Product Design and Manufacturing

Prof. J. Ramkumar
Dr. Amandeep Singh Oberoi
Department of Mechanical Engineering & Design Program
Department of Industrial and Production Engineering
Indian Institute of Technology, Kanpur
National Institute of Technology, Jalandhar

Lecture – 7b
Elements of Visual Design (Part 3 of 3)

Welcome friends, we will try to continue the Elements of Visual Design

(Refer Slide Time: 00:32)

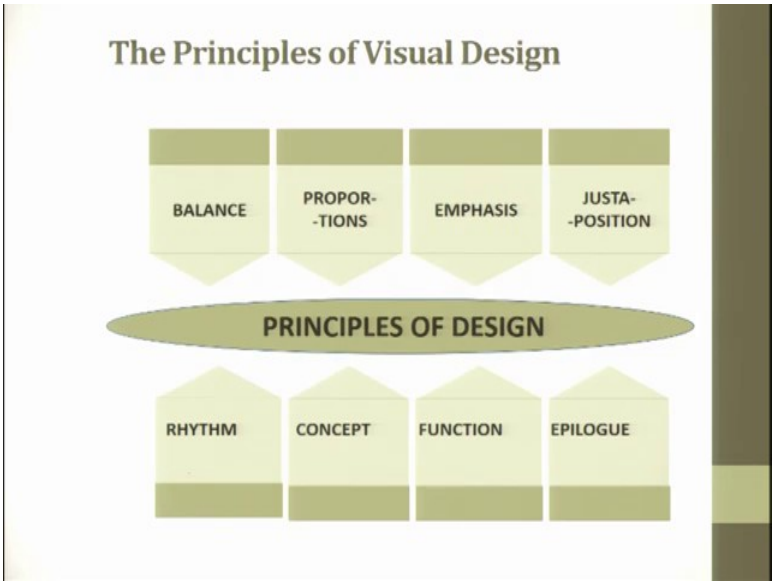
We will start by looking at Balancing then at Proportions, Emphasis, Juxtaposition, Rhythm and Unity.

(Refer Slide Time: 00:42)

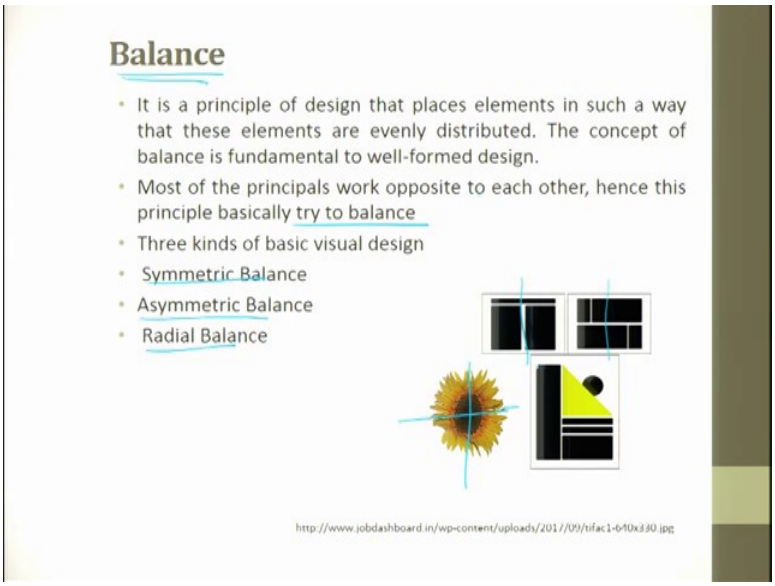
We will try to learn with examples, the principles of visual design, the principles of visual design represents the most general classes of tools available for determining the ideal arrangement of elements of design for any given visual work.

we are talking about the principles of visual design, ideal arrangement of the elements of design for any given visual work.

(Refer Slide Time: 01:12)



(Refer Slide Time: 01:35)



Balance: it is the principle of design that places elements in such a way that these elements are evenly distributed, the concept of balance is fundamental to well formed design.

In balance, the design places the elements in such a way that these elements are evenly distributed. Most of the principles work opposite to each other; hence this principle basically tries to balance. Balancing is very important and this concept has to be followed. Balancing of design elements, which are used in figure. There are three kinds of balancing which we saw one is Symmetrical, Asymmetrical and Radial balance.

(Refer Slide Time: 02:39)

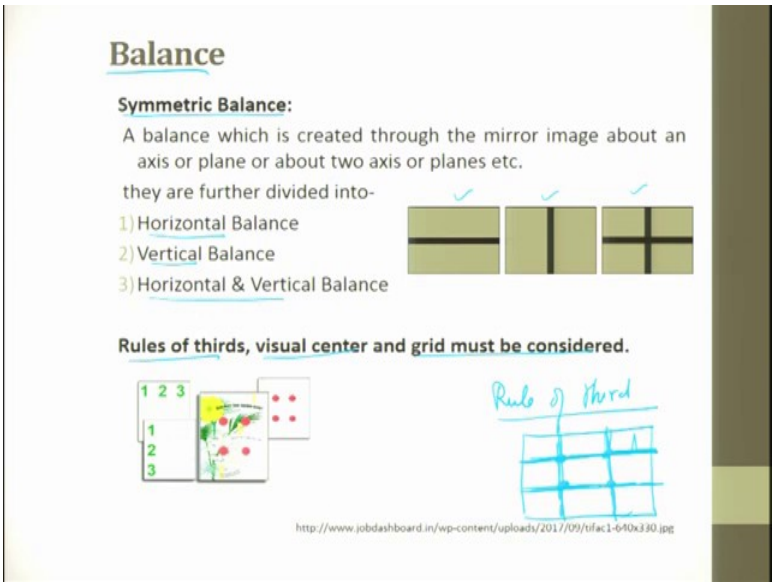


Fig shows symmetrical, asymmetrical and radial designs.

