Usability Engineering
Dr. Debayan Dhar
Department of Design
Indian Institute of Technology, Guwahati

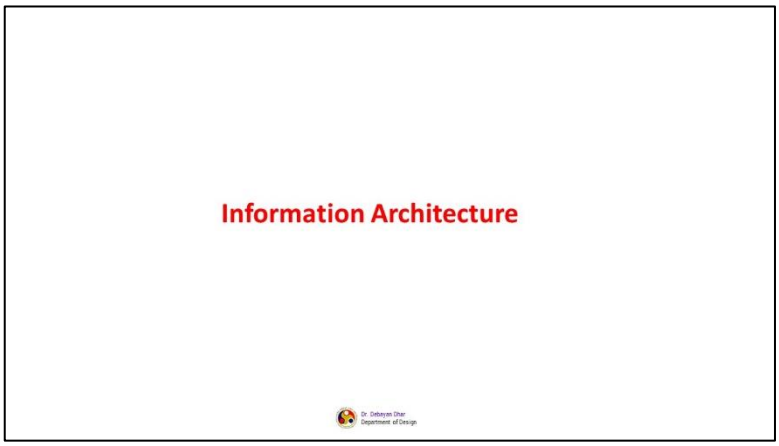
Module - 11
Lecture - 34
Usability Heuristics and Testing

Welcome to module 11, lecture number 34. We are at the fag end of this course after that there would be the last module. Now, in this module we are going to discuss about Usability Heuristics and Testing. And before we start discussing about heuristics evaluation about the tendency of usability in terms of how you are going to ensure that the product and the concept that you have developed are tested out with users we would first discuss about the information architecture.

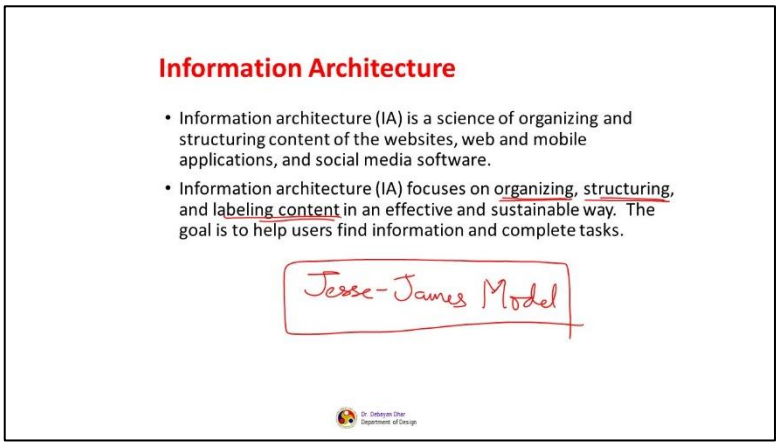
Now, if you remember we did talk about information architecture in our last lecture in the last module. And before I ended the session with prototyping and wire framing I said that information architecture plays a major role in ensuring that the abstract content or the information that you would like to present through your interface is being visualized in terms of a structure in terms of a skeletal representation. And that in turn ensures that you proceed towards the wire frames and finally, to the prototyping phase.

So, we are going to discuss about these issues in detail in this session. Let us begin.

(Refer Slide Time: 02:11)



(Refer Slide Time: 02:12)



Now, see information architecture it is a science. It is a science of organizing and structuring content of web pages, software applications. It can be web based applications, it can be mobile based applications and it can also be social media software's right. Now, information architecture focuses on organizing that is the crucial aspect of for piece of information that you mean to focus on.

It focuses on organizing, structuring and labelling content in an effective and sustainable way. Now, if you remember the Jesse James Garrett model that we discussed; the Jesse James Garrett model James Garrett model that we discussed earlier during the initial phase of this course you would realize the role of information design in that structure in the hierarchy phase.

So, from being abstractions from being at the label of abstraction where we focus on the user needs and requirements we move down to more specific representation of those abstractions which are in terms of the interface. In between that phase lies the information design, navigation design and the structure plane. So, if you remember that a hierarchy you would realize the role of information architecture in the context of interface design.

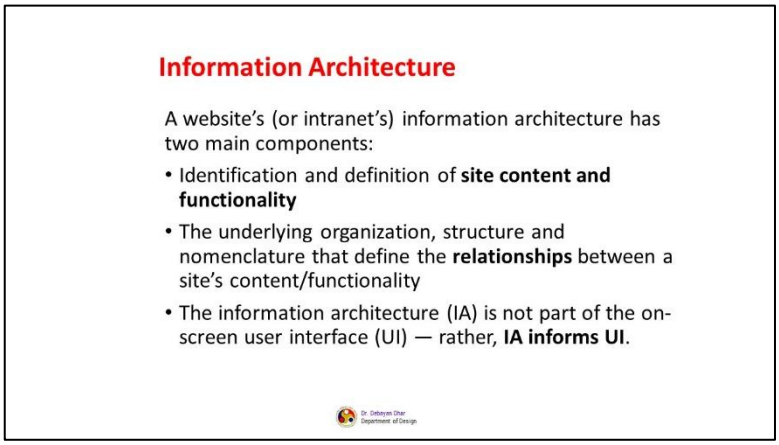
Now as you can see here a information architecture focuses on what? This is important aspects of it; organizing, structuring and labelling content. So, when what do you mean by organizing? See you need to understand that the concept that you have thought about it is actually a medium through which your users are communicating with the system in order to ensure that their goal is reached. That is the most important aspect of what you must remember.

And then you must also realize that these activities this call to action features the interface features that you use that your use user is going to use in order to complete that activity has to be arranged meaningfully, so that it falls in a structure. Now, when I say has to be arranged meaningfully it means there has to be a structural representation of the information in a way that relates with the mental model of your user of your end user. And that is why organizing and structuring and then labelling is important.

Because until and unless you organize the information into meaningful groups you structure them in a way that they are relatable and then you label them so that they can be comprehended by your end user. The structure of your interface or the offerings or the deliverables that your interface is going to provide to the end user is not going to fructify right.

So, therefore, information architecture provides your end user with these structural planes to ensure that the information, the content, the call to action features are being delivered to them in a way that are meaningful that relates with their mental model and they can have a meaningful interaction with the interface in order to communicate with the system.

(Refer Slide Time: 06:26)



Now, a website or an intranet I you know intranet and internet are two different aspects of the web. I am sure you are aware of that. Now, a website or an intranets function information architecture has two main components and these components are the site content and functionality and the relationship between the site contents and functionality and the information architecture that informs the UI.

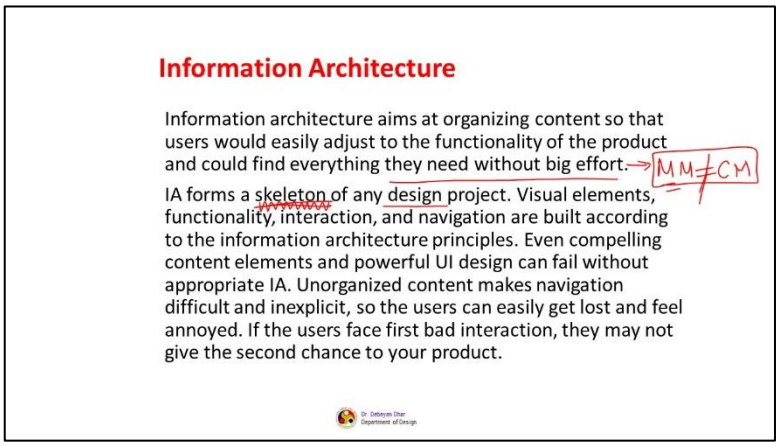
So, the main component the two important components are first of all identification and defining the site content and functionality. So, in order to see that the concept that you have conceived works the concept must have some primary features. It must have some primary activities which your user will use through call to action feature and then the goal that your user wants to reach can be achieved.

So, correctly defining, identifying the site content and functionality is of paramount importance while focusing on the information architecture. Once you do that the next important component is what? Define the underlying organization, structure and nomenclature that define the relationships between the content and the function.

See when we say content we mean, what? You can see labels, we mean see these are the things or these are the entities, that helps your user to trigger a particular activity to ensure that a particular feature is activated and a task is completed. So, therefore, there should be a direct relationship between the site's contents, functionality and the structure nomenclature that you are using.

So, the information architecture is not part of the on-screen user interface. If you want to see it as a visual as a visible interface feature probably will not be able to see that. But rather what we can say is that your information architecture informs the user interface; that means it ensures what is to be presented into the interface as a medium for your user to interact with the system.

(Refer Slide Time: 09:02)



So, information architecture aims at organizing content so that users would easily adjust to the functionality of the product and could find everything they need without big effort.

So, when we say this we mean if there is a complete similarity between the mental model of your user with the conceptual model of the product then adoption and delightful experiences happen.

And it is the effort only gets increased if this happens; that means, the mental model of your user whatever they are expecting, whatever they are planning, whatever they intend to do, whatever the structure they have in their internal structure they have inside them does not match what the product or the software is providing.

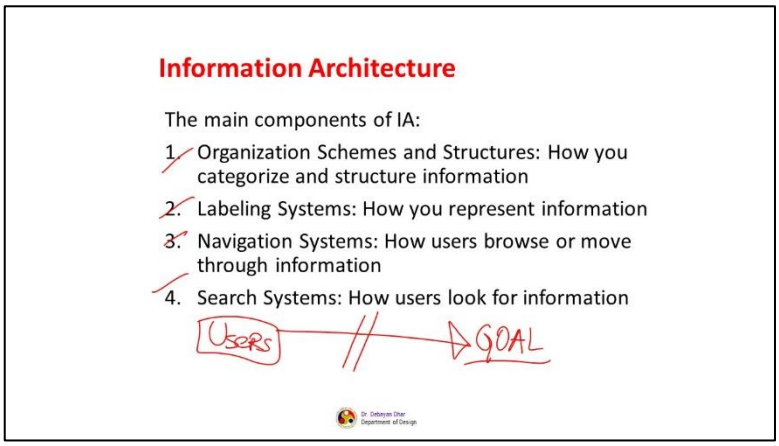
So, information architecture forms a skeleton of any design product or project. It is a skeleton structure. Remember this. This is very very important word, it is a skeletal structure. So, visual elements, functionality, interaction, navigation; all are part of it and are built according to the information architecture principles. Now, even compelling content elements and powerful user interface design can fail without you know meaningful or appropriate information architecture.

Unorganized content makes navigation difficult and inexplicit. So, the users can easily get lost and feel annoyed. If the users face first bad interaction they may not give the second chance to your product. You now understand why having an appropriate information architecture is so so crucial for the adoption of the product.

Because the moment there is an error, the moment there is something which the user is looking and he is not able to figure out through the interface, he is not able to complete the goal or reach his complete his activity or reach the goal in the destine time that he has thought of there would not be any second chance for the that particular user to come back and use your system.

And these are areas of concern because remember this is a market driven economy. The more loyal customers you have the more return on investment you will have right.

(Refer Slide Time: 12:05)



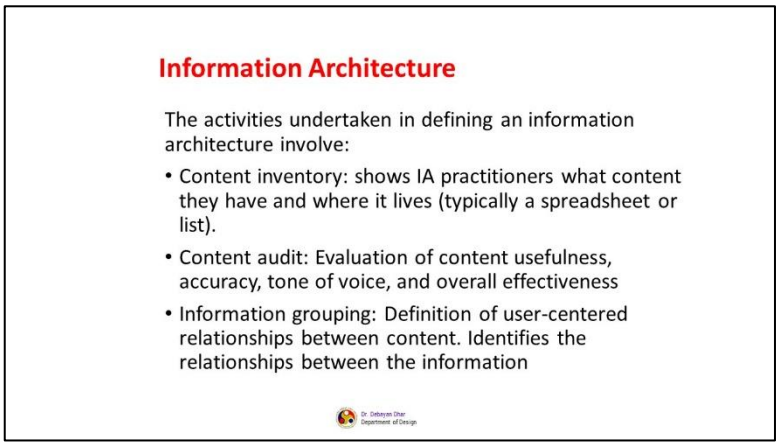
So, let us understand now the main components of information architecture. The main components of information architecture are as follows. 1st, organization schemes and structures; that means how you categorize and structure information; 2nd, labelling systems; how you represent information; 3rd, navigation systems; how users browse or move through the information and 4th search systems how users look for information.

If you understand each of these things are so crucial to ensure that the users reach the goal. You affect any one of them and there is a breakdown, a breakdown that your users will not be able to reach and when you look a look at a software you would see that it is composed essentially of these main elements.

It is a structure of information that have been categorized, classified into groups right. It has been appropriately labelled then there have been essential pathways through which the users move which has already been defined and then in extreme cases where these kinds of navigations are complex to figure out something complex the users use search systems.

All these are the essential components of not only the information architecture, but the product as a whole and you must ensure that you pay great amount of detailing in ensuring that the structure, the labelling, the navigation systems and the search systems are accurately provided so that breakdown does not happen.

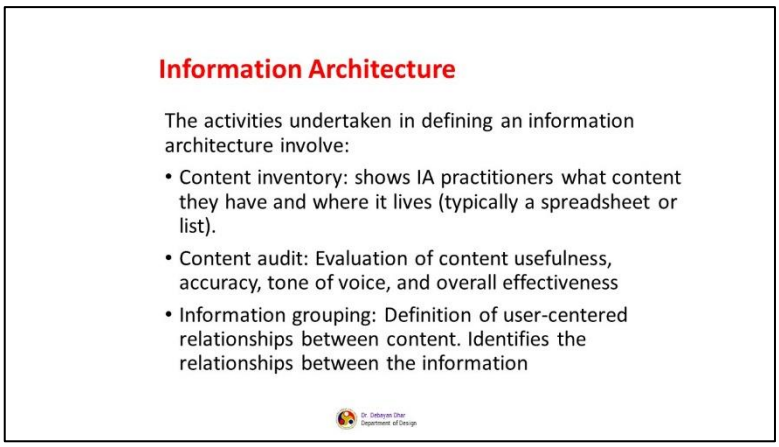
(Refer Slide Time: 14:24)



Now, the activities undertaking undertaken in defining an information architecture involve some preliminary stuff. And what are they? They are first content inventory. Now, it shows that information architect practitioners what content they have and where it lives.

Typically, you use a spreadsheet or a list, then comes content audit, evaluation of content usefulness, accuracy because otherwise the concept of trustworthiness of the content will appear in the mind of the user, tone of voice and overall effectiveness. And then information grouping means definition of user - cantered relationships between content. How does your user relate between content A and content B? How do this relationship is defined? So, it identifies the relationship between the information.

(Refer Slide Time: 15:30)



Apart from this the next step important step which is very crucial is taxonomy development. Now, what do we mean by taxonomy development? See by taxonomy

development we mean definition of a standardized naming convention which is controlled by vocabulary to apply to all side content.

See the word taxonomy means it is a practice of organizing and classifying items based on similarities. If you remember card sorting, if you remember affinity you will understand what do we mean by organizing and classifying items based on a shared theme or a shared similarity. This exercise typically follows the user research and content inventory processes. The information architecture might classify the items using categories, sections or meta data tags.

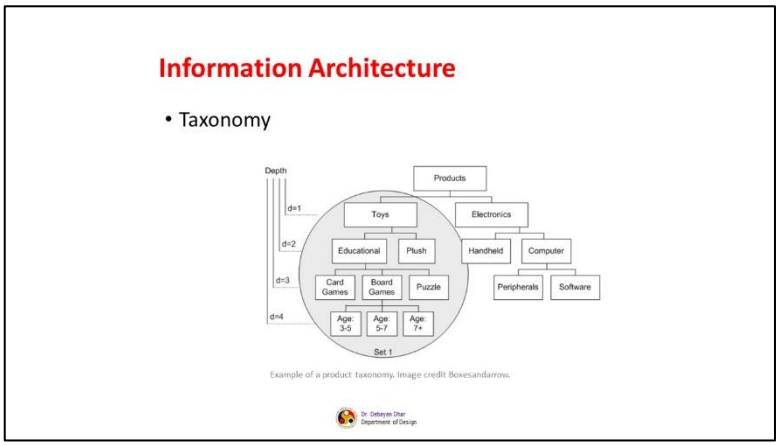
Now, during this process it is important to remember that the products content and the functionality will grow, so, the way it is organized must be easily scalable. One of the fundamental properties of product design is to ensure that your product is scalable. Now, what do we understand by scalable products?

We understand that over a period of time the user behaviour shifts, it changes if certain behaviours are met and then future behaviours are unmet. It moves from being met to unmet and that trajectory is what products generally want to take. If you see cars you will see that there are similar platforms on top of which new cars are launched every two three years in succession.

So, if you have a particular model of car it would be released a new model would be released with minor changes with some kind of additions or features into it; this is called scalability of product. So, you ensured that new features, new functions are added to the product so that the customer base that you have for the product does not get disappointed if the existing product does not meet their ever-changing need or ever-changing behaviour.

And therefore, it is important that you define you practice or organize the content in such a way that there is room for scaling up the functions, features of the product in future; that is what we understand by taxonomy development.

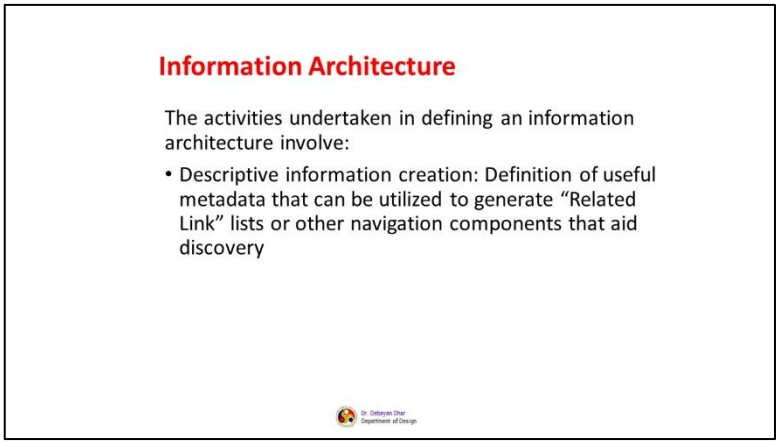
(Refer Slide Time: 18:34)



Now, you can see in the image an example of how contents are being grouped. So, we have products; products can be toys, depth one this is 1st level depth. It has toys and electronics. At the 2nd level depth toys have been classified further into educational and plush.

