Variable Fonts
TUG 2021

Dave Crossland
Lead Program Manager
Google Fonts
August 6, 2021
Making the web more beautiful, fast, and open through great typography

We believe the best way to bring personality and performance to websites and products is through great design and technology. Our goal is to make that process simple, by offering an intuitive and robust collection of open source designer web fonts. By using our extensive catalog, you can share and integrate typography into any design project seamlessly—no matter where you are in the world.

Discover great typography

Our font catalog places typography front and center, inviting users to explore, sort, and test fonts for use in more than 135 languages. We showcase individual type designers and foundries, giving you valuable information about the people and their processes, as well as analytics on usage and demographics. Our series of thematic collections helps you discover new fonts that have been vetted and organized by our team of designers, engineers, and collaborators, and our default sort organizes fonts based on popularity, trends, and your geographic location. You can also create your own highly customized collections by filtering families, weights, and scripts, plus test color themes, and review sample copy. Collections can be shared, making it easy to collaborate on projects and ensure typography is optimized and streamlined throughout the design and engineering process.

Collaborate with open source

All the fonts in our catalog are free and open source, making beautiful type accessible to anyone for any project. This means you can share favorites and collaborate easily with friends and colleagues. Google Fonts takes care of all the licensing and hosting, ensuring that the latest and greatest version of any font is available to everyone.

Make the web faster

Using the code generated by Google Fonts, our servers will automatically send the smallest possible file to every user based on the technologies that their browser supports. For example, we use WOFF 2.0 compression when available. This makes the web faster for all users—particularly in areas where bandwidth and connectivity are an issue. Now everyone can enjoy the same quality and design integrity in their products and web pages, no matter where they are in the world.
FREE FONT LICENCES

Fonts are typically redistributed in part when they are embedded into a digital document such as PDF. This is called "sub-setting," and means only the parts of the font needed for the characters in the document are included.

Strong copyleft licenses like the GNU GPL make this situation complicated. When a GPL work is combined with another work, the whole must be licensed under the GPL, or it cannot be distributed. This means that if a font is embedded in a PDF, it requires all other works in the PDF to also be licensed under the GPL—including the text of the document—or the document cannot be distributed.

Weak- and non-copyleft licenses, such as CC-BY-SA or MIT X11 licenses, do not cause this problem. The Sil Open Font licence (OFL, Appendix B.6) is a free software licence written specifically for fonts. Drafts were reviewed and refined at various free software and type design conferences (Spatlinger and Gaulthier, 2007).

![Image](https://via.placeholder.com/150)

**Figure 10:** The Sil Open Font licence in the context of other free software and free culture licences.

The OFL accommodates type designers by being very simple, with the only major requirement being that derivatives must be re-named. For example, the ‘Cantium’ font published under the OFL by one of its authors, Victor Gaulthier, can be freely modified and redistributed by anyone, but no one other than Gaulthier may call their font ‘Cantium.’

FUTURE DEVELOPMENTS

GNU/Linux distributions include hundreds of fonts (Debian Font task force, 2006; Red Hat, 2008) whose developers have freely licensed the copyrights inherent in the font software. The GPL version 3 is the strongest copyleft licence available for fonts, and it is essential to include the ‘font exception’ additional permission for document embedding. However, best practices for procedures to require remaking of GPL derivatives have not yet been established.

In addition to the copyright of a font being freely licensed, the typeface it implements must be in public domain or freely licensed too. To make a typeface design freely available in the USA, the designer has to simply not apply for a design patent. However in the EU unsigned design rights are automatically granted for a period of 15 years, and those rights must be disclaimed. There has been no precedent for this in the free font community, though.

Also, free fonts must avoid names that infringe trademarks. It is possible to use the same first two characters for a similar typeface design, so a revival of ‘Helvetica’ called ‘Helenes’ would risk trademark infringement while ‘Herme’ would not. An exception to this is that people’s names and surnames can not be trademarks, so while ‘Gil’ Stone’s ‘Bell’ Cooper ‘Zapf’ and ‘Warwick’ are used as names for proprietary fonts, they are not valid trademarks (Nack, 2006). A methodology or even technology for checking free fonts and type designs to avoid infringing design patents, design rights or trademarks ought to be established.

When people use type that they feel could be improved, if it is in the public domain they are free to do so. With the development of free software font editors, everyone has access to the necessary tools. Now the obstacle is that the knowledge of how to develop and refine type is not freely available.