Symmetrical balance: a balance which is created through the mirror image about an axis or a plane or about two axis or planes etc. is called as Symmetric balancing. They are further divided into:-

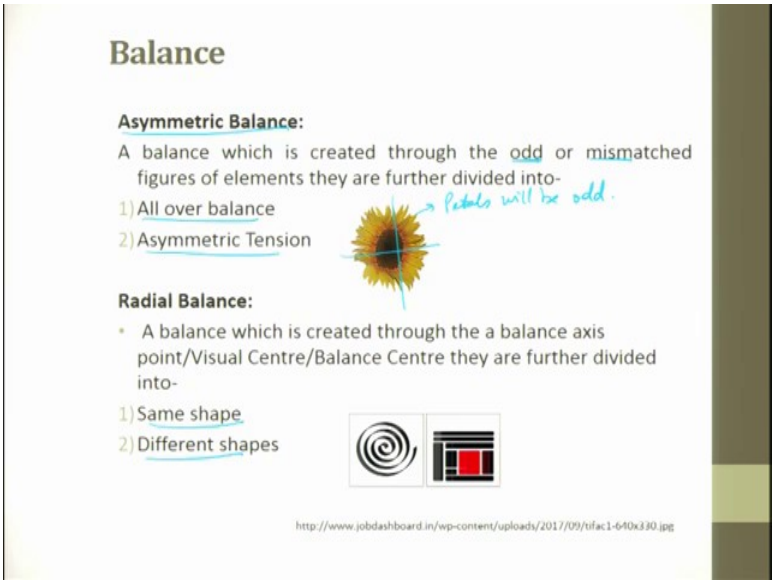
- Horizontal Balance.
- Vertical Balance
- Horizontal & Vertical Balance.

Interestingly when we try to take a photograph , we have to follow the rule of third. We have to try to take an image and try to divide this image into two horizontal lines and two vertical lines and and focus should be at horizontal, vertical or diagonal. So, you try to keep your image where exactly focus has to be made such that you get the best out of the photograph or image.

If object is balanced properly, the surrounding can be given more weightage, the object can be more a given more weightage when compared to the surrounding and that's all by just balancing. In system symmetric balancing, we have a horizontal balancing, vertical balancing and horizontal &vertical balancing, the rule of third is followed here.

The visual center and the grid must be considered so that we keep our object either in the horizontal lines or in the vertical lines or in the diagonal opposite lines such that we get the best image or the best figure out of it.

(Refer Slide Time: 04:48)



Asymmetrical Balance: Asymmetrical balance, is created through an odd or mismatched figures of elements that are further divided into:-

- All over balance.
- Asymmetric tension.

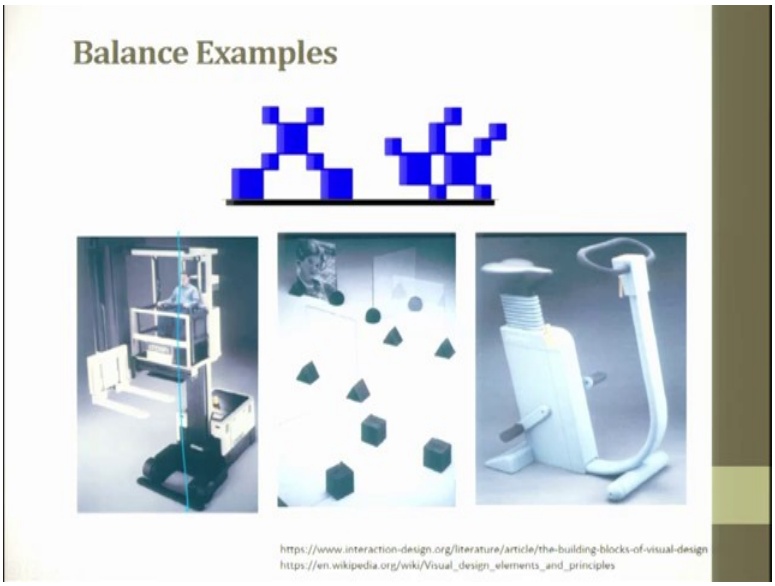
In the figure, the number of petals will be in odd or there is a mismatch, but overall it will try to have a symmetry and it will try to balance.

Radial Balance: is something which is spirally going out and out, this is generally created for having hallucination or feelings, the balancing is created through the balance axis point visual center, balance Centre that are further divided into:-

- Same shape.
- Different shapes.

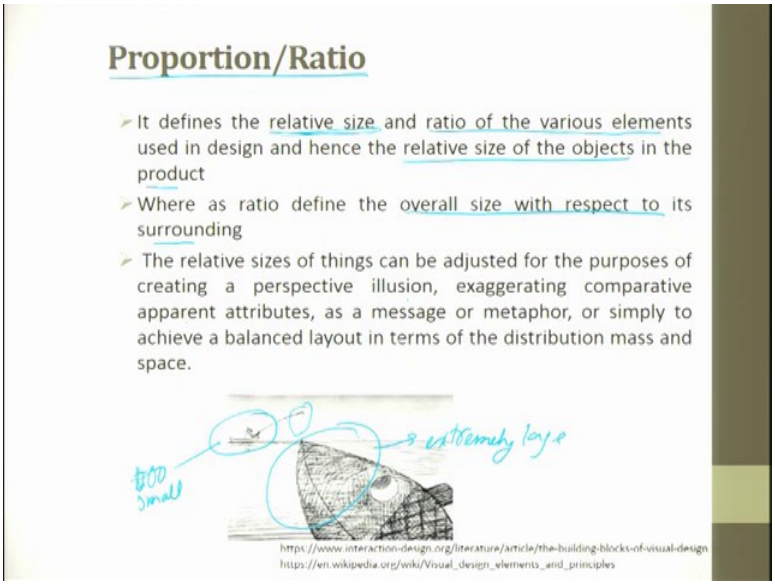
these are called as radial balance, which you can also follow while trying to develop a design or while trying to develop a image. The first principle of design is balancing.

