**Lecture - 14**
**Usage of Typography in User Interface Design - I**

Welcome students to the online NPTEL course, User Interface Design. Today, we were discussing the visual communication design part and which is the high fidelity and how to translate the low fidelity design to high fidelity design with the colors and all other visual communication design elements.

So today we will talk about the typography which is one of the intrinsic part of visual communication design. Colors, shapes, lines along with the other visual communication design part, typography plays a very vital role in the GUI or the graphic user interface of the interface design.

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So in typography we will take 2 lectures to discuss to discuss that typography and what is the use of typography into user interface design. So first we will talk about the evolution of typography that will help you to understand which typefaces to select when we want to capture a particular visual style. So the typeface, if the visual style you want to portray visual style which is not so

contemporary which has a old style so that you have to also select the typeface which match with the style of the visual.

So that is why evolution of typography knowing this part is important then morphology of typography what are the different parts of typeface, what is the x-height, the ascenders, descenders and how we can classify a typeface that is the morphology part of typefaces. Then based on this morphology, how we classify the typefaces.

So Sans Serif and within Sans Serif what are the different categories and within Serifs what are the different categories that we will discuss in the lecture 1 and in the next lecture we will discuss how to incorporate these different typefaces into the design. So what is the pictorial quality of the typefaces and how the legibility and pictorial quality differs. When you increase the pictorial quality how the legibility will get affected.

And when you want to increase the legibility how the pictorial quality gets affected. Then the selection and the design of typefaces when you want to design a particular typeface which might not be your main forte but when you select a typeface and you want to digitally iterate the typeface a little bit to suit with your visual style then this part you need to know. Then the impact of color selection within the typeface also, how the legibility affect when you select a particular color.

And when you put a typeface, assign a particular color to a typeface and to a particular background and how this figure-ground relationship works in the legibility with the typefaces. And then achieving hierarchy. So when you create a front-end design different information will have a different hierarchy. Some information will have a higher hierarchy. Some information will have the next level hierarchy. So there will be different levels of hierarchy.

How you can achieve with the different kind of typefaces. It might not be just the size of typefaces. It can be also a different category, different classification of typeface can also give you the hierarchy. Color contrast and other things can also give you, help you to achieve this hierarchy.

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## Evolution of Typography

The instrument creating form and often the material in which the form is created are of crucial importance in determining the pattern of writing.

Written form always points to the tools and techniques used:
- calligraphy using pen,
- Letters carved in stone with the chisel,
- cut forms using stylus,
- copperplate letters by engraver...

Source: "Typographi", by Emil Ruder
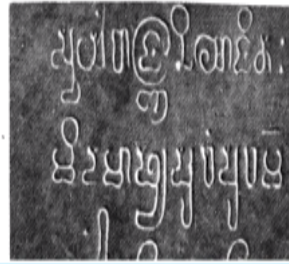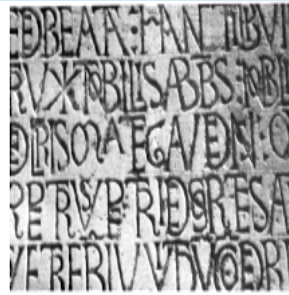
So we will start with the evolution of typefaces. So we will go to the history and how the typefaces evolved. So initially the typography and the typefaces started evolving when people started chiseling on the (()) (4:10) plate which happens in Mesopotamia or they started carving marble stone in case of Roman and Greek civilization or with the calligraphic pin which they started inscribing on the papiers or the paper which is there in you can say in Chinese origin.

So here we can see the material on which they are typing and the tools and techniques creates an impact of the particular typefaces. Now we will talk about the Roman or the English typefaces mostly. You only concentrated on the English typefaces. So they also evolved from the tools and techniques, the way people started using it.

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**Evolution of Typography**

Most contemporary typefaces ultimately take a digital form, but many are rooted in calligraphic tradition and originate in handwritten sketches and prototypes.

