Introduction to Human Computer Interaction
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Lecture – 17
Lab Session: Material Design

[noise].

Hello everyone today, we will be learning about material design which is a design language developed by Google back in 2014. [noise]

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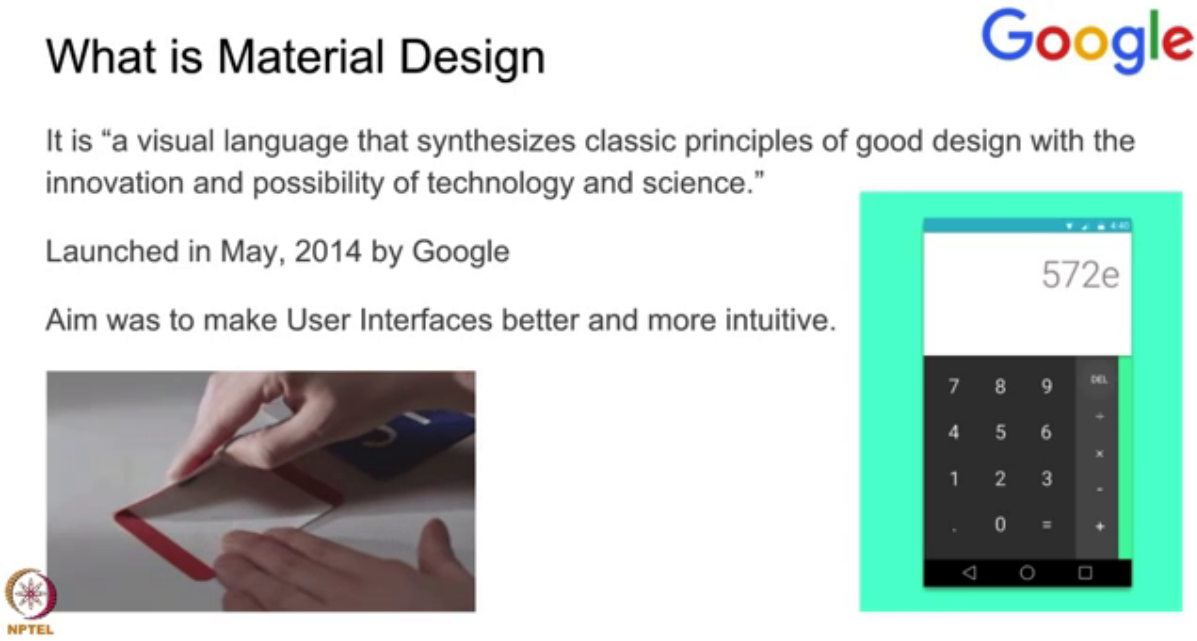

According to Google's sufficient introduction to material design the goal that they had in mind for the concept was to create a visual language that synthesizes classic principles of good design with the innovation and possibility of technology and solution.

The idea was to create a single unified system [noise] that could work across multiple platforms [noise]. Material design uses crate based layouts responsive animations and transitions padding and depth effects such as lighting and shadows [noise] it was inspired by real life materials like paper ink and cardboard.

Unlike real paper a digital material can expand and reform intelligently [noise]. Material has physical surfaces and edges. Seams and shadows provide more meaning which you can touch.

The basic aim was to make user interfaces better and more intuitive make the components seem like those in real life by adding shadows, height, depth, and edges, They wanted the design to be responsive avoid unnatural by paying attention to detail these are 2 examples on the screen which follow material design like any common app on your android phone all the icons for any app like g mail or the calendar app [noise].

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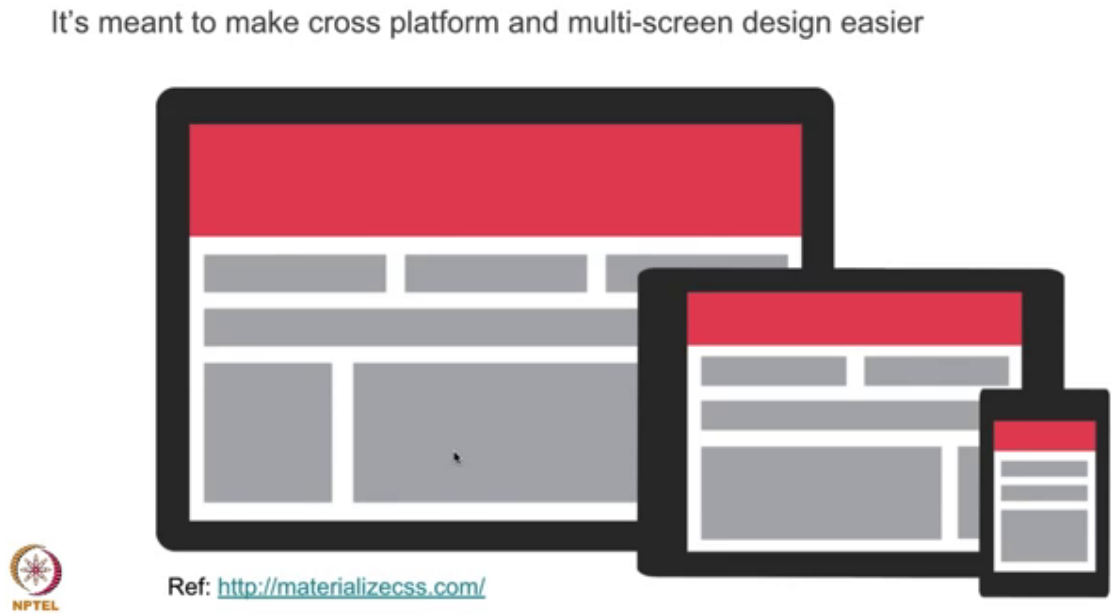

Material design is meant to make cross platform and multi screen design easier. So, that users feel like home, but the design of the system no matter which device they use it on. For example, I should be able to locate the features and functionalities of g mail no matter which device I am using it from [noise] be it my I pad, my phone or my laptop [noise].

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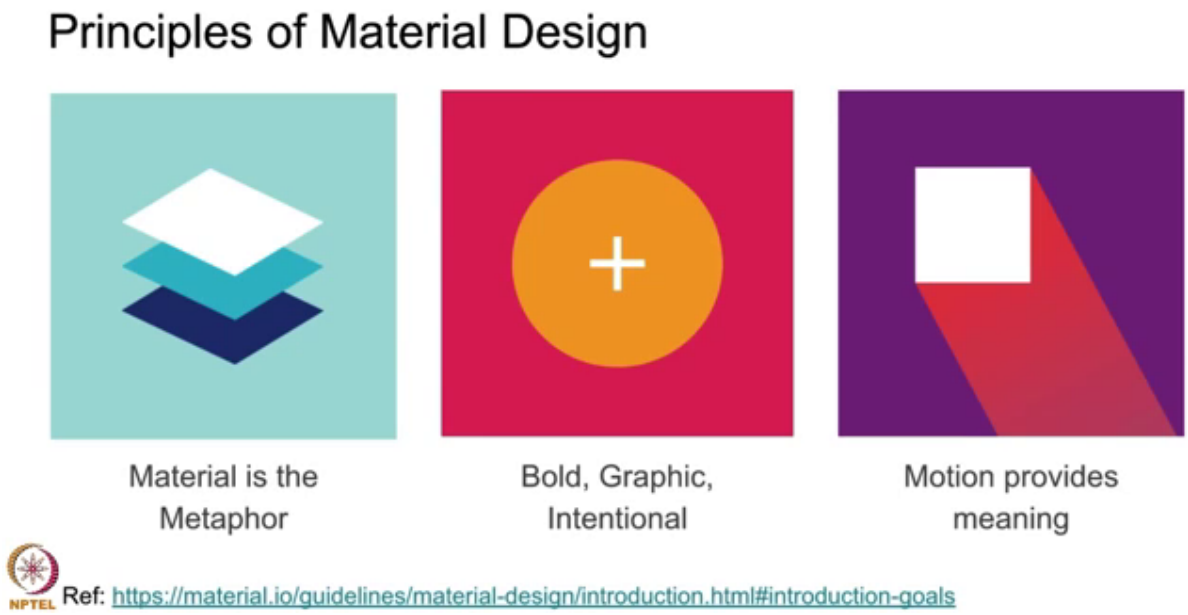

Now, we will talk about the basic principles of material design. [noise]

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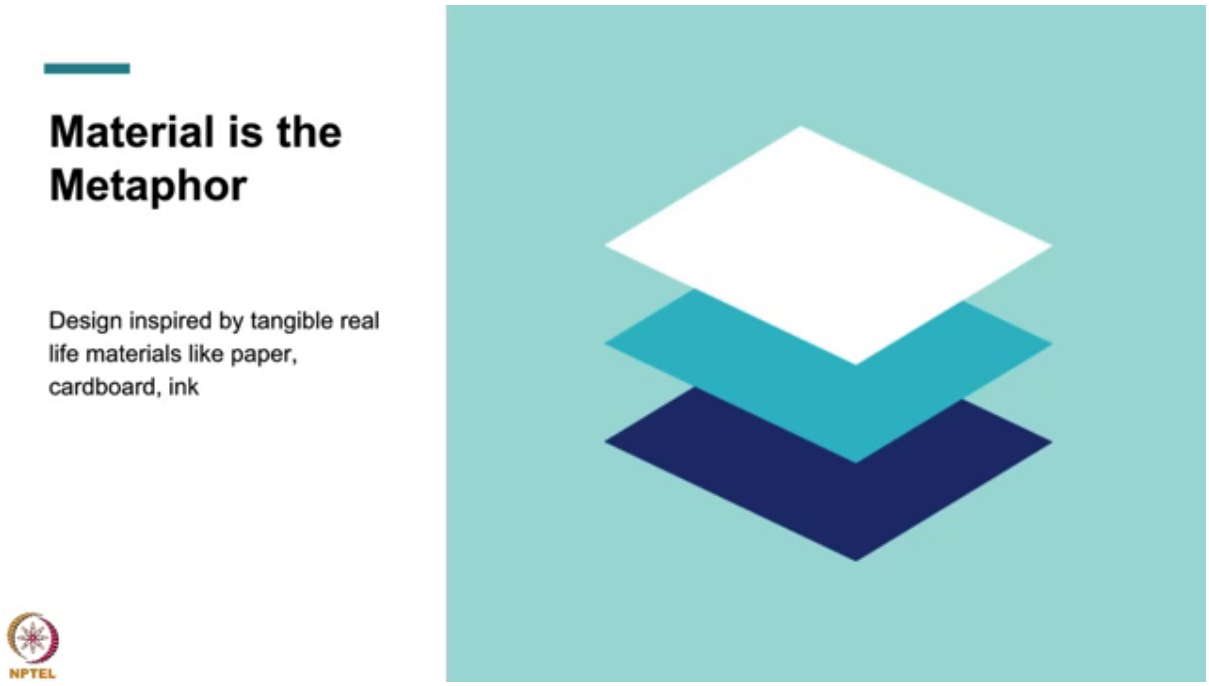

The first one is material time [vocalized-noise] material is the metaphor [noise] the goal is to make the design inspired by tangible real life materials like paper cardboard or ink. Tangible is something that we can touch and interact with the feeling on the screen should be such that it should feel as if you are interacting with real life elements.

The surfaces and edges are designed in such a way that it makes us feel close to reality [noise] light, surface and movements pay a key role in defining this [noise] realistic lighting shows seems to write spaces and indicates moving parts making it seem lifelike [noise]. The next one is bold graphic and intentional design.

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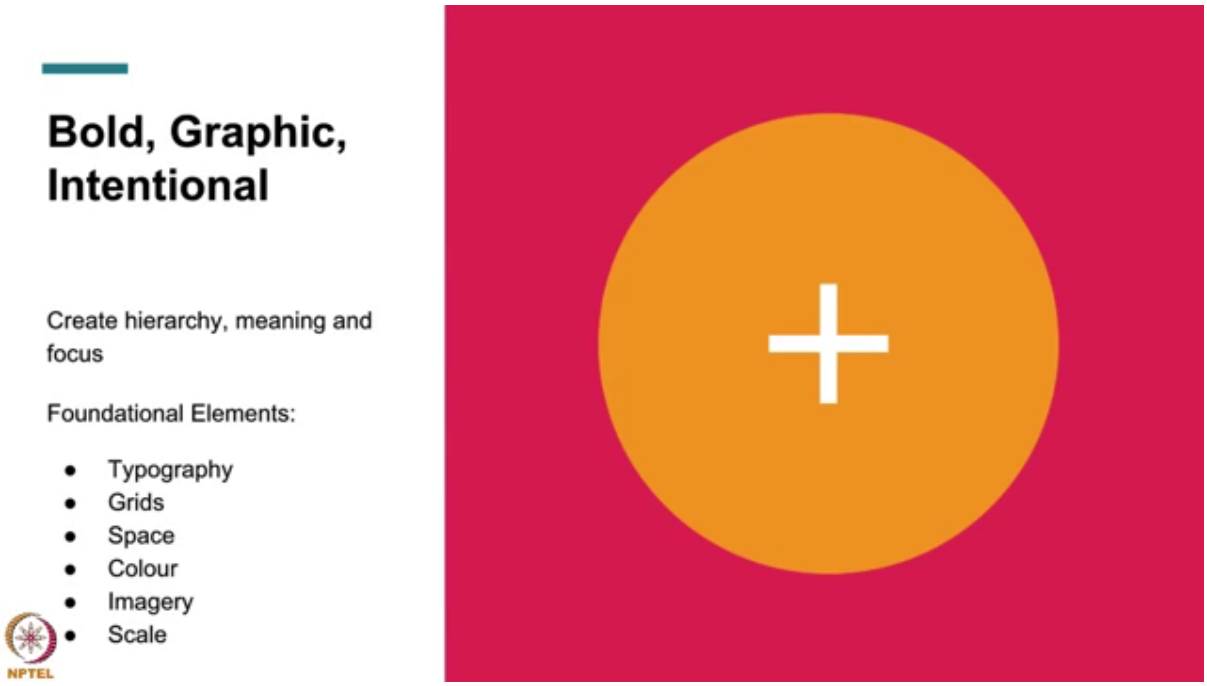

Bold design creates hierarchy meaning and focused [noise]. Decisions ranging from choosing the right colours to images spanning from edge to edge, large scale typography and leaving white spaces intentionally, help in achieving the goals of [noise] material design [noise].

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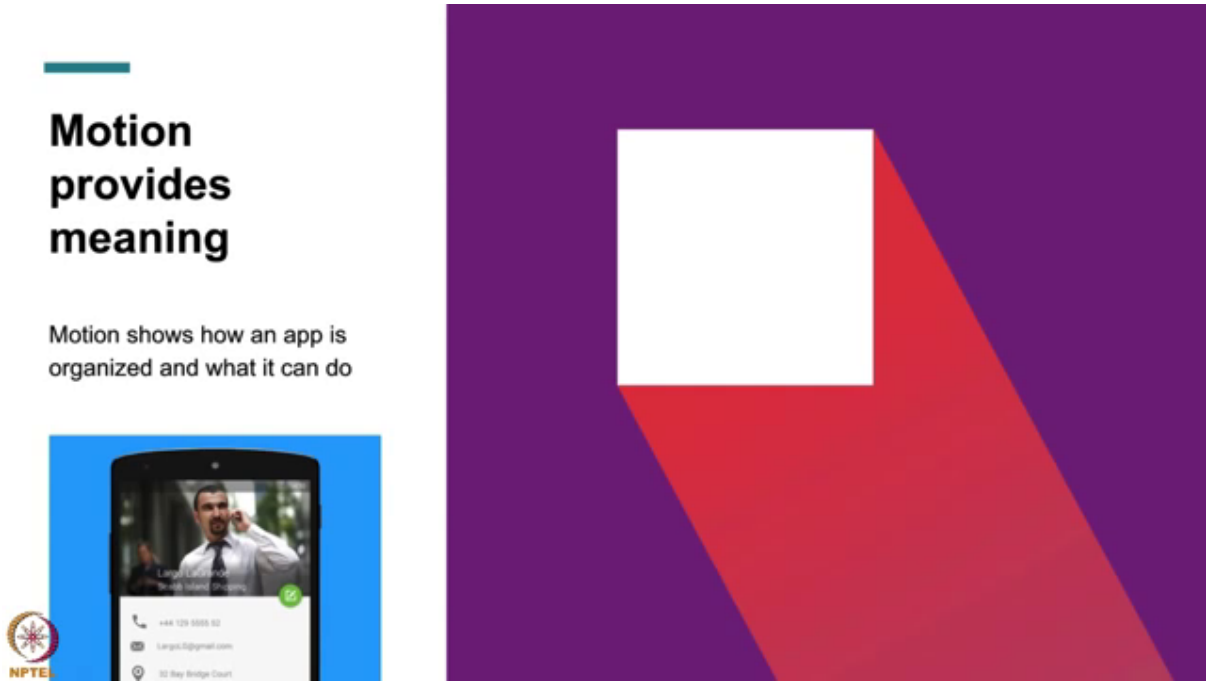

The next principle is motion provides meaning; Motion in the world of material design is used to describe spatial relationships, functionality and intention but beauty and fluidity [noise]. But why is motion important? Motion shows how an app is organized and what all it can do? Motion provides meaning and gives continuity for eyes to navigate in the direction in which the designer wants it to. [noise]