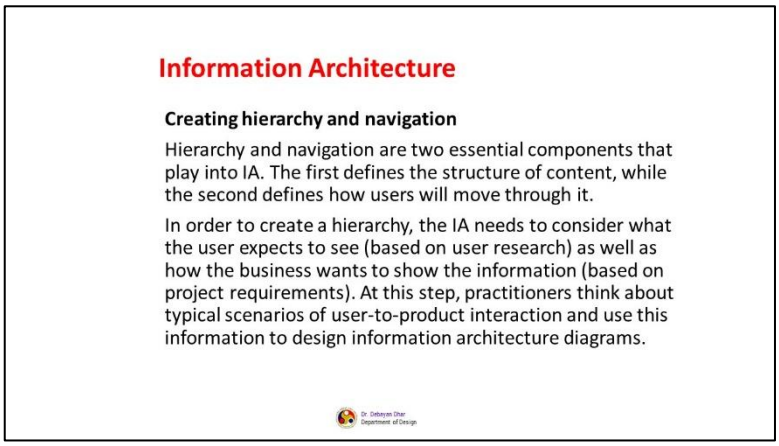
The 3rd level depth the educational toys have been classified further into card games, board games and puzzles. At the 4th level of depth is board games have been classified into age groups and that is one set right. Now, this is an example of a product taxonomy. This is how categorization structuring of information takes place.

(Refer Slide Time: 19:25)



Now, apart from this once the taxonomies are defined one of the important steps there is to describe information creation; that means, definition of useful metadata that can be utilized to generate related links lists to other navigation components that aid discovery.

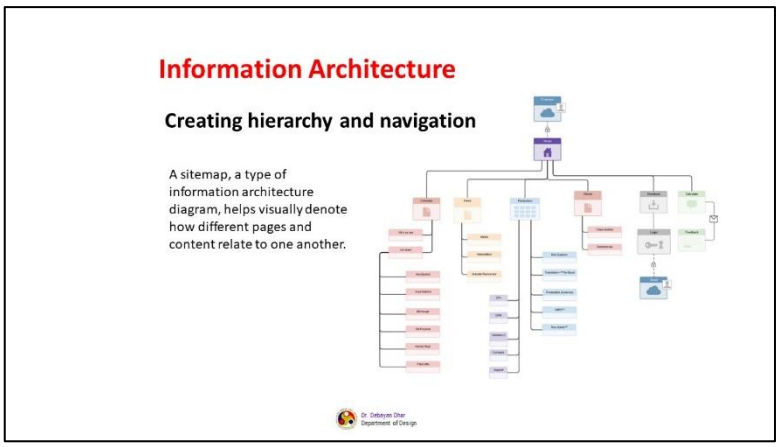
(Refer Slide Time: 19:51)



Once all these things are met, the final focus is then on creating hierarchy and navigation. Now, hierarchy and navigation are two very essential components that play into information architecture. The first defines the structure of the component hierarchy while navigation defines how users will move through it will move from point a to point b.

Now in order to create a hierarchy, the information architect needs to consider what the user expects to see based on user research data as well as how the business wants to show the information and that is based on the product requirements. At this step practitioners think about typical scenarios of user to product interaction and use this information to design information architecture diagrams.

(Refer Slide Time: 21:05)



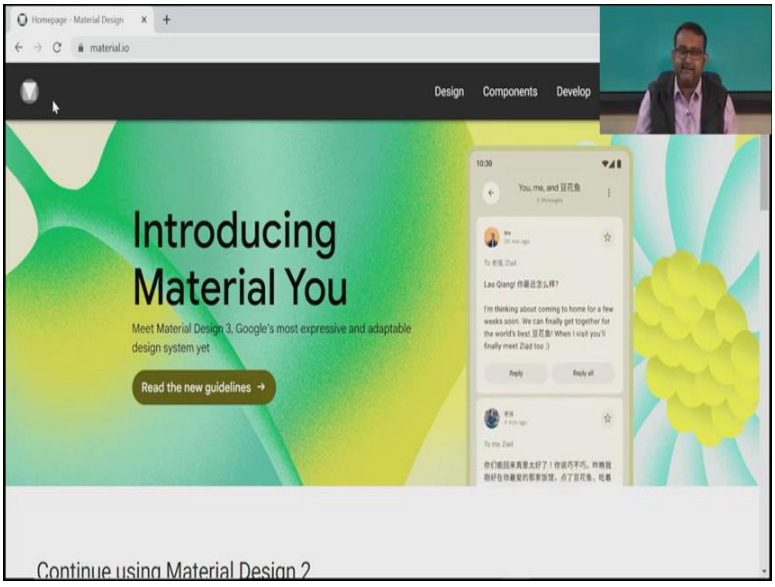
What you see in the next slide is a classic example of a sitemap which is a type of information architecture diagram that tells visually denote how different pages and content

relate to one another. You can see here there is a homepage and these various contents are being listed here.

Although the image is not clear, but what essential it means that each page is designated here. You can see the main page here. From here there is a equal chance of the user to reach page b c three c d e f and all these important pages can be also classified as functions or the features and each function has each sub depths more depths to it; that is how an information architecture is created based on sitemap.

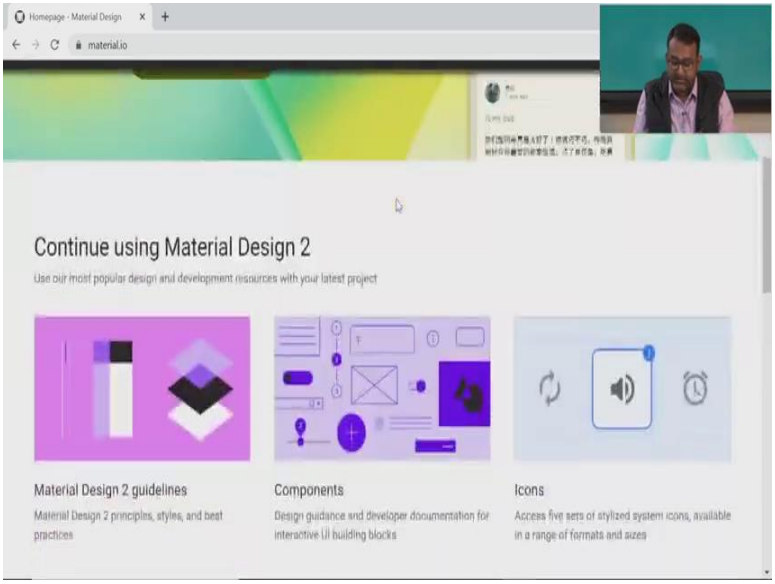
Now after this, what is important for us to understand is how do you create your UIs. See in this course though it is beyond the scope of this course to discuss in detail about the visual aspects of UI design and the user interface design, but I will show you a repository of good documentation of guidelines that would allow you to create user interface elements according particular structure and that would be very realistic in nature. So, let us see that repository.

(Refer Slide Time: 23:00)



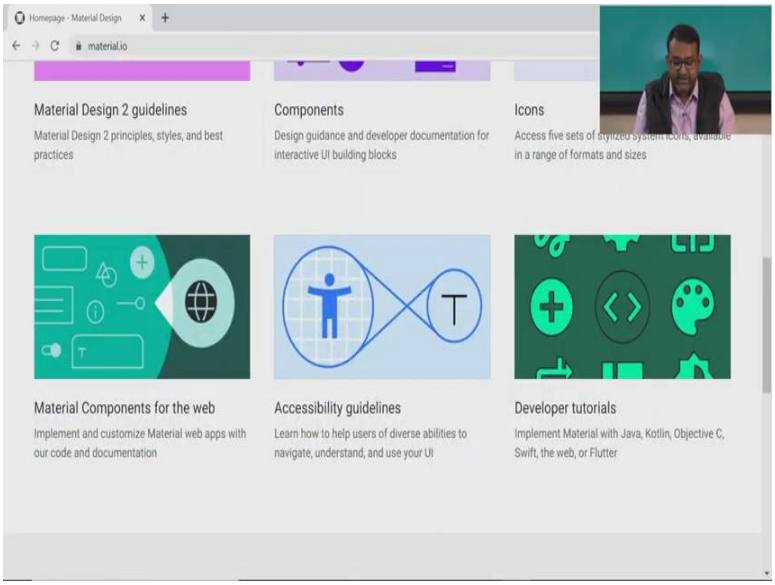
So, what I am going to introduce now to all of you is the material design guidelines, that is a trusted guideline for all UI and UX designers. Now, this is a guideline that has been brought to you by Google and currently we are going to look at the material design 3 guidelines.

(Refer Slide Time: 23:33)

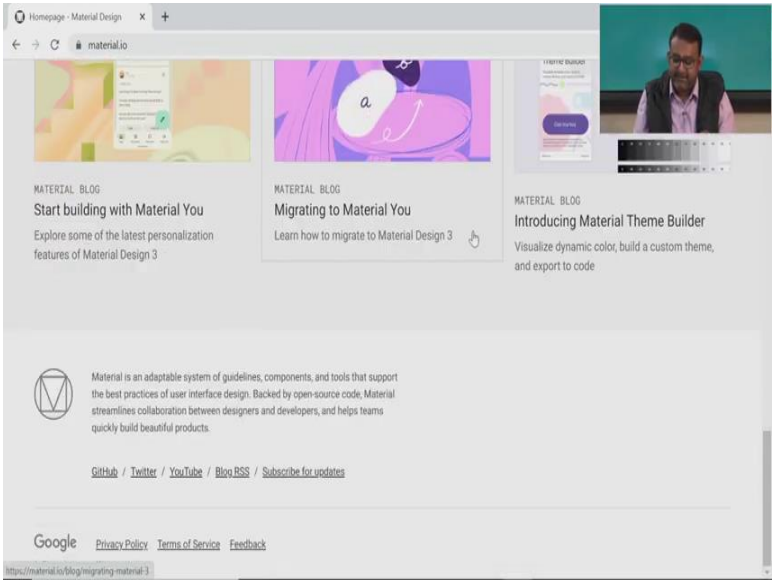


If you type material dot io which you can see here you will get this page and this page is an exciting piece of hosts all exciting information about user interfaces.

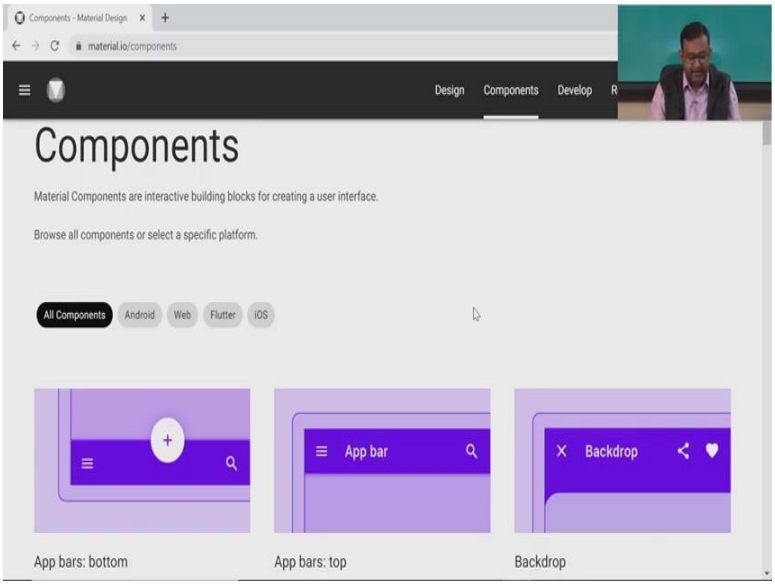
(Refer Slide Time: 23:34)



(Refer Slide Time: 23:36)

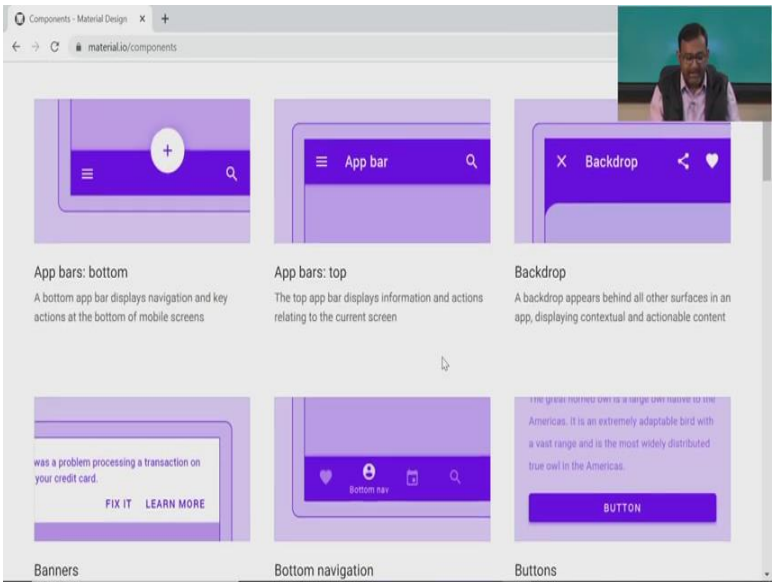


(Refer Slide Time: 23:45)



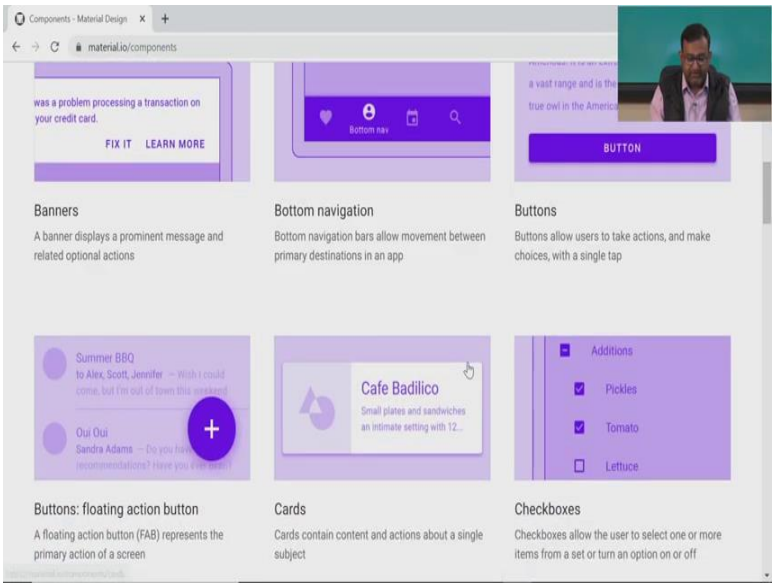
You can go into components.

(Refer Slide Time: 23:55)



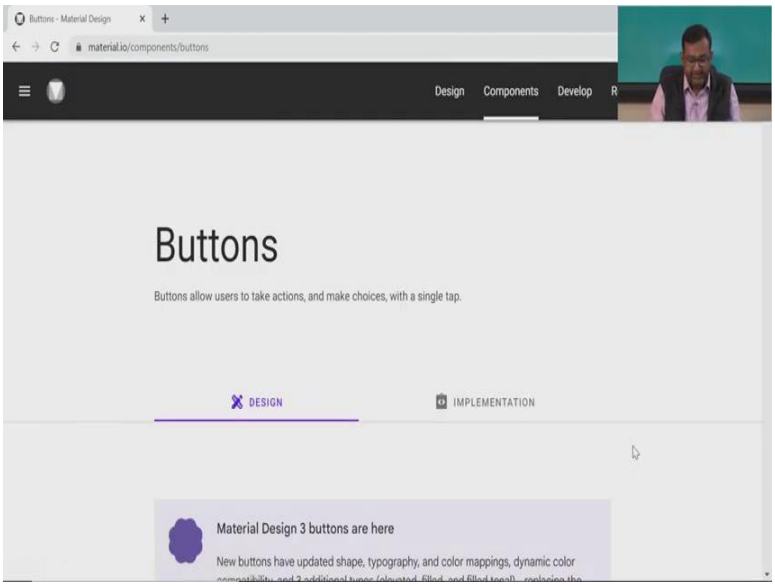
If you click components you will see the building blocks of user interface like application bars in bottom, how do you design that in the top in the backdrop.

(Refer Slide Time: 23:58)

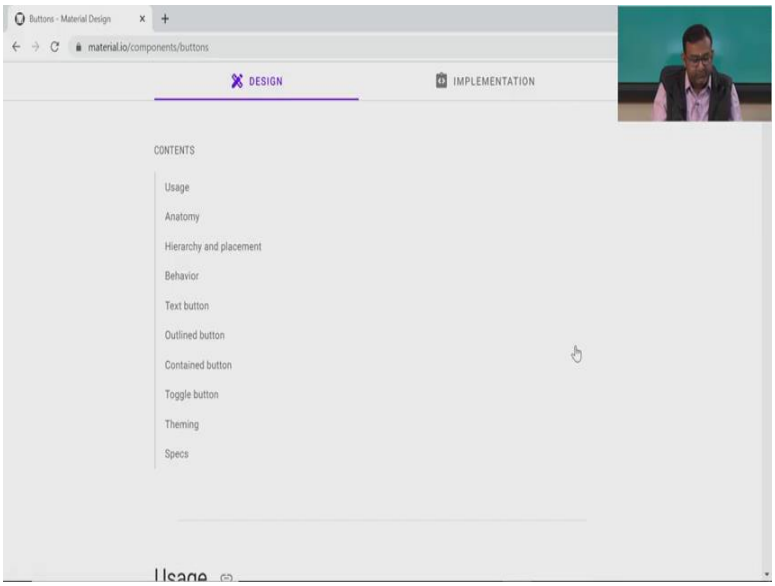


You know banners, bottom navigations, buttons. Just click on any one of them.