There is no central repository from which to easily feed a free font into the various free culture distribution channels, such as each of the popular GNU/Linux distributions. The closest projects to this so far are the ‘Open Font Library’ and the ‘Comprehensive TeX Archive Network’s’ websites (CTAN, 2008; Phillips and Pronkowicz, 2008). But neither site provides visitors a means of browsing and downloading free fonts, akin to Blumenthal’s MyFonts website (Blumenthal, 2008). Such a website might also become a central place for free software fonts to be linked from using the upcoming CSS3 web font linking technology, already available in some free software browsers (like Mozilla’s Firefox).
Cantarell

Fox Jumps Over
The Lazy Dog

Gg
Variable Fonts
Skia Variations

Skia, Matthew Carter, 1994
Users Caught in Font War Cross Fire

Apple, Microsoft Join in Battle Against Adobe

BY LAURIE FLYNN AND MARTIN MARSHALL

SAN FRANCISCO — In far-reaching font announcements last week, Microsoft, Apple, and Adobe staked out positions that promise a consistent imaging model across PC and Mac platforms but could leave users struggling to cope with multiple font standards.

Microsoft announced at the Seybold Computer Publishing Conference here that it will include Apple's font technology in OS/2 Presentation Manager. In the cross-licensing agreement which both companies said held Postscript language and font format in the hopes of finding off a swell of support for

Postscript-compatible interpreter in future Apple printers.

But the plan may have hit a
As technology advancement is critical to the long-term success of the type industry, Monotype is thrilled to have played a role in development of OpenType Font Variations. This important technology will allow us to improve the value of type solutions we can offer to type designers, partners and customers.

Monotype

As a pioneer developer of Apple’s GX variations in the 1990’s, Font Bureau is delighted to be working with Type Network and its foundry partners to support the new OpenType Font Variations standards.

David Berlow, Font Bureau

ATypI, Warsaw, September 2016

monotype.com/blog/articles/part-1-from-truetype-gx-to-variable-fonts
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Google, Microsoft, Apple, Adobe
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Compress
Express
Finesse
Compress
Express
Finesse
Almost before we knew it, we had left the ground.
Almost before we knew it, we had left the ground.
<table>
<thead>
<tr>
<th>Font Style</th>
<th>Example Text</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thin 100</td>
<td>Almost before we knew it, we had left the ground.</td>
</tr>
<tr>
<td>Extra-light 200</td>
<td>Almost before we knew it, we had left the ground.</td>
</tr>
<tr>
<td>Light 300</td>
<td>Almost before we knew it, we had left the ground.</td>
</tr>
<tr>
<td>Regular 400</td>
<td>Almost before we knew it, we had left the ground.</td>
</tr>
<tr>
<td>Medium 500</td>
<td>Almost before we knew it, we had left the ground.</td>
</tr>
<tr>
<td>Semi-bold 600</td>
<td>Almost before we knew it, we had left the ground.</td>
</tr>
<tr>
<td>Bold 700</td>
<td>Almost before we knew it, we had left the ground.</td>
</tr>
<tr>
<td>Extra-bold 800</td>
<td>Almost before we knew it, we had left the ground.</td>
</tr>
<tr>
<td>Black 900</td>
<td>Almost before we knew it, we had left the ground.</td>
</tr>
</tbody>
</table>
Roboto Cond Light
Roboto Cond Regular
Roboto Cond Bold
Roboto Thin
Roboto Light
Roboto Regular
Roboto Medium
Roboto Bold
Roboto Black
Compress
Express
Finesse
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DECOVAR
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Adobe “Multiple Master” Model
monotype.com/resources/articles/part-1-from-truetype-gx-to-variable-fonts
Apple “GX” Model
monotype.com/resources/articles/part-1-from-truetype-gx-to-variable-fonts
Compress
Express
Finesse
Variable axes

Learn more about variable fonts

Italic

Weight

Glyphs
Optical Size
Amstelvar
Amstelvar
Amstelvar
“Where can I obtain optical size designs?”
## Variable fonts