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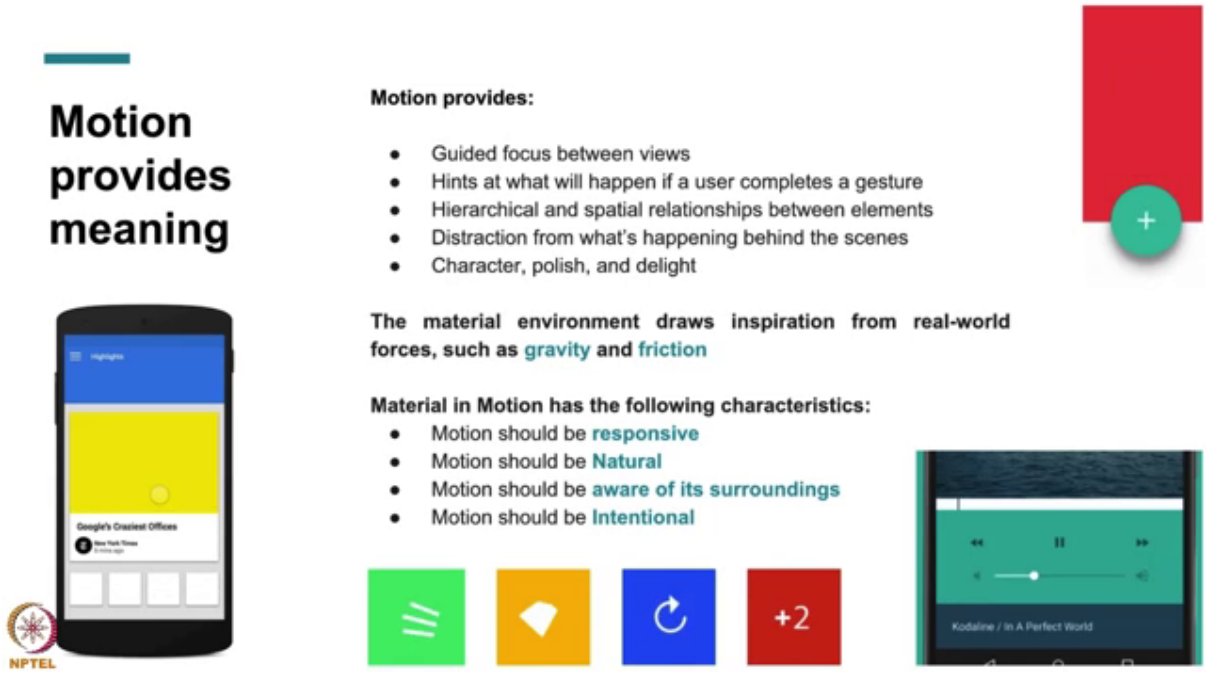

So, ah these are some of the components that motions prevent the first one is motion guides focus between views. So, it tells you where the focus lies in which view. So, whenever a motion is occurring in any interface your eyes tend to go in that direction and hence the focus has shifted to wherever the designer wants. [noise]

The next one is motion hints at what will happen if a user completes a gesture, this should be intuitive enough seeing the motion which is taking place [noise]. Motion provides hierarchical and spatial relationships between elements. So, it makes visible as to which elements are of more importance in the screen and which play a more crucial role than others.

Motion provides distraction from what is happening behind the scenes like so whenever any back end activity is being performed there might be some time lag while the processing takes place to distract the users from this time that motions and animations are needed. So, they keep the user distracted while any ah back end activity is happening. [noise]

So, how does material move the material environment draws inspiration from real world forces like gravity and friction [noise]. These forces are reflected in the way a user input effects elements on the screen and how elements react to each other [noise]. So, a material in motion also has the following characteristics; the motion should be responsive it should be natural it should be aware of it is surroundings and it should be intentional [noise]. So, ah material is full of energy and the design should be quick enough to respond what to whatever is happening. [noise]

So, by what we mean is ah mean by a natural motion is [noise]? The laws of physics should not be violated the motion should be a natural like forces in the real world such as gravity and friction [noise]. So, ah what we mean by motion should be aware is material is aware of it is surroundings including user as well as other material components which are there on any screen around it. So, it ah it the other components should also show how the movement of this particular material is taking place and ah it should be in synchronization with other materials around it. [noise]

Motion should be intentional [noise], material in motion guides focus to the right spot at the right time, the user should be able to focus on the component that is intended by the designer. [noise]

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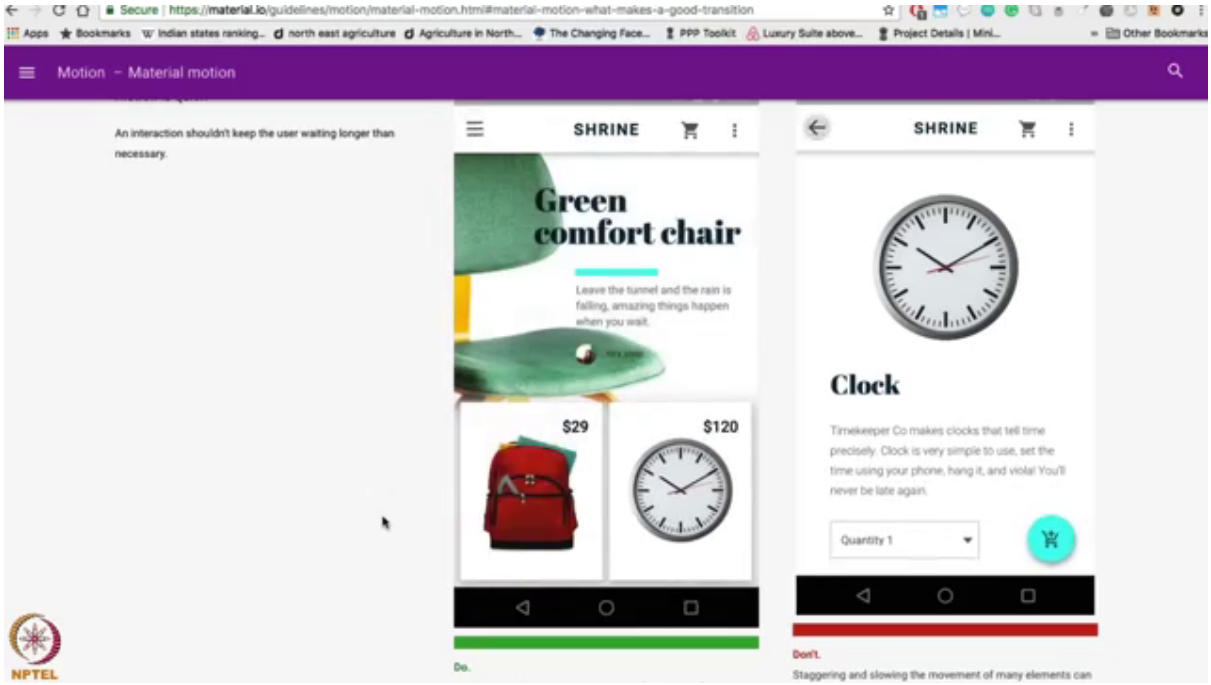

Now, we will move to the ah material design website which is hosted by Google and I would [vocalized-noise] run you [noise] through some examples of good motion and bad motion. So, this is one example of a good motion which is portrayed by Google and this is a bad example. [noise]

So, observe carefully what is the difference between the two examples? So, in the second example as you can see there is some time lag as a lot of ah activities are happening simultaneously [noise] so, that should be avoided. [noise]

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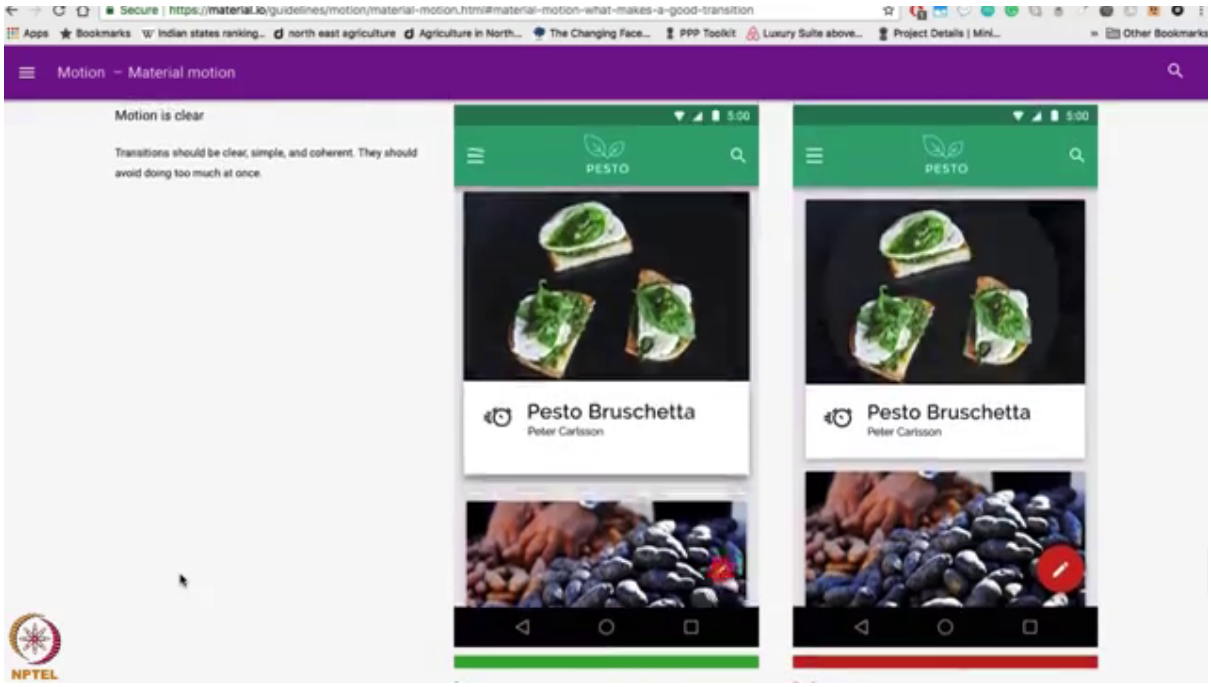

The second feature of a good motion is that the motion should be clear. [noise]

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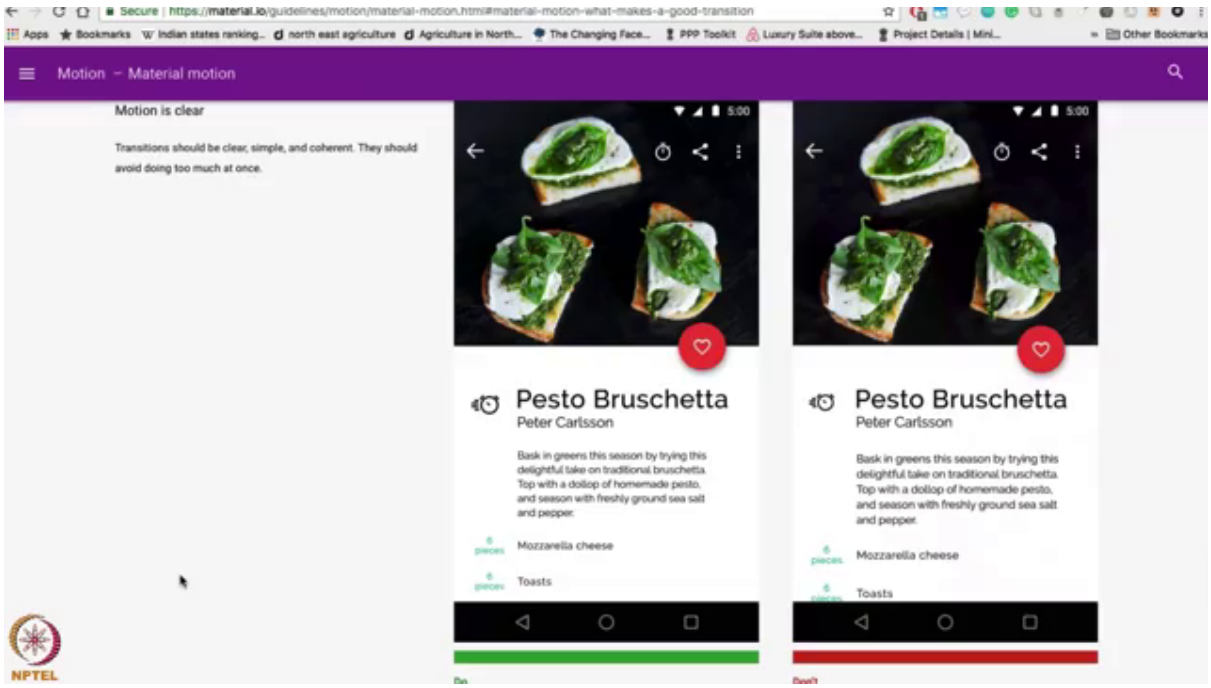

So, carefully observe the 2 interactions which are taking place [noise]. So, the first one is a good practice while the one on the right hand is not a good practice [noise] as multiple elements are moving in different directions and they are confusing the user what is going

in what direction and they are crossing each others paths [noise]. So, such motions should generally be avoided. [noise]

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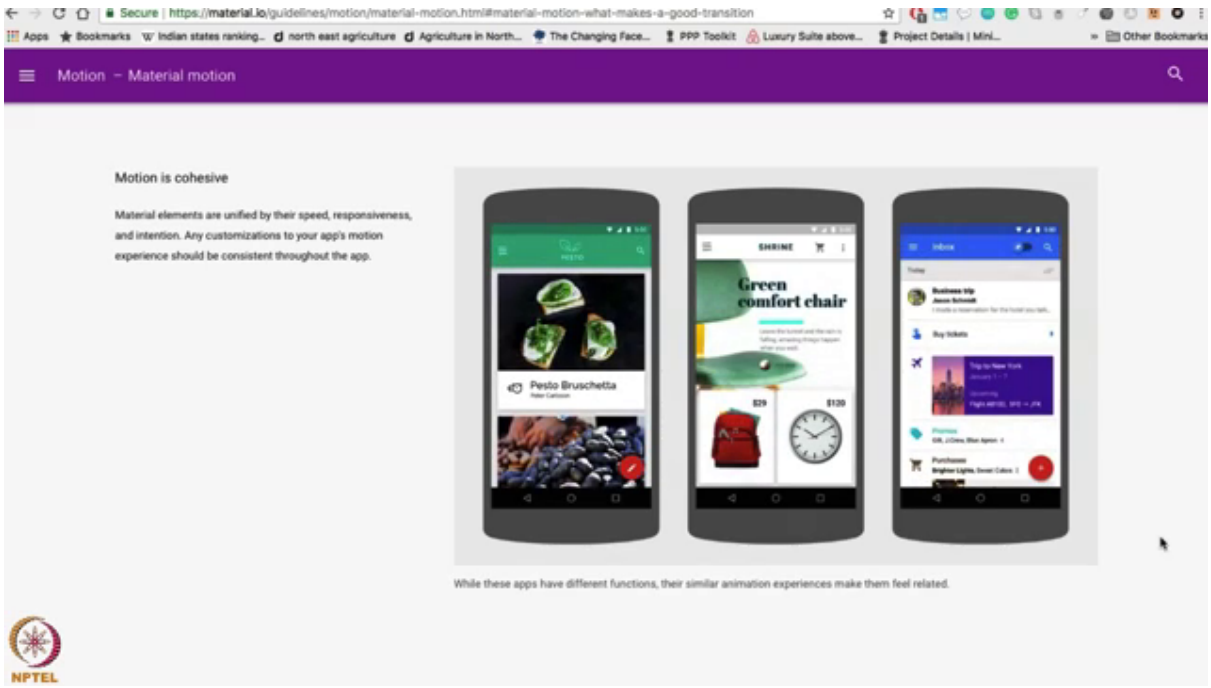

And the next one is motion should be cohesive [noise] it means that if there are multiple components on the screen they should move in synchronization with each other. [noise] So, that they feel relative. [noise] So, these are some examples of good motions. [noise]

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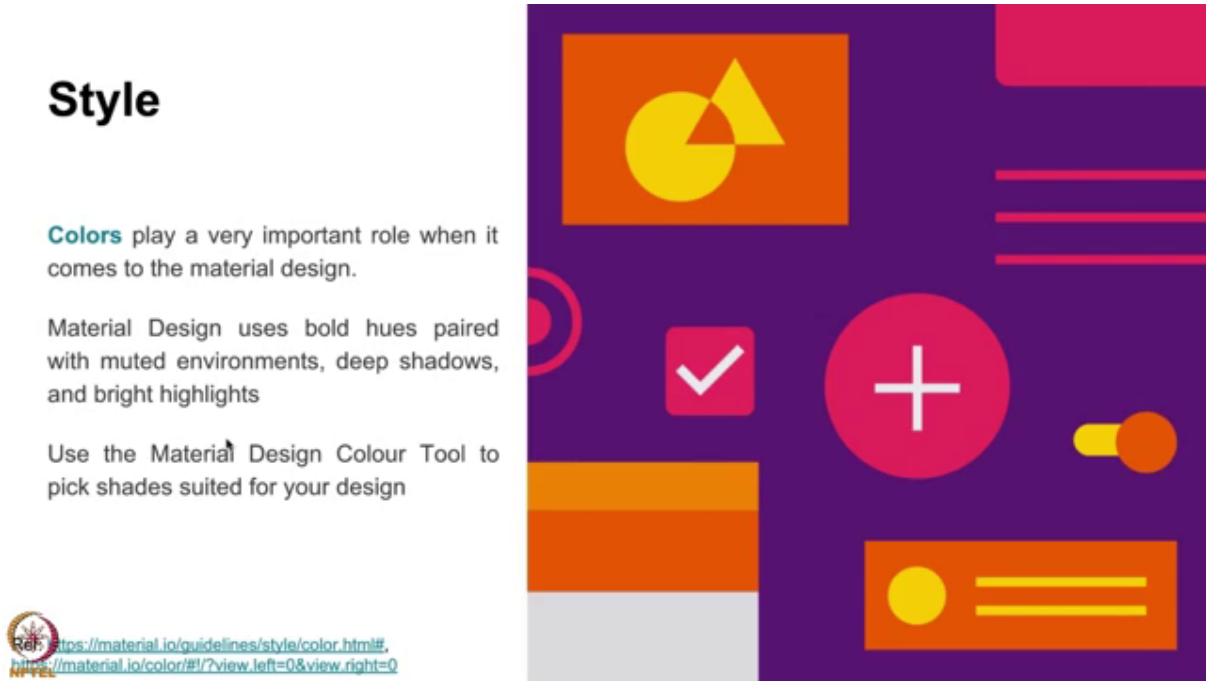