Movable type, invented by Johannes Gutenberg in Germany in the early fifteenth century. Movable type had been employed earlier in China, but proven less useful there as the Chinese writing system contains tens of thousands of distinct characters making it ill-suited to mechanization.
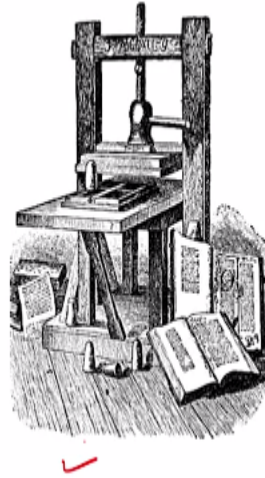
And after that when there was this Renaissance time Johannes Gutenberg invented the printing press which is around early 15th century and in this case it was the style of his first printed books which is the Gutenberg's Bible. It had the influence of the calligraphic tradition because before that people used to copy the Bible with calligraphic ink and pen and so that was the precursor of this typographic style.

And based on that the first typefaces were designed which kind of mimics the handwritten calligraphic typefaces. So China also had that but translating Chinese typefaces into printing press was really different because they have thousands of different characters. When the characters combine they become different characters and they look different. So it was not so useful that Chinese context but English typefaces Gutenberg did that.

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Evolution of Typography

The genesis of Gutenberg's printing types were from the visual style of hand written (calligraphy) scripts of that era.
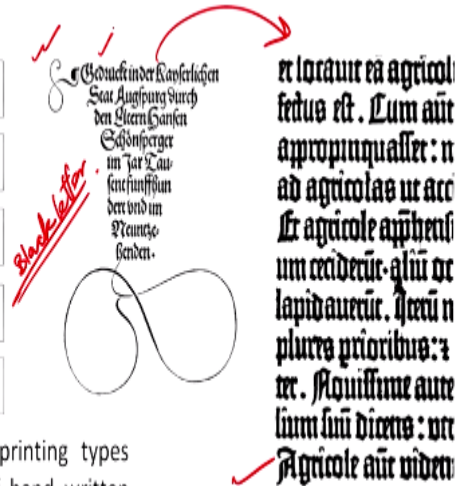
Guttenberg's Bible

So this is the Gutenberg's Bible. This is how it looks like. So it has a lot of influence from the calligraphic style of writing. So this calligraphic style of writing has a Gothic style of typefaces. So this is called the Gothic style. So black letter is one of the Gothic influenced font. Black letter is a digital font but this mimics the Gothic style of design. If you know the Gothic architecture and Gothic design so it has lot of ornamentation.

So as in the Black letter, if you check the Black letter so you will see lot of, this is not Black letter but if you look at the black letters typefaces there are lot of ornamentation in the Black letter typefaces. So here also in the early first printed typefaces there are lot of ornamentation which we can see in the initial stages.

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## Evolution of Typography

In fifteenth-century Italy, humanist writers and scholars rejected gothic scripts in favour of the *lettera antica*, a classical mode of handwriting with wider, more open forms.

Nicolas Jenson, a French man who had learned to print in Germany, established a printing firm in Venice around 1469. His typefaces merged the gothic traditions he had known in France and Germany with the Italian taste for rounder, lighter forms. They are considered among the first-and finest-roman typefaces.
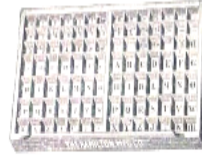
Source: Thinking with types, Ellen Lupton

Now in the fifteenth century Italy, humanist writers and scholars rejected the Gothic scripts in favor of the lettera antica, a classical mode of handwritten and wider more open forms. So from this Gothical style we are moving towards different style of typeface design which is more minimalist. Because if you look at this timeframe this is the fifteenth century and gradually we are moving towards the industrial revolution and after that modernism will start.

So gradually from this Gothic style if you look at the modernist, if you look at the design movement and the architectural movement, gradually in design and architecture and in other aspects of visual design the ornamentation started to decrease. So it is going towards the minimalist way of design. So Nicolas Jenson who had learnt to print in Germany established a printing firm in Venice around 1469.