(Refer Slide Time: 24:03)

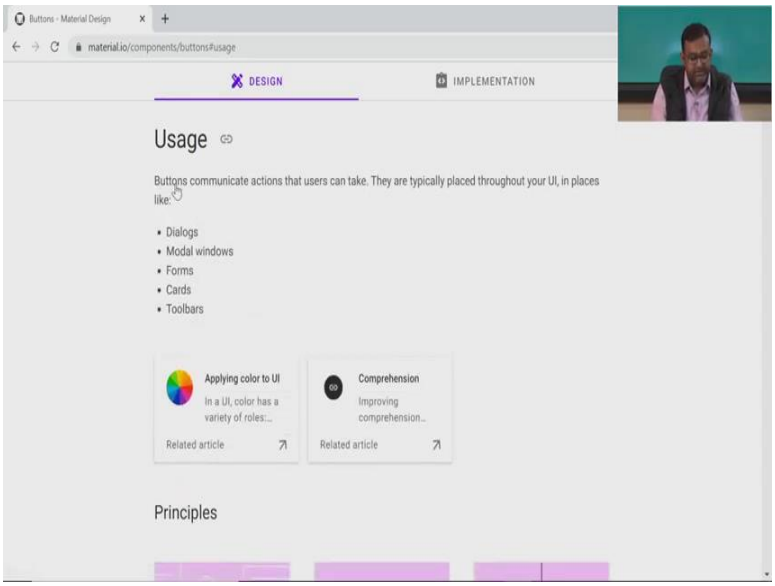


(Refer Slide Time: 24:08)



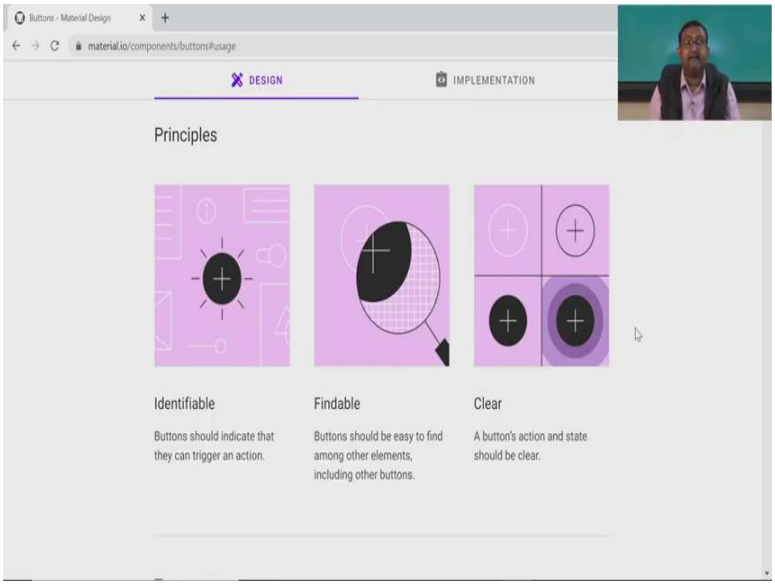
And you can enter for example, you see that this will contain the usage for example, contents list of contents you can see about buttons usage, anatomy, hierarchy placement, text button.

(Refer Slide Time: 24:18)

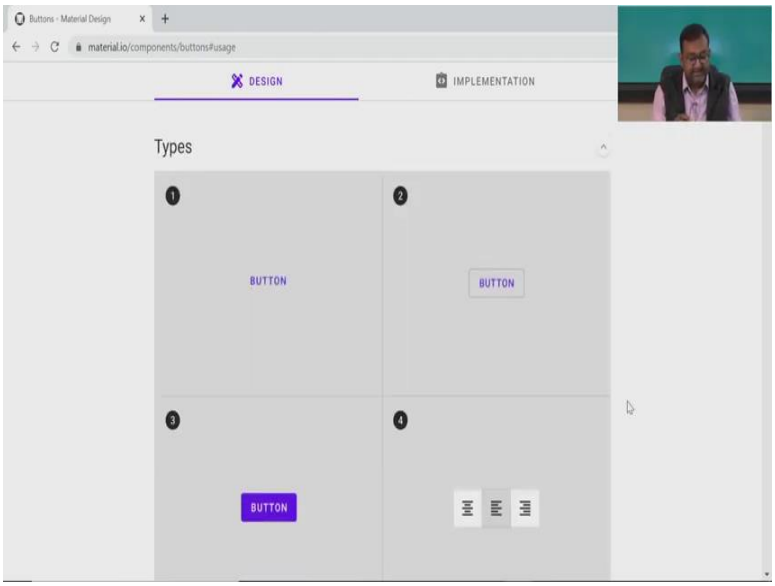


So, for example, you click on the usage and you can read all these extensive documentations like buttons communicate actions that users can take. They are typically placed throughout your user interfaced in places like dialogs, modal windows, forms, cards and toolbars right.

(Refer Slide Time: 24:39)

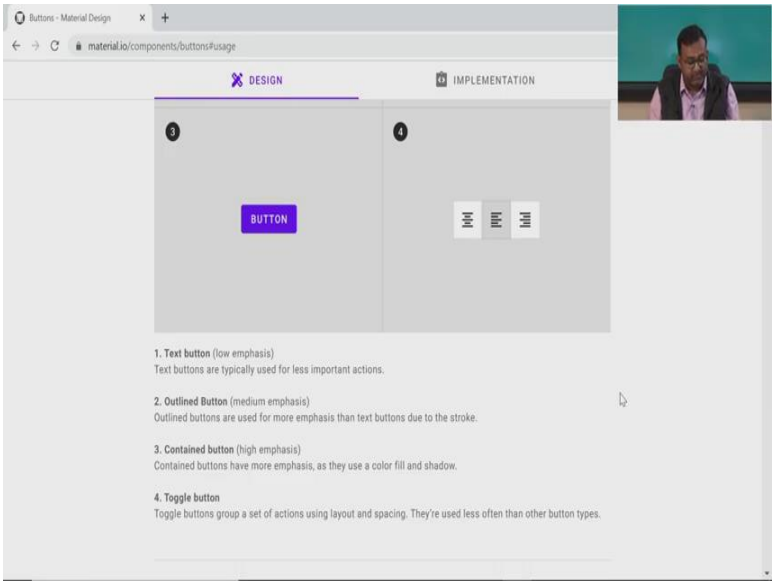


(Refer Slide Time: 24:51)



And the principles are also explained here for example, it needs to be identifiable which you can see here, a findable and clear. And how many different types of buttons you can see here? It is a text based one, it is a button that has a shape also, but the shape is an outline only. In behind it then you have a solid button with a solid shape and then you have the 4th one which is called the toggle buttons.

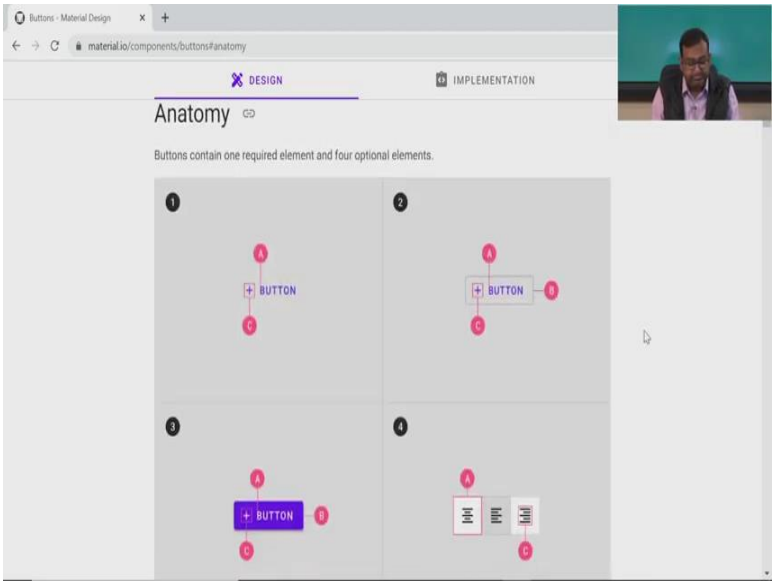
(Refer Slide Time: 25:10)



So, essentially you have 4 categories of buttons; like text button, outlined button, contained button and toggle buttons. And text button are used to provide you know low emphasis,

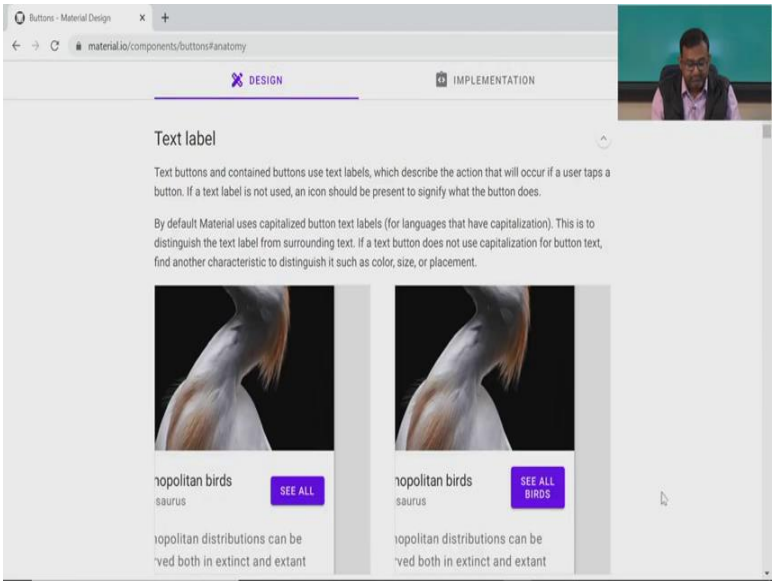
outlined one are the medium emphasis one, the contained are the high emphasis one and the toggle button are the ones it is a set of actions using layout and spacing are used for.

(Refer Slide Time: 25:34)

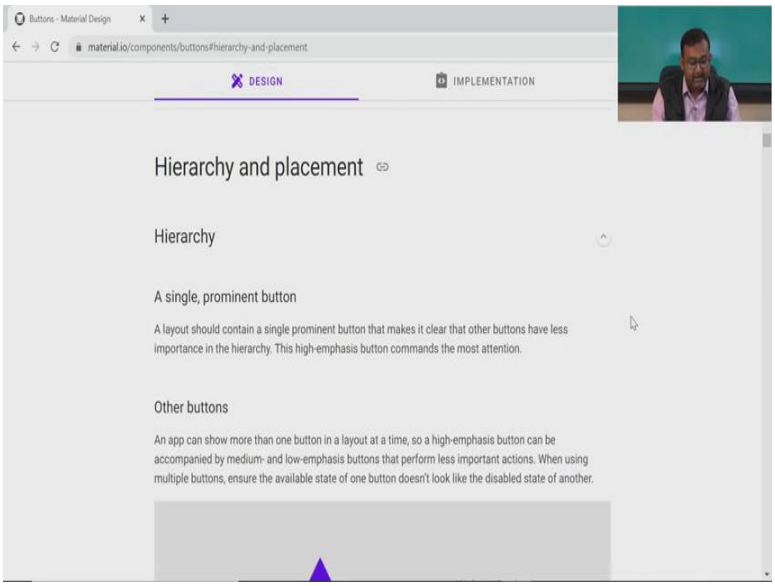


And you can also check out the anatomy of the buttons. For example, you see here like the text button, the outline button, the contained button right and the toggle button its anatomy here.

(Refer Slide Time: 25:48)

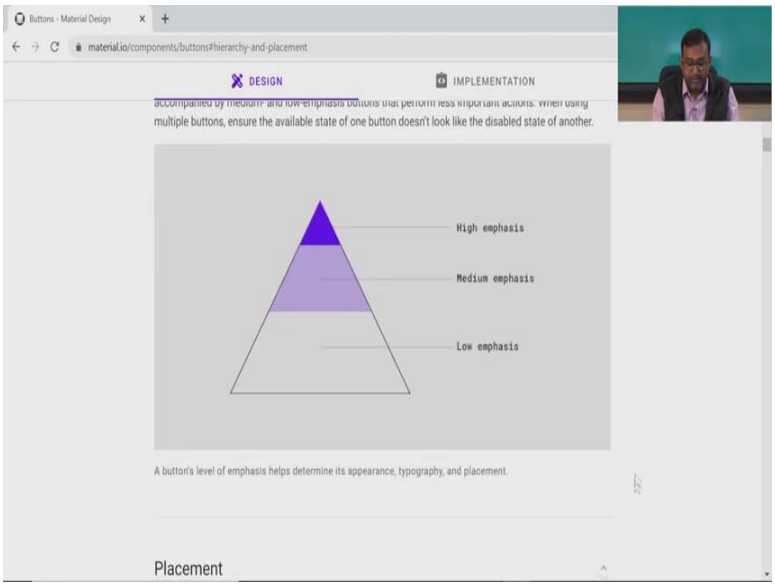


(Refer Slide Time: 25:55)



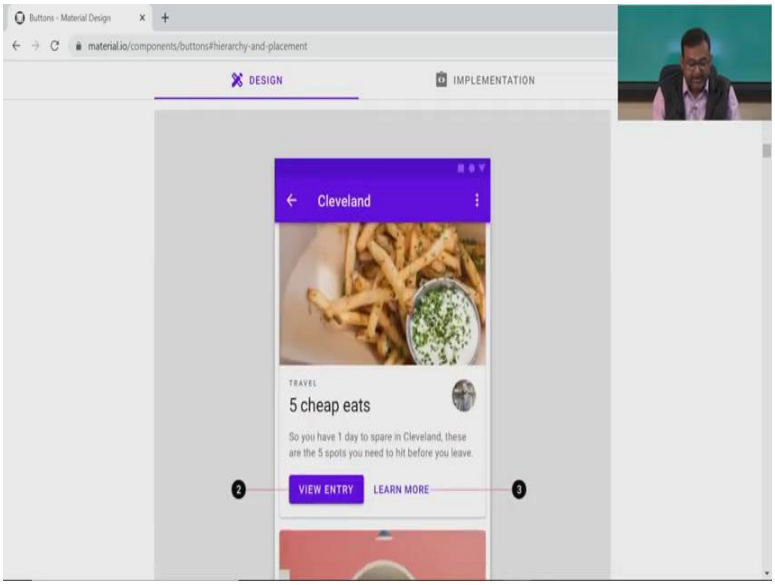
Text labels right like writing see all versus see all birds, how the labels are to be placed.

(Refer Slide Time: 25:57)

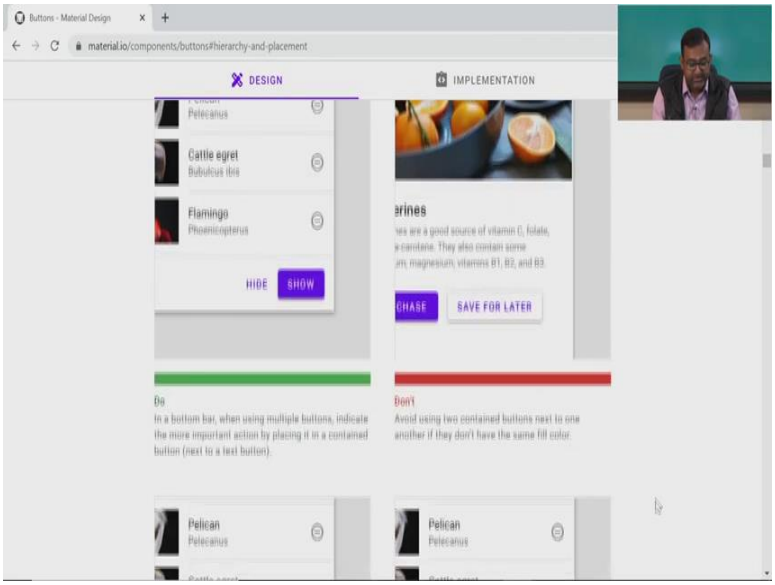


Then hierarchy you know low emphasis, medium emphasis, high emphasis right. Placements where do you put it, right.