So, ah next we have the style guidelines of material design color is the first one. [noise] So, color and material design is inspired by bold shades paired with muted environments deep shadows and bright highlights. [noise]

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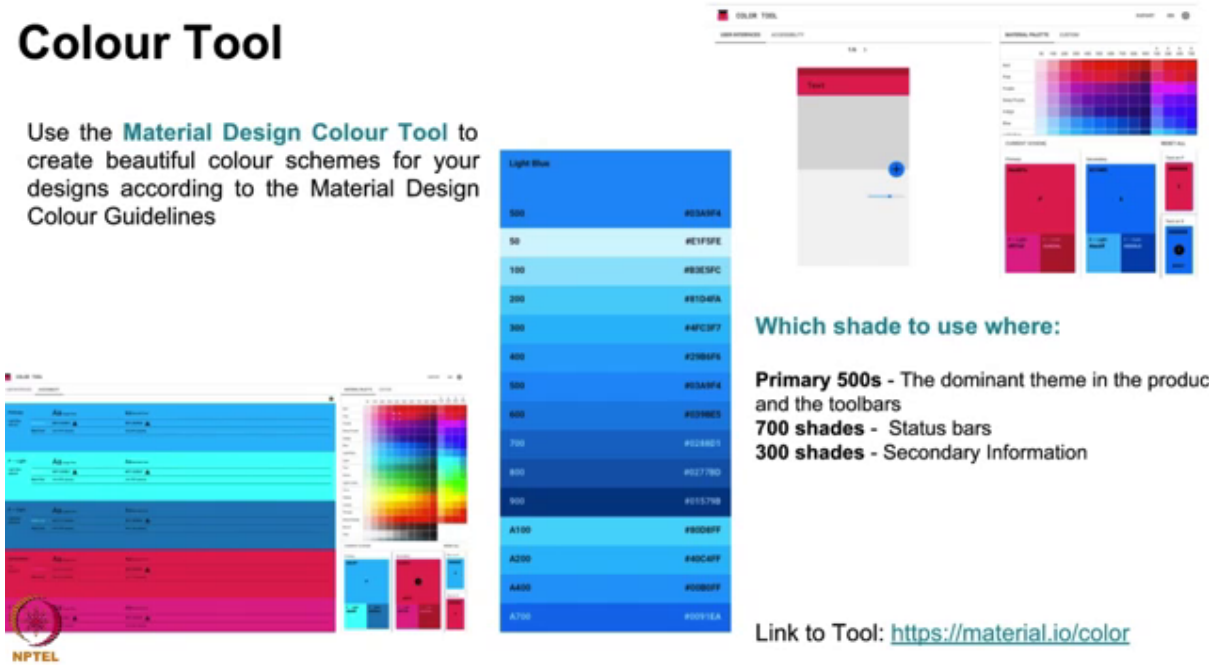

So, ah here are ah so now I would tell you how to use the material design color tool [noise]. So, you can simply go to the link which is given here on the slide.

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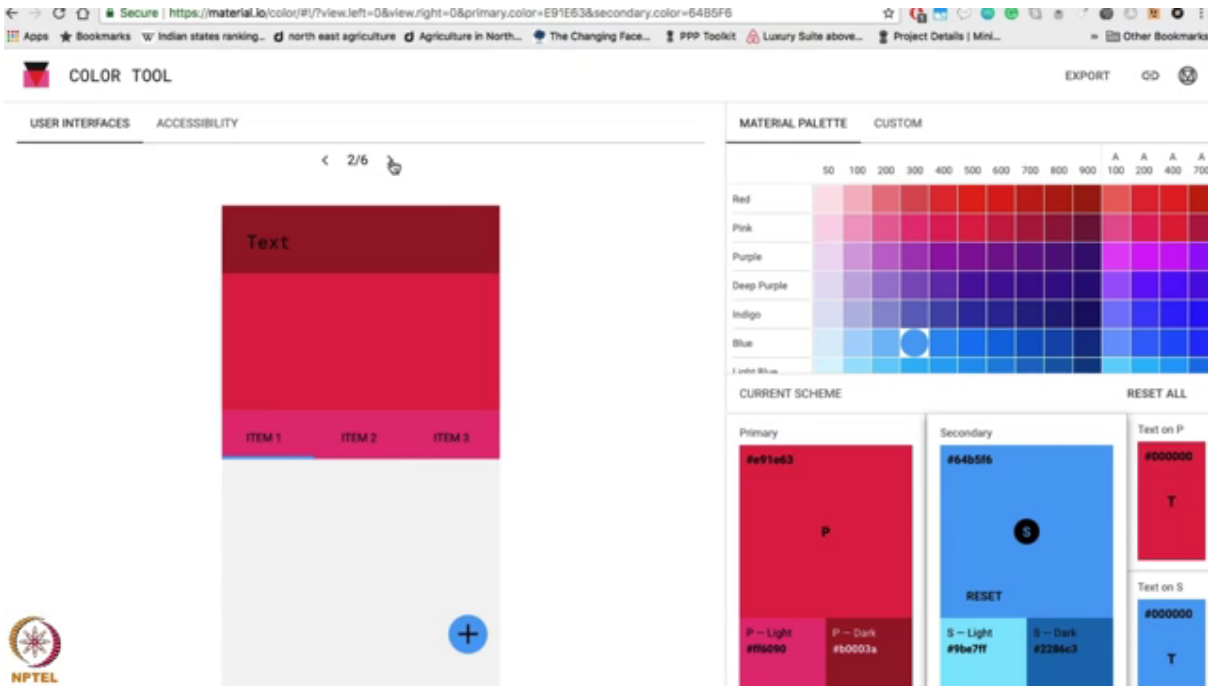

Once you go to the link [noise] you would be shown an example interface for which you could choose [vocalized-noise] you could make your color scheme [noise]. So, you can navigate across different elements as well [noise] ok. So, this is the basic the first entries point of any interface which is there. So, first it asks me to pick the primary color so usually you choose 500 as the primary color so this is what I take [noise]. Next step I go to the secondary option and choose a secondary color for my screen [noise]. So, here I am done [noise] once.

So, now you could also see how this ah how the selection of your colors would show across different screens [noise]. So, here are some preset examples [noise].

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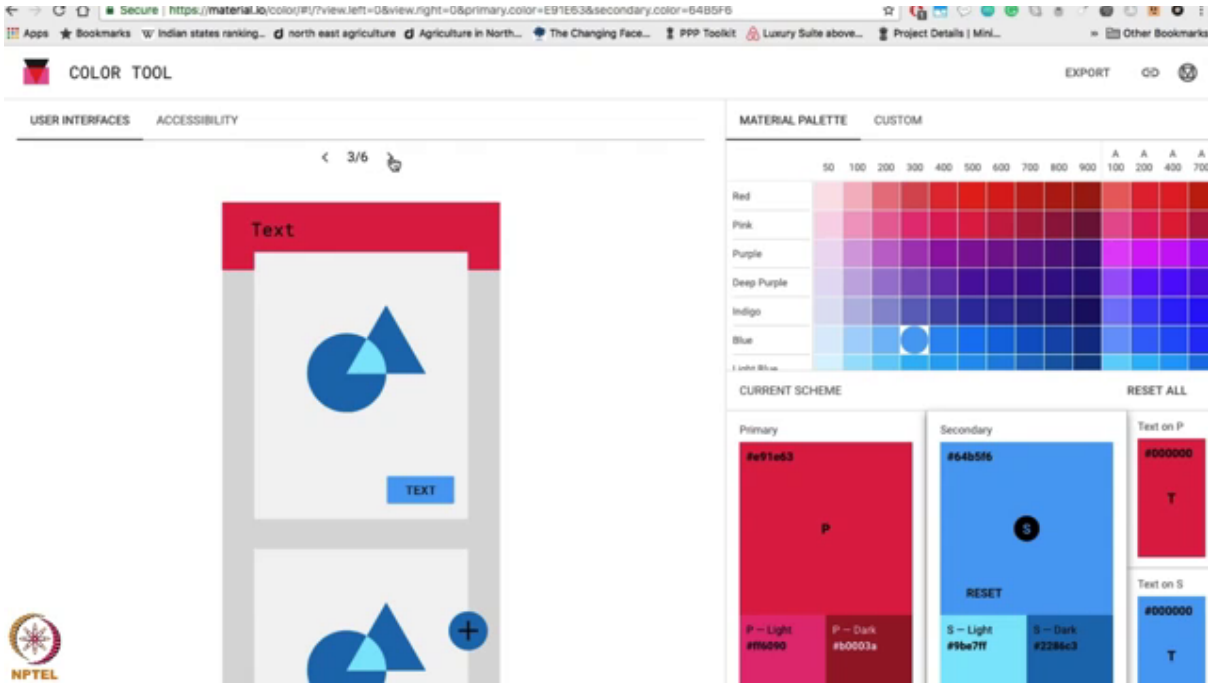

And you could see how your color scheme would look once your app uses it [noise] and how different components would show it [noise].

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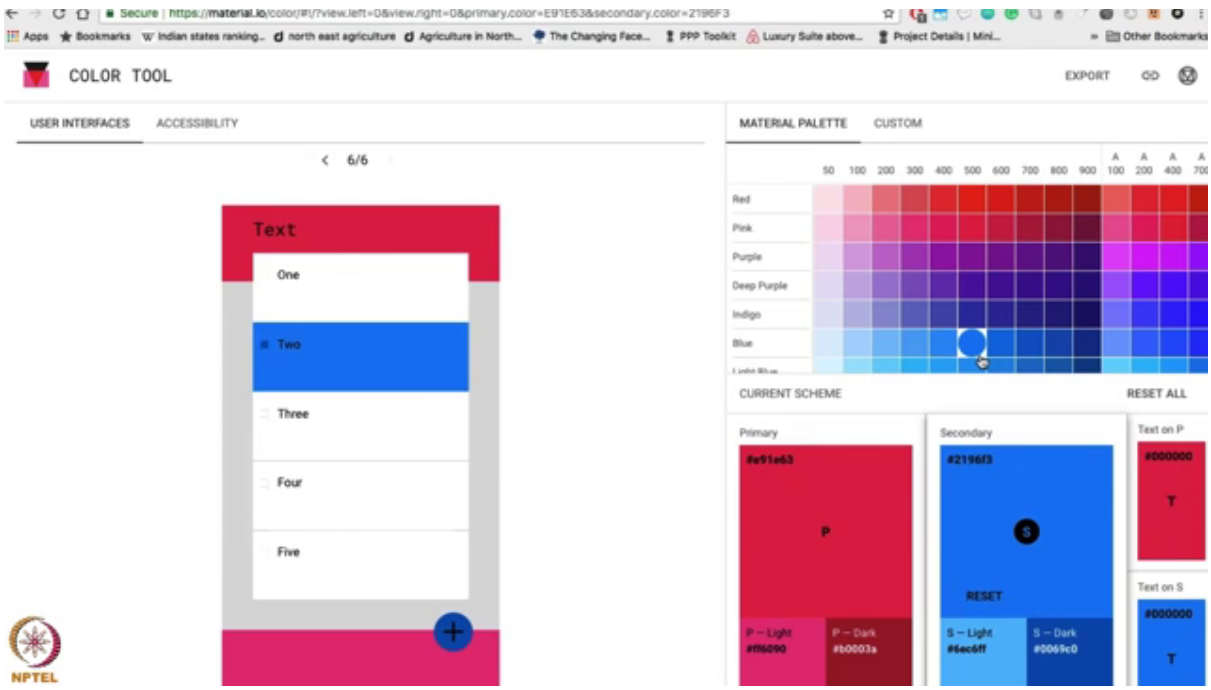

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So, ah once you are satisfied with the color selection you are free to choose whatever you want [noise]. So, you could read more details about it whether the colors are legible or not. So, it shows you the accessibility options. [noise]

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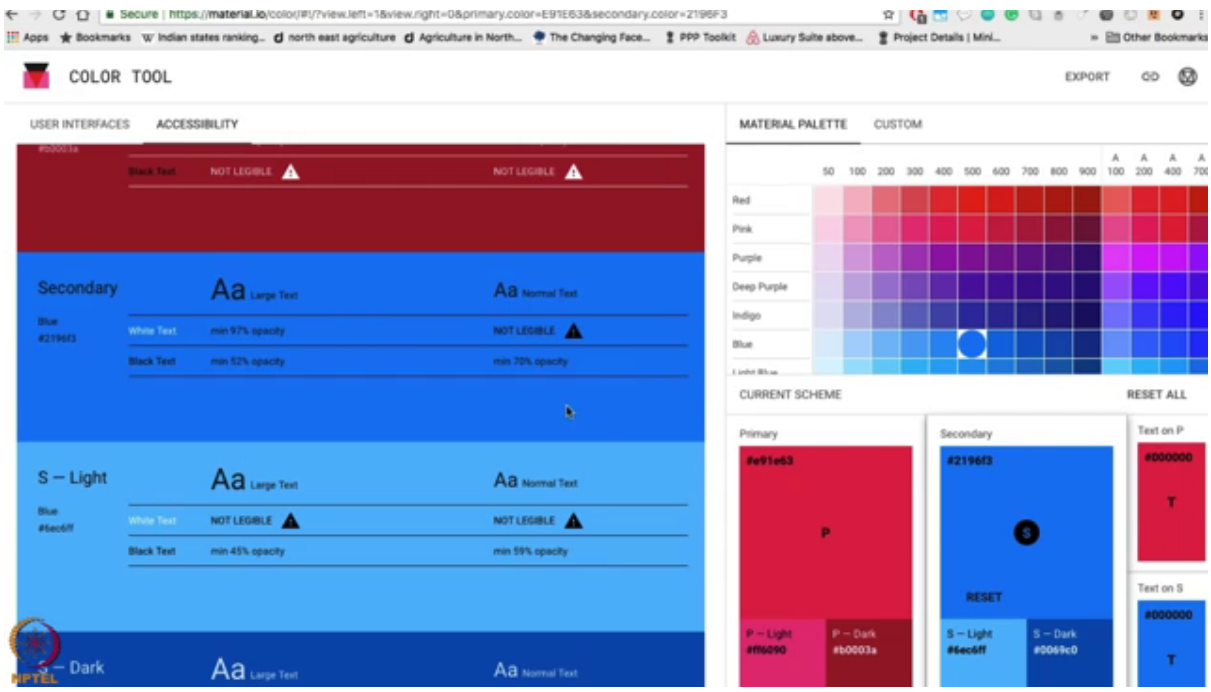

So, once you are satisfied with the color scheme of your app or what you can do is you can go to the export option and say if I am developing for android click on this. So, the colors with xml ah file would be downloaded and those can directly be imported into android studio [noise] and that color scheme would be used for your app. [noise]

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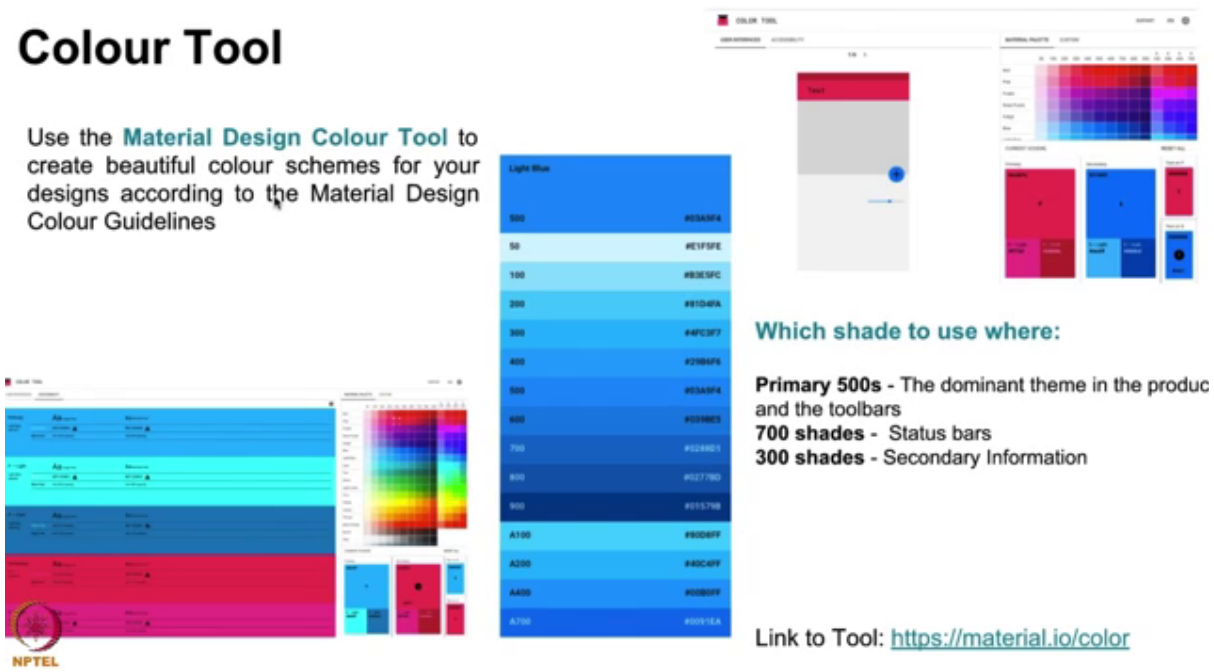