### Font families

<table>
<thead>
<tr>
<th>Font Family</th>
<th>Axes</th>
<th>Default</th>
<th>Min</th>
<th>Max</th>
<th>Step</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arimo</td>
<td>Ital</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>wght</td>
<td>400</td>
<td>400</td>
<td>700</td>
<td>1</td>
</tr>
<tr>
<td>Assistant</td>
<td>wght</td>
<td>400</td>
<td>200</td>
<td>800</td>
<td>1</td>
</tr>
<tr>
<td>Bitter</td>
<td>Ital</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>wght</td>
<td>400</td>
<td>100</td>
<td>900</td>
<td>1</td>
</tr>
<tr>
<td>Bodoni Moda</td>
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<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
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<td>14</td>
<td>6</td>
<td>96</td>
<td>0.1</td>
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<tr>
<td></td>
<td>wght</td>
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<td>400</td>
<td>900</td>
<td>1</td>
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<tr>
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<td>Ital</td>
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<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
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<td>width</td>
<td>100</td>
<td>75</td>
<td>100</td>
<td>0.1</td>
</tr>
<tr>
<td></td>
<td>wght</td>
<td>400</td>
<td>400</td>
<td>700</td>
<td>1</td>
</tr>
<tr>
<td>Font Family</td>
<td>Axis</td>
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<td>0</td>
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</tr>
<tr>
<td></td>
<td>width</td>
<td>100</td>
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<td>0.1</td>
</tr>
<tr>
<td></td>
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<td>opsz</td>
<td>14</td>
<td>6</td>
<td>96</td>
<td>0.1</td>
</tr>
<tr>
<td>Fraunces</td>
<td>opsz</td>
<td>14</td>
<td>9</td>
<td>144</td>
<td>0.1</td>
</tr>
<tr>
<td>Imbue</td>
<td>opsz</td>
<td>14</td>
<td>10</td>
<td>100</td>
<td>0.1</td>
</tr>
<tr>
<td>Literata</td>
<td>opsz</td>
<td>14</td>
<td>7</td>
<td>72</td>
<td>0.1</td>
</tr>
<tr>
<td>Piazzolla</td>
<td>opsz</td>
<td>14</td>
<td>8</td>
<td>30</td>
<td>0.1</td>
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<tr>
<td>Texturina</td>
<td>opsz</td>
<td>14</td>
<td>12</td>
<td>72</td>
<td>0.1</td>
</tr>
</tbody>
</table>

## Axis definitions

**opsz**  
**Optical size**

- Default: 14  
- Min: 6  
- Max: 144  
- Step: 0.1

Adapt the style to specific text sizes, specified in Points. At smaller sizes, letters typically become optimized for more legibility, with loose spacing/kerning and thicker strokes with less detail. At larger sizes, letters are typically optimized for headlines with thinner strokes and more detailed forms, and more extreme weights and widths. When used in CSS, this axis is activated by default, but not all products/platforms use it automatically.

[fonts.google.com/variablefonts](https://fonts.google.com/variablefonts)
13 must-read Russian female writers

Russian literature has for centuries been male dominated, but here we present a rare selection of women writers

Ludmila Ulitskaya – Людмила Евгеньевна Улицкая

WEEK 23 2020

BOOKS THEATRE FILMS COMICS ART

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Russian literature has for centuries been male dominated, but here we present a rare selection of women writers
Give us some credit

Crediting nourishes the community and helps to establish type-making worthy of people’s appreciation

VERONIKA BURIAN

Larger teams and more complex work are moving type design toward more thorough crediting systems. But it's only partially about the system and more about honouring the often unknown ones investing their considerable skills into producing the fonts we use and love. To begin with, type design is a problematic field when it comes to crediting for several reasons. It can be done by a single person working from a home office, or by large teams of professionals, each of them dealing with very specific parts of the development and release cycle. Many of the necessary tasks may require in-depth research, hiring external consultants, or outsourcing processes. These external collaborators may not push nodes around, but they do contribute toward the final product’s quality or lack thereof. Another important fact that is obvious but should be mentioned is that type design has changed together with technology — from a craft to an industrial trade to a technical design field. As part of an article about intellectual property and copyrights, Charles Bigelow compares type design to a monumental sculpture or to the design of a programming language. Bigelow helps us understand some of the first things we need to consider when discussing credits. In short, type design has a strong artistic component, parts of the process imply creativity, and it has become a technically challenging trade, other processes require specific technical knowledge.

At the same time, the artistic qualities of a typeface are not solely related to the drawing of
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Now in its third version, Literata is one of the most distinct free font families for digital books. Literata was originally created as the default font family for all Google Play Books, balancing a brandable look for Google with the strict needs of a comfortable reading experience on a wide range of devices with varying screen resolutions and rendering technologies—not an easy task.