(Refer Slide Time: 05:52)



As shown in figure are other Balance examples, the video game figures which are made of the pixels which are getting activated, this object is again done balancing

(Refer Slide Time: 06:16)

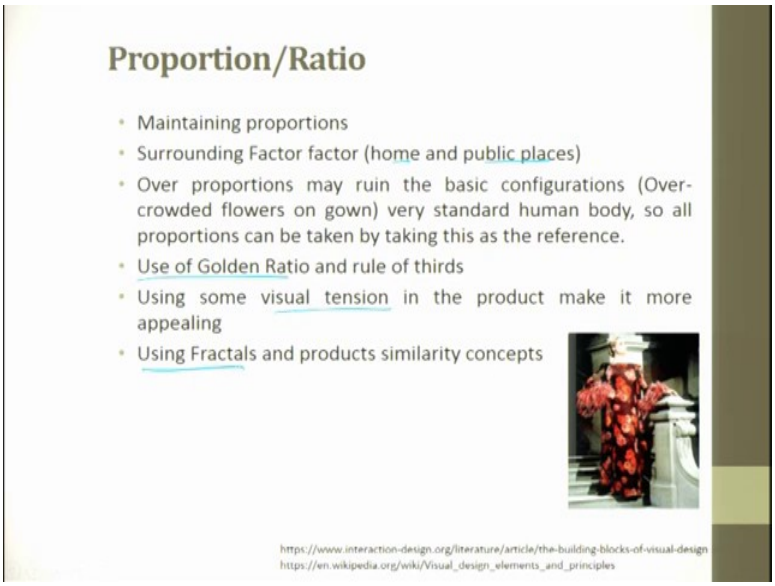


Ratios and Proportions: it defines the relative size and the ratio of various elements used in design and hence the relative size of the object in the product, here they talk about the relative sizes and the ratio of the various elements. For example, relate to see you have a fish which is extremely large, now look at a man outside, who is too small. So, proportions or may be the fish is very close to you, the man is too far off and if you

say such a big fish and if we look at the wire and other things, which are used then it is just disproportionally , which is drawn or it can be a cartoon image. It defines the relative size between the man and the fish and the ratio of the various elements used in the design and hence the relative size of the objects in the product is maintained whereas ratio defines the overall size with respect to the surrounding.

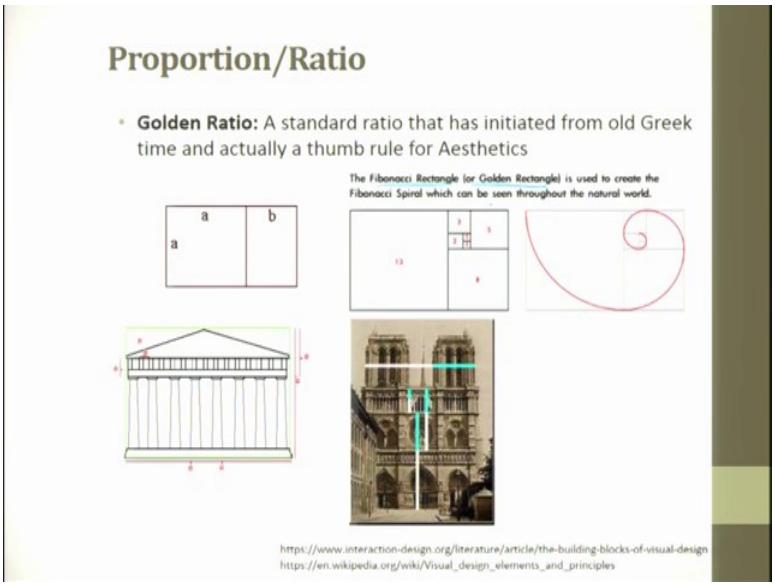
The relative size of things can be adjusted for the purpose of creating a perspective illusion, exaggerating, comparative, apparent attributes, such as message or metaphor, or simply to achieve a balance layout in terms of the distribution of mass and space is done. We always try to give importance to ratios and proportions.

(Refer Slide Time: 07:56)



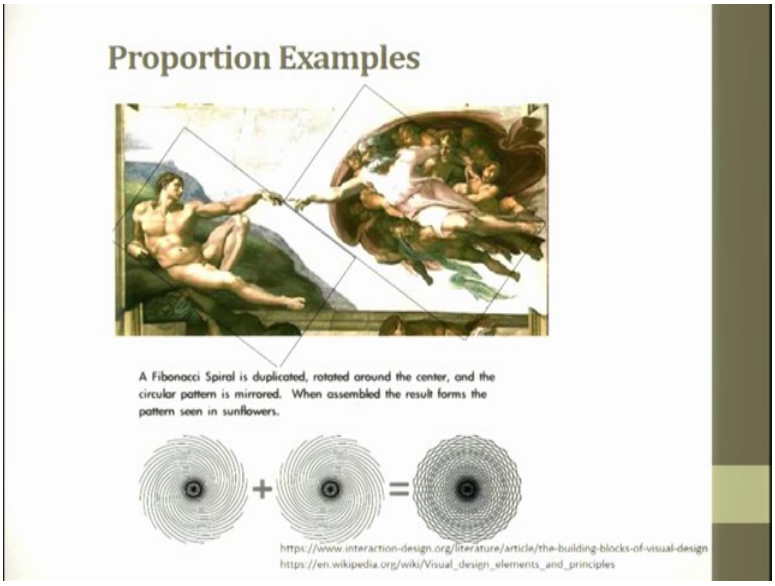
Ratios and proportions maintaining propositions are very important. Surrounding factor such as home and public place is there. So, overall proportion may ruin the basic configuration, very standard human body. Proportion can be taken by taking this as a reference. With this as reference and use it, we use the Golden Ratio which we have discussed earlier, while using visual tension in the product makes it more appealing, fractal design is also using proportions.

(Refer Slide Time: 08:30)



As shown in figure, this is a Golden ratio which we saw, the buildings where in which it is followed and these are the other old buildings where it is magnificent, they follow Fibonacci rectangle is or a Golden rectangle. So, you can see the spiraling effect is formed and it forms a very beautiful image.

