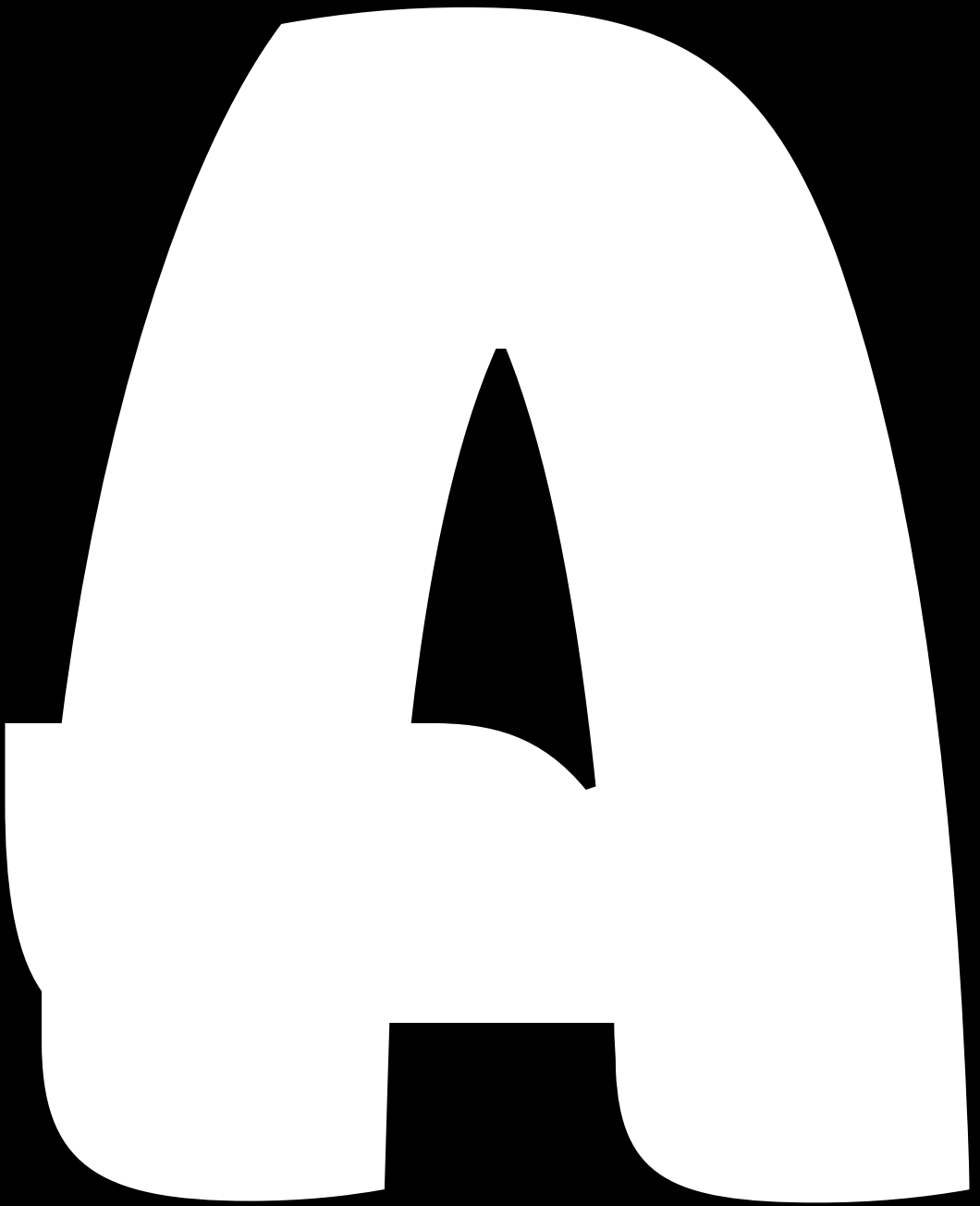
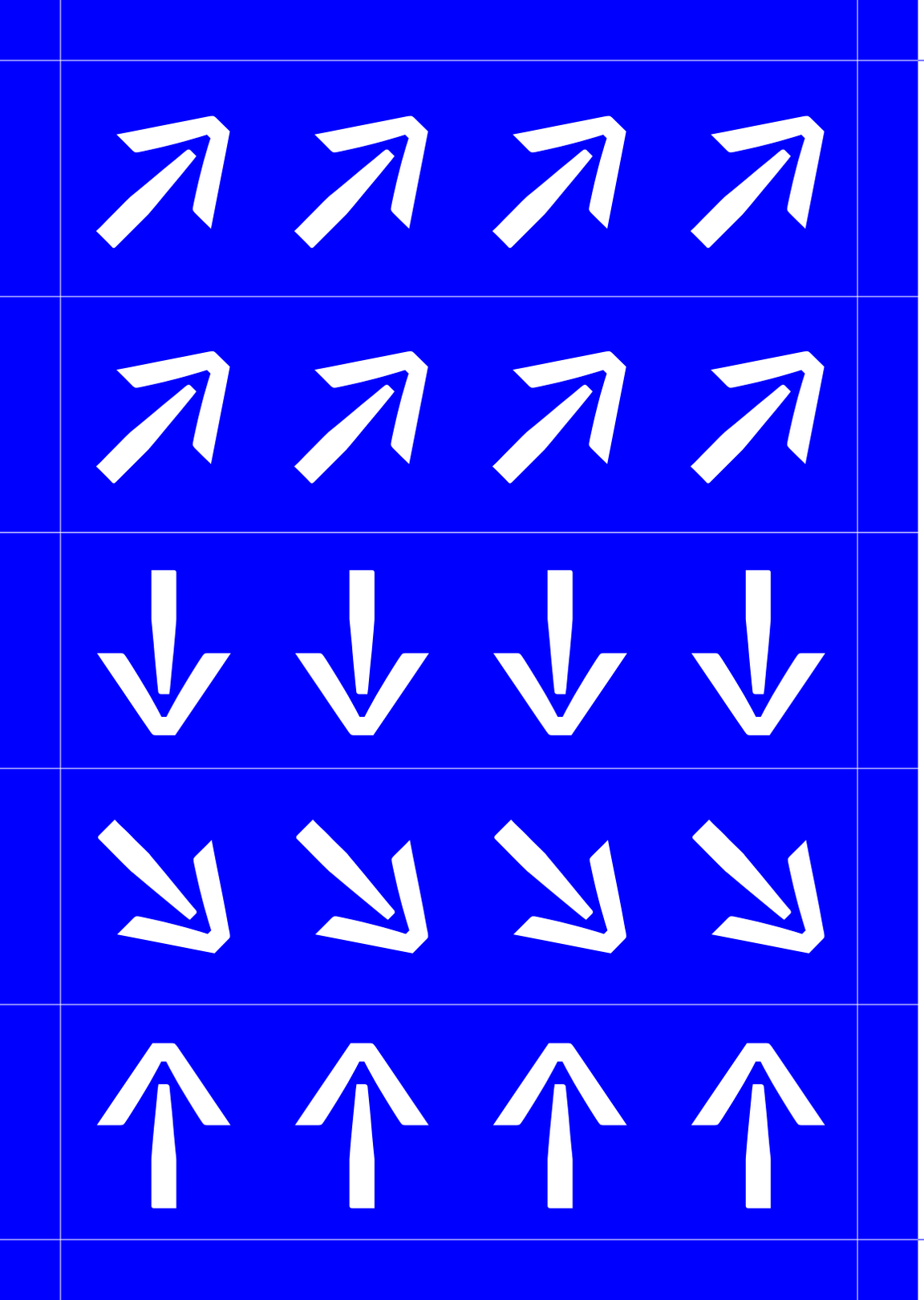
Recursive Sans & Mono
by Arrow Type