TypeTogether solved these problems by designing a familiar roman style (varied texture, slanted stress, and less mechanic structure) paired with an uncommon upright italic that accounts for the inherent limitations of the square pixel grid. Get the entire type family for free!
“Where can I play with optical size designs?”
Heading One

Heading Two

Heading Three

Intro text leads reader into the article by the nose, with grace and dignity and a little pithy charm. Typeface has changed to the appropriate optical size by the miracle of modern typography.

Johannes Gutenberg’s work on the printing press began in approximately 1436 when he partnered with Andreas Heilmann, owner of a paper mill.
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Johannes Gutenberg’s work on the printing press began in approximately 1436 when he partnered with Andreas Heilmann, owner of a paper mill. Having previously worked as a goldsmith, Gutenberg made skillful use of the knowledge of metals he had learned as a craftsman. He was the first to make type from an alloy of lead, tin, and antimony, which was critical for
Auto approximation
font-optical-sizing: auto
On 6/25/2013 6:16 AM, Andres Conrado Montoya wrote:
>
> Thank you so much, Hans. :) It works great.
> 
> I must agree, however, with Georg's considerations. I am very grateful
> for the current solution, but an automatic selection of optical sizes
> could be insanely good, from a book designer point of view (I'm a book
> designer). Just for the curious, these are some links that go deeper
> in the theme of Optical Sizes for Typography:
>
> Optical sizes have always been part of tex (macro packages) and are also
> one of the reasons why tex font subsystems are complex:
>
- fonts often provide only some styles / variants in sizes, so fallbacks
  need to be supported
- names are highly inconsistent, so there is no systematic robust
  solution that automates it
- only a few fonts provide optical sizes and the whole font machinery
  must not suffer (in performance) from this
- fonts can be combined in any way with other designs (and we also need
  to take math into account)
Why are these changes made?

2 confounding ideas
1. Human Perception

Physiology + Neurology

*The Doors of Perception*
There are twelve black dots at the intersections in this image. Your brain won't let you see them all at once.
Stop messing with my head.
Legendary poster artist Victor Moscoso joins @jamestedmondson to teach psychedelic lettering @Lett_Arc 7/22 & 7/23 buff.ly/2rQvqOG
Same lines look different lengths.
researchgate.net/publication/42834022_Application_of_Riesz_transforms_to_the_isotropic_AM-PM_decomposition_of_geometrical-optical_illusion_images
Same size shapes look different sizes. Straight lines look crooked.
researchgate.net/publication/42834022_Application_of_Riesz_transforms_to_the_isotropic_AM-PM_decomposition_of_geometrical-optical_illusion_images
Straight lines don't even look straight.

researchgate.net/publication/42834022_Application_of_Riesz_transforms_to_the_isotropic_AM-PM_decomposition_of_geometrical-optical_illusion_images
2. What is ‘size’?

Points and arc minutes
Angular diameter: the angle subtended by an object

Actual diameter

Angular diameter
(32 arc minutes or 1920 arc seconds or 0.5 degrees)

Sun

Earth

tonylouis.wordpress.com/2017/12/29/angular-diameter-sect-and-the-aries-ingress
The state of the art, 1900 & 2020

w3.org/TR/css-fonts-4/#font-optical-sizing-def
1.8 The large size-specific designs are optimized for elegance (The Berlow-Hudson Hypothesis)

Historically, typefaces were designed differently for large sizes than for small sizes. This is sometimes called optical scaling or size-specific design. A typeface designed for small size will have a taller x-height, wider letters, less difference between thick and thin strokes, and wider spacing than a typeface designed for larger sizes. In metal type each size had to be made separately. In digital type the same letter can be displayed at any size. The advantage to digital type production is the ease and speed of designing a single version of each letter, but what is lost is the size-specific tuning. Sitka is one of several dozen digital typefaces that have different outlines optimized for different output sizes [Ahrens and Mugikura, 2013].

