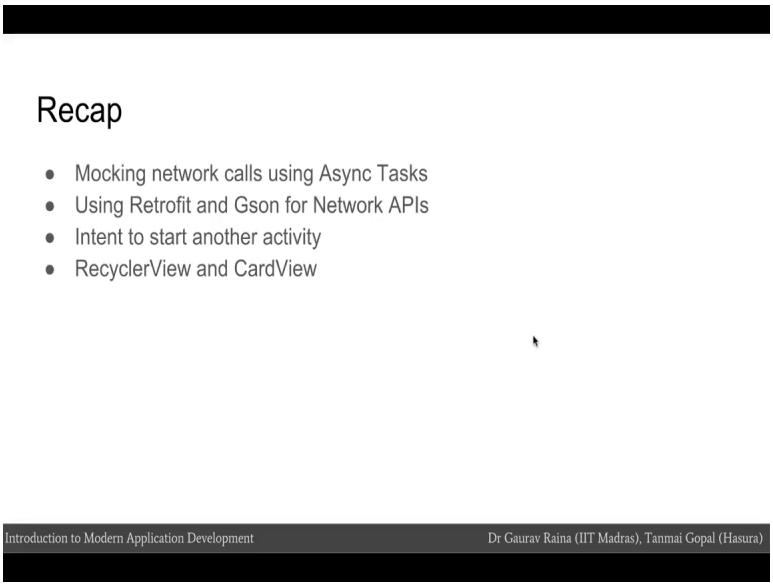

As you can see the toast gives the article name and the ripple effect it is also shown, in this module we learnt how to mock network API calls using Async tasks, we used retrofit and Gson for making an network API calls we also.

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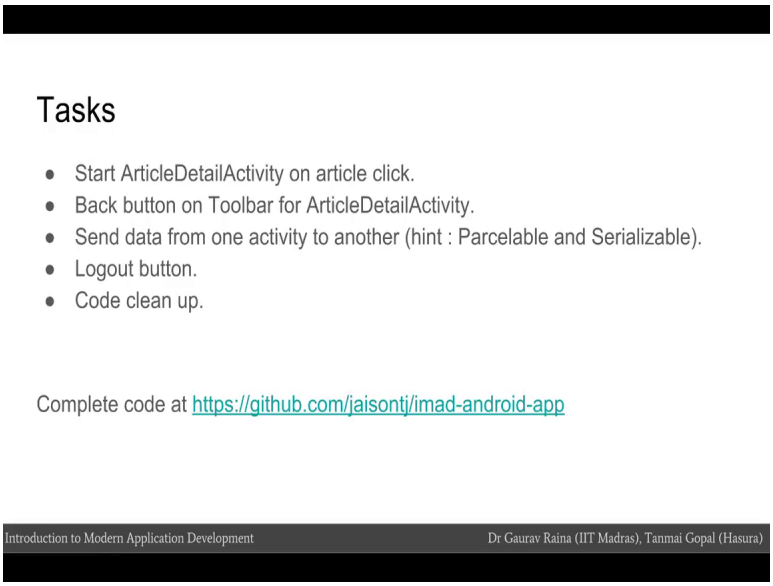

Now, know how to start another activity using intent and finally, we used the recycler view and card view in our app. Here there is a task assigned to you. Firstly, you need to create a new activity called article detailed activity and show the detailed view of the article being clicked by the user, this activity also needs to have a back button on it is tools bar on clicking which the user should be taken back to the article list activity, since we are making API call to fetch the detail in the article list activity, we need to figure out the way to send the information of the selected article to the article detailed activity, and finally, implement a logout button in the article list activity on it is toolbar. Also do some code clean up so that the repetitive code is avoided and everything is modularized the complete code to this app is edges repository which is provided in the slides.