So, this is how you can use [noise] a color tool for material design these are different shades and different guidelines that you have. So, usually the 500 series shades are used as a primary colors and for the toolbars [noise]. Then the colors with the 700 series [noise] they are used in the status bars and usually the ah usually the 300 [noise] series is used for the secondary information. [noise]

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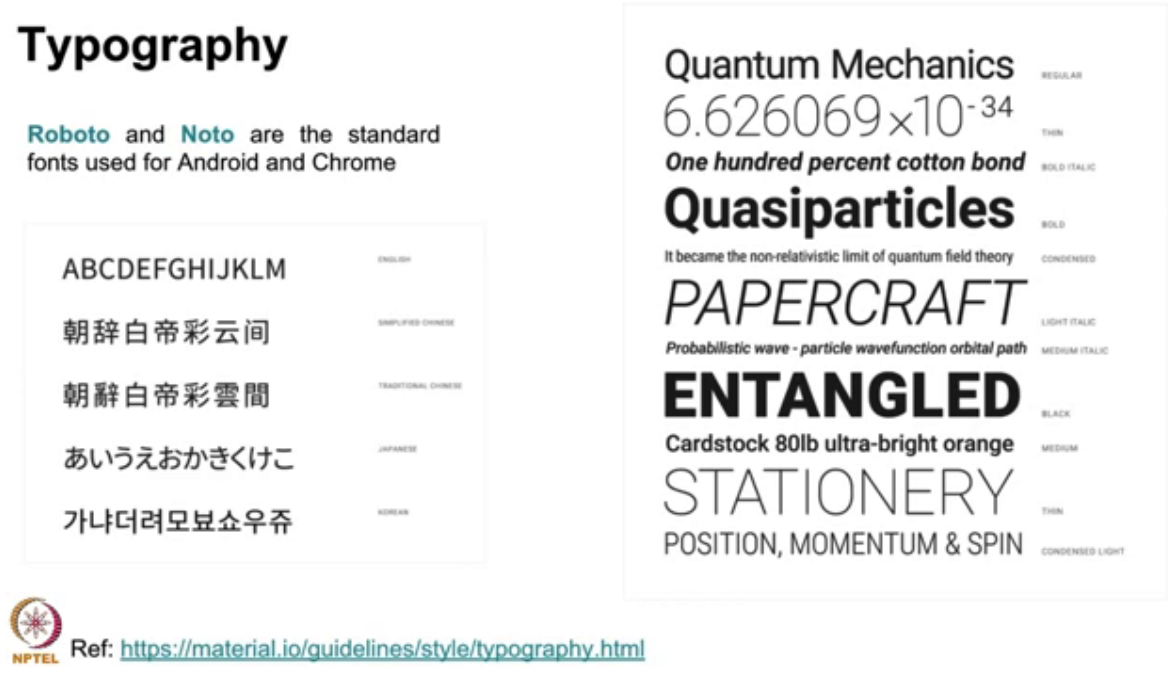

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So, ah next step we have typography [noise]. So, basically Roboto and Noto are the 2 standard fonts which are used for Android and Chrome [noise] you can drink more about these fonts on the link given below. [noise]

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So, next step come icons [noise] each and every icon in the material design library has been crafted very ah has been crafted carefully. So, each and every icon has gone through a very rigorous cycle of designing before which I would [vocalized-noise] with the before it is actually given out for usage. [noise]

So, a product icon design was inspired by the tactile and physical quality of material. Each icon is cut folded and let as paper would be [noise], but represented by simple [vocalized-noise] ah graphic elements [noise] the quality of the material is sturdy with clean folds and crisp edges. [noise]

So, in this example you could see how the logo how the icon of g mail has evolved. We have they have actually taken paper and crafted it into the probable icon [noise] that it could be they have studied the lighting and shadows of it and then they came up with a final prototype. [noise]

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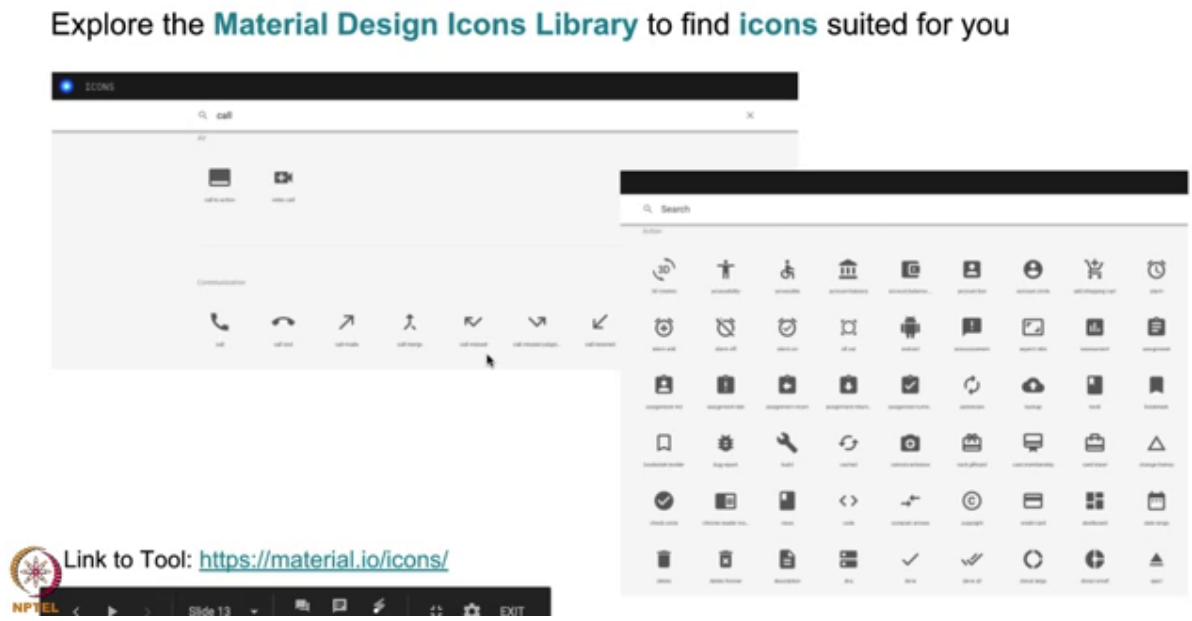

So, material design has a very good collection of icons that you could use. So, here is a link given for the icons [noise]. And it has a very good search functionality from that you could choose whatever icon you want [noise].

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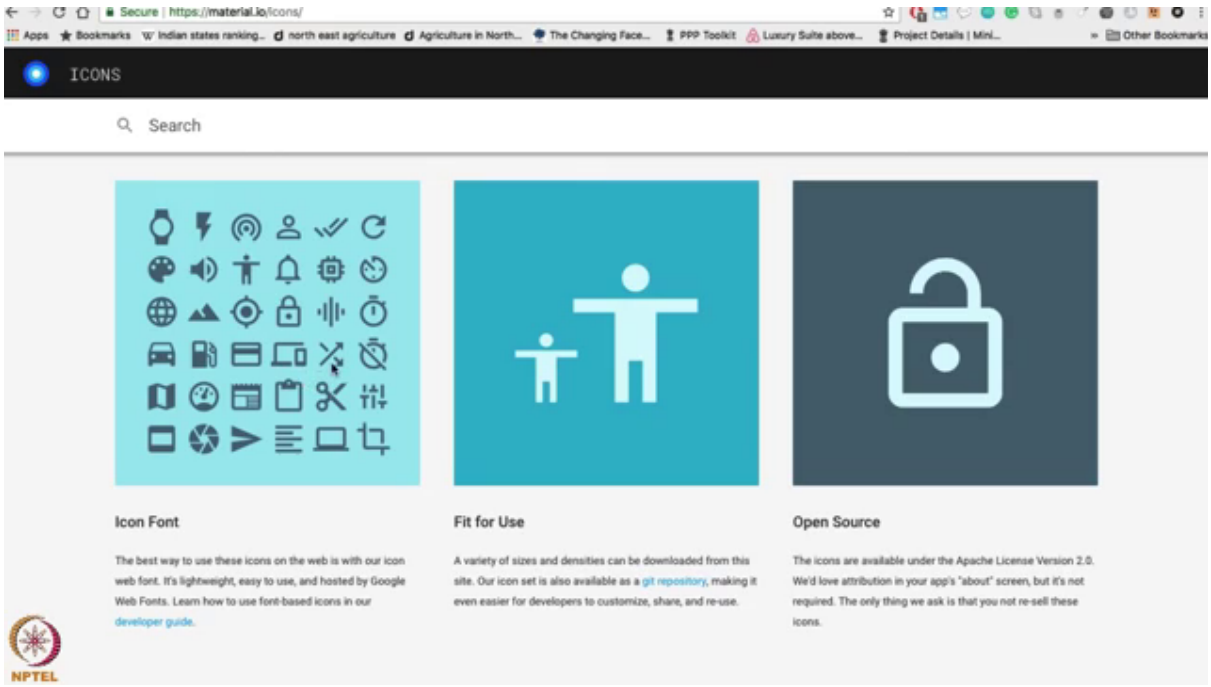

So, I will ah show you how to use and quick icons for your app [noise]. So, go to material dot Io slash icons [noise] and once you go here you would be able to see different icons which are available. [noise]

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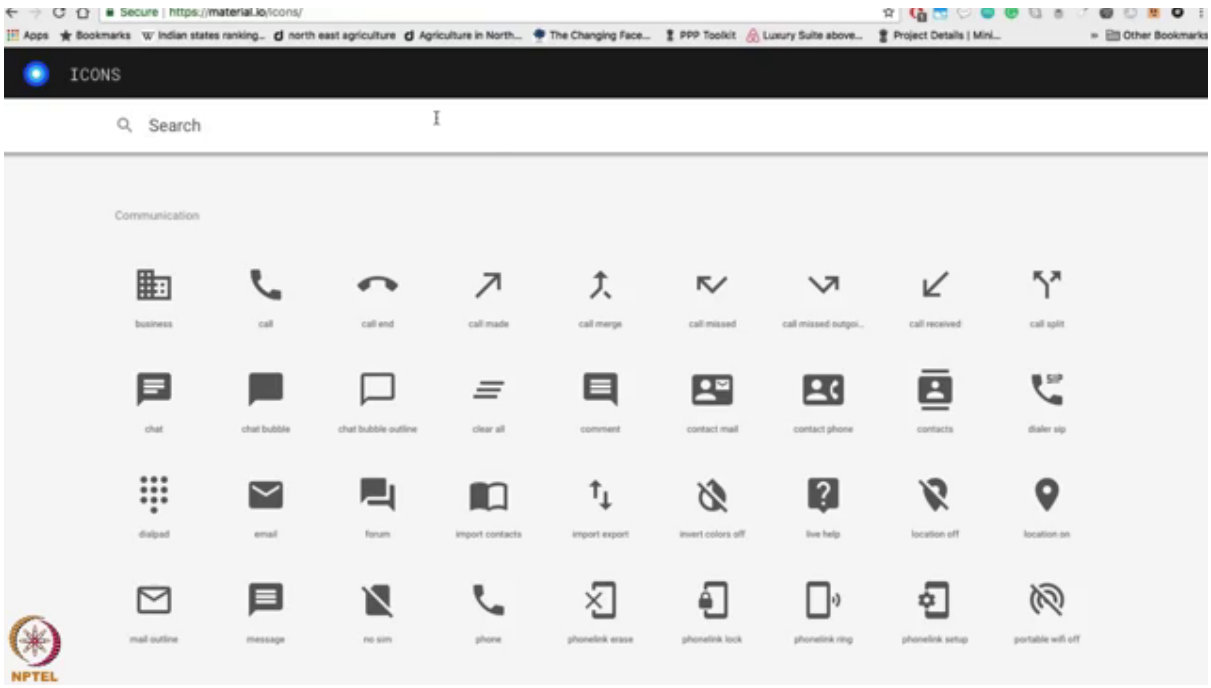

So, you have a wide variety of icons that you can use from different categories [noise]. So, say I am making a calling app.

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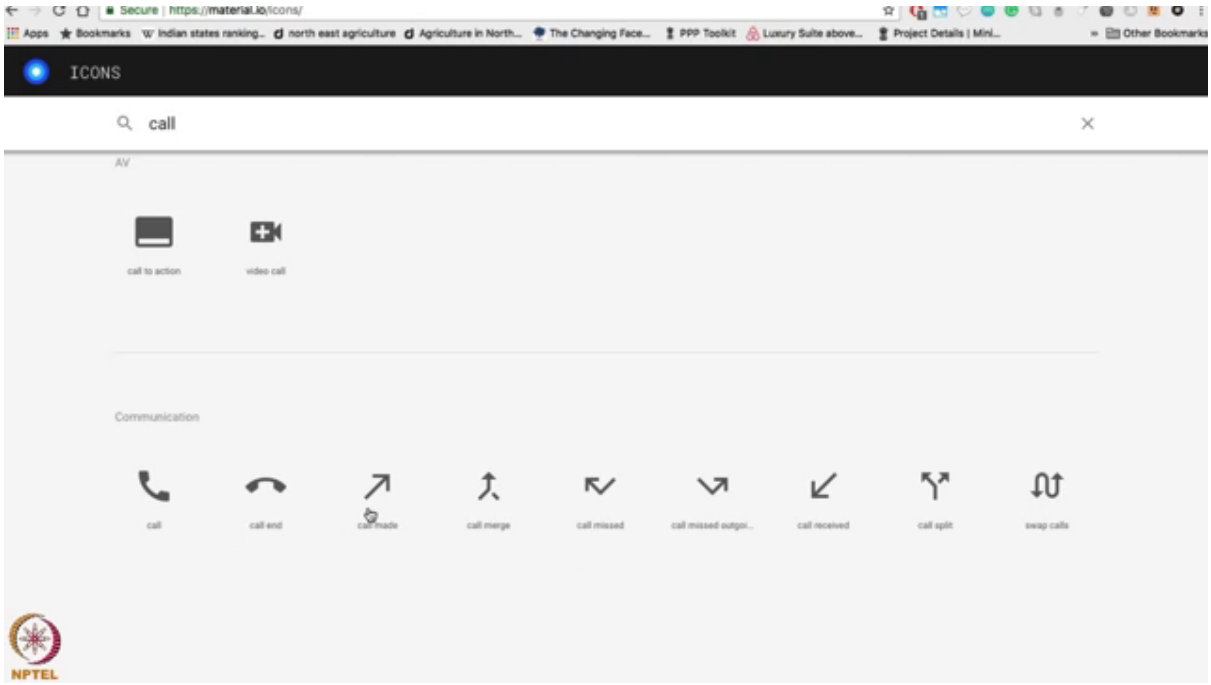

So, [noise] I will just search for icons which depict calls and I will be able to choose them and them [noise] and then I can simply download them in whatever format I want see I want to png [noise] and the [vocalized-noise] download would start.