His typeface merged with the Gothic traditions he had known in France and Germany with the Italian taste for rounder, lighter form which is essentially minimalist and so from Gothic more Italian style which is going to be more minimalist style is coming into the picture. So they are considered among the first and finest Roman typefaces.

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## Evolution of Typography

Many fonts we use today, including Garamond, Bembo, Palatino, and Jenson, are named after printers who worked in the fifteenth and sixteenth centuries. These typefaces are generally known as "humanist."

Contemporary revivals of historical fonts are designed to conform with modern technologies and current demands for sharpness and uniformity. Each revival responds to or reacts against the production methods, printing styles, and artistic habits of its own time.

Source: Thinking with types, Ellen Lupton
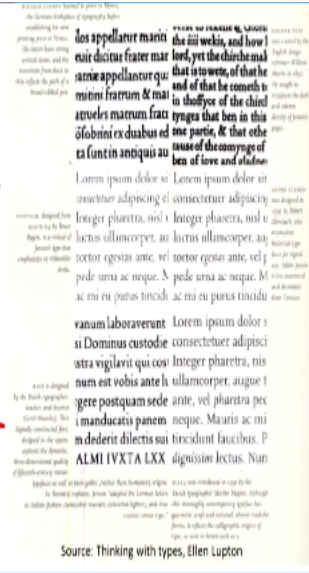
So in many fonts, we use today including Garamond, Bembo, Palantino and Jenson are named after the printers who worked in the fifteenth and sixteenth centuries. These typefaces are generally known as humanist. So this humanist typefaces which is gradually translating from the Gothic style of typefaces are much more minimal in nature but still in this humanist typefaces when we look at the modernist typefaces humanist typeface still have this calligraphic style.

We will discuss with some examples. So in humanist typefaces this letters does not have a very digitally generated look. So their thickness and then the stroke thickness varies. And that is why it gives a human touch into the typefaces. It does not look like a digital typeface. So contemporary revival of historical fonts are designed to conform with modern technologies and current demand of the sharpness and the uniformity.

So as we know that in the modern style modern design with the invention of new technology there was also postindustrial revolution. After postindustrial revolution lot of technology advancement started and the technology started and this visual style in architecture as well as in design started to imbibe the digitally generated technology into the, that machine made aesthetics into the design.

So we know that pre-modern era there was this for the machine movement and also there was the counterpart against the machine movement. But later in this architecture and design movement

lot of machine made aesthetics started to come into the picture. For example if we look at Art Deco and other internationalism and Bauhaus De Stijl movement, it had lot of machine made aesthetics and the geometry was much more predominant in the style and the uniformity and sharpness was much more in the design.
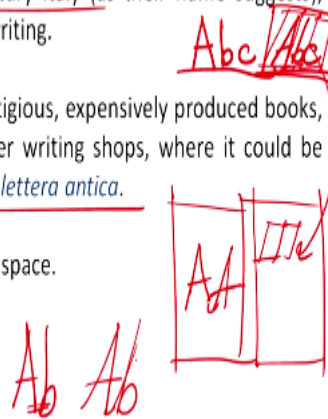
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So in the evolution we can see also there is another one which is the Italic letters. This started coming into picture because when we start writing a Roman style of letter which is upright and straight versus Italic style which is cursive which is bent, this takes lesser space. So this become more economic and you can print much more information into a same amount of page. So this becomes a cheaper version of printing.

In fifteenth century Italy it started coming into picture, so they started bending the typefaces. So one typeface block will be like this and the other will come within the space of the other typefaces and it will, this cursive style of writing takes less space. So right now we know that one typeface also has a upright Roman typefaces and also the same typeface can also have a Italic version. So this is not just tilt.

There can also be some other design elements which goes with the tilt and which joins. So generally when we write in Roman style, so this typefaces does not join. But when we right in Italics, so this might some element of the previous letter can join with the next letter.