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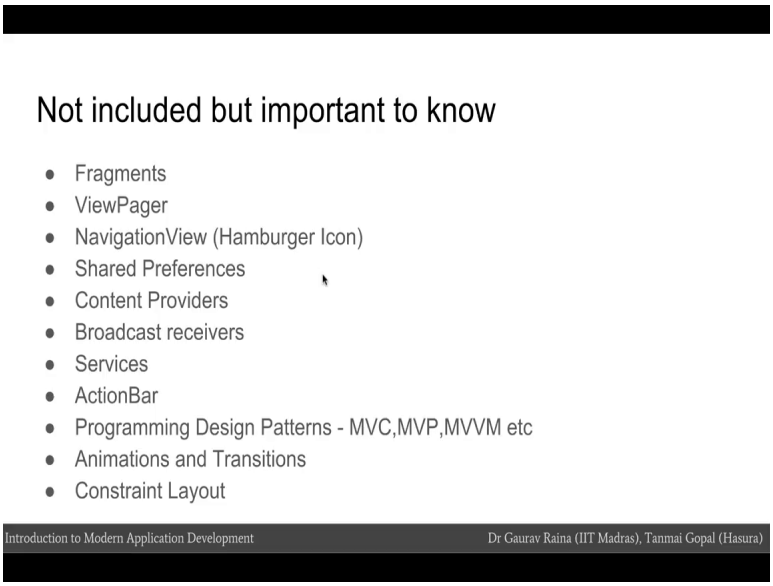

Some of the things that we have not included in this module, but are important for android application developers are fragments view pagers the navigation view which is the hamburger icon that comes on left hand side top corner. Shared preferences which should be used to persist minimal data about the user offline content providers broadcast receivers services action bar programming design patterns like MVC, MVP, MVVM etcetera animations and transitions and constraint layout.

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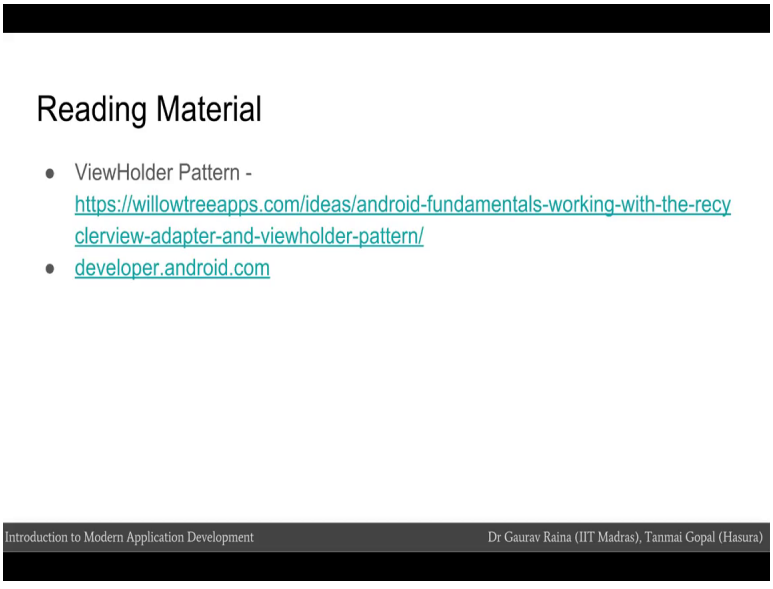

For those for you interested in understanding the recycler view and the holder pattern a little better here is a link to it, apart from that developer android dot com should give you the view information about everything.

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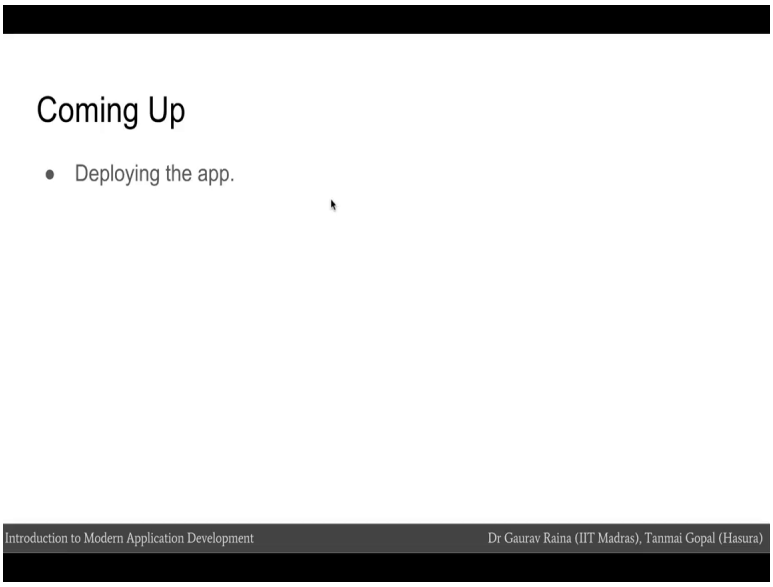

That you need to know to develop a very good android application in the next we will we will finally, deploy this blog app to the Google play store.