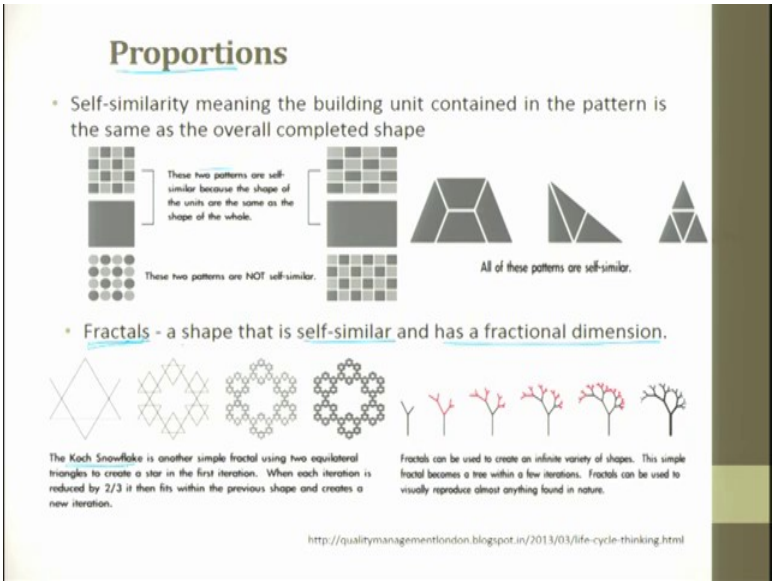
(Refer Slide Time: 08:49)



The proportion of the examples again for Fibonacci spiral is duplicated, rotated around the center, and the circular pattern is mirrored. When assembled the results forms a pattern as seen in sunflower.

whatever drawing you do, if you follow this golden ratio, then you will have a very appealing figure.

(Refer Slide Time: 09:16)

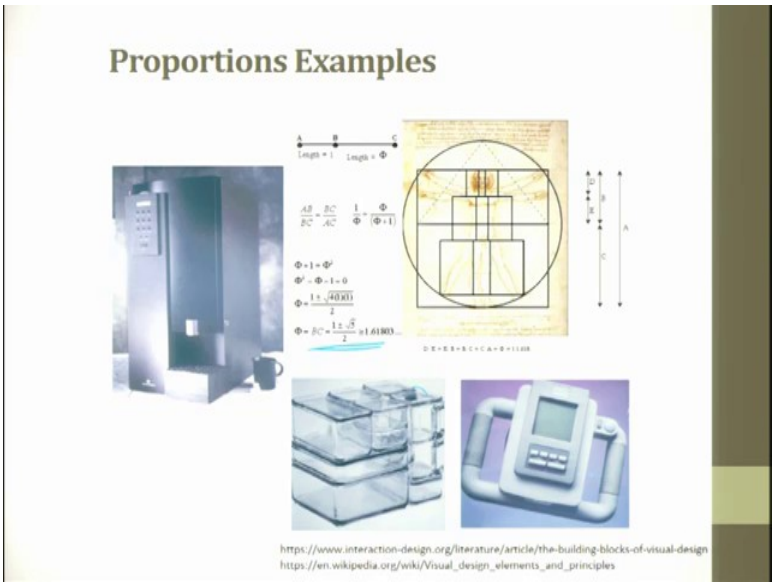


Going back to proportions, the self-similarity means, the building unit contained in the pattern, is the same as the overall complete shape. You can see in the figure, these two patterns are self similar the shape of the units are same, as the shape as a whole. So, these two things, they are not similar, it is a same color the pixels are there.

Here you will have a round pixel. So, here you have a square pixel. So, these two patterns are same and here the only shape is different. So, all of these patterns are self similar. The Fractal a shape that is self similar and has a fractional dimension is called as fractals. Fractals are taken from the nature. For example, if you see a branch which is going it is also fractal, fractals can be used to create a infinite variants of shapes, this simple fractal became a tree within a few iterations. The fractal can be used to visually reproduce almost anything found in nature is under the fractal.

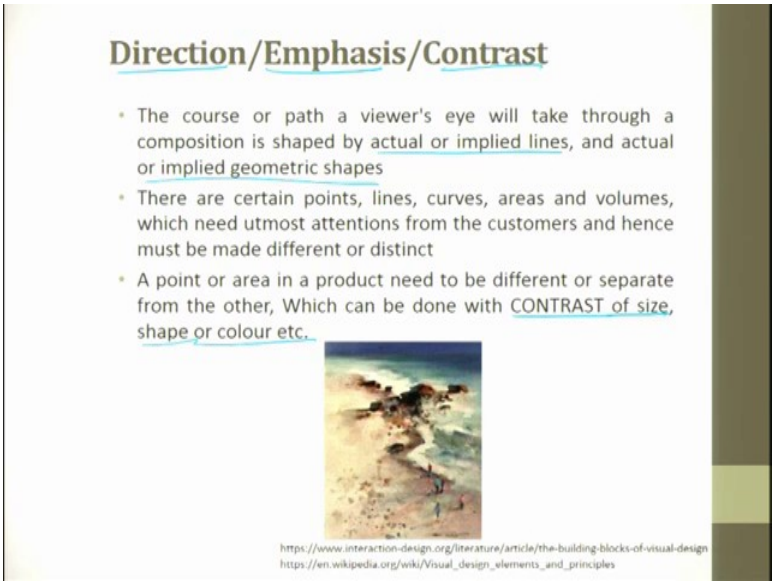
We always try to capture this fractal. Snowflake is another simple fractal using a two equilateral triangle to create a star in the first iteration. When each iteration is reduced to two third, it then fits within the previous shape and creates a new iteration, you see two-third again and again makes a Snowflake, Koch Snowflakes are created follows the fractal.

(Refer Slide Time: 10:59)



shapes are very important, this is again a golden ratio which we have discussed earlier. these are the boxes which are made. If you see that in totality, it is followed but when you look at the furnaces, it also follows it. A telephone or gym equipment, they also follows the golden ratio.