## Evolution of Typography

In the sixteenth century, printers began integrating roman and italic forms into type families with matching weights and x-heights (the height of the main body of the lower face letters)

Today, the italic style in most fonts is not simply a slanted version of the roman; it incorporates the curves, angles, and narrower proportions associated with cursive forms.
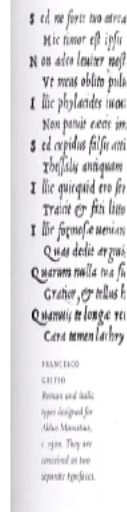
Source: Thinking with types, Ellen Lupton

So in the sixteenth century printers started integrating the Roman as well as the Italic form into the one type family. So the type family is a bigger umbrella where a particular typeface for example Helvetica or Arial or Calibri can have different version. One is the straight Roman version another can be the Italic version. There can be bold, there can be ultra thin, there can be light other. All these versions of a particular typeface creates the type family.

So in sixteenth century onwards a particular typeface started having these two different version. Now we have much more different version in the digital era. So today Italic style is of the most font. Is not just simply a slanted version of the Roman. It incorporates the curve, angle and other design elements into the typeface.

**Morphology of Type Faces**

Now talking about the morphology of the typeface, when we look at a particular letter, there are different elements of the letter. So if we see this capital and small letter together, the small letters height which is the bottom of the small letter to the top part is called the x height. So if we write x in this particular typeface, the height of x, small x will be the x height. And the cap height is the height of the capital letter without the descender.

Now this part, few of the letters have a descender like y, f, p. these parts are called descender. Now if we write x in small letter, some of the small letter also has a ascender. For example h, l, t these parts are called ascenders. Now some of the letters has a curvilinear form like s which is called spine and some of the capital letters or other letters has a droopy edge which is called terminal.

And then the cross bar and this is the counterpart which is important to understand the figure-ground relationship. So this background, the ground is totally confined by a figure. So these are the different elements of, morphological element of a typeface.

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Morphology of Type Faces

Now there are other things when we discuss this typefaces. So this is how x height, cap height, ascender, descender goes.

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Morphology of Type Faces

Now there are other things too when we talk about the type family. So typeface can be thinner, typeface can be thicker. And particular typeface can also be narrow, ultrathin, slant. So we can play with the width of the typefaces and that also helps to create the hierarchy. So when we increase the width of a typeface this goes in a upper level of the hierarchy. So when the typeface, with the same x height is wider it captures human attention more.

So this has a higher potentiality to become a focal point in the frontend design. So that augments in the hierarchy level. But if we increase the width in the body of the text that creates issue with the legibility. So if the body of the text where there are lot of text written and the typeface is very wide people will feel difficulty while reading. So if we consider this part of this text and instead of this width if we change the width into this without changing the cap x height, so there will be lot of difficulty while reading.

But here in this heading or wherever you want to emphasize and create the focal point or we want to give more importance in the hierarchy level then we can increase the width.

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Now another very important part is in typography is called kerning. Kerning is the horizontal space between the pair of 2 adjacent letter which is used to create a homogeneous visual and increased readability of the text. Now if we look at the body of the text for example just consider this body of the text and if this body of the text does not look homogeneous or the blackness or the white and black proportion is not equally distributed then it creates difficulty in reading.

So if there is a lot of white patch in between the text, for example this part is I have created a justified mode of letter. You can see this one particular line which is confining the text. That is why there are lot of white gaps and uneven white gaps here. But if this white gaps are equally

distributed, that creates more legibility. And if there are lot of this uneven white and black patches that hampers the legibility.

Now if we consider this different typefaces into a very basic minimal geometric form for example if we consider a triangle instead of A and if we consider inverted triangle instead of V. instead of O if we consider this. Instead of T or D or H we consider square then these are the basic forms which are the basic abstract forms of geometric forms of typeface. Now within this, this acts as a background and this acts as a figure.