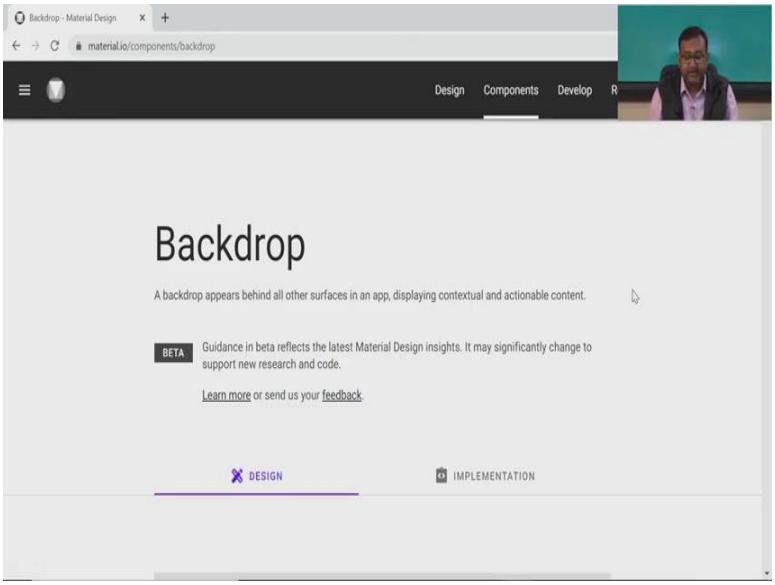
(Refer Slide Time: 26:02)



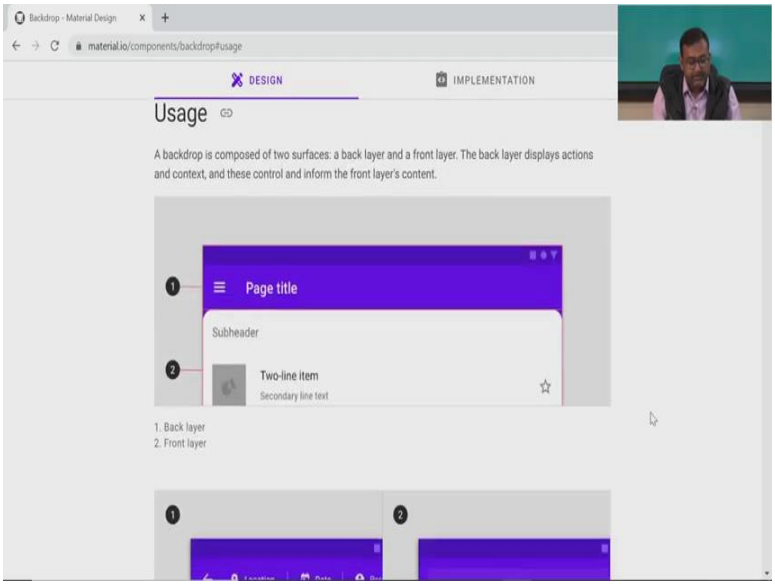
(Refer Slide Time: 26:04)



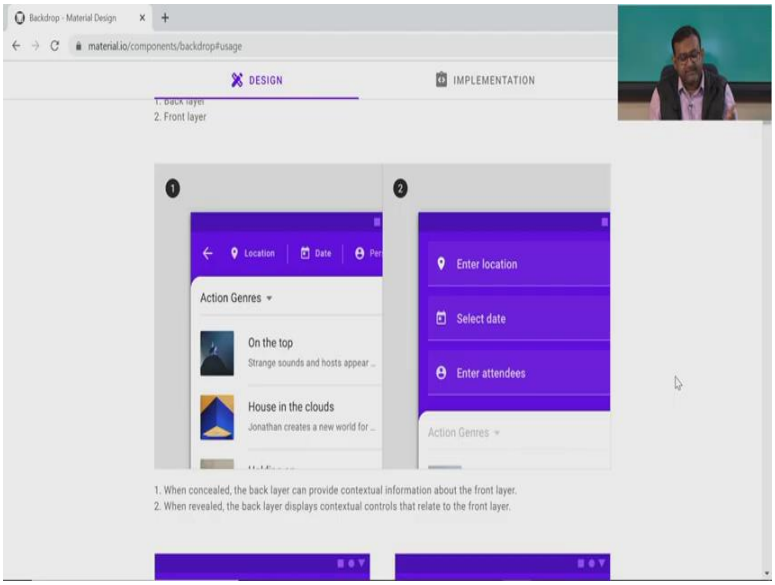
(Refer Slide Time: 26:22)



(Refer Slide Time: 26:27)



(Refer Slide Time: 26:37)

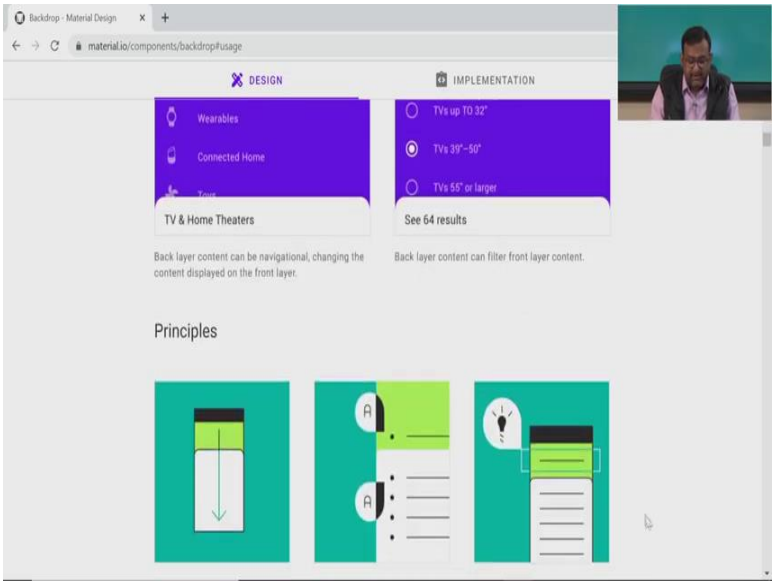


So, this is an exciting piece of information that have been presented summarized and presented by Google and this is available for free. All of you guys can look at it really refer to it when you are designing for the interface. Now, we are looking at the backdrop aspect where you can see the when how backdrops are used what are the usages, how the back layers are defined the front layers.

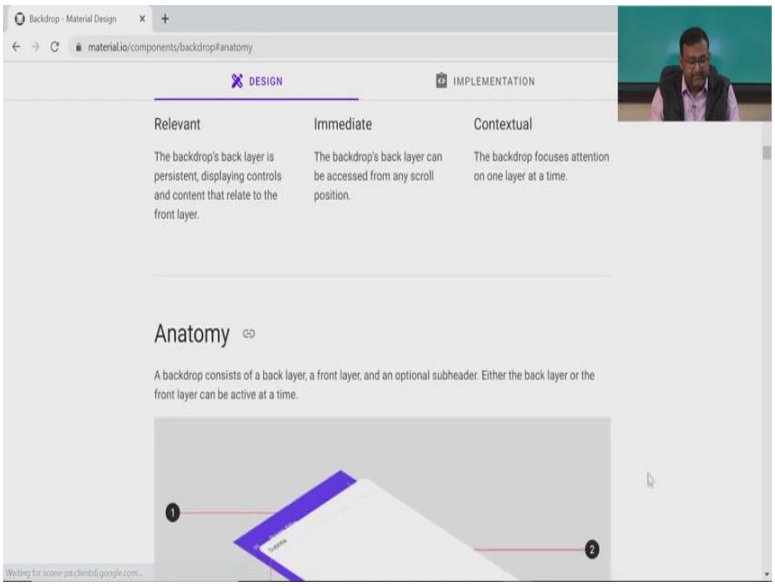
Essentially these material design layouts are you can see these things very prominently in mobile screens as well as tablet screens. But this can also be used as a guideline for your desktop applications you know. Now, material design guidelines are being extensively used in software design as well in standalone software.

So, you need not think that these are only for mobile applications. Essentially this can be used for all types of software; be it web, be its mobile based, be desktop based anything right.

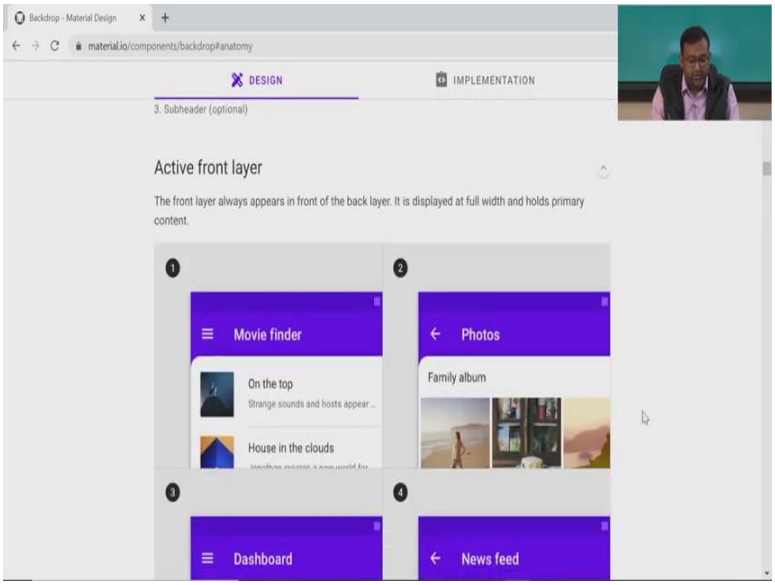
(Refer Slide Time: 27:13)



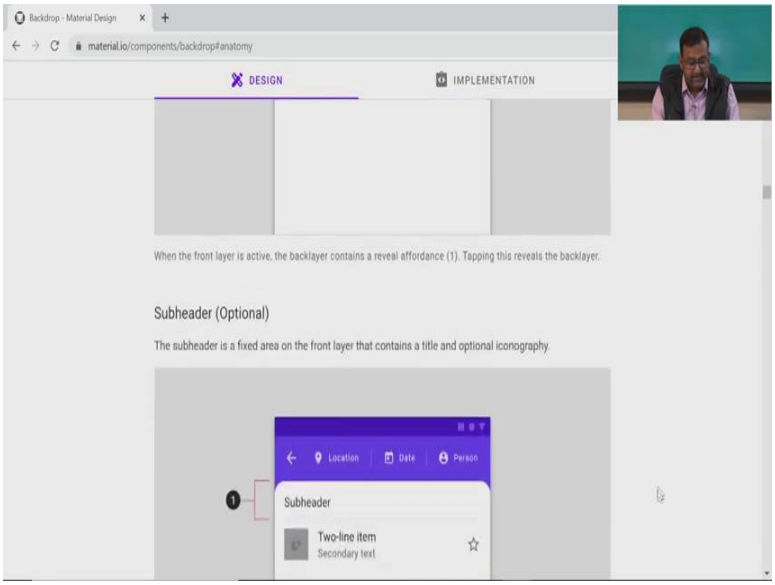
(Refer Slide Time: 27:16)



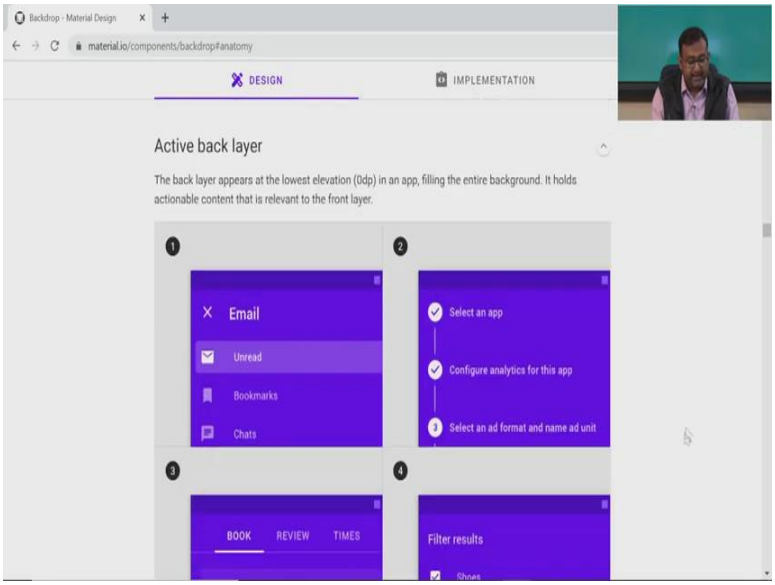
(Refer Slide Time: 27:20)



(Refer Slide Time: 27:22)

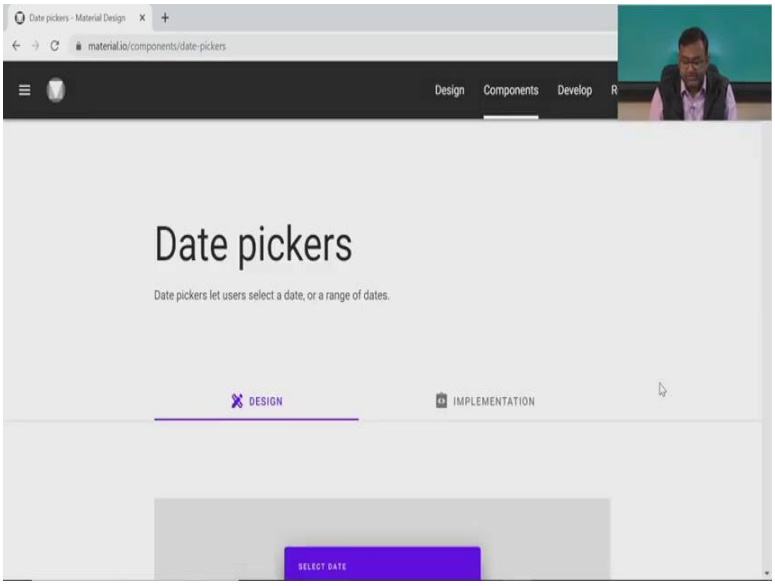


(Refer Slide Time: 27:30)



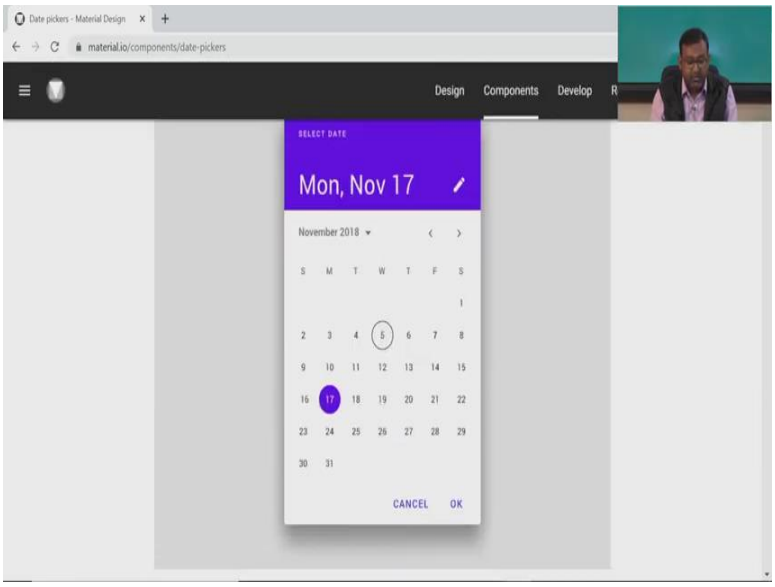
So, in case of backdrop you can see all the principles are related here, the anatomy is given, the active front layer how it has to be there right and sub header how it is placed here everything is given in detail active back layer right. So, I would encourage each one of you to go through this important piece of information which Google has brought for all of us and you can see how things are being generally practiced in the UI practices that are being generally continuing in the industry.

(Refer Slide Time: 27:53)

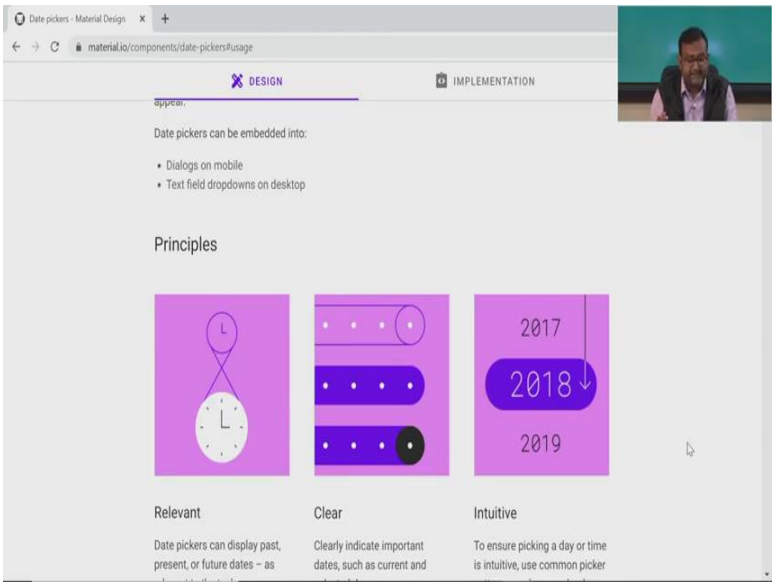


For example, date pickers.

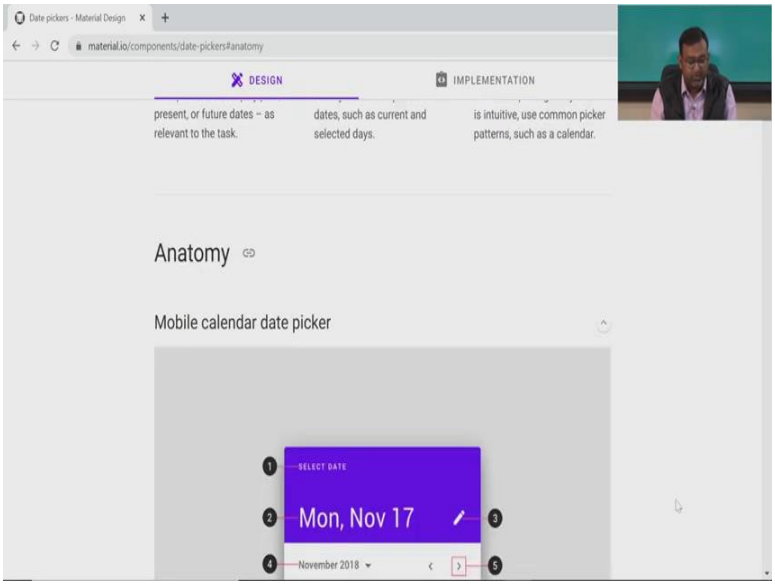
(Refer Slide Time: 27:57)



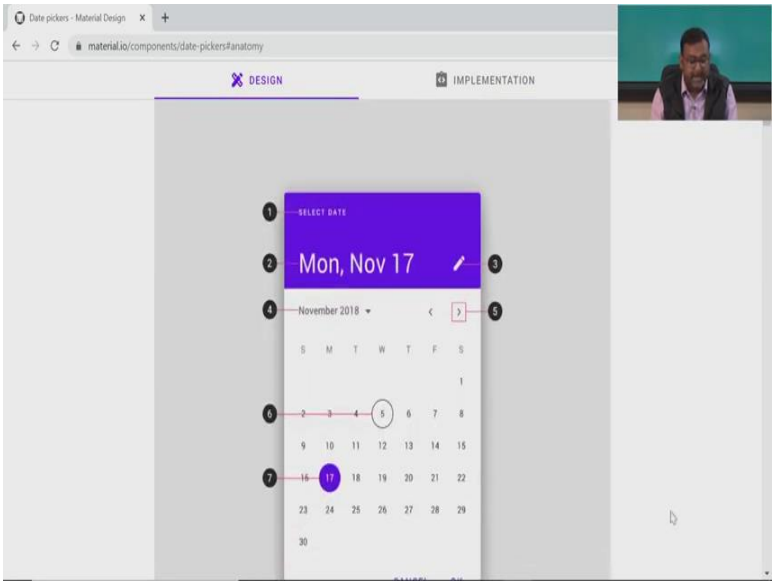
(Refer Slide Time: 28:00)