(Refer Slide Time: 11:24)

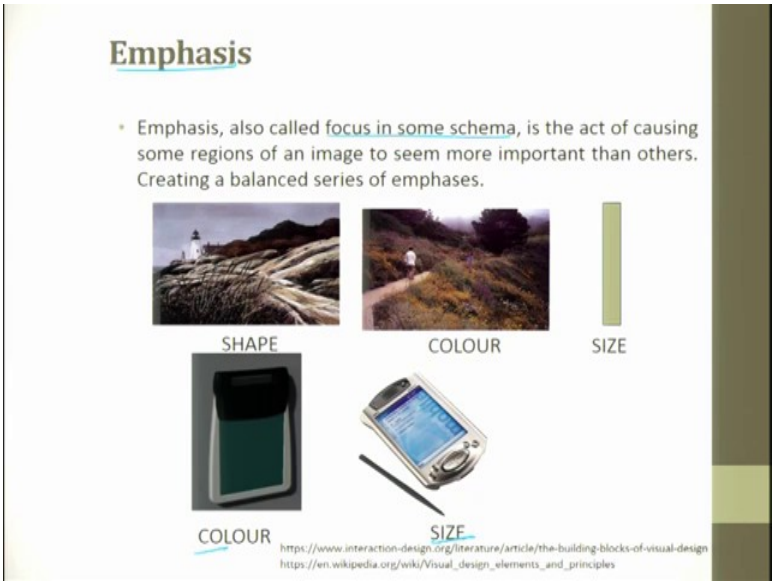


The Direction, Emphasis and Contrast: the course or path, a viewers eye will take through a composition is shaped by actual or implied lines, and actual or implied geometric shapes. There are certain points, lines, curves, areas and volumes, which need

utmost attention from the customer and hence must be made different or distinct say for example, blue-brown colour in picture.So, distinctlt it says that there is the seashore.

A point or in area in a product need to be different or separate from the other which can be done with the contrast of size, shape, or color. The direction, emphasis, and contrast in a figure tries to bring in a difference in the feeling.

(Refer Slide Time: 12:11)



Emphasis: Emphasis are also called as focus in some schema, is the acting of causing some region of an image to seem more important, some region is more important than the other, creating a balance, series of emphasis.

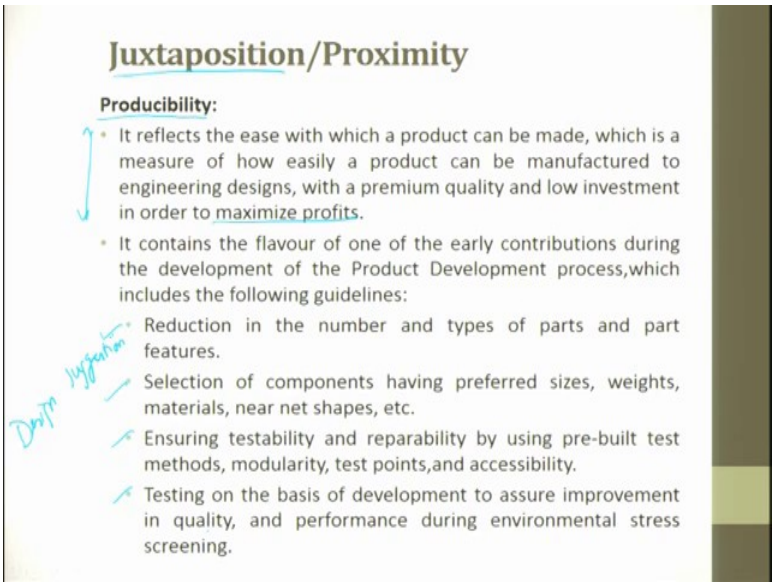
As show in above slide first one is according to shape, then according to color, next is according to size and color, we try to give more emphasis so, by taking one of the design elements.

(Refer Slide Time: 12:42)

Contrast: the viewer's eye, to contrast is to set elements in definite opposition, in order to highlight different attributes. For example white in color, dark in color. We see a very clear distinction between white and then along the edges. Same way this has a green background, this has a white background, clear distinction, contrast difference is there and white background, grey it is also there.

In a building entry doors are generally dark in colour.

(Refer Slide Time: 13:16)



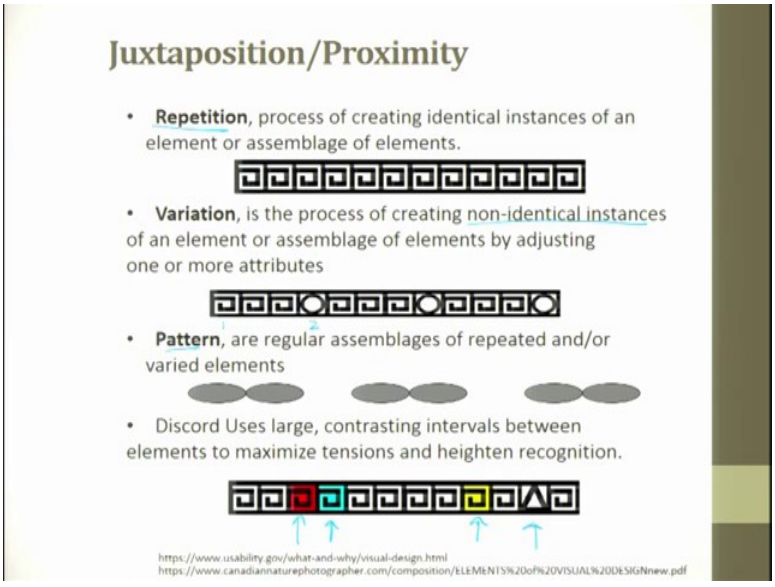
Proximity/Juxtaposition: the producibility, it reflects the ease with which product can be made, which is a measure of how easily a product can be manufactured to engineering design with a premium quality and low investment in order to maximize profit, this is producibility or proximity.

It contains the flavor of one of the early contribution during the development of a product development process, which includes the following guidelines

- Reduction in the number, type of parts and the part features.
- Selection of components having preferred size, weight, material and near net shape.
- Ensuring testability, reparability by using pre-built test methods, modularity, test points, and accessibility
- Testing on the basis of development to assure improvement in quality, performance during environmental stress and screening.