So in this figure-ground relationship the amount of white in between all these letters should be equally distributed. Then we can read a particular word. Within a word this amount of white space and the black space should be equally distributed. Then it will be more legible. Now if we look at the case no. 1 and case no. 2, here the gap between all the different typefaces are equal.

But if we look at this situation carefully, then this part, this version 1 does not look homogeneous. So if you look at option 1 and option 2 carefully, option 2 looks more homogeneous and option 1 does not look homogeneous. In option 2 what is happening there is a different distance between two typefaces, but in option 1 there is equal distance. But what is happening in option 1 because in this part, this added part of the triangle is also adding towards the whiteness of the space.

But here that is why it has to be justified and it has to be minimized in case of this triangle. And in case of circle, this part, this part, as well as this part is adding into the background which is the white part. That is why we see the circle and the triangle has the minimum, should have the minimum space. And if we draw a square beside another square that should have the maximum space because they do not have any added space in between them.

So that is why this justification and creating equal and homogeneous figure-ground relationship is called kerning and we have to adjust when the typography designers who design the typefaces adjust this space so that while we type this all this letter has a homogeneous gap in between them.
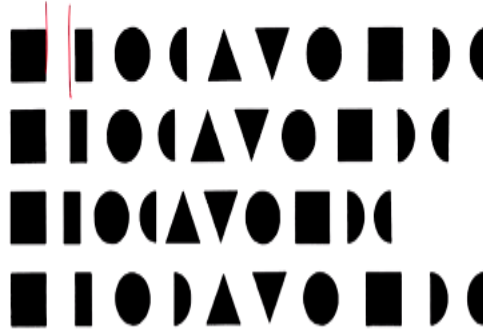
So this is David Kindersley's experiment with the kerning. So he have used different basic shapes and he experimented with the kerning and he started giving a unified space and he proposed a unified space what it should be.

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And then there are differences between Serif and Sans Serif. We will discuss what is Serif and what is Sans Serif. But if you look at the difference between these two, in this case, this part is added into this letter which is called Serif and which is the end of this letter and this letter Z does not have this Serif end. This is the Sans Serif. So now if you look at, this O and Z here has more gap than this.

Why this is happening because when you add this Serif in, this part of negative space is getting confined. Now in this case, this part of negative space is getting merged with the other negative space. So this will appear bigger than this. Because this has a confined negative space and this will not appear bigger. Because this appears like one negative space and this is another negative space which is part of this figure.

Now this negative space does not appear to be part of this figure because this does not have a Serif end which does not confine the figure. So that is why you should provide lesser space in this and more space in this case. So you have to adjust and when you design a logo or you are creating, you are using different typefaces with different x size, sometimes you need to do that to design the frontend.

Some font can be, you can use a bigger font which juxtapose with a smaller font. Then this kind of sense of kerning will help you to create this logo or the heading of this or even in the others part when you are using experiment with the typography this kerning is very important to create the design.

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Now there are different spacing methods which typography designers use in terms of Serif as well as the Sans Serif design. So Robert Slimbach's method, Walter Tracy's method and Miguel

Sousa's method of kerning is 3 of the most important methods. If you want to learn more about this, you can check in the website and google it. So now we will come to the classification of typefaces.

So the main broad classification of typefaces are Serif and Sans Serif. Serif typefaces looks older because when the English letter started appearing, so we started from the Roman and the Greek letters when the Latin letters when they started chiseling with the hammer and the chisel on the stone. So they started creating the Serif ends because when they start cutting a stone, the end to create a proper end they had to create some kind of ornamentation.

Otherwise the stone used to break and creating this kind of end was very difficult with the tools they are using. That is why because of the tools they created this Serif ends and when they started chiseling, so they started putting the hammer on the right hand side and the chisel has a particular slant. That is why this side of this Serif font is smaller and then they put the chisel in this side and that is why the right hand side of the letters are generally thicker.

And that is why also in the O you will see uneven distribution of the thickness. That is because of the tools and techniques they started using. So that is why because Serif started evolved first, Serif is more ornamental and Serif has a association with the older style font, older style

typefaces. So always Serif looks older than a Sans Serif. So if you want to create a older look you should go for a serif typeface.