For the legibility testing aspects of this project we focused our attention on the Sitka Small size because we saw its optimization as having the greatest effect on legibility. In agreement with Harry Carter [1937/1984], we felt that the larger sizes were optimized for elegance and visual interest: ‘Shortened descending and ascending strokes are unforgivable on bodies over 18-point. It is quite legitimate to shorten the tails of the small founts to increase legibility and to lengthen them in the display sizes of the same face for the sake of elegance.’ An alternative hypothesis that was disputably proposed by David Berlow (personal conversation), and later taken up by John Hudson (personal conversation), claimed that the size-specific adjustments for larger sizes are in fact legibility optimizations for larger text.
1.8 The large size-specific designs are optimized for elegance
(The Berlow-Hudson Hypothesis)

Historically, typefaces were designed differently for large sizes than for small sizes. This is sometimes called optical scaling or size-specific design. A typeface designed for small size will have a taller x-height, wider letters, less difference between thick and thin strokes, and wider spacing than a typeface designed for larger sizes. In metal type each size had to be made separately. In digital type the same letter can be displayed at any size. The advantage to digital type production is the ease and speed of designing a single version of each letter, but what is lost is the size-specific tuning. Sitka is one of several dozen digital typefaces that have different outlines optimized for different output sizes [Ahrens and Mugikura, 2013].

For the legibility testing aspects of this project we focused our attention on the Sitka Small size because we saw its optimization as having the greatest effect on legibility. In agreement with Harry Carter [1937/1984], we felt that the larger sizes were optimized for elegance and visual interest: ‘Shortened descending and ascending strokes are unforgivable on bodies over 18-point. It is quite legitimate to shorten the tails of the small founts to increase legibility and to lengthen them in the display sizes of the same face for the sake of elegance.’ An alternative hypothesis that was disputably proposed by David Berlow (personal conversation), and later taken up by John Hudson (personal conversation), claimed that the size-specific adjustments for larger sizes are in fact legibility optimizations for larger text.
1.8 The large size-specific designs are optimized for elegance
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Brand Design: Logo anti-homogenization

Optical size for ‘downsizing’
<table>
<thead>
<tr>
<th>Tech</th>
<th>Fashion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Revolut</td>
<td>BALenciaga</td>
</tr>
<tr>
<td>facebook</td>
<td>BURBERRY</td>
</tr>
<tr>
<td>Google</td>
<td>SAINT LAURENT</td>
</tr>
<tr>
<td>Microsoft</td>
<td>BERluti</td>
</tr>
<tr>
<td>airbnb</td>
<td>BALMAIN</td>
</tr>
<tr>
<td>Spotify</td>
<td>RIMOWA</td>
</tr>
<tr>
<td>Pinterest</td>
<td>DIANE VON FURSTENBERG</td>
</tr>
<tr>
<td>ebay</td>
<td></td>
</tr>
</tbody>
</table>
The fictitious Elemeno Pea company is having difficulty spreading their brand across the full range of media for modern use. Being used in print to just scaling their artwork and having the printer over-ink the smaller uses, the thin hairlines that bring elegance to their pea products, is having a hard time in rendering in screen environments, where such elegant details often fail to appear.
The first instinct of their fictitious ad agency, probably based on the experience of doing the same thing over and over again and again from brand to brand, is to switch Elemeno to a simple, low contrast san serif with little or no flavor.
Elemeno instead, can now make a custom version of their logo as a scaleable font with an optical size axis that maintains the look, feel, and elegance of their products, without the concern for ink in print, and with control over their logo’s appearance with any rendering.

ELEMENO PEA Inc.

ELEMENO PEA Inc.

ELEMENO PEA Inc.
ELEMENO PEA Inc.
ELEMENO PEA Inc.
ELEMENO PEA Inc.
Reading fluency

Optical size for better comprehension, retention, and speed
Stem rhythm
Stem rhythm
minimum
Stem rhythm
minimum
Saccades
DANS, KÖN OCH JAGPROJEKT

På jakt efter ungdomars kroppsspråk och den "synkretiska dansen", en sammansmältning av olika kulturers dans, har jag i mitt fältarbete under hösten rört mig på olika arenor inom skolans värld. Nordiska, afrikanska, syd- och östeuropeiska ungdomar gör sina röster hörda genom sång, musik, skrik, skraft och gestaltar känslor och uttryck med hjälp av kroppsspråk och dans.