So, these are some of the design suggestions which are to be followed when you try to make a product.

(Refer Slide Time: 14:28)



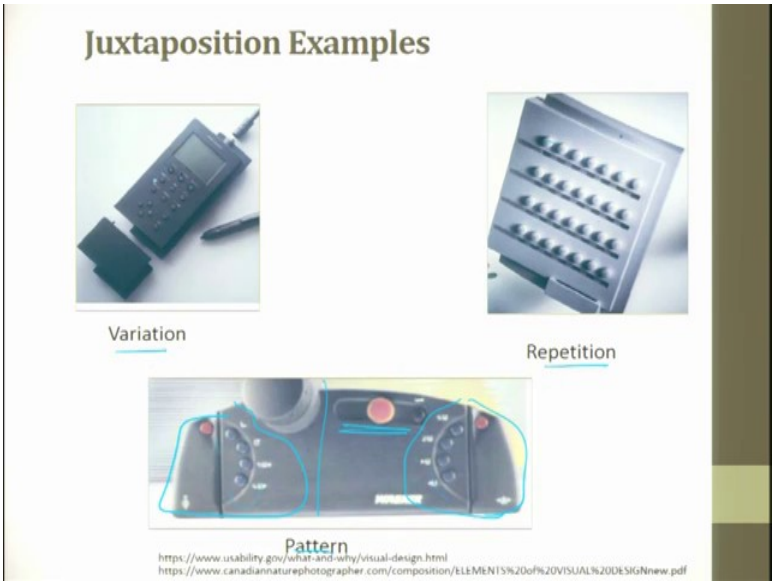
Repetition: a process of creating an identical instance of the same element and assembled one after the other, is called as repetition.

Variation: is, you can see there are two elements. this is one element and second element, these element, second element is repeated at regular intervals of time that is called as a variation, is a process of creating a non identical instant of elements or assembly of elements by adjusting one or more of the attributes

Patterning: is regularly assembling of repeated or other varying elements

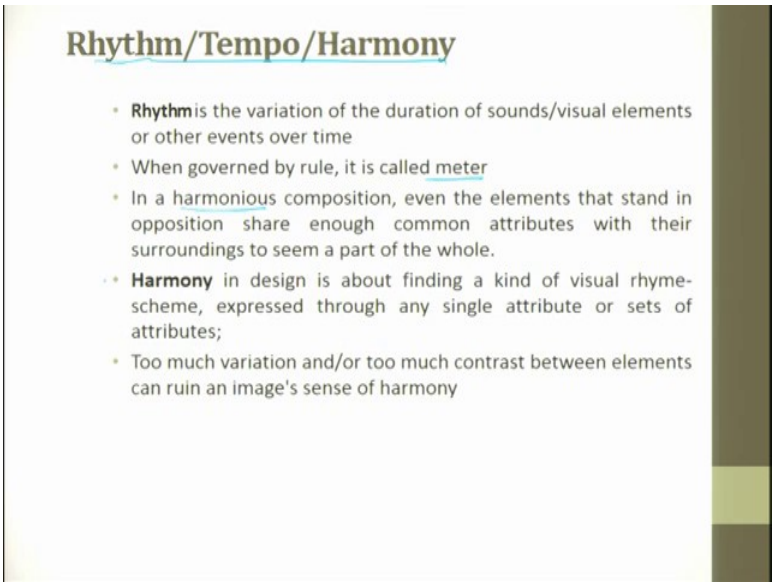
This is pattern, these are identical elements which are, Discord use large, contrasting intervals between the elements to maximize tension and heighten recognition, you see here they have given red color, blue color and yellow color, there is a size change. So, here your focus in this entire object goes to these four points and the information is expressed.

(Refer Slide Time: 15:37)



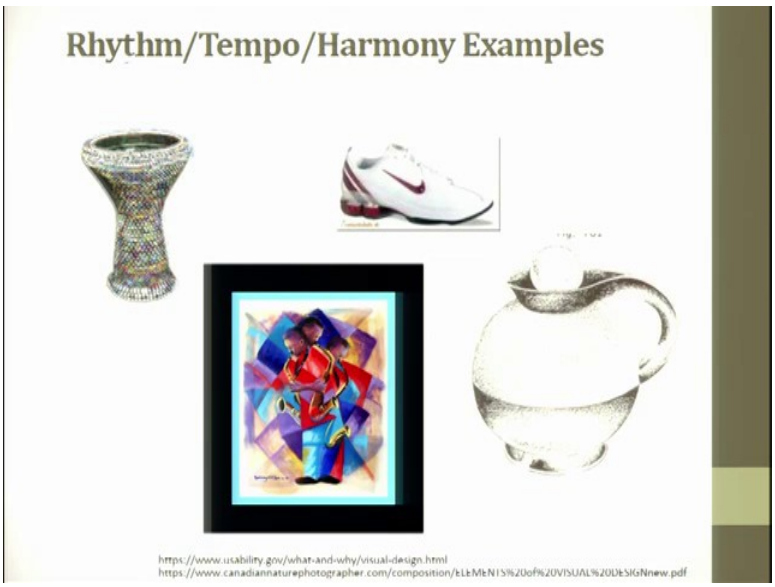
here is a variation, here is a repetition, and here is a pattern. This pattern is repeated here, all these things are repeated here, except the projections, positive impressions which are regularly arranged in sequence. Variation is, you see them, they are there but projections are also there, but they do not follow any regular repetition.