And if you want to create a new and crisp modern look then you should go with the Sans Serif typefaces. So Sans Serif, sans means without. So without Serif. So here in this typefaces, this is called Futura. Futura does not have a Serif end. Now within that there are lot of differences. Within Sans Serif there are lot of differences and Serif also there are lot of differences.

So as we started discussing that from the Gothic style when the printing press started evolving and from the renaissance we are going towards the industrial revolution and the post industrial revolution there is a modern era. So humanist Serif typefaces started evolving. And so they deleted lot of ornamentation which was there in the Gothic styles. For example black letter.

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And then in 19th century which is just before modern, modernism started around 1920s, not exactly but on and before 1920s. So that is the time when humanist typefaces started evolving. So humanist or the old style, this is still old style because after that 1920s lot of different typefaces started coming. So these old style letters form a close connection with the calligraphy. So it is also related with the calligraphy and the movement of the hand.

It does not give appear digital. The Roman typefaces of the 15th and 16th century is kind of converted into this. So Sabon is one of this style which is designed in 1966 based on a 16th century typeface which is of Claude Garamond. This is a typeface of this humanist old style. So if you look carefully this width of this letter A and the width here varies. And also if you look at, so there are lot of ornamentation which is not equal, does not appear digital.

So it has a connection with the calligraphic style. And if you also look at the small letter, their width varies a lot. And here also the width are not equal. So that gives the connotation of a calligraphy and hand painted typefaces.

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## Classification of Type Faces

A basic system for classifying typefaces was devised in 19th Century when printers sought to identify a heritage for their own craft analogous to that of art history.

**Transitional** typefaces are more abstract and less biomorphic than humanist but more curvilinear than Modern. These typefaces have sharper sheriffs and a more vertical axis than humanist letters.

When the fonts of **John Baskerville** were introduced in the mid 18th Century, their sharp form and high contrast were considered shocking.

Aa

Now the next is around 19th century when printers started using typefaces which is analogous to that of the history which perform the same function but the origin is different. They started creating a different origin which is we know that modernism started deleting all the classical style into the design. So they did not want to incorporate the classical style of design into the modernist style. So this is transitional but this process happened gradually.

So this is called the transitional typefaces when this is more abstract. More abstract means more geometric and less biomorphic. Biomorphic creates this curvilinear line which is like whiplash lines or which mimics the biomorphic or the animal the floral and fauna, the line which comes

from flora and fauna which we see in the Art Nouveau and art and craft movement which is against the machine movement which happened just before the modernist movement.

So that is the time when there was a dilemma between whether to go with the machine made aesthetics or opposite. So this is something in between which is more abstract and less biomorphic than the humanist typefaces which we have seen just before but more curvilinear than the modern. So when we see the modern we will understand the style of it and this is something in between. So John Baskerville's font, Baskerville it is an 18th century design which is also the, still it is not modern.

So we will go to the modern era after this. So it is just pre-modern and this is one of the design of pre-modern transition Sans Serif typeface.

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Now we come to the modern time which is the designers of the 20th century and 21st century have continued to create this new typefaces based on history characteristics. Still they have this Serif style and later we will go to the Sans Serif style when we start going towards more crisp modernism. So this is late 18th century and early 19th century and it is a radically abstract thin and abstract Serif.

We can see a straight line coming into this style and another straight line coming into this style and there is lot of drastic difference. So this is the thin is really thin and the thick is really thick. So this gives like a very geometric and abstract form and this looks like a there are lot of difference and contrast and boldness into the design.

And if you look at the Serif ends it is absolutely straight line and also in the small letters, there are lot of geometry coming into the picture. So this is the typefaces Bodoni which is a modern typeface.