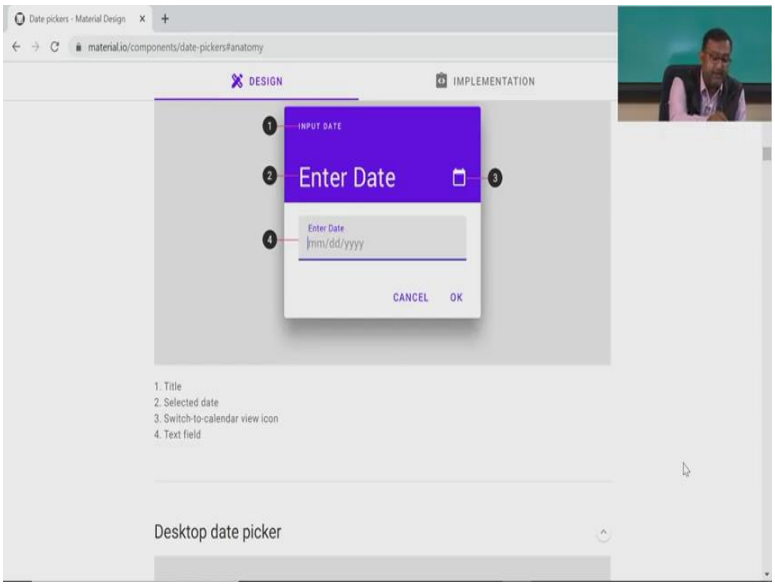
(Refer Slide Time: 28:03)



(Refer Slide Time: 28:04)

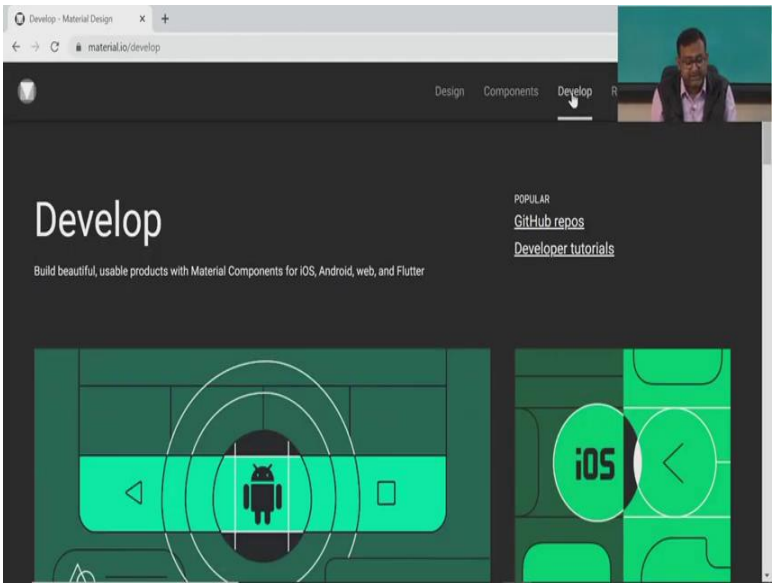


(Refer Slide Time: 28:14)



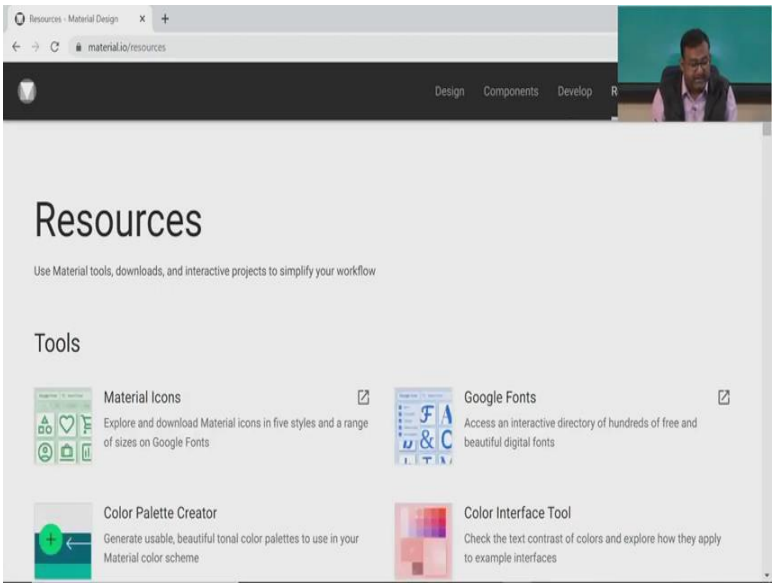
How do you have a date picker, what is the size of it, in which context it is being used, what are the principles that it should follow, what are the anatomies, what are the hierarchy generally it has, all these things are clearly mentioned here.

(Refer Slide Time: 28:19)

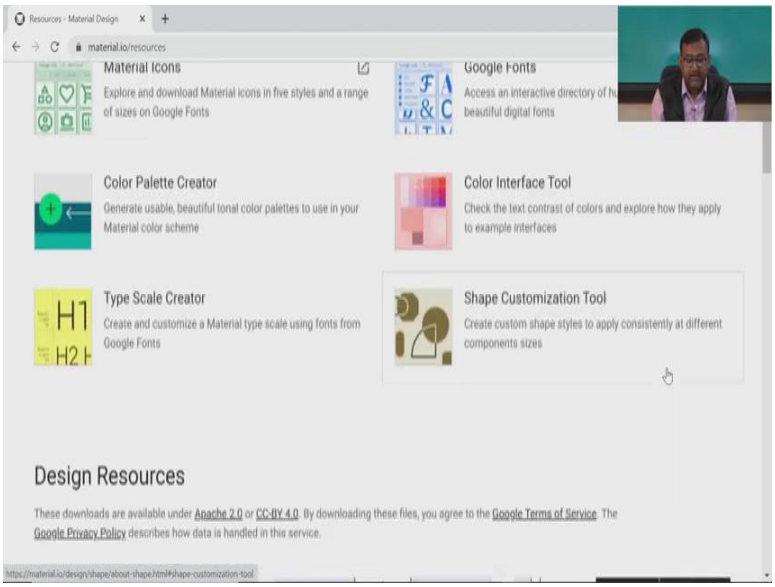


So, you ensured that you follow Google material design to its fruitfulness and then you have a lot of resources as well as for example, if you want to develop certain things you have this GitHub repos and developer tutorials also for that.

(Refer Slide Time: 28:29)

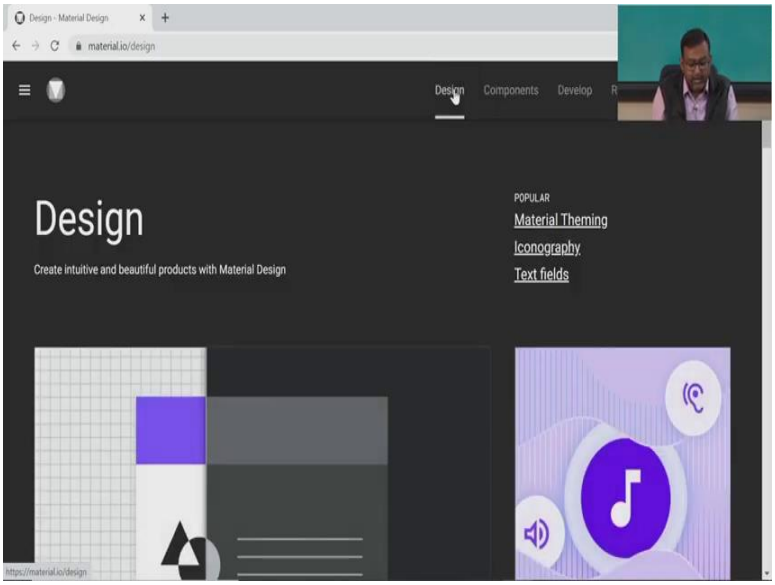


(Refer Slide Time: 28:33)



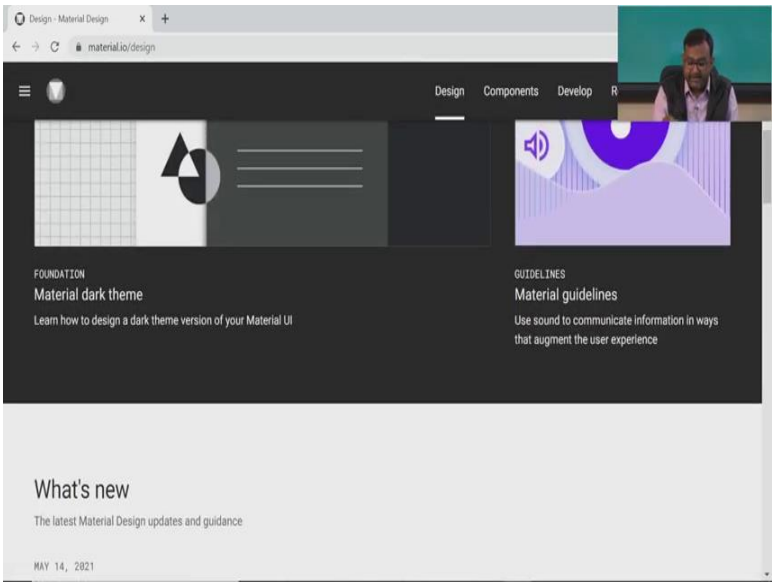
Apart from that you have resources like Material Icons, Google Fonts, Color Interface Tool, Color Palette Creator, high Type Scale Creator, Shape Customization Tool; all these things can be explored as well right.

(Refer Slide Time: 28:46)



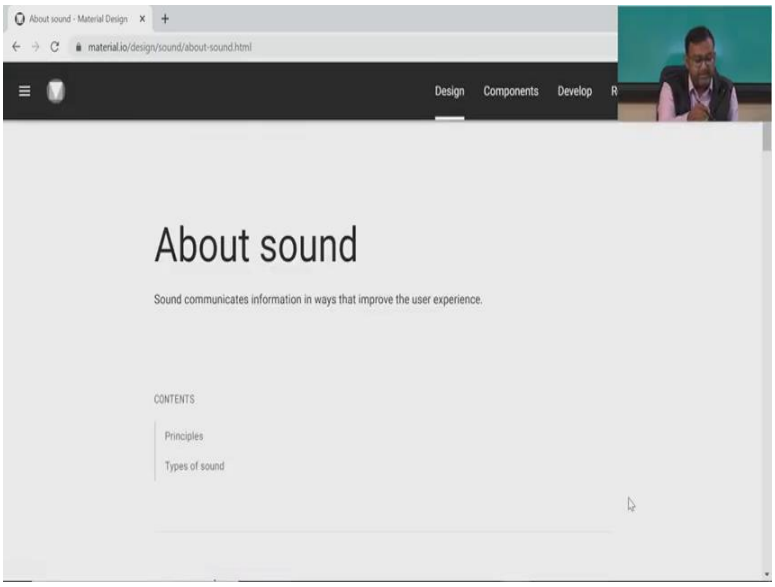
Now, let us go into the design aspect of it.

(Refer Slide Time: 28:51)



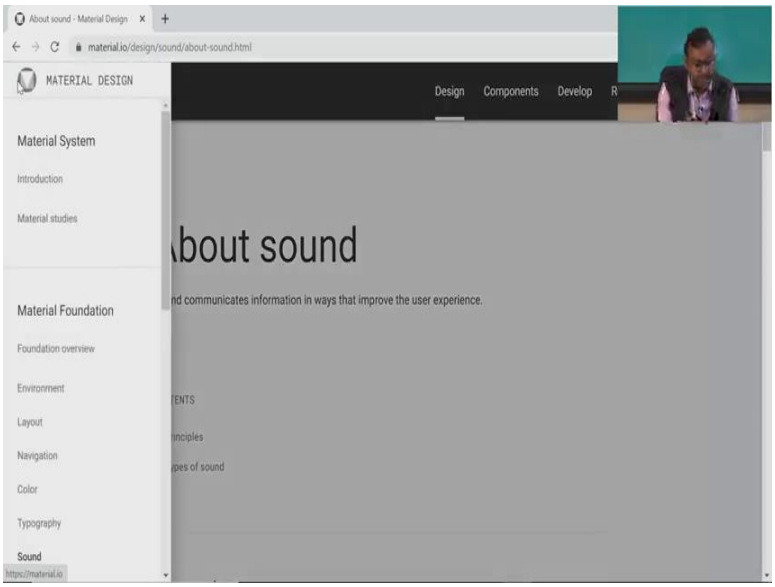
So, here you can see material guidelines.

(Refer Slide Time: 29:00)

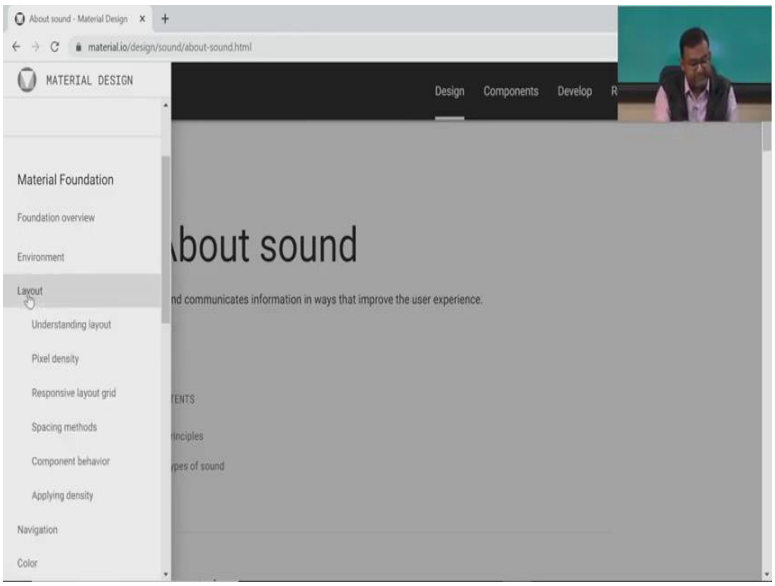


If I click at the guidelines what it will happen is that I will enter about the first principles about sound. Let me just check it out.

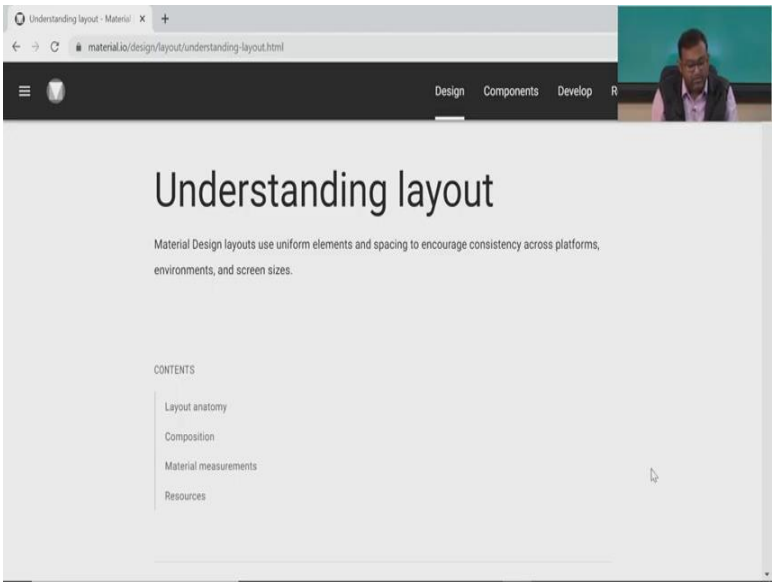
(Refer Slide Time: 29:04)



(Refer Slide Time: 29:06)

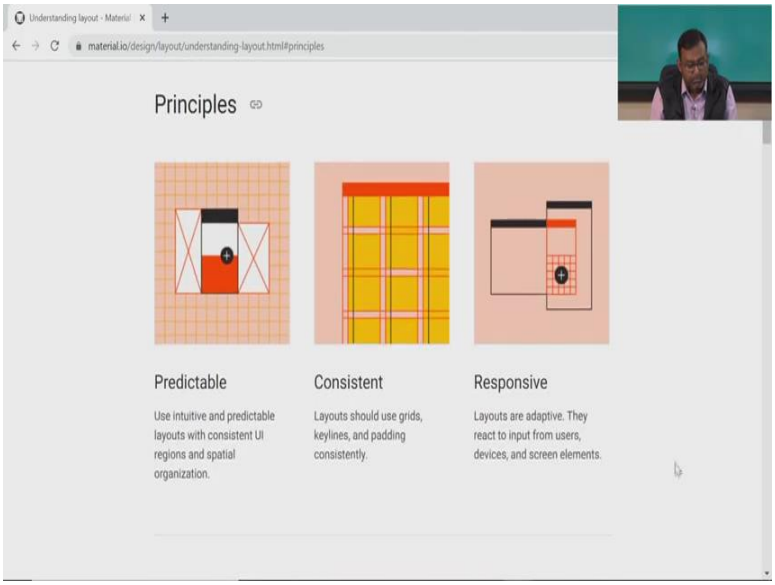


(Refer Slide Time: 29:09)

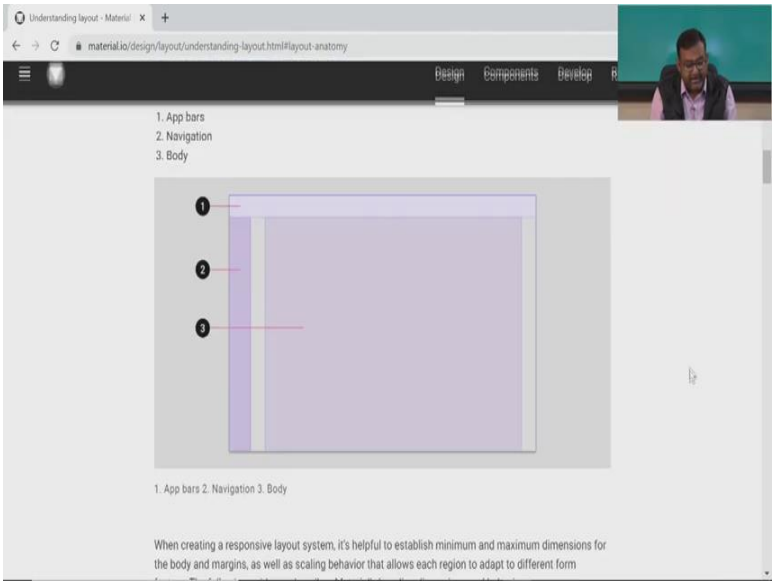


Let me start with layout first, understanding layout see. So, now, this section is devoted on layout.