(Refer Slide Time: 16:06)



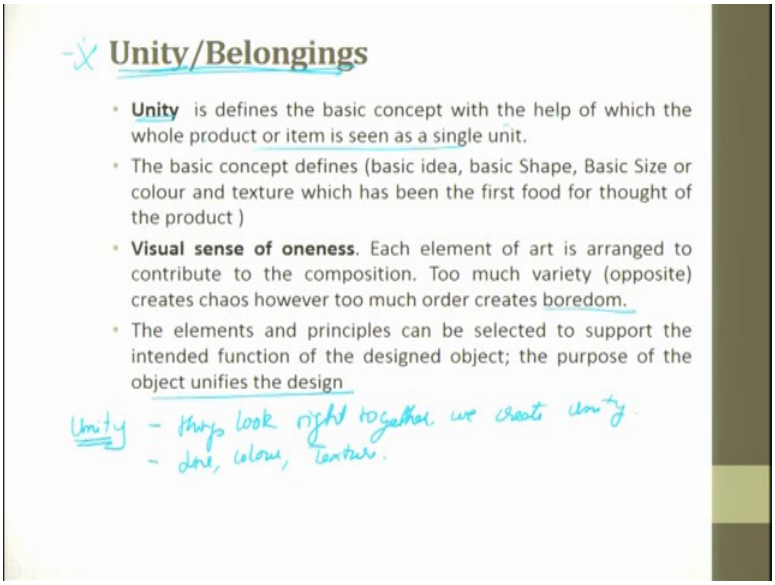
Rhythm/Tempo/Harmony: it is rhythm, it is otherwise called as tempo or harmony. Rhythm is a variation of the duration of sound or visual effect or other events over time. When governed by a rule, it is called meter. In a harmonious composition, even the element that stands in the opposition shares enough common attributes with their surroundings to seem a part of the whole, that is harmony; harmony in the design is about finding a kind of visual rhythm scheme expresses through a single attribute or a set of attributes is harmony.

(Refer Slide Time: 16:47)



Rhythm, harmony is all used as a design element So, this is rhythm, you also have a rhythm here, a harmony here, a tempo here.

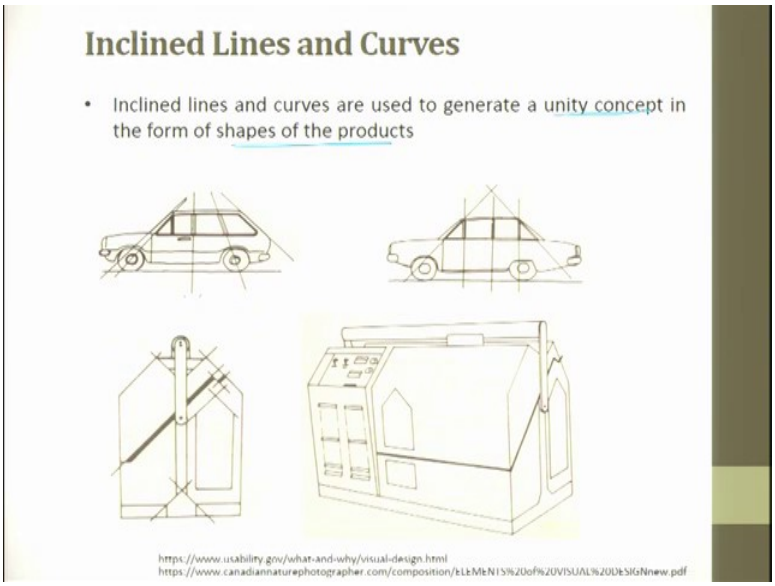
(Refer Slide Time: 16:56)



Unity/Belonging: unity defines the basic concept with the help of which the whole product or the item is seen as a single unit. The basic concept defines basic idea, basic shape, basic size, color, texture which has been the first food for thought of the product. So, this is unity. Visual sense of oneness, each element of art is arranged to contribute to the composition, too much variety create chaos; however, too much order creates boredom.

Break the boredom, break the chaos and have some variation. The elements and the principles can be selected to support the intended function of the design object; the purpose of the object unifies the design. this is very important.

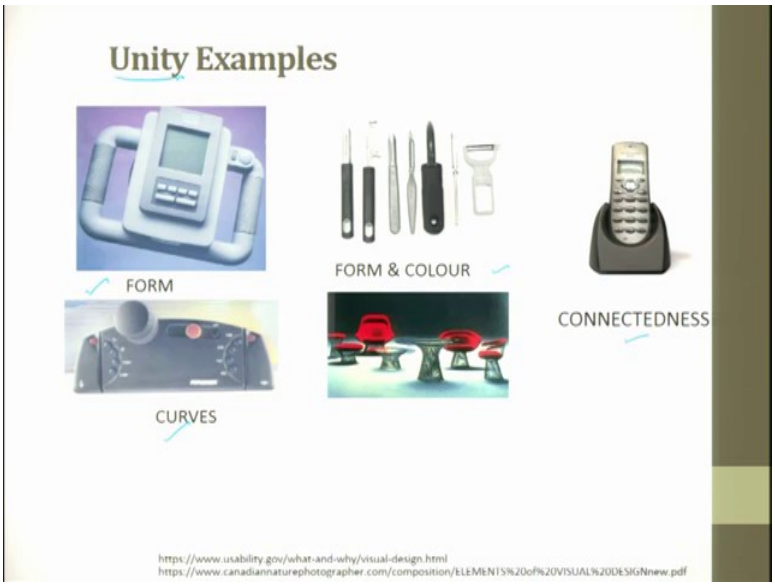
(Refer Slide Time: 17:58)



Inclined lines and the curved lines, the inclined lines or the curved lines are used to create a unity concept in the form of shape of a product.

you can see lot of lines inclined, going and try to create a unity concept.