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Now we come to the more minimalist style. So here they are cutting down all the added ornamentation from the typefaces. That is why the Sans Serif typefaces started evolving. So there is no Serif end. But still when we talk about the Sans Serif it again is coming from the humanist Sans Serif to more modern and abstract grotesque Sans Serif. So here we can see some curvilinear end in few letters but from some part it is not there.

So in the late 19th century this humanist Sans Serif style started evolving mostly commonly in the 20th century. So parallely in the architecture Ludwig Mies van der Rohe whose most of the architectural style and the design he have also designed few furnitures which falls under the internationalism which is high modern era. He told that less is more. So in the high modernist time the design style was minimalist.

So if there are less element in the design, that is more and that is more beautiful. That is the visual style of this modernism. So Gill Sans is one of the typefaces which is design by Eric Gill in 1928. So remember this we were discussing this 1920 onwards is kind of we started modernism. So this is one decade, almost one decade after modernism when this Sans Serif fonts are really very important in this era.

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## Classification of Type Faces

A basic system for classifying typefaces was devised in 19th Century when printers sought to identify a heritage for their own craft analogous to that of art history.

**Transitional Sans serif (Grotesque and Neo Grotesque)** These are also referred to as anonymous sans serif. International Typographic style of Swiss style.

**Helvetica** designed by Max Miedinger in 1957 is one of the world's most used typefaces. It's uniform, upright character makes it similar to transitional serif letters.
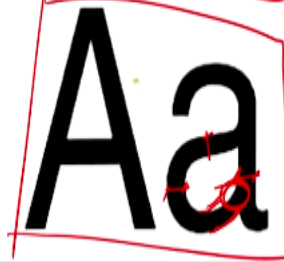
Then the transitional Sans Serif or the Grotesque or the Neo Grotesque Sans Serif these are also referred as the anonymously the Sans Serifs and this typography style is the Swiss style and which is quite contemporary with the Bauhaus and De Stijl movement and with the Kandinsky's painting and Mondrian's are the contemporary painters in De Stijl movement and Bauhaus. So this is quite contemporary for that.

And also one of the designers Maximum Miedinger in 1957 which is also the middle or the late part of this modernism, he have design Helvetica which is one of the famous typefaces and this is Helvetica and this looks more modern than the humanist Sans Serif. In humanist Sans Serif there are some optical corrections so that you can see difference in the small letters a. The width difference is there. But if you look at the small letter a, the width difference is highly decreased.

Now still this width difference is there because if this width of this part and this part comes like equal and then there will be a black patch over there. So when there is a join of two arm of a letter and if we do not decrease the width then there will be a black patch created. So to create this optical illusion, you have to decrease the width. So just because of that the width is decreased. But otherwise this has a much more homogeneous width all over the typefaces.

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Now the more geometric from the Grotesque we go to the more geometric Sans Serif which is absolutely geometric and which is called one of the typefaces is Futura which is designed by Paul Renner. Though it is in 1927 but it looks more geometric than the previous example. So we cannot fit everything into the proper timeline and how it goes because many of the typefaces comes later.

And few of the typefaces which looks modern can come can be designed before because together from 1920 to 1980s this is the modernist time where the visual style was more towards the minimalism. So here if you look at the A has a very sharp edge which we do not see in the previous styles. So it is absolutely geometric. It is chiseled out from a triangle. Also the small letter a is absolutely geometric which is there, just a combination of rectangle and circle.

But the same principle is again added here. So it just tapers a little bit so that to avoid the black patch over here. Otherwise, if you again join it like that so there will be a bold black patch and

then if you use this small letter so then there are lot of black patch on these areas. So just to avoid that this kind of design is created. Otherwise this is totally if we look at, if you type something in this Futura typeface so you will see all the letters are derivative of pure geometric form.

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Now from the late part of 19th century, the later part and the 20th century earlier part we come into the postmodernism which is after modern and that time which is after the World War. Modernism is around the time of World War and the postmodernism was just after the World War when the social cultural context was very different. And that time again from minimalism, there were lot of ornamentation started coming into picture.