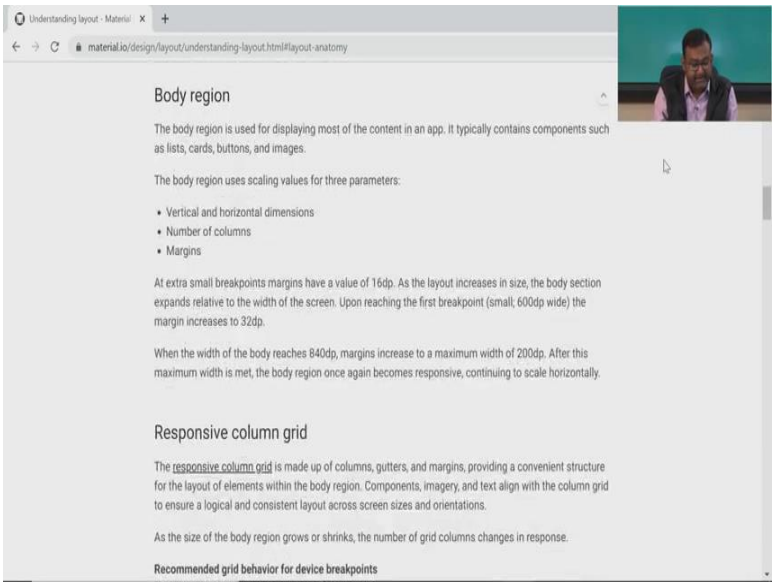
(Refer Slide Time: 29:15)



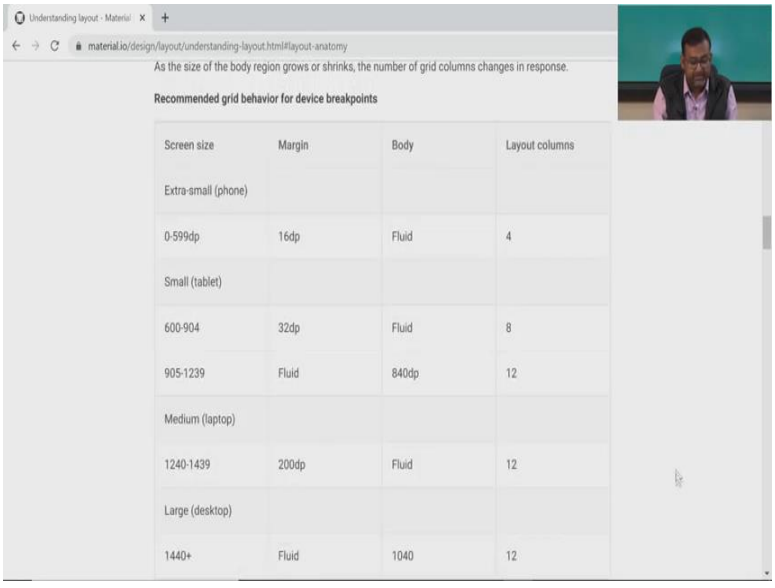
(Refer Slide Time: 29:21)



(Refer Slide Time: 29:23)

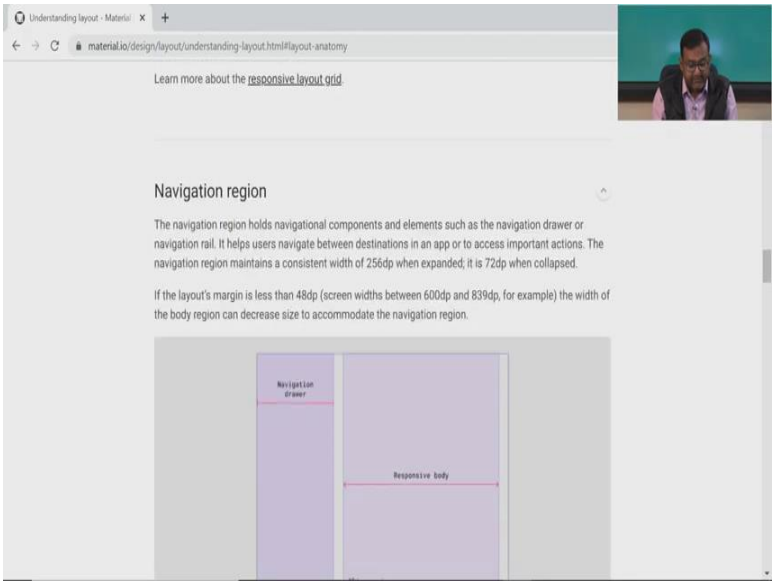


(Refer Slide Time: 29:25)

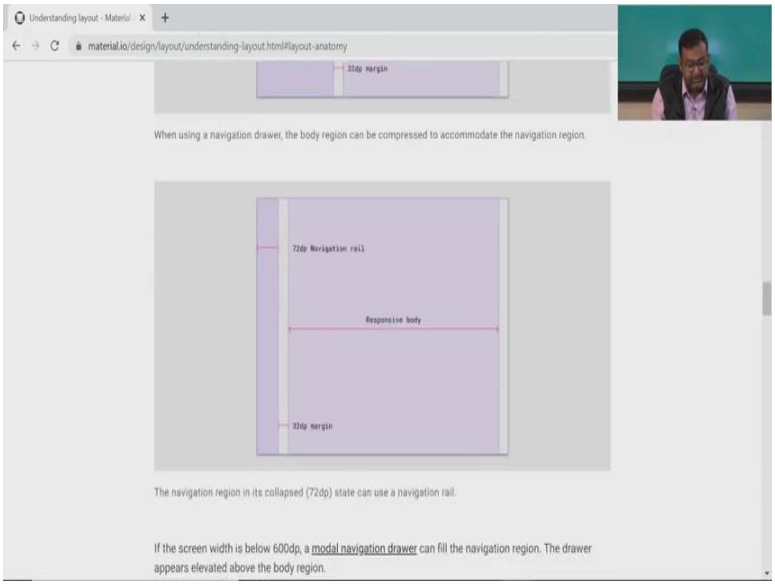


So, what are the layout anatomy composition right. Application bars, navigation body and then the body region, responsive column grid right everything is given here in terms of the size also the screen size right, navigation region right.

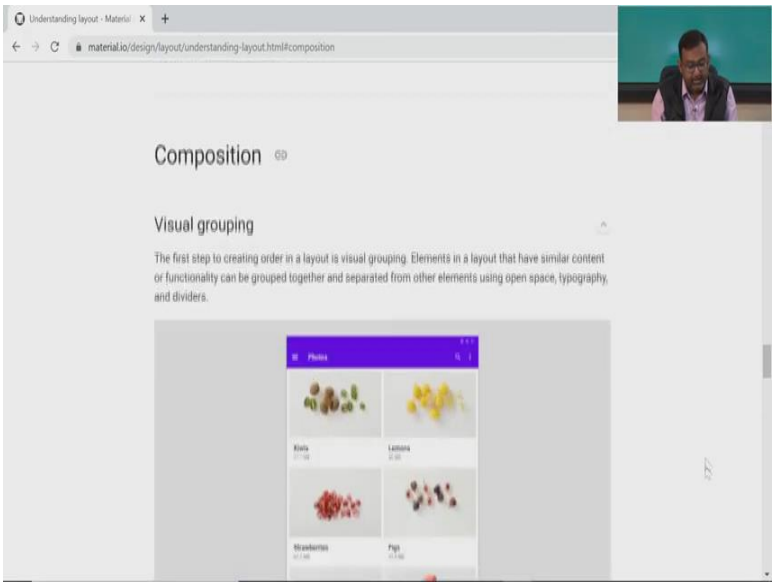
(Refer Slide Time: 29:33)



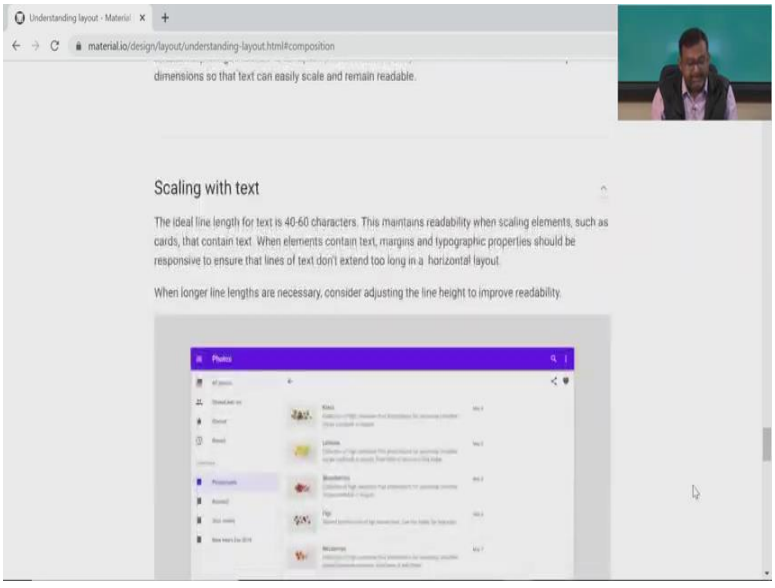
(Refer Slide Time: 29:34)



(Refer Slide Time: 29:35)

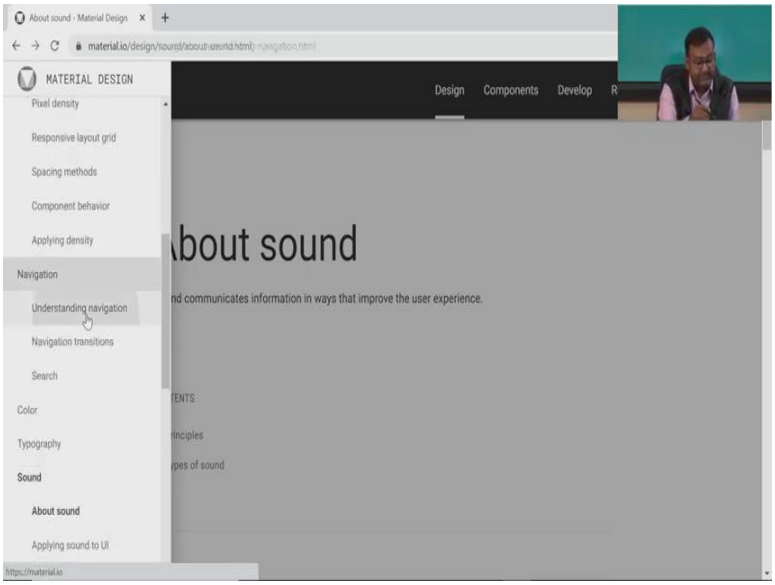


(Refer Slide Time: 29:38)

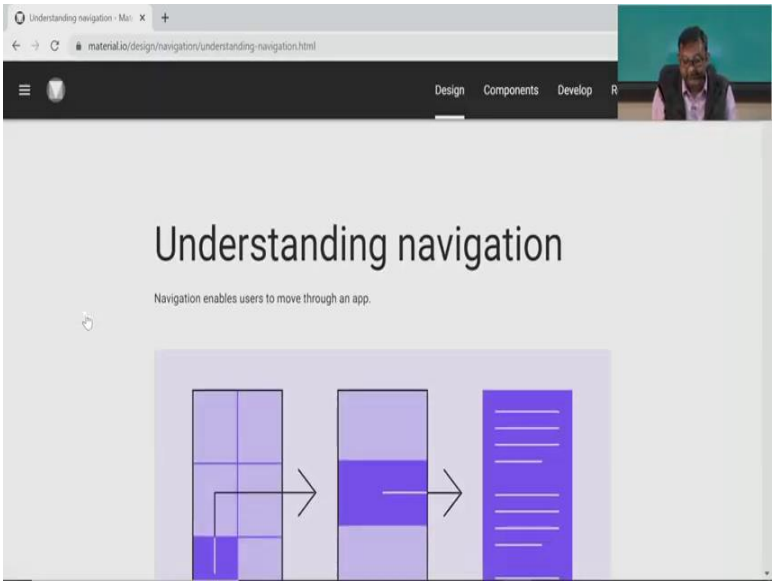


How do you compose, containment, scaling with text; so, this is a very very good repository for all of you to refer to and learn the user interface activities, design activities.

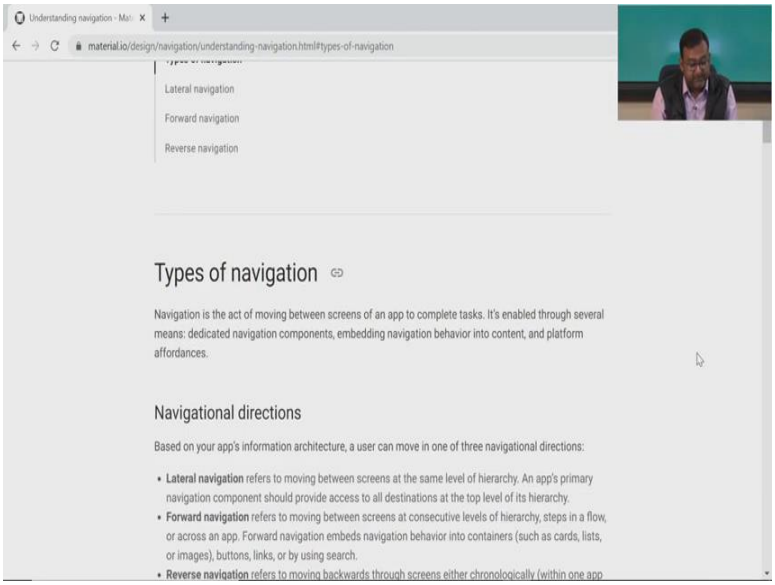
(Refer Slide Time: 29:51)



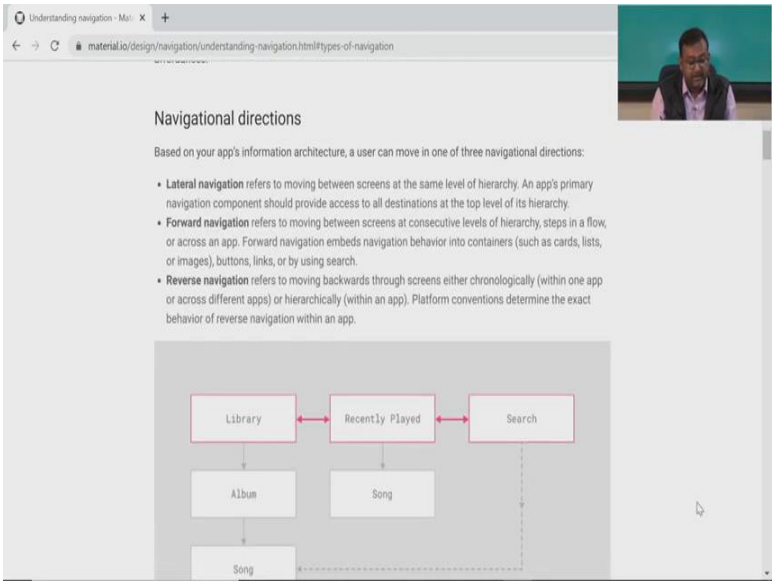
(Refer Slide Time: 29:55)



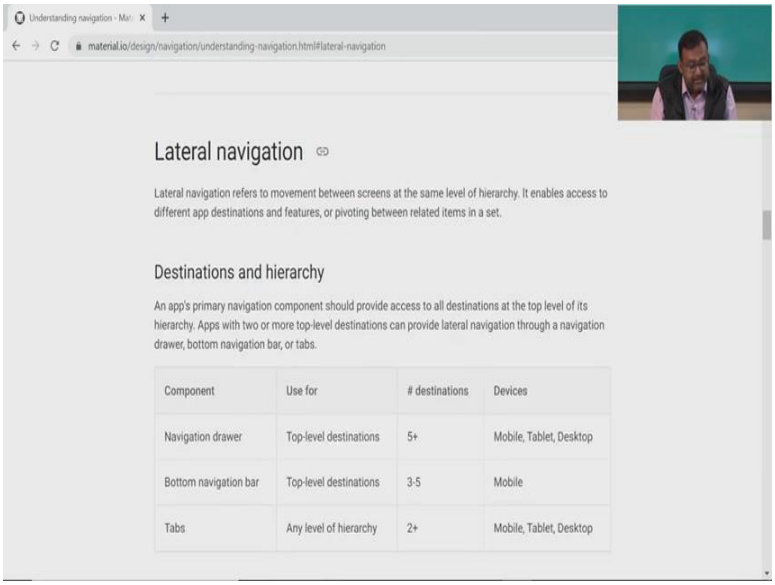
(Refer Slide Time: 29:59)



(Refer Slide Time: 30:05)

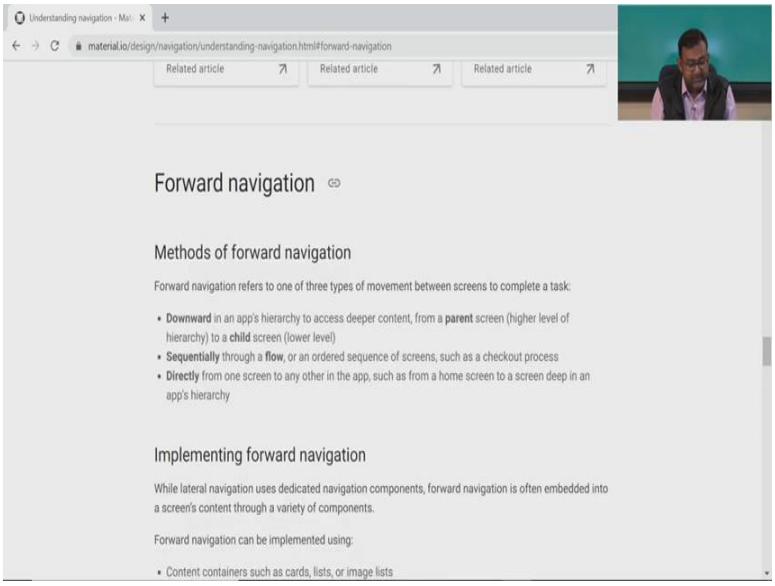


(Refer Slide Time: 30:12)

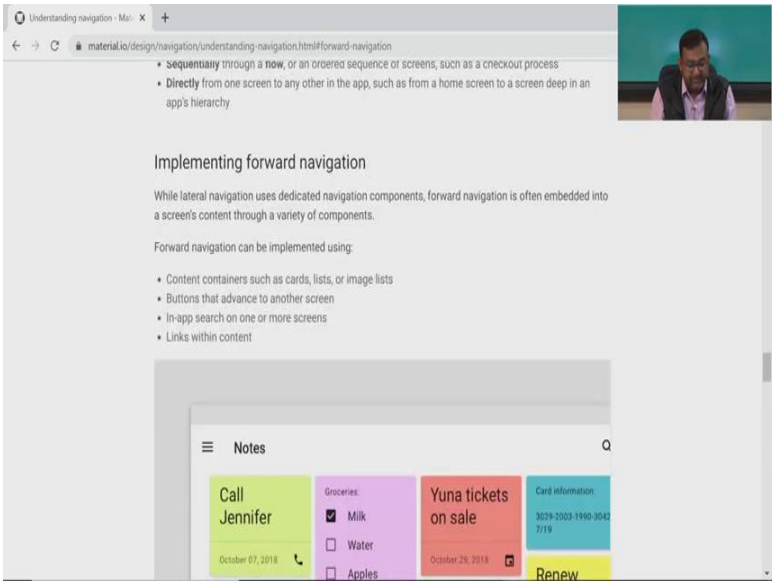


And then we can also learn about navigation no, understanding navigation which we have just discussed now. You know types of navigation for example, you have lateral navigation, you have forward navigation, you have reverse navigation right and the examples are given very rightly here, the contexts at which lateral navigations are used.