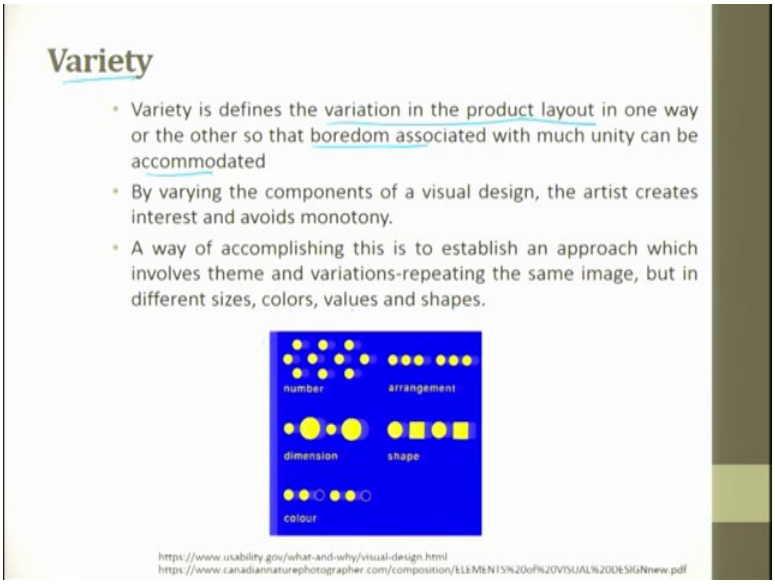
(Refer Slide Time: 18:15)



unity examples for form and color, for connectedness and then for curved, we have seen, this is form and this is color. These are examples for unity. what is unity? unity is defined as the basic concept with the help of which the whole product or item is seen as a single unit. So, unity means you look at things when things look right together. So, we

create unity. You can do line, you can do color, you can do texture, you can do anything right.So, these are all unity, unity is defined as a basic concept with the help of which the whole product or the item is same as a single unit.

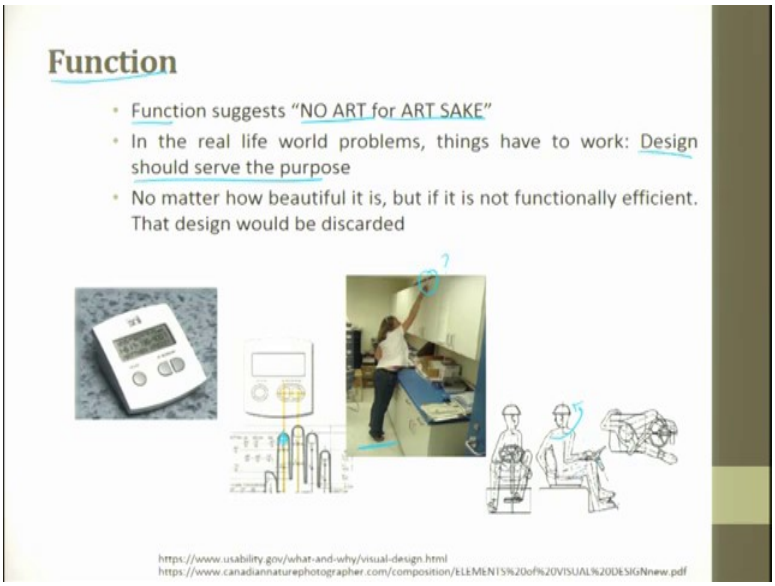
(Refer Slide Time: 19:29)



You can have a Variety, variety is defined as a variation in the product layout in one way or the other. So, that the boredom associated with much unity can be accommodated. So, you can have numbers, you can arrange them, you can have dimensions, shapes, color which are varying.

All these varieties try to kill the boredom which is done because of the repetitive patterns. By varying the component of a visual design, the artist creates an interest and avoids monotony. The way of accomplishing this is to establish an approach which involves theme and variation-repeating the shape and image built in the different size, color, values and shapes.

(Refer Slide Time: 20:14)

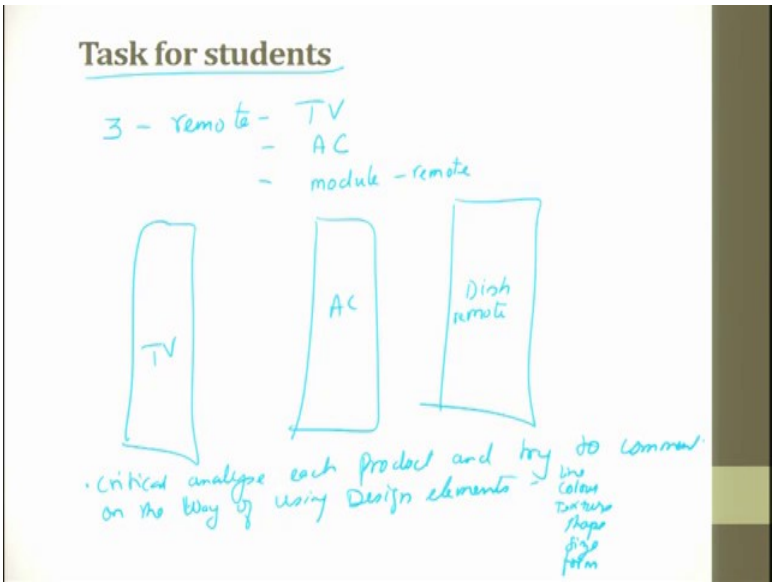


Function: function suggests no art for art sake. Function is very very important.

In the real life world problem, things have to work, design should serve the purpose. No matter how beautiful it is , but it is not functionally effective, the design would be discarded. Look at the size of the button and look at the shape of your finger. It is half of it. So, it becomes very difficult for you to use, it is a wonderful design.

You look at the handle, it is large at the top. So, it is not going to serve a purpose because this lady cannot stretch more than that and when she stretches more, there is a problem of stability in her body, she may topple or fall down. So, this is not accepted. So, in the same way when you are trying to make a seat for truck and when he tries to swing he has to strain himself so much and his leg may be hurt while steering. So, this is not a functional one; however, it has art in it.

(Refer Slide Time: 21:34)



coming to the end. Here's an activity

Student's Activity

I would now like you to take 3-remote, it can be a TV remote, it can be an AC remote, it can any other remote.

this can be a module-remote, you will have three remotes. You try to take the three remotes and try to critically analyze that there's an TV, Ac and maybe a dish remote. Critically analyze each product and try to comment on their way of using Design elements. What are the design elements, line, color, texture, shape, size and form? How have they used it, which one of the three is good, what is the mistake in each one.

If you do this exercise then the basic design elements and the principle of design elements both can be used for critical analysis and you can try to make a report. With this we come to an end of the topic Design for Elements and Principles for Design. I hope you would have enjoyed.