So if we look at the history and art history or the design history or architectural history, so it goes simultaneously and this occurs one after other. So once if the movement talks about minimalism, the next movement might add more ornamentation and the next movement again delete ornamentation. So this goes on in a loop. So in post modernism, one of the postmodern architect Robert Venturi describes it as a less is bore.

So that was the theme and the motto of the postmodernism. So less element, if there is less element this is a boring design. So postmodernist architect designers and the typographer they started incorporating lot of element into the, again the elements started coming back into picture. So if you look at the, we have discussed the visual style and the design style also there are lot of

ornamentation coming into picture which is in pop movement and other postmodernist movement.

So Egyptian or Slab Serif is one of the style of postmodern fonts which we see in the display typography or the neon signboards this kind of typefaces are there because it grabs people's attention and because of the Serif ends. So they have a very thick Serif and they have enhanced the ornamentation part in such a level that it looks like a slab. So it has almost a similar width of a main body of the text and the Serif in the small letters are extended to create a very ornate expression. So Clarendon is one of these typefaces.

**(Refer Slide Time: 38:15)**
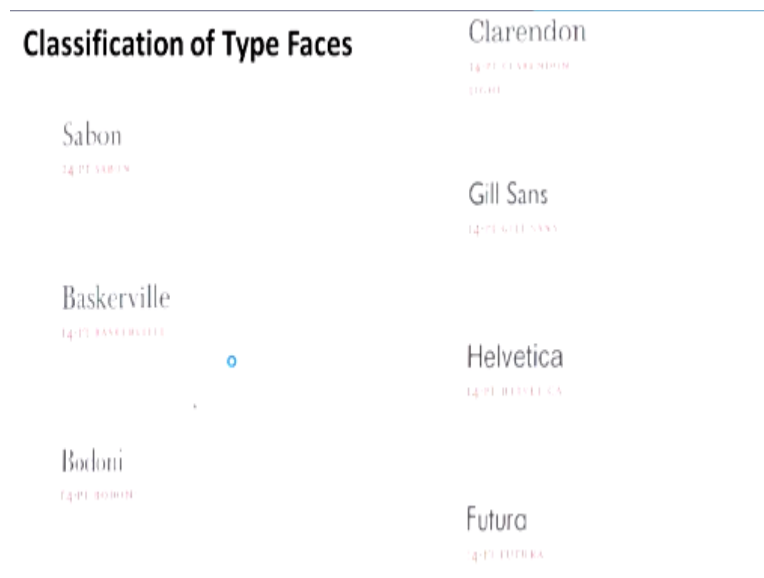


So these are few typefaces which are good typefaces from different style. Clarendon, Gill Sans, Helvetica, Futura, Bodoni, Baskerville, Sabon. These are some of the very good typefaces, well-designed typefaces which you can use according to your theme.

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**Classification of Type Faces**

Roman Typefaces are the basic fonts. When they are modified into *italics*, **bold**, condensed, extended, etc. without disrupting their visual identity, they create a Typeface Family.

**Universe** Typeface Family, designed by Adrian Frutiger in 1957
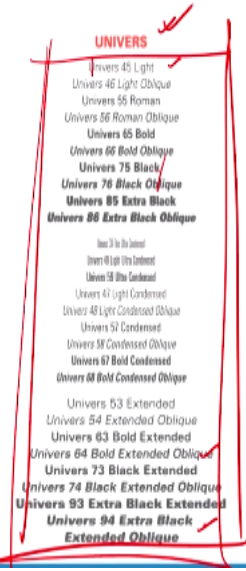
So this classification also we can see right now we are in digital age. So one particular typeface if you see, for example we are discussing about Universe. This can have a lot of different variation to create the hierarchy of the typefaces. So it can go ultra light to very thin, very thick, extended, black and different styles with upright Roman to Italics and lot of different variations are available right now within a particular typefaces.

So in the next class we will discuss how to use all these typefaces and based on the knowledge of this lecture, we will apply this and we will see how we use typefaces in the digital GUI or the user interface.