You could even choose the color scheme whether you want it in white or black [noise] and you could choose the size of the icon from here [noise]. So, this is how you could download whatever icon you want [noise] and use it [noise] for your design. [noise] Hello [noise] now that we have seen [noise] the basics of material [noise] design [noise] and the basics of material design [noise] paradigm. [noise]

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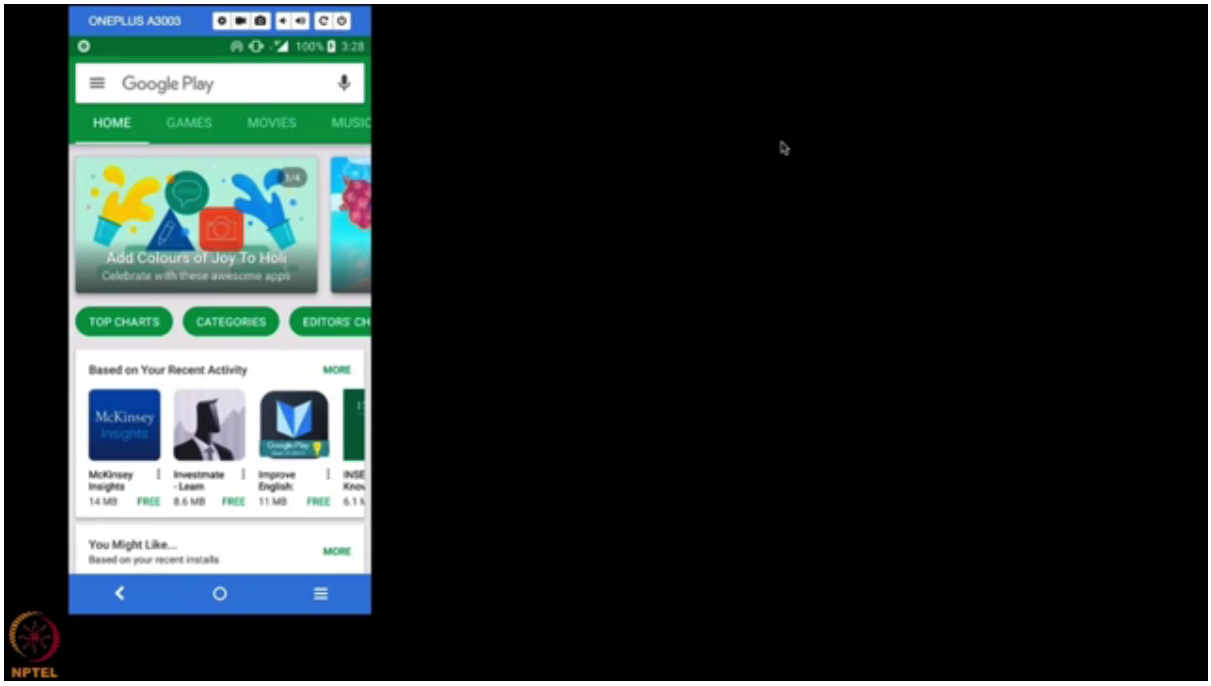

Let us just have a look at ah of the real world apps and see how developers use these paradigms [noise] and then corporate them in their apps [noise]. So, let us take the example of Google play store [noise] like you can see on the screen [noise]. So, I am sure almost every android user must have used this app at least once. [noise]

So, looking at this app if I look at the home screen [noise] of this [noise] I can see there is a lot of graphic content [noise], there is a lot of [noise] ah [noise] bold graphical content, [noise] ah you can see some shadow lines here on this curve which says [noise] had colors to joy [noise] [vocalized-noise] add colors of joy to holy you can see some [noise] shadowy [noise] ah [noise] outline to this box. [noise]

Ah now coming to the color scheme which ah Simran said is a very important part of material design [noise] you can see that [noise]. First it is consistent throughout the [noise] app you can see green ah [vocalized-noise] on the topmost tab [noise] you can see green here for every icon green for text. [noise]

So, one thing we see is consistency second thing [noise] as far as using ah [noise] using the shades of colors is concerned [noise] we saw that [noise] the shade corresponding to the number 500 is [vocalized-noise] is usually used for primary. [noise]

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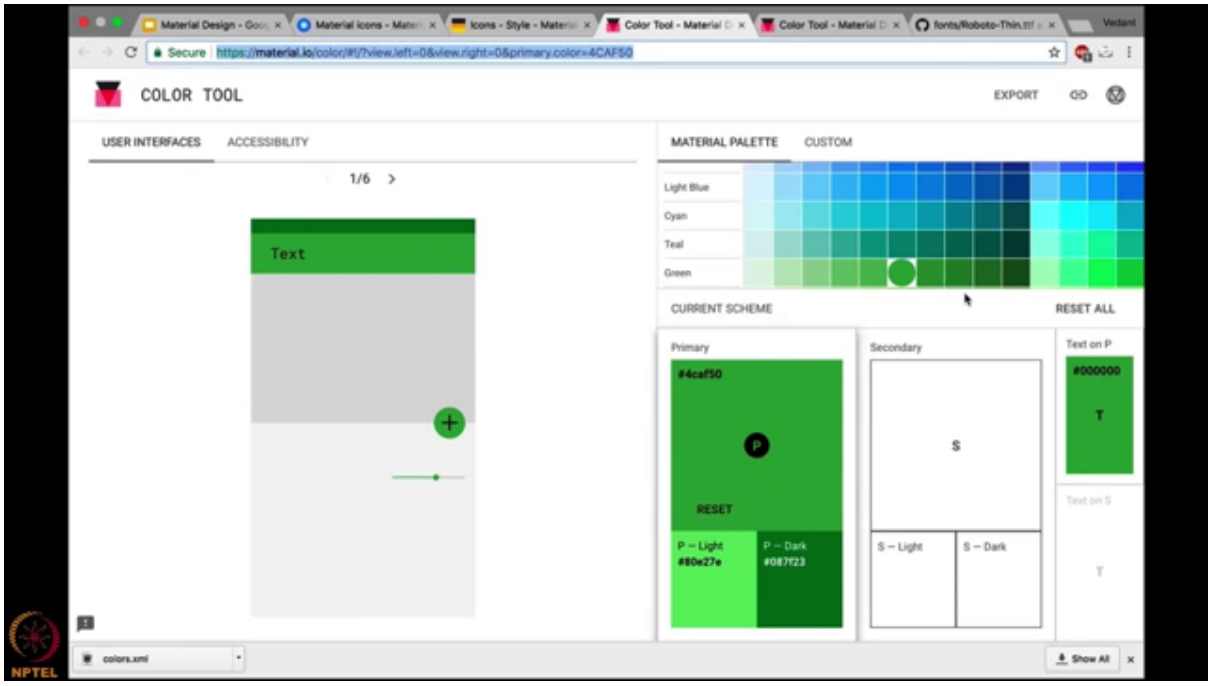

So, if you look at Google's [noise] color shade [noise] ah we can see that the primary [noise] ah the the [noise] 500 shade corresponding to green [noise] is the one which is exactly being used by play store as well [noise]. Now moving to a different tab [noise] that is a [noise] movies [noise] we see that the color has changed [noise], but again it is consistent throughout. [noise]

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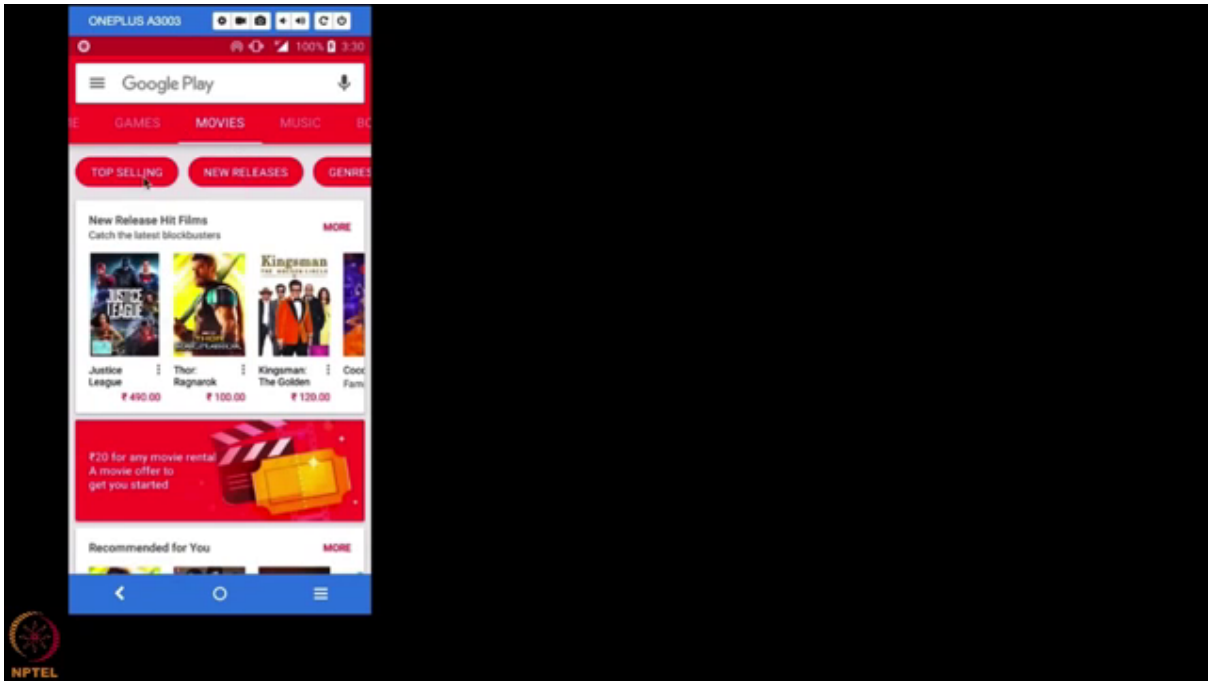

And again if you want to have look at the shade of this color [noise] we can see that this corresponds to [noise] the 500 shade under red [noise]. This is [noise] this is exactly what Google is using as well [noise]. So, [noise] color is consistent color the shades are rightly used [noise]. Content written on top of any colored element is legible [noise] and [noise] a lot of graphical content is there. [noise]

Another thing is font [noise]. So, the font used by font of the typography likes something 10 [noise]. So, font used by Google play store is [noise] something called as Roboto r o b o t o [noise] and this is a form developed by ah font developed by Google [noise] and you can see that this is again consistent throughout the app through every tab has the same font [noise], color might change, but font color [noise], color of the tab might change but the font color and the font itself does not change. [noise]

Now, another very important thing of material design is the way things move around it should be intuitive [noise] it should [noise] it should be [noise] basically a user should be able to [noise] yeah [noise] he should not have to figure out how the movement is it should come naturally to a users. [noise]

So, looking at this app the first [noise] thing I can see is the first card which I see [noise] I see [noise] a small part of another card [noise]. So, intuitively I would try to slide left [noise] to see the next card [noise] and that is exactly what I do to see the next card [noise]. So, the [noise] motion is smooth the motion is intuitive [noise]. Again if I want to scroll down it is all very smooth [noise] it is all very intuitive [noise] [vocalized-noise] it is basically enhancing the user experience as a whole. [noise]

So, that is another very important thing which we see and almost [noise] which is a very important element of material design and we see it in almost all apps we use [noise]. Ah [noise] another thing which everyone talked about are the icons.

So, Google has made a lot of [noise] icons under the material design category available to the public [noise] and you can see [noise] some of these icons is [noise] even they are using some of these icons like notification, account, settings [noise] all these can be found at [noise] this place [noise] ah.

So, [noise] material dot Io icons [noise] you can see [noise] probably [noise] [vocalized-noise]. Yeah [noise] so you can see [noise] like the [noise] account one [noise], account

circle [noise], account box [noise] and [noise] probably [noise] you can [noise] see [noise] notifications [noise] yes [noise]. Yeah basically all these [noise] icons are [noise] American [noise] ok. [noise]

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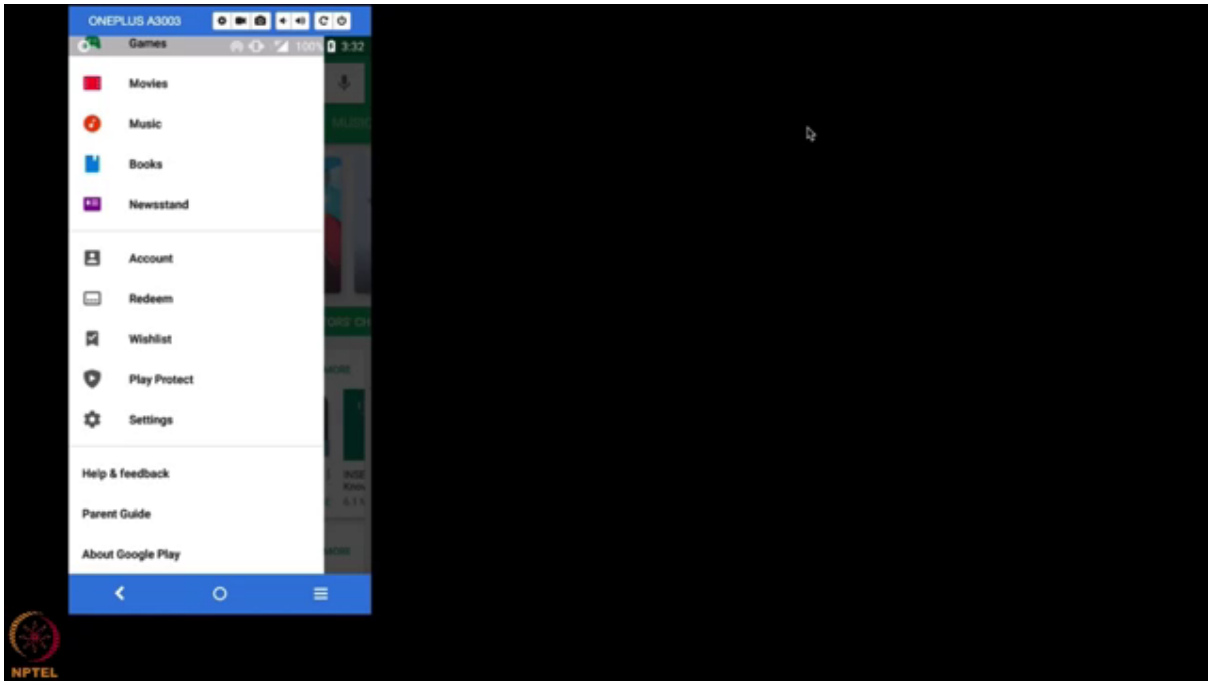

So, now [noise] if you are familiar with android app development you must have wanted to use these elements in your app [noise] or [noise] you must want to you must need to use these [noise] fonts and colors in your android app or the [noise] or an I o s app which you are developing [noise]. So, let us just quickly see how we can actually [noise] incorporate these colors or these fonts in our app. [noise]

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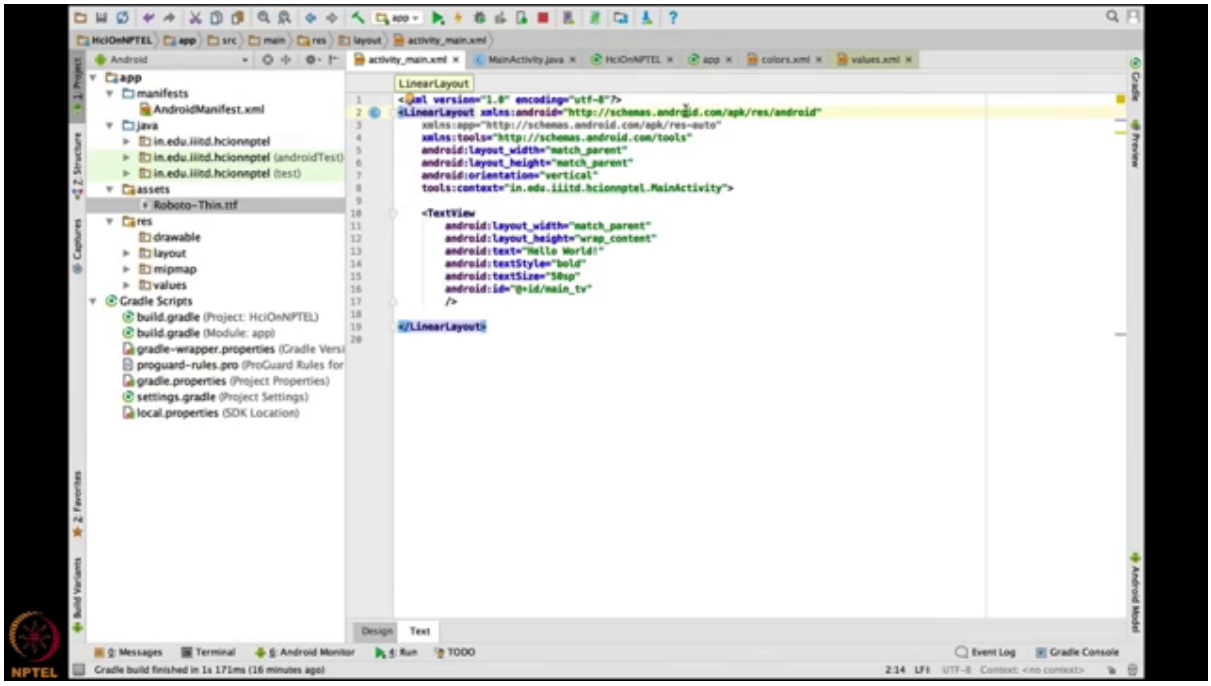

So, [noise]. So, this you are going to need android studio [noise] ah which is [noise] a very famous framework [noise] made public by Google [noise] which allows users to [noise] ah build android apps [noise]. So, just download Google play store from Google's website [noise] I think [noise] they have [noise] a lot [noise].