Den individuella estetiken framträder i kläder, frisyrer och symboliska tecken som förstärker ungdomarnas "jagprojekt" där också den egna stilen i kroppsrörelserna spelar en betydande roll i identitetsprövningen. Uppchållsrummet fungerar som offentlig arena där ungdomarna spelar upp sina performanceliknande kroppsslower enligt Wikipedia Artikel en.wikipedia.org/wiki/Eye_tracking
If You Can Raed Tihs, You Msut Be Raelly Smrat

Chances are you've seen this in your inbox:

"Aoccdrinig to a rscheearch at Cmabrigde Uinervtisy, it deosn't mttaer in waht oredr the ltteers in a wrod are, the olny iprmoatnt thng is taht the frist and lsat ltteers be at the rghit pclae. The rset can be a toatl mses and you can sittl raed it wouthit porbelm. Tihs is bcusea the huamn mnd deos not raed ervey lteter by istlef, but the wrod as a wlohe."
A mirror is an object that reflects light in such a way that, for incident light in some range of wavelengths, the reflected light preserves many or most of the detailed physical characteristics of the original light. This is different from other light-reflecting objects that do not preserve much of the original wave signal other than color and diffuse reflected light.
The Valuable Virtues of Variable Font Technology

As the study demonstrates, while the Lexend series were beneficial to a large sample of students, no one setting worked best for all students. Diverse readers call for diverse axis settings just like every individual person requires their own individual eyeglass prescription.

Eyeglass prescriptions are not six strict settings. There are more granular settings possible.

Variable font technology allows for continuous selection of the Lexend Series to find the specific setting for an individual student.

My name is Commander Smith and the spaceship that I command has been exploring the planet known as Earth for almost a year. We have discovered that Earth is very different from our planet. Our next job was to explore the states of Texas, New Mexico, Arizona, and Nevada. These states make up the Southwest region.

First, we had to backtrack a little and fly east to Texas. This is a huge state—the map showed that it was more than seven hundred miles wide. Later we found out that Texas is the second largest state in size, after Alaska. It is also the second largest state in population, after California. We certainly saw a lot of really big things in Texas—big cities, big oil fields, and big ranches. In fact, we found out that there is a ranch in Texas that is bigger than the whole state of Rhode Island! Texas raises more cattle than any other state.

The cowboy, a person who takes care of the cattle, is a symbol of Texas. In the late 1800s, Texas cowboys drove the cattle hundreds of miles to market in the northern states.

It was hard, dangerous, adventurous work, so many people thought of cowboys as heroes. Over time, the cattle ranches changed so that there was less need for cowboys. Today, there are not as many cowboys in Texas. There are, however, many Texans who still dress like cowboys. They wear cowboy boots and a kind of tall cowboy hat they call a ten-gallon- hat because it looks as if it could hold that much water. Another symbol of Texas is the oil well. Texas produces more oil than any other state. Oil was first discovered near the city of Houston in the early 1900s.

Today, Houston is the largest city in Texas. The American space program has one of its largest workplaces there. One man told us that Houston was the first word spoken on the moon. He explained that when an American became the first human to land on the moon on July 20, 1969. The first thing he did was radio back to Houston. The United States was the first manned mission to land on the Moon. There have been six manned U. S. landings and numerous unmanned landings. To date, the United States is the only country to have successfully conducted manned missions to the Moon, with the last one in December 1972.
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Product & Page Design: A better type ramp

The spine of a design system, and ‘upsizing’ with Roboto Flex
Headline 1
Headline 2
Headline 3
Headline 4
Headline 5
Subtitle 1
Body 1
Subtitle 2
Body 2
BUTTON
Caption
OVERRIDE
Headline 1
Headline 2
Headline 3
Headline 4
Headline 5
Headline 6
Subtitle 1
Body 1
Subtitle 2
Body 2
BUTTON
Caption
OVERLINE
Feeling comfortable? No?
Here the 32pt design is mis-applied to the text sizes.

Intro text leads reader into the article by the nose, with grace and
dignity and a little pithy charm. Typeface has changed to the
appropriate optical size by the miracle of modern typography.

Johannes Gutenberg’s work on the printing press began in approximately 1436 when he
partnered with Andreas Heilmann, owner of a paper mill. Having previously worked as a
goldsmith, Gutenberg made skillful use of the knowledge of metals he had learned as a
craftsman. He was the first to make type from an alloy of lead, tin, and antimony, which was
critical for producing durable type that produced high-quality printed books and proved to be
much better suited for printing than all other known materials.
Here the 14 pt design is mis-applied to the display sizes. The H1 is now much longer, and even seems to be bolder.

Intro text leads reader into the article by the nose, with grace and dignity and a little pithy charm. Typeface has changed to the appropriate optical size by the miracle of modern typography.