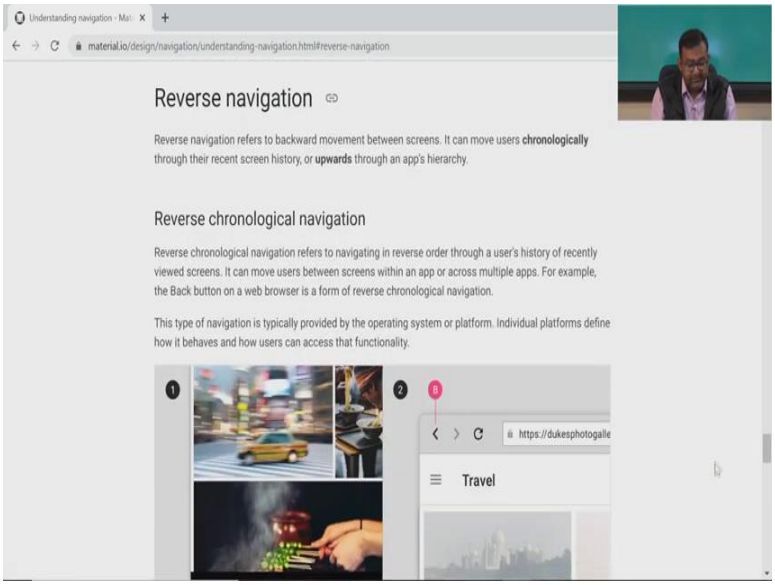
(Refer Slide Time: 30:22)



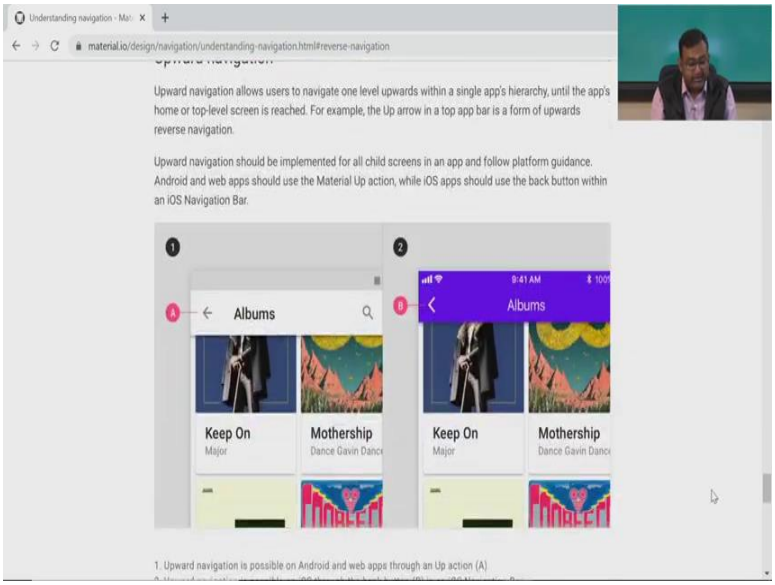
(Refer Slide Time: 30:24)



(Refer Slide Time: 30:27)

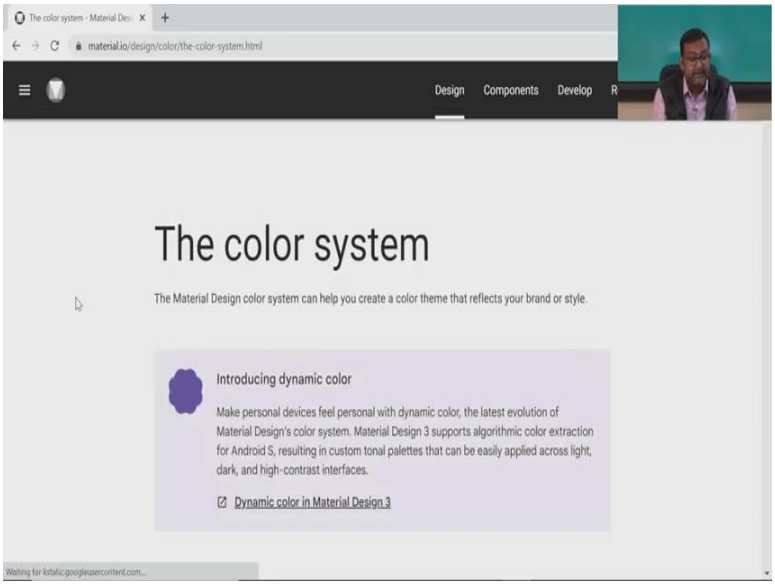


(Refer Slide Time: 30:30)



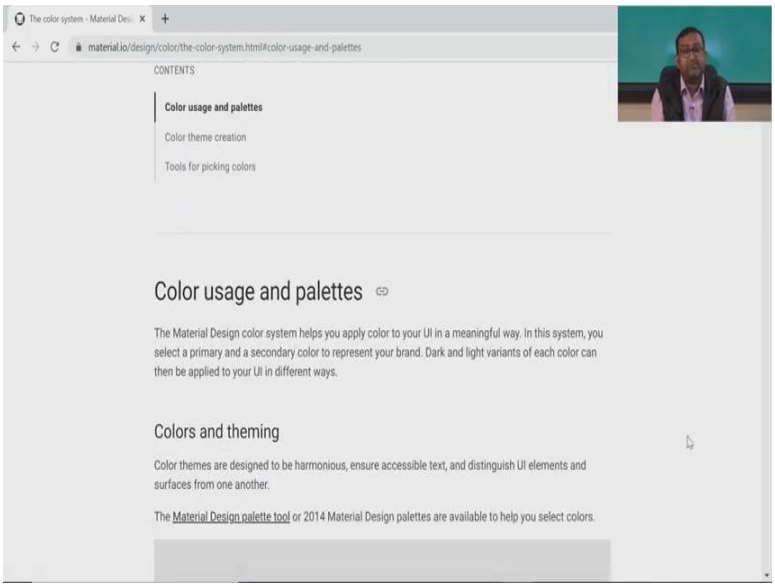
Some examples of it have been also placed here right. You can see the examples where forward navigation can be used right. There are some examples for reverse navigation also when at what context it has to be used, when does somebody use a reverse navigation so on and so forth. So, these are very very essential and very useful tools for your user interface design.

(Refer Slide Time: 30:48)



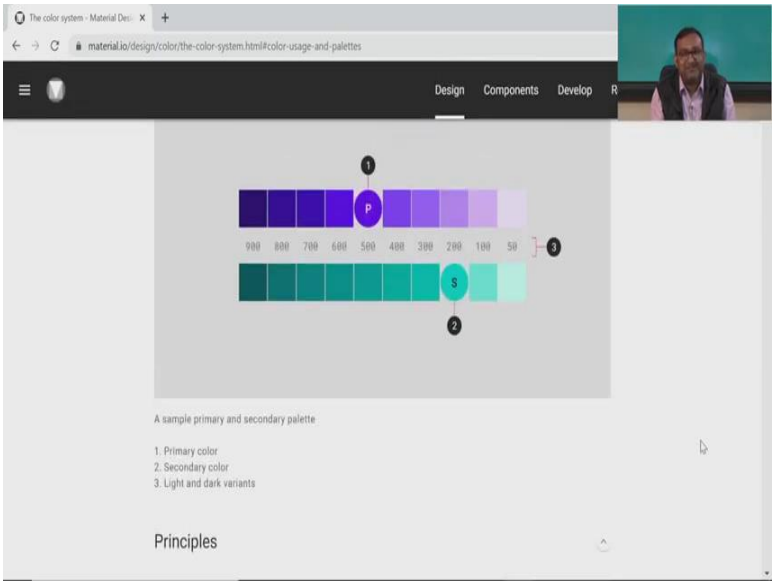
You also get a good repository on colours you know. majority of us are afraid of colours. I am sure that engineers I have seen including myself we hesitate to use a lot of colours in our UI, but we tend to keep it very simple and very pale interface.

(Refer Slide Time: 31:10)



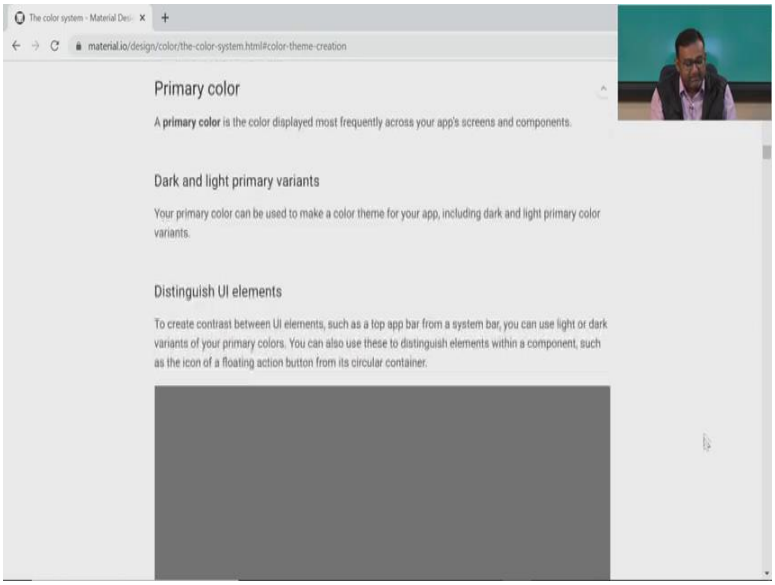
But we will see here how colors plays a major role in ensuring that the engagement of the user happens and it becomes delightful experience.

(Refer Slide Time: 31:16)

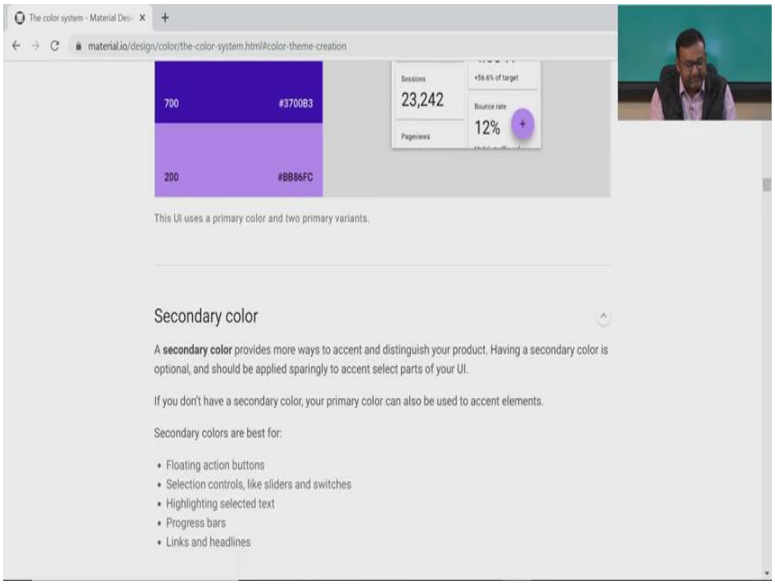


So, the principles of colours are there, the baseline materials, primary colours, UI elements right, secondary colour right.

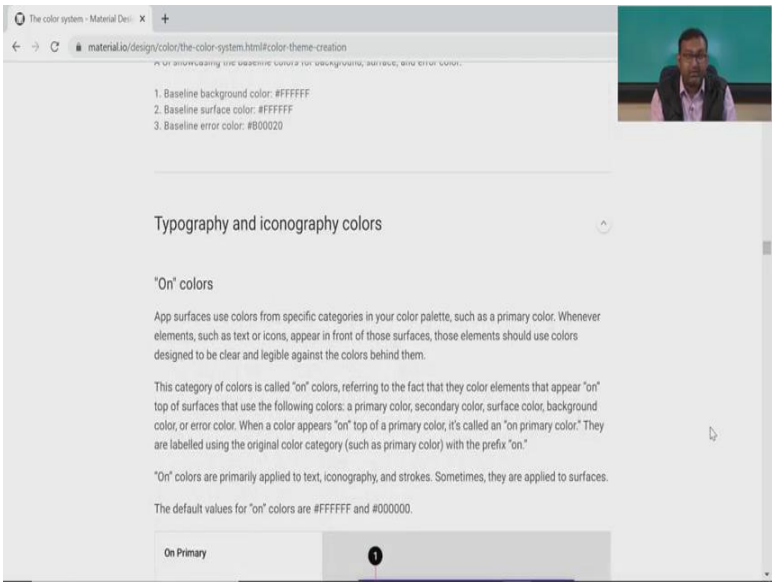
(Refer Slide Time: 31:23)



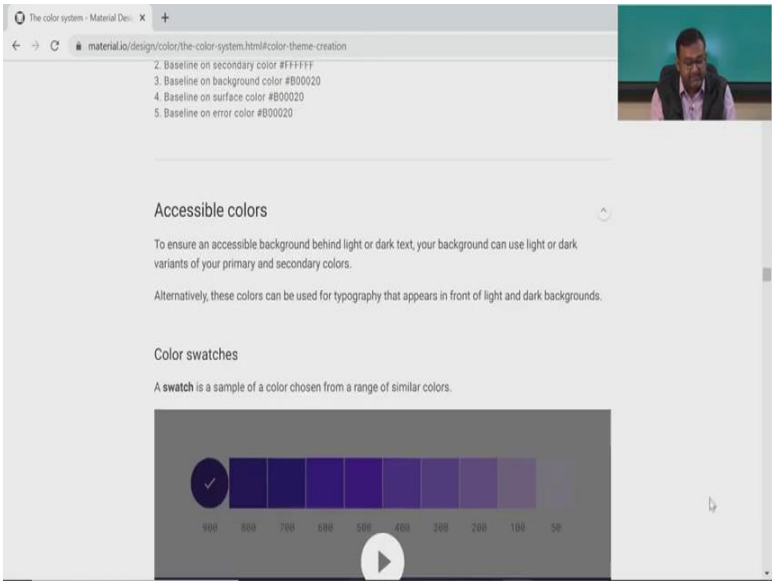
(Refer Slide Time: 31:27)



(Refer Slide Time: 31:33)

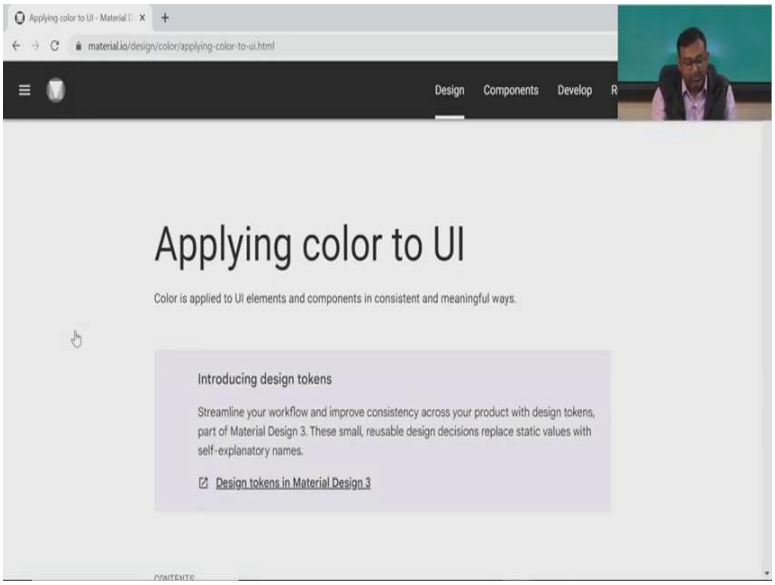


(Refer Slide Time: 31:38)



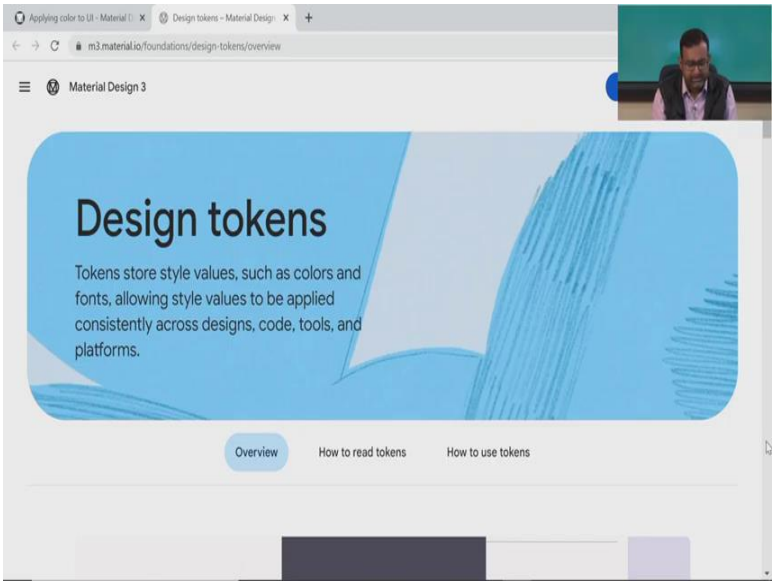
If you see that there are primarily two colours; the primary one and the secondary one that is used colours which are used for active buttons, accessible colours all these different discussions on colours are also here right.