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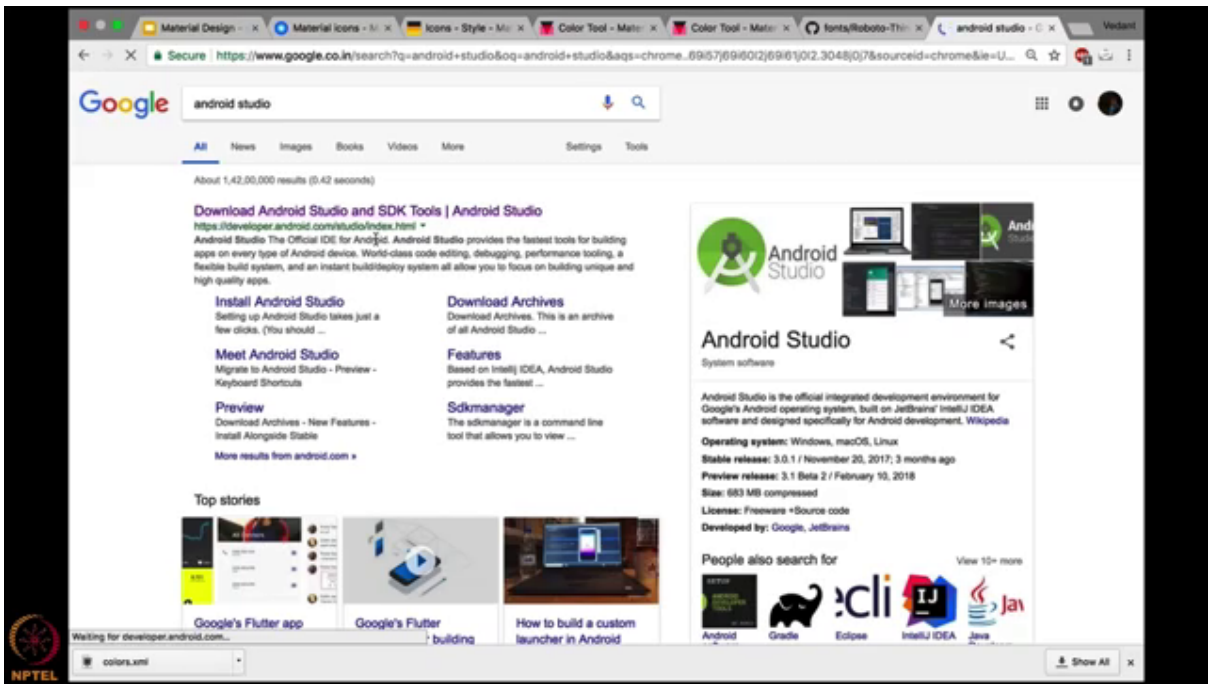

Yeah [noise] so from developer dot android dot com you can download this [noise] and install [noise] it is it is all pretty [noise] yeah just download it and install [noise]. And once you install just open it [noise] open android studio [noise] and [noise] just click on [noise] go to file [noise] new [noise]; new project [noise] just give it any name [noise].

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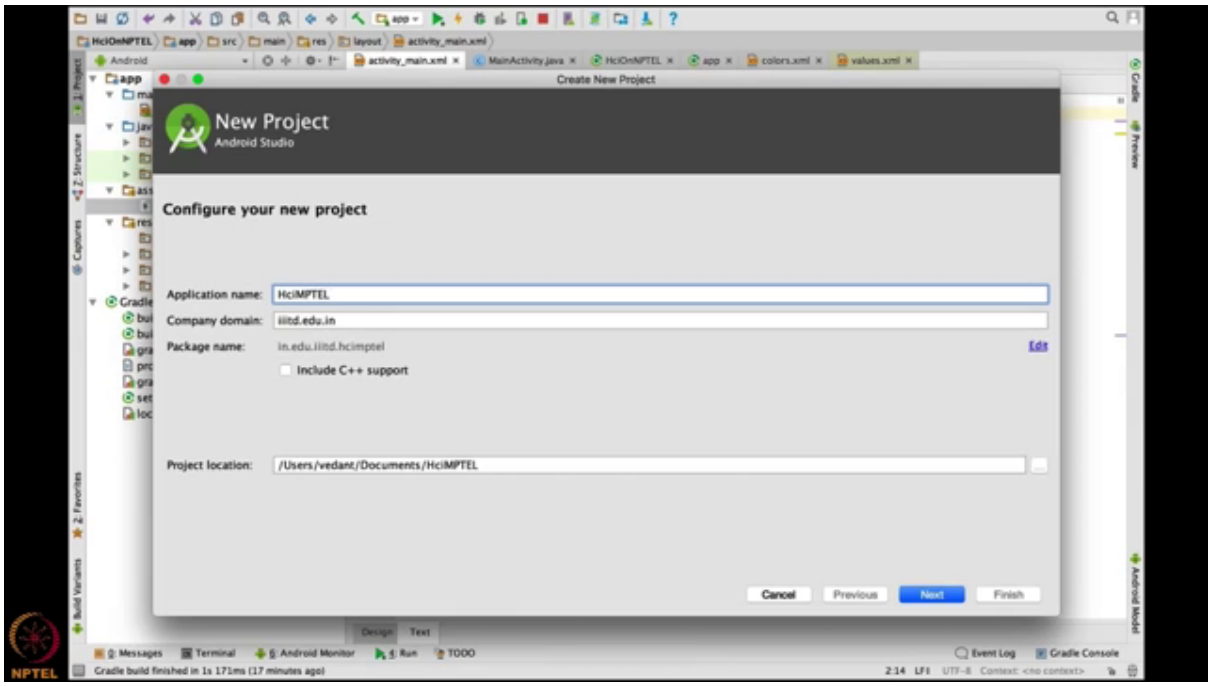

Let us say as a [noise] Let us [noise] call it [noise] HciNPTEL [noise] specify the folder [noise] do next.

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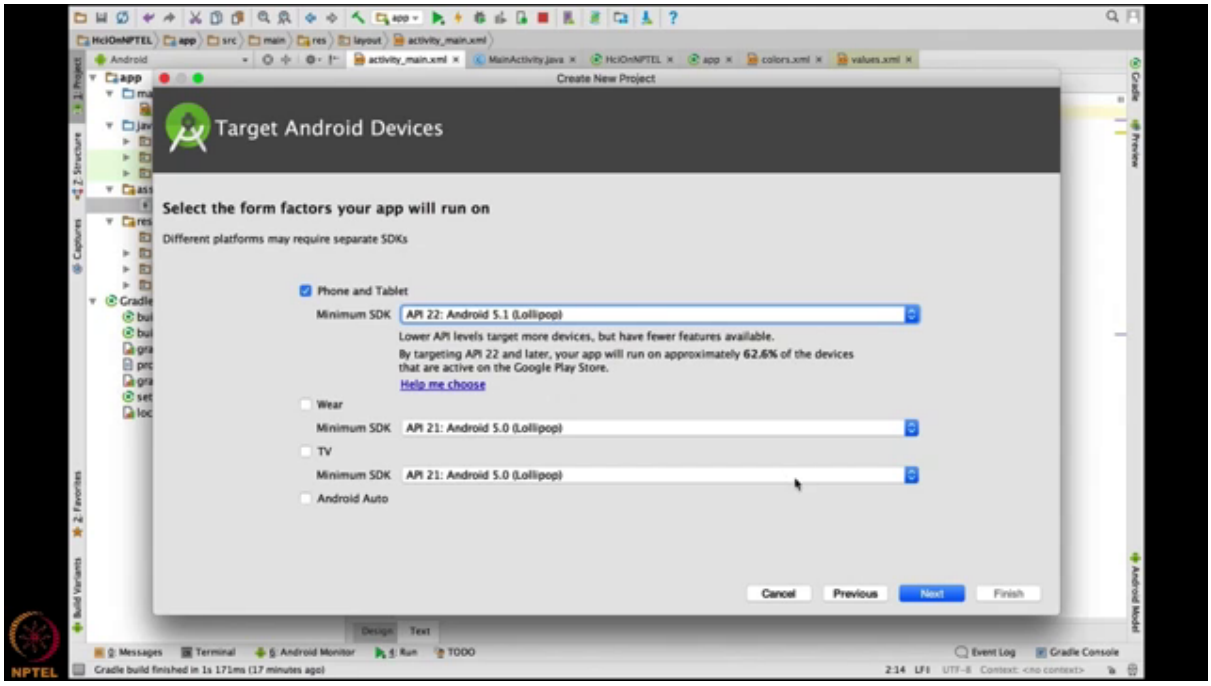

You can specify the minimum android version [noise] your apps should be accessible to [noise]. So, you can set it to anything you want [noise] I will set it to lollipop [noise] which is [noise] ah API [noise] number 22 [noise] ah.

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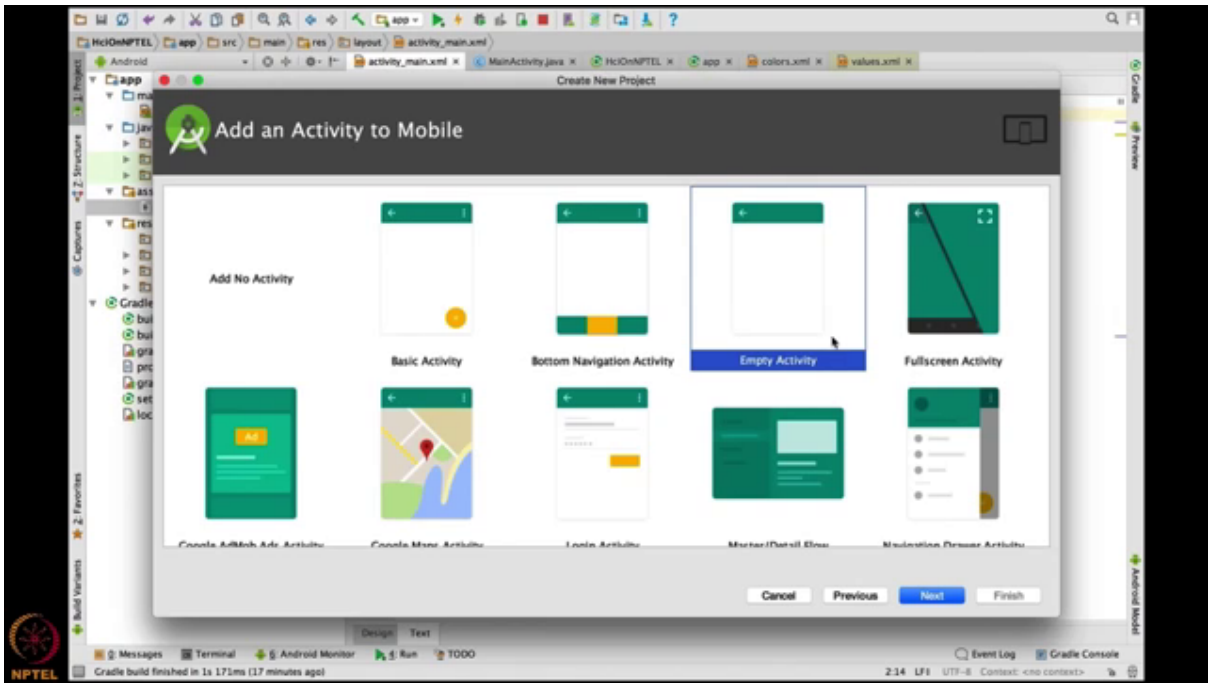

Choose the empty activity [noise] do next [noise], let it be main activity [noise] finish [noise].

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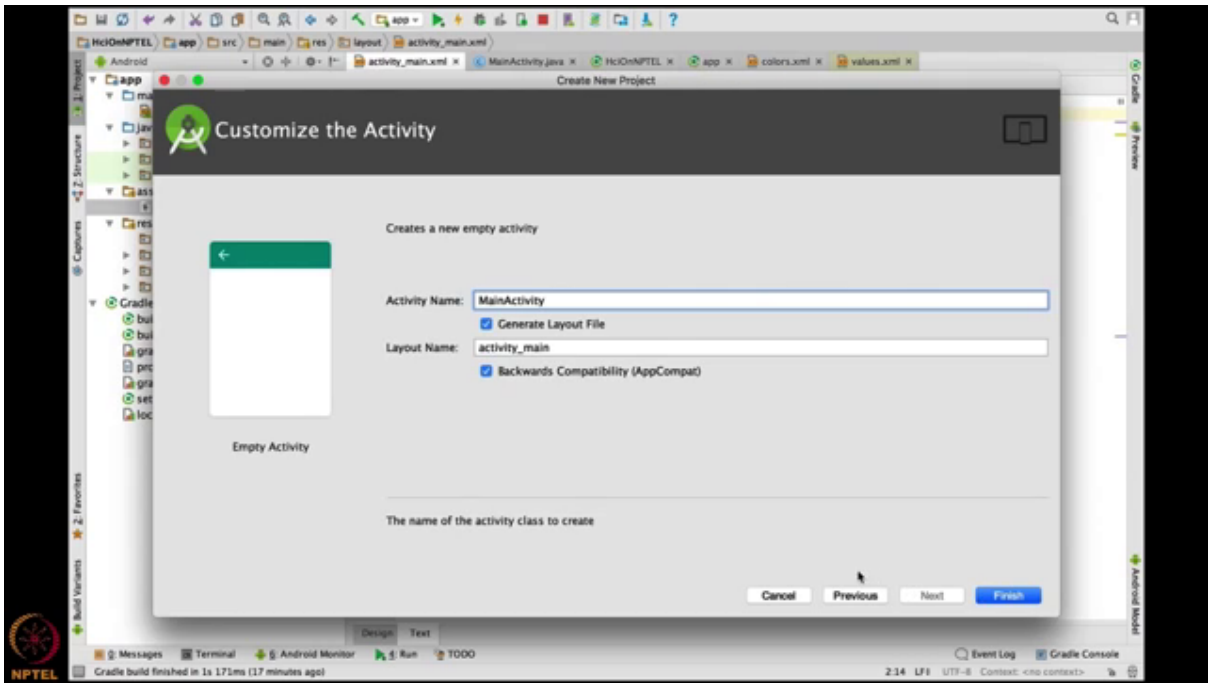

And [noise] android will then build the app for you [noise] I have already done [noise] that [noise] so I will open [noise] that for you [noise] yeah [noise]. So, android will build the app [noise] for you [noise]. If it throws any errors you should probably [noise] you might probably want to just open [noise] alright.

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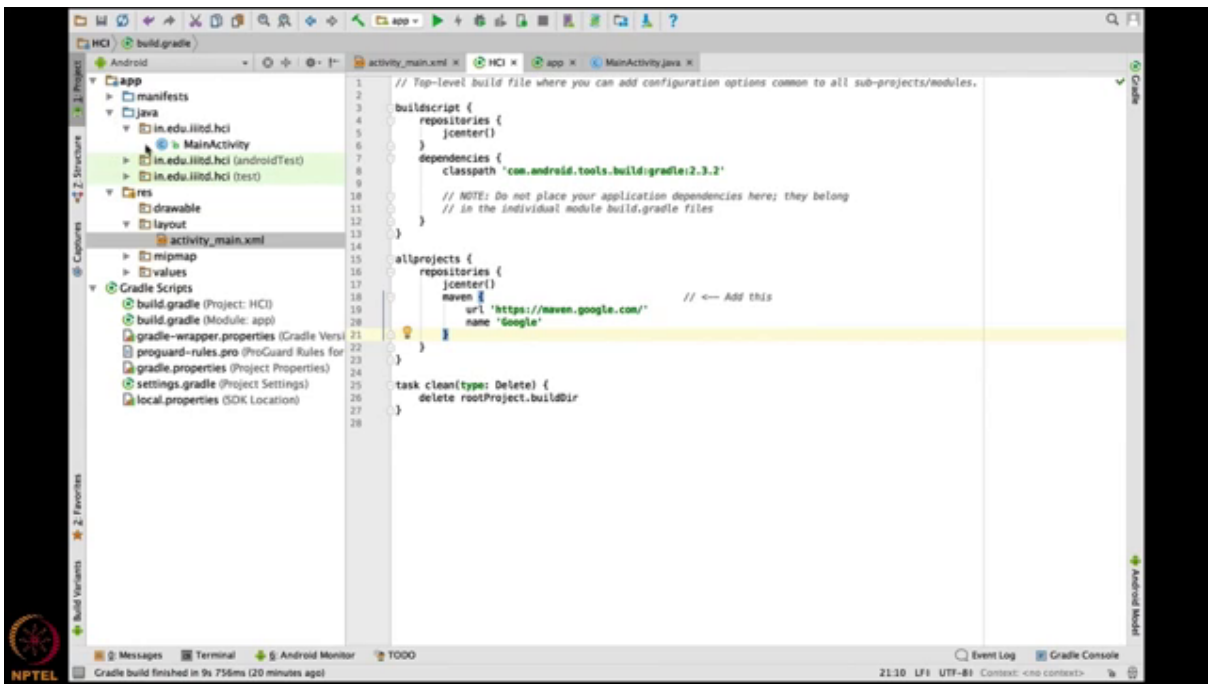

So, first I will go through the [noise] layout on the left [noise]. So, this contains all the Java code.

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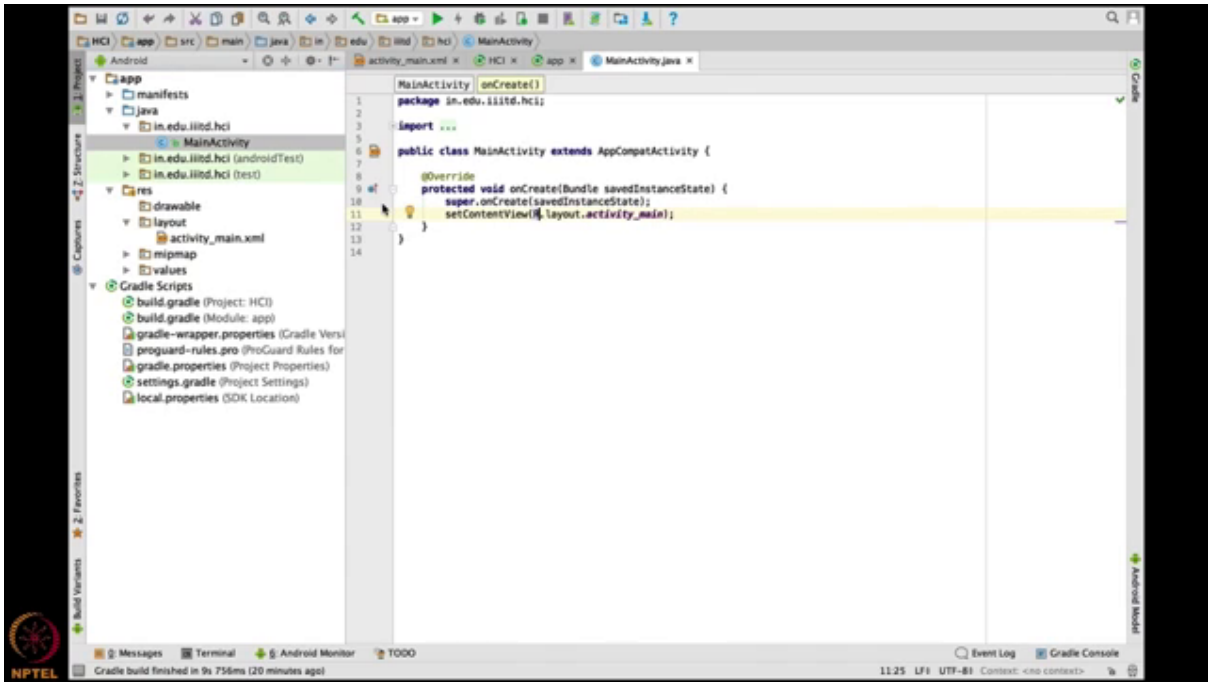

This is the main activity. So, this is the backend of your app [noise] ah when you go to res folder [noise] you can see your folder called layout [noise]. So, layout contains how your app looks [noise]. So, like the names just [noise] it is the layout of the app [noise].