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To approximately finesse the headline, the Material Typography guidelines use Light (300) weight at H1.
Here the intended designs are applied. This should feel more comfortable to read, with nothing out of place.

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Our quick brown fo
dy sweep over the lazy sleeping

Pack my bag with six dozen jugs of

Blabbering boulevard strangers quizzed puzzled v

Parking attendants worried when the zebras quite juggling the sleeping

Masterful planning before the trip enabled the client, a Quaker family to all the peace

Everyone knew that the particle accelerator would not function in zero gravity but planned the experiment

Practical application of the necessary variables created a greatly simplified hierarchy over the broad range of nutrition

The typical North American composition of text does not normally involve extensive testing for legibility

Magnification of issues into unmanageable specifications, quietly but certainly, raised the price of everything they did,
Our quick brown fox
Sweep over the lazy sleeping dog
Pack my bag with six dozen jugs of wine
Blabbering boulevard strangers quizzed puzzled visitor
Parking attendants worried when the zebras quite juggling the sleeping sit
Masterful planning before the trip enabled the client, a Quaker family to all the peace and
Everyone knew that the particle accelerator would not function in zero gravity but planned the experiment none
Practical application of the necessary variables created a greatly simplified hierarchy over the broad range of nutritional risk
The typical North American composition of text does not normally involve extensive testing for legibility at each
Magnification of issues into unmanageable specifications, quietly but certainly, raised the price of everything they did, geo
Ecuador Egypt El Salvador Equatorial Guinea Ethiopia Fiji Finland France Gabon Gambia Georgia Germany and Massachusetts
“But that's just regular!”

The ‘Upside Down Pyramid,’
and ‘upsizing’
<table>
<thead>
<tr>
<th>Font Style</th>
<th>Normal</th>
<th>Italic</th>
<th>Condensed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>Black</td>
<td>Black</td>
<td>Black</td>
</tr>
<tr>
<td>Bold</td>
<td>Bold</td>
<td>Bold</td>
<td>Bold</td>
</tr>
<tr>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Regular</td>
<td>Regular</td>
<td>Regular</td>
<td>Regular</td>
</tr>
<tr>
<td>LIGHT</td>
<td>LIGHT</td>
<td>LIGHT</td>
<td>LIGHT</td>
</tr>
</tbody>
</table>
# Small text use among typical font family

<table>
<thead>
<tr>
<th></th>
<th>NORMAL</th>
<th>ITALIC</th>
<th>CONDENSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black</td>
<td>Black</td>
<td>Black</td>
<td></td>
</tr>
<tr>
<td>Bold</td>
<td>Bold</td>
<td>Bold</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>Medium</td>
<td>Medium</td>
<td></td>
</tr>
<tr>
<td>Regular</td>
<td>Regular</td>
<td>Regular</td>
<td></td>
</tr>
<tr>
<td>LIGHT</td>
<td>LIGHT</td>
<td>LIGHT</td>
<td></td>
</tr>
</tbody>
</table>
Roboto Flex: Words in styles that reinforce themselves.
github.com/typenetwork/roboto-flex
One Roboto, many moods
Variable font axes enable a variety of looks
“How can I make optical size designs?”

A ‘Parametric Axes System’ approach
space inside and around the glyph in the x and y direction.
Changes the stroke weight in the x and y direction.
Parametric axes change
Spaces independently in the
x (horizontal) and y (vertical) directions
<table>
<thead>
<tr>
<th>Type</th>
<th>Expression</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight</td>
<td>$a + a + a + a + a$</td>
<td>$a$</td>
</tr>
<tr>
<td>Width</td>
<td>$a + a + a + a + a$</td>
<td>$a$</td>
</tr>
<tr>
<td>Grade</td>
<td>$a + a$</td>
<td>$a$</td>
</tr>
</tbody>
</table>

Blends are created by combining parametric axes.
Optical

dog
Start with the default

Architecture
Negative optical size (downsizing)
Positive optical size (upsizing)
Amstelvar
Parametric axis: YTRA overall

Hhp

variationsguide.typenetwork.com
Parametric axis: YTLC lowercase
Parametric axis: YTUC uppercase
bit.do/calibrate-type
“Where can I learn more?”
Thirty to three billion users in three years

An old and stable font format

Enhancing typographic experience

Suggestions for using variable fonts
Thank you
@davelab6