(Refer Slide Time: 31:46)

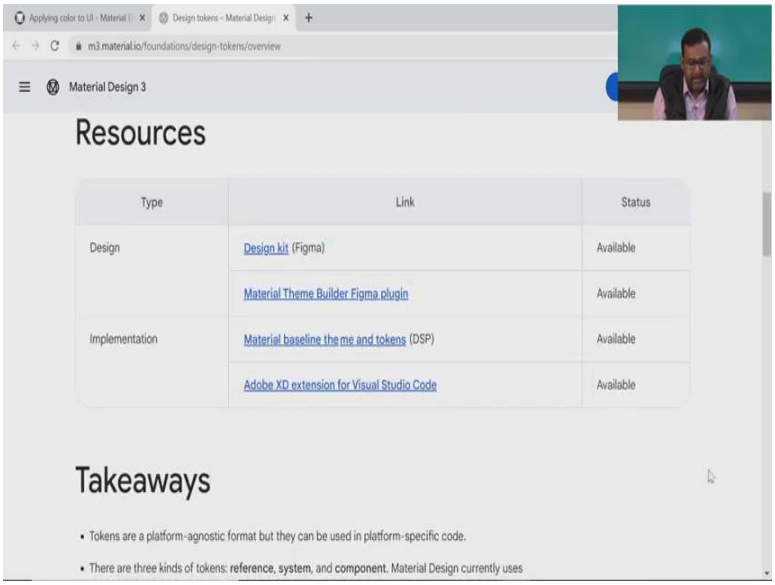


Applying color to UI, if you go here you can see let me just see what design tokens and material design means. It opens up completely a new site.

(Refer Slide Time: 31:55)

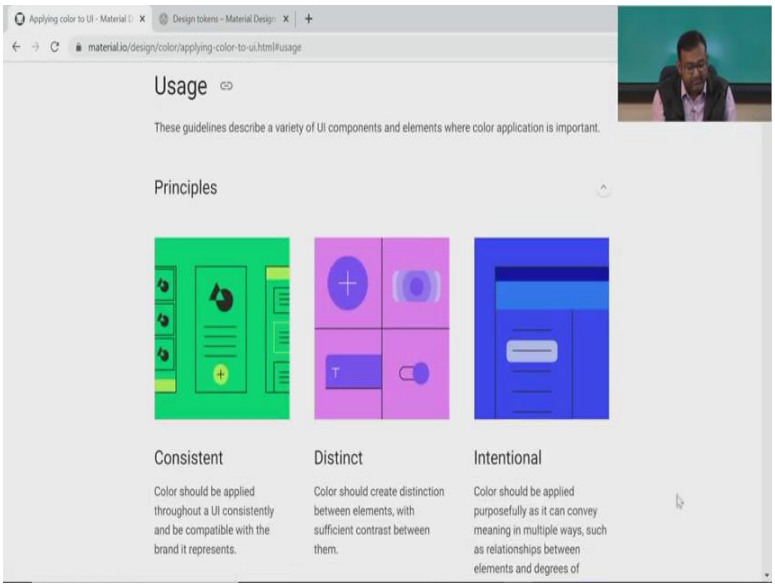


(Refer Slide Time: 32:01)

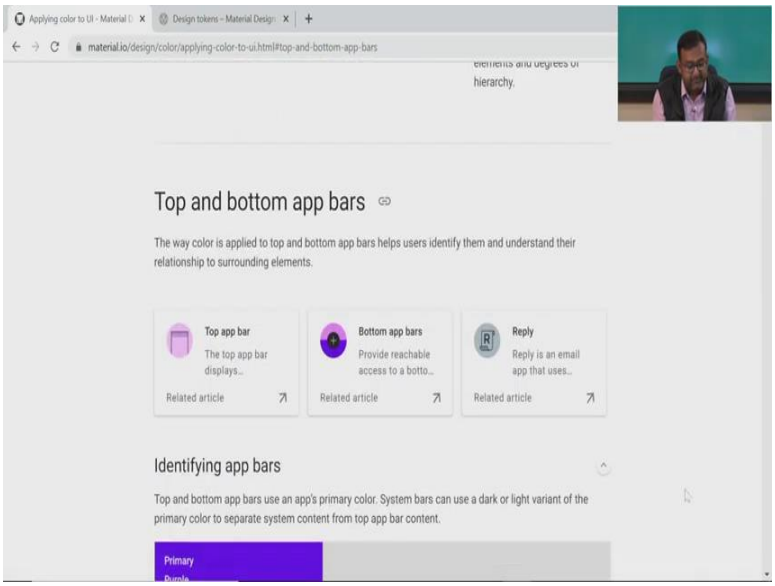


This is probably more into yeah. So, you can see the design kit for Figma, for the DSP implementation; these are all source files of the software that generally you are used by the designers.

(Refer Slide Time: 32:15)

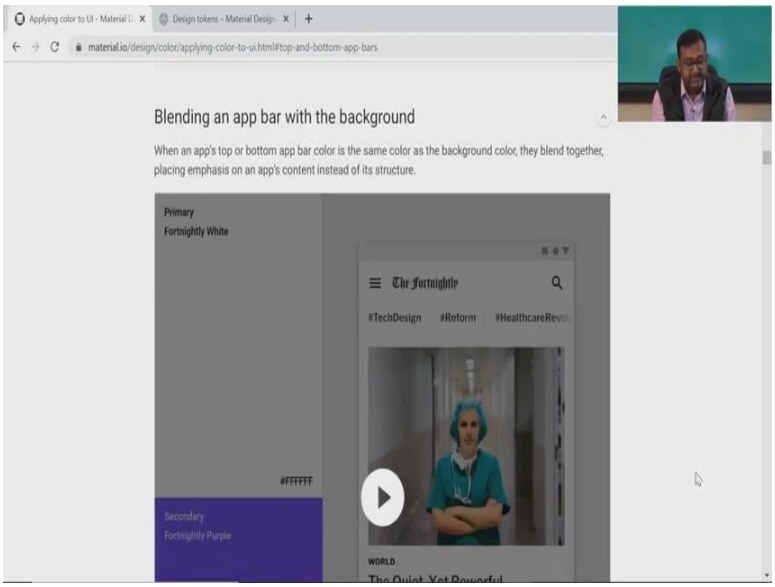


(Refer Slide Time: 32:18)

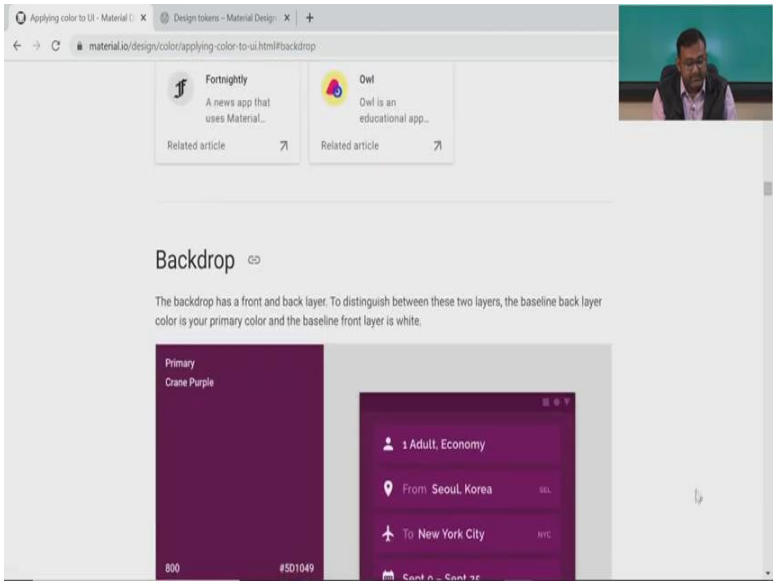


Let us go back to our main site. Now, here you would see all the principles of how do you apply color, identify application bars right, what are the standard practices, blending an app bar with the background right.

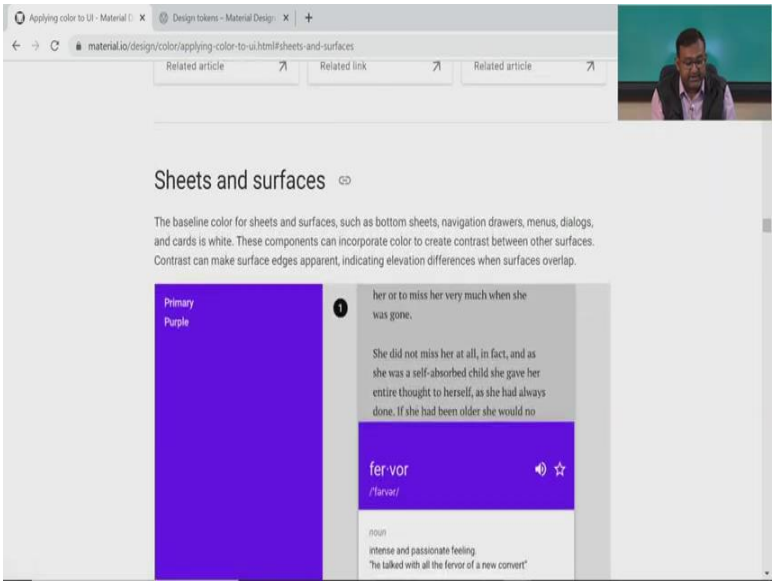
(Refer Slide Time: 32:25)



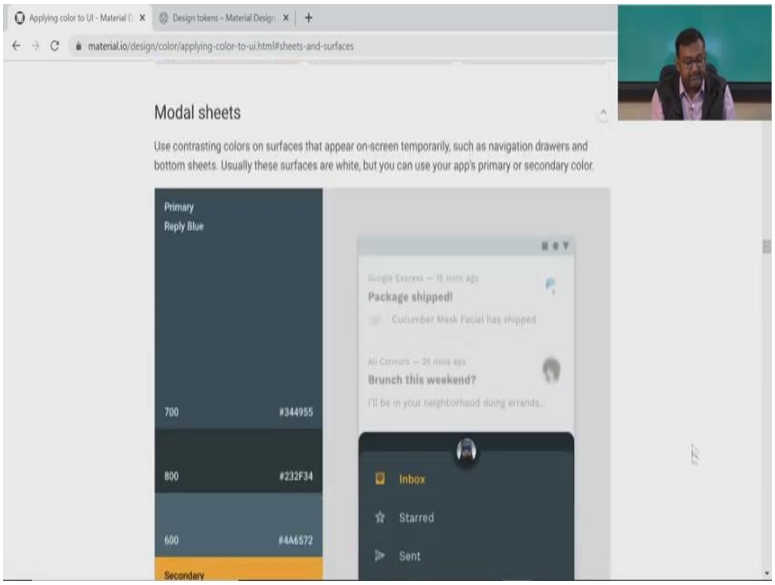
(Refer Slide Time: 32:30)



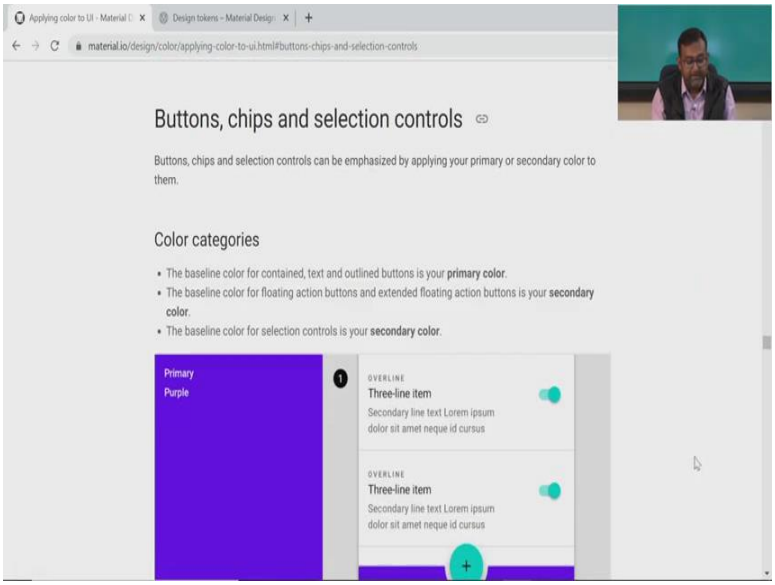
(Refer Slide Time: 32:34)



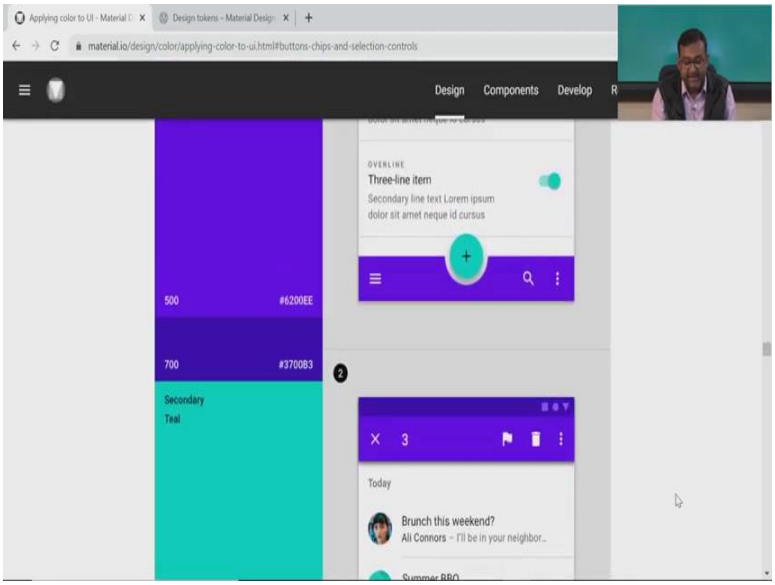
(Refer Slide Time: 32:38)



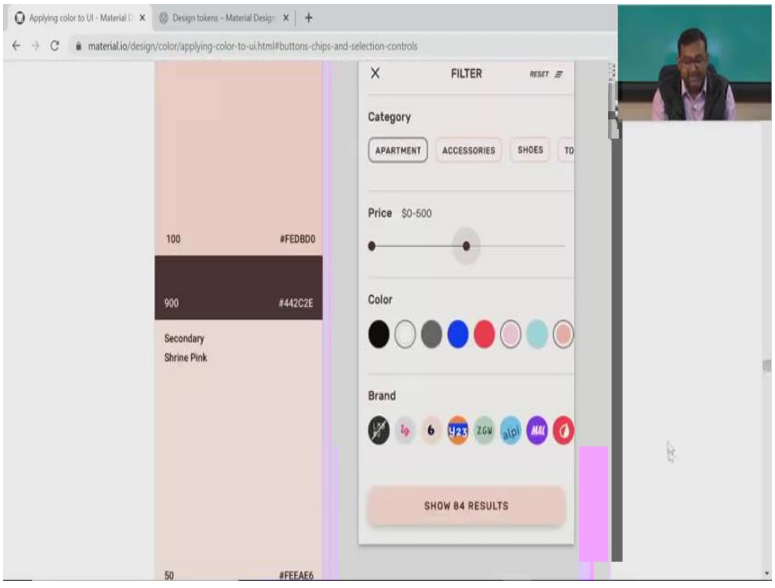
(Refer Slide Time: 32:44)



(Refer Slide Time: 32:47)



(Refer Slide Time: 32:48)



How do you do that, then back drop, what are the ways through do it, sheets and surfaces, then model sheets right and then you have buttons, chips and selecting selection controls. See so, these are very unique ways of learning about the colours, you can access all these files and can learn about colours right. So, the motive behind showing you about all these things is to make you understand that this is a good repository for all of you to learn about material design guidelines and follow it.

See primarily your user is accustomed in looking at the user interface from these guidelines' perspectives. So, it is also important for you that you do not violate these guidelines. Because if you violate these guidelines the then what happens is that there would be immediate disengagement and it would happen because of your user not able to relate the screens that you have presented to him or her and what have been already he been he or she been exposed to.

So, you do not want your product to be a product that is completely irrelevant completely does not follow any standard. So, in order to ensure that all these standards are followed and still you come up with features that are unique and novel in nature, you follow these material design guidelines. So, though discussing in more about the material design guidelines is beyond the scope of this course.

I thought that I should talk about this in a very very short way just to ensure to make you aware of these guidelines so that if you are doing a project in this course if you are doing if you are learning this course and if you intend to design a software for this then you see to it and see and make sure that you your interface adhere to the guidelines and the standards that are being applied in the industry ok.

So, that is what we end with in this session. And we will start about usability heuristics and testing from the next lecture.