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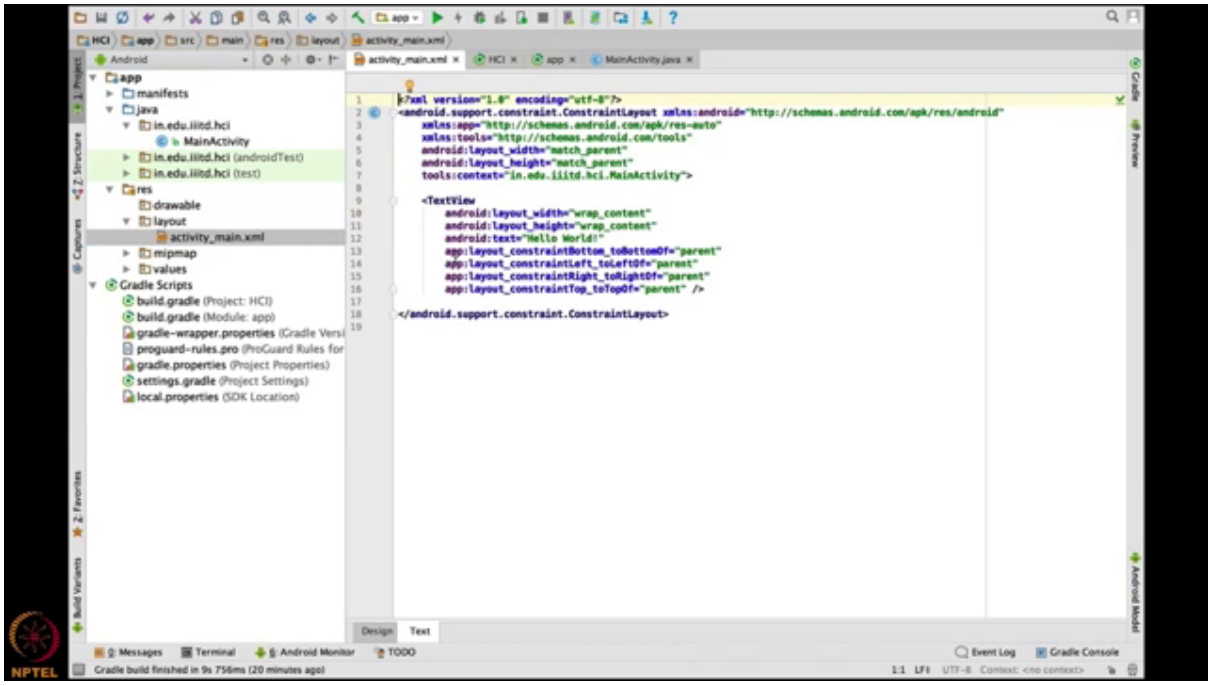

So, [noise] my first screen [noise] this is the xml [noise].

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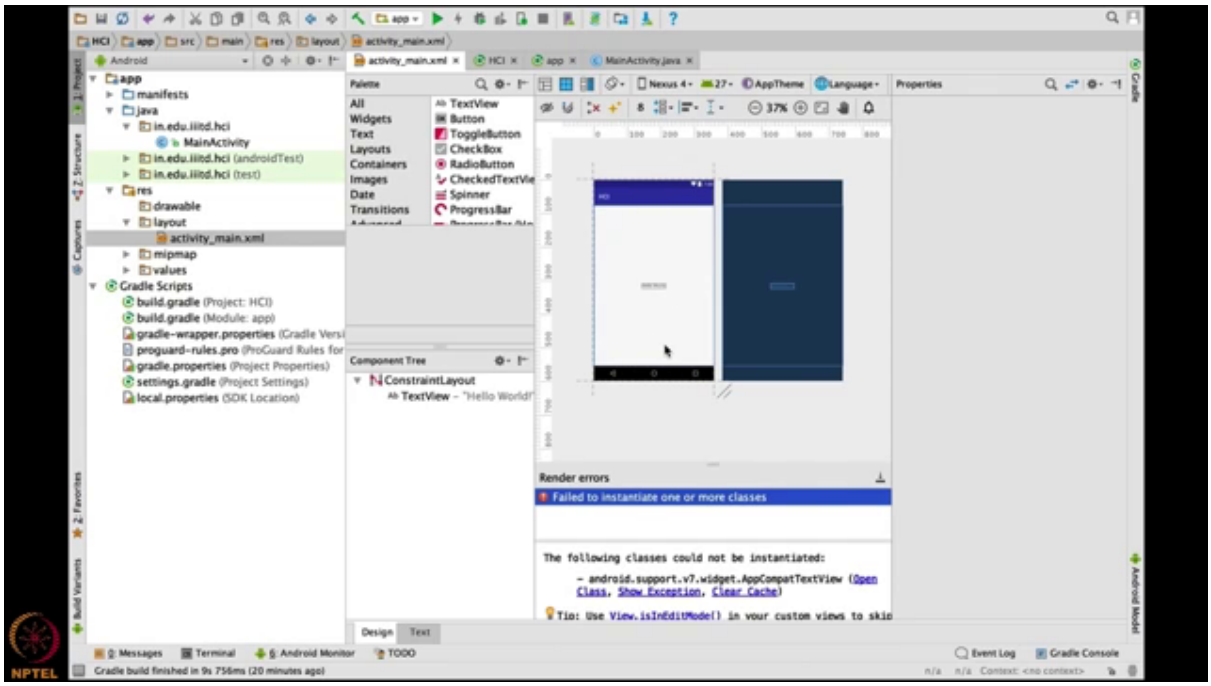

And you can actually click on the design tab to see how it actually looks [noise]? So, this this is the current look of my screen it will just show hello world and the name of the app on the top [noise] and this is the color scheme being used [noise] alright [noise]. So [noise] again now so if [noise] your app throws any errors [noise] while building [noise]

just put this thing in the Gradle app [noise]. So, this is the gradle file [noise] and a gradle scripts [noise] go to build out gradle [noise] open this file [noise] just copy and [noise] paste this [noise] the error [noise] should [noise] hopefully [noise] go away [noise] alright [noise].

So, [noise] coming back to the design part of it [noise] now [noise] let us say you want to change the design scheme of the app blue is not what you want [noise]. So, let us say you want [noise] let us choose something if you want Google or escape next [noise].

Yeah [noise] So, let us choose this color [noise] let us say [noise] or let us say [noise] let us choose orange [noise] for that [noise] matter yeah so here is [noise]. So [noise] click on [noise] export [noise] android [noise] that will download the color [noise] for you [noise].

Now what you need to do is [noise] place this [noise] it will download a [vocalized-noise] download an xml file for you [noise].

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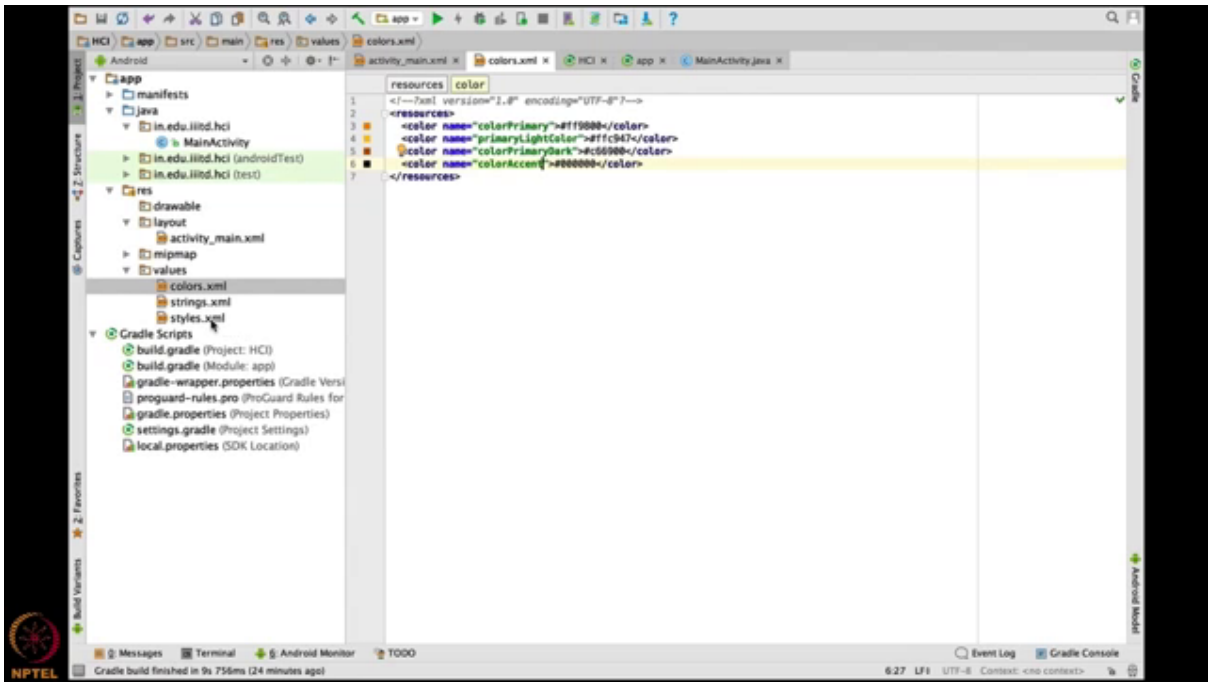

So, what you need to do [noise] is [noise] go to your [noise] app [noise]. On the left hand side [noise] you can see [noise] values [noise] ah under the res folder you can see values

[noise] click on colors dot xml [noise]. So, this this colors dot x m l is a very important file [noise] because this defines the theme of the entire app [noise].

So, any color you specify here [noise] as primary [noise] will be set as the primary color for the entire app [noise]. Apart for the entire [noise] basically you can control [noise] it is for the entire app of the entire tab, but for the current view this will be the final color [noise]. So, this is a very [noise] important [noise] file [noise] ah. So, [noise] just replace this file with [noise] let us just keep this [noise] folder [noise].

So, you can do a reveal [noise] in finder [noise] this actually [noise] points you to the folder [noise] where it say it is [noise] and just replace with the file [noise] we downloaded [noise]. So so this is the file will be downloaded [noise] just to replace it [noise] and [noise] click on replace [noise].

So, [noise] now when you go back to the app [noise] you see [noise] things have changed [noise] alright [noise] good [noise]. So, [noise] technically now the app [noise] should work [noise] every other different color [noise]. So, let us just see [noise] if that works [noise] oh also if you notice the names of the colors [noise] were different [noise] so we might have to change that [noise].

So, it was [noise] color primary [noise] instead of primary color [noise]. So, [noise] to make it [noise] color [noise] primary [noise] and [noise] there was [noise] color [noise] primary [noise] dark [noise] and there was [noise] color accent.

So, color accent basically means [noise] it is the text color [noise] again this might not be needed if you are using android 3.0 which is the latest [noise] ah android studio 3.0 [noise] which is the latest android studio version [noise] my version is a bit old [noise]. So, probably [noise] that is why [noise] I have to [noise] make these [noise] changes [noise] color accent [noise] this [noise] defines a exponent [noise] and let us just see [noise] if this [noise] runs now [noise]. So, this is [noise] virtual device [noise].

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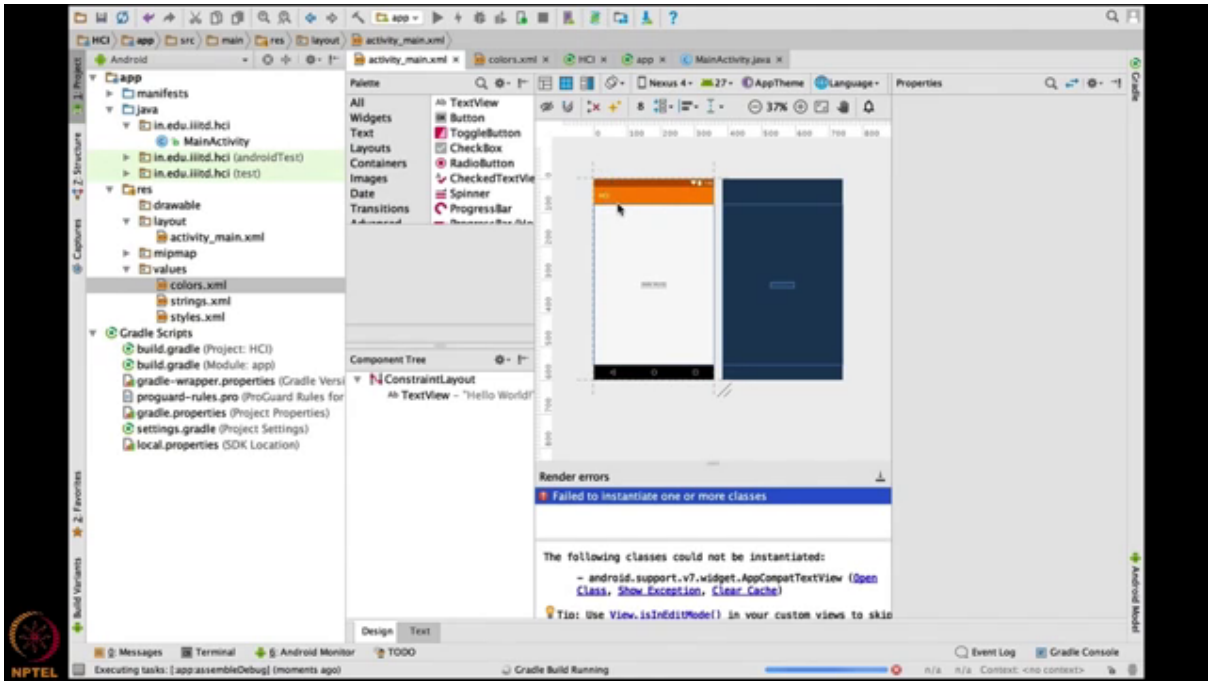

Yeah [noise] so, you can see these [noise] color changes are reflected [noise] in the [noise] ah activity mean dot xml which is the layout of my file [noise] ok [noise]. So, the app build and [noise] ok great [noise].

So, we changed from [noise] color blue [noise] further to be orange [noise] so that is how you [noise] change the color [noise] scheme [noise] of the app [noise] um [noise] again [noise] if you did not understand [noise] ah that is fine [noise] because this is more of the [noise] android side of things [noise] I will just quickly go through it [noise] again [noise].

So, you had values [noise] [vocalized-noise] so it is the values folder under s [noise] you just download the colors xml [noise] to replace it [noise] with the [noise] with a file [noise] given here [noise]. And just [noise] accordingly whatever [noise] your old [noise] color [noise] dot x m l had the names [noise] just name accordingly [noise] and [noise] you will see that the color scheme [noise] of your app is change [noise] alright [noise].

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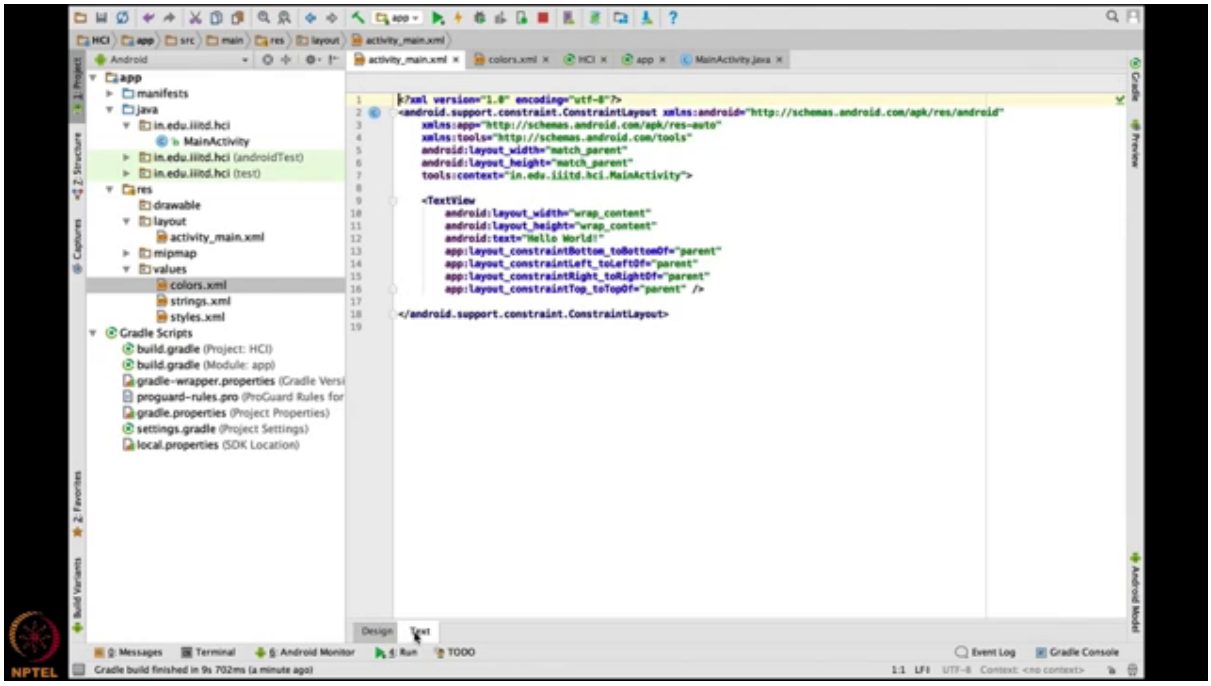

So, [noise] now looking at this [noise] I would probably want to [noise] let us say next thing which we want to look at is font [noise]. So, if I go to the x m l part of this [noise] I can see that this [noise] the font is the basic font [noise] which I were built in [noise]. So, let me try and change the font of this [noise]. So, to do that [noise] ah first after download a font file [noise] so [noise] that is [noise] well as well.

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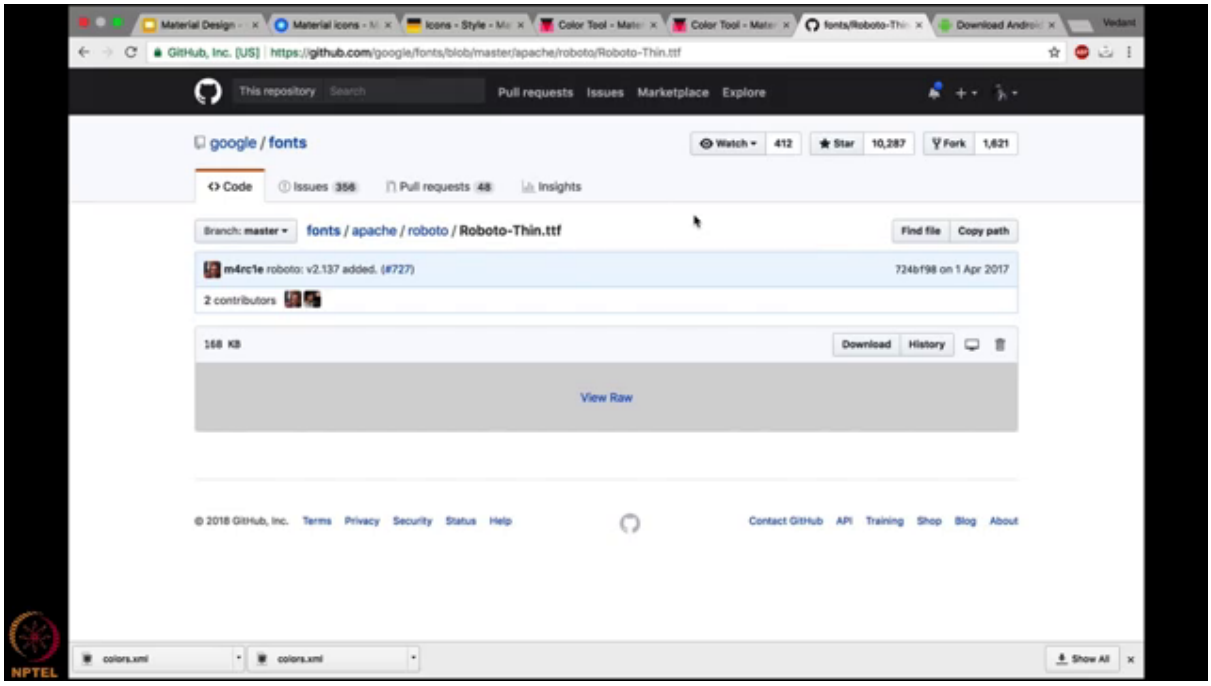
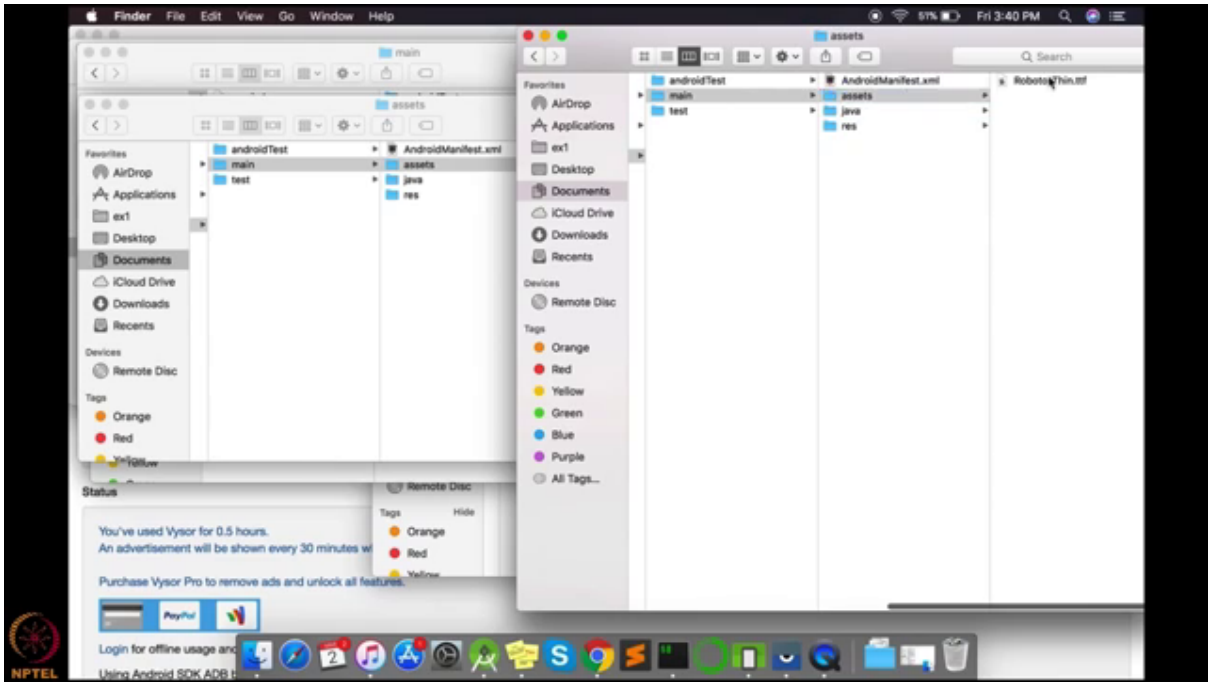


Yeah so [noise] so [noise] Google [noise] has a file [noise] so like I said reporters a font which Google came up with [noise] and [noise] let us say I want a thinner version of it [noise] which is a [noise] little more elegant to look at [noise]. You can actually go to Github and download this [noise].

So, once you get a dot t f f file [noise] just will download [noise] and this will [noise] save on your [vocalized-noise] on your system [noise] you can [noise] go back to your app [noise] and ah [noise] under the app [noise] you want to create a folder [noise] called [noise] assets [noise].

So, basically [noise] font is one of the [noise] additional assets [noise] of the app hence the name asset [noise]. So, [noise] what I am going to do is [noise] I am going to review [noise] this in finder [noise] and [noise] this is my app [noise] yeah [noise]. So, [noise] this is my app [noise] and go in the source [noise] I will go to main [noise] and this place [noise] where you can see java and (Refer Time: 24:53) I create a [noise] folder called [noise] assets [noise].

(Refer Slide Time: 25:02)



Now this is where you should place your font file [noise]. So, I have already downloaded it [noise] robot [noise] thin dot t f f dot t f f is basically [noise] the extension for all the fonts [noise]. So, just place it in the assets [noise] folder [noise] and [noise] this should

[noise] reflect [noise] here [noise]. So, like you can see this is an assets folder [noise] which is being [noise] created with your font file [noise] ok [noise] so far so good [noise].

Now we want [noise] the text to be written [noise] in this view [noise] text view is basically [noise] the element which renders [noise] the text hello world [noise] like we saw [noise]. So, [noise] I want the hello world which was in Roboto earlier [noise] to now be in Roboto thin [noise].

So, [noise] we look at how to [noise] do [noise] that first [noise] let us just [noise] change the [noise] text size [noise]. So, [noise] just to make it [noise] more legible [noise] I am setting [noise] the text size [noise] to be [noise] fifteen s p [noise]. Now now I want to change the font [noise] to [noise] let us say [noise] Roboto thin [noise] how to do that [noise]. So, for that we will have to go to our main activity [noise] which is the back end [noise].

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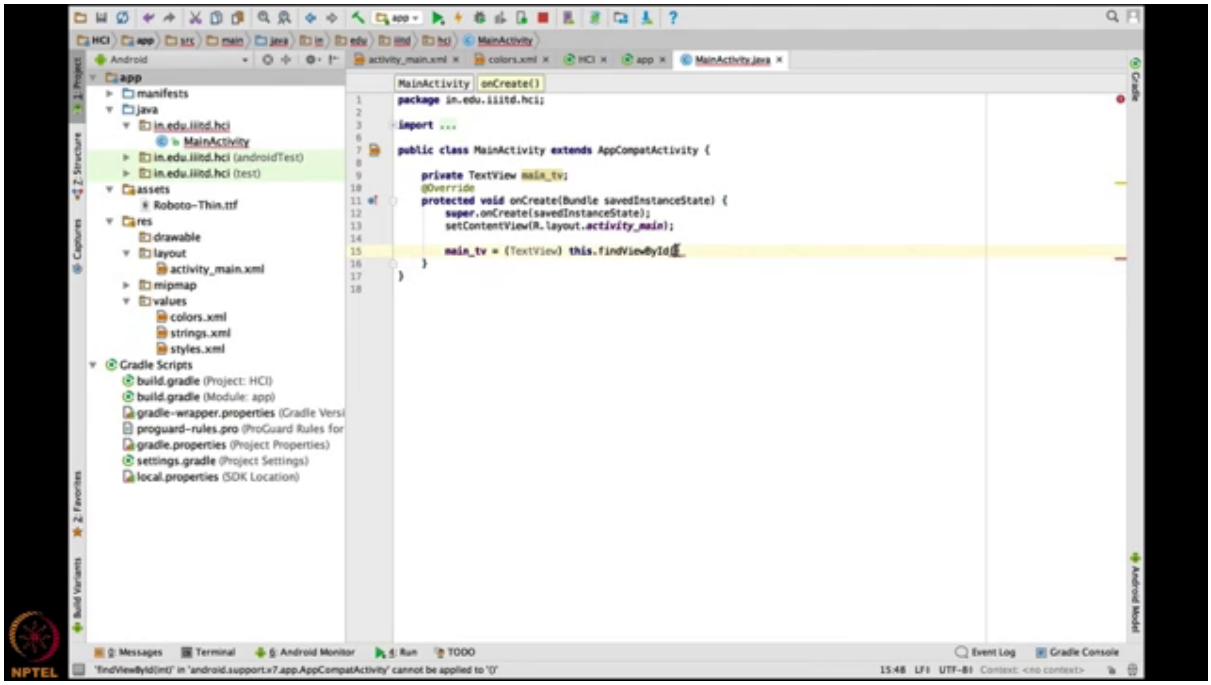

Now, [noise] if you do not understand this code [noise] that is fine this is already [noise] this is pre rendered code by Google [noise]. So, you do not need to understand it [noise] all you need to do is [noise] this is [noise] java code [noise].

So, just declare [noise] a [noise] variable [noise] which is private [noise] text [noise] view [noise] and give it [noise] any [noise] main [noise] text view [noise]. So, this is the variable name [noise], this is the variable type [noise] and you might [noise] want to [noise] import this [noise].

and [noise] here in oncreate [noise] so oncrate is a call back [noise] and this function is called whenever [noise] an app is started [noise] or whenever an app is created and when is an app created whenever you fire up an app [noise] that is when it creates all the elements [noise].

So, whatever code is written in this oncreate function will be executed then [noise]. So, I will [noise] just [noise] go to [noise] show you [noise]. So, what fine view by I d does is [noise] I have declared my view here [noise] and I want to capture [noise] that view in my back end [noise]. So, [noise] this is basically just indicating I am referring to [noise] main activity which is my only activity as of now [noise] this dot find view by I d [noise] and [noise] r dot [noise] I d [noise] dot. [noise]

So, I first need to set the Id as well here. So, android I d [noise] just [noise] set whatever I d you want to [noise] this can be anything [noise] and this set it as main underscore [noise] t v for a main text view [noise]. So, [noise] here you can be [noise] r dot [noise] I d dot [noise] main t v. [noise]

So, this gets the element in the front end to the back end and now you can actually set the font here [noise]. So, absolutely we have done here so [noise] yeah [noise] something [noise] like this [noise]. So, [noise] so, in android studio you cannot set a custom font [noise] which you have downloaded from the front end [noise] that is why [noise] you need to capture the text view at the back end [noise] and do this. [noise]

So, typeface is the [noise] is [vocalized-noise] like the name suggest, [noise] it is it it defines [noise] how a view looks like [noise]. What is the font going be [noise]? So [noise] I am just going to (Refer Time: 28:04) [noise]. So, declare a typeface object [noise] I do create from asset create from asset [noise].

Because I [noise] saved it in the assets folder [noise] this dot get [noise] assets [noise] just basically [noise] gets all the things in the assets folder [noise] and Roboto thin dot t f f which is the file name [noise]. So, again if you do not understand the code part of this

that is fine just copy paste this code [noise] this should work [noise] ah [noise] they are [noise] more [noise] focused on the [noise] design part of things [noise].

So, [noise] I just said the [noise] typeface as Roboto [noise] and this should set [noise] my font in this field to Roboto thin [noise]. So, let us [noise] just see that [noise] what implemented [noise]. We are [noise] going to compile [noise] the app [noise] yeah [noise] ok cool [noise].

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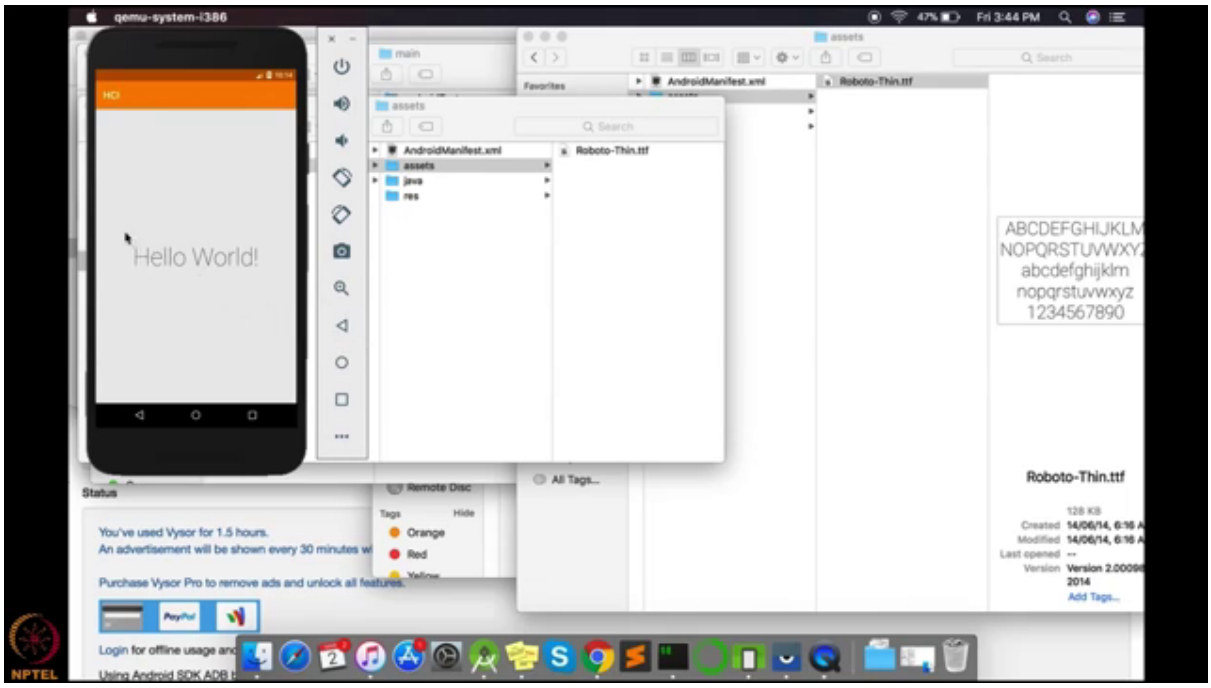

So, [noise] later we ah [noise] previously we saw [vocalized-noise] a more [noise] ah a thicker hello world [noise] which was Roboto font [noise] and now we have changed to Roboto thin [noise] I can [noise] probably [noise] and we can see that if I comment out this part of the code [noise] which is actually setting the typeface [noise] ah and I compile it again [noise] I see that [noise] I now have a thicker hello world [noise].

So, this [noise] hopefully gave you an idea of how to build [noise] external [noise] or how to get external fonts in your app [noise] and how to change the color scheme of your app [noise] and hopefully will help you [noise] design better [noise] interfaces [noise].

Thank you [noise].