MONO	0.0
CASL	0.0
wght	300.0
slnt	-15.0
CRSV	0.0



Sans Linear ExtraBlack

Sans Linear ExtraBlack Italic

Sans Linear Black

Sans Linear Black Italic

Sans Linear ExtraBold

Sans Linear ExtraBold Italic

Sans Linear Bold

Sans Linear Bold Italic

Sans Linear SemiBold

Sans Linear SemiBold Italic

Sans Linear Medium

Sans Linear Medium Italic

Sans Linear Regular

Sans Linear Italic

Sans Linear Light

Sans Linear Light Italic

Mono Linear ExtraBlack

Mono Linear ExtraBlack Italic

Mono Linear Black

Mono Linear Black Italic

Mono Linear ExtraBold

Mono Linear ExtraBold Italic

Mono Linear Bold

Mono Linear Bold Italic

Mono Linear SemiBold

Mono Linear SemiBold Italic

Mono Linear Medium

Mono Linear Medium Italic

Mono Linear Regular

Mono Linear Italic

Mono Linear Light

Mono Linear Light Italic

Sans Casual ExtraBlack

Sans Casual ExtraBlack Italic

Sans Casual Black

Sans Casual Black Italic

Sans Casual ExtraBold

Sans Casual ExtraBold Italic

Sans Casual Bold

Sans Casual Bold Italic

Sans Casual SemiBold

Sans Casual SemiBold Italic

Sans Casual Medium

Sans Casual Medium Italic

Sans Casual Regular

Sans Casual Italic

Sans Casual Light

Sans Casual Light Italic

Mono Casual ExtraBlack

Mono Casual ExtraBlack Italic

Mono Casual Black

Mono Casual Black Italic

Mono Casual ExtraBold

Mono Casual ExtraBold Italic

Mono Casual Bold

Mono Casual Bold Italic

Mono Casual SemiBold

Mono Casual SemiBold Italic

Mono Casual Medium

Mono Casual Medium Italic

Mono Casual Regular

Mono Casual Italic

Mono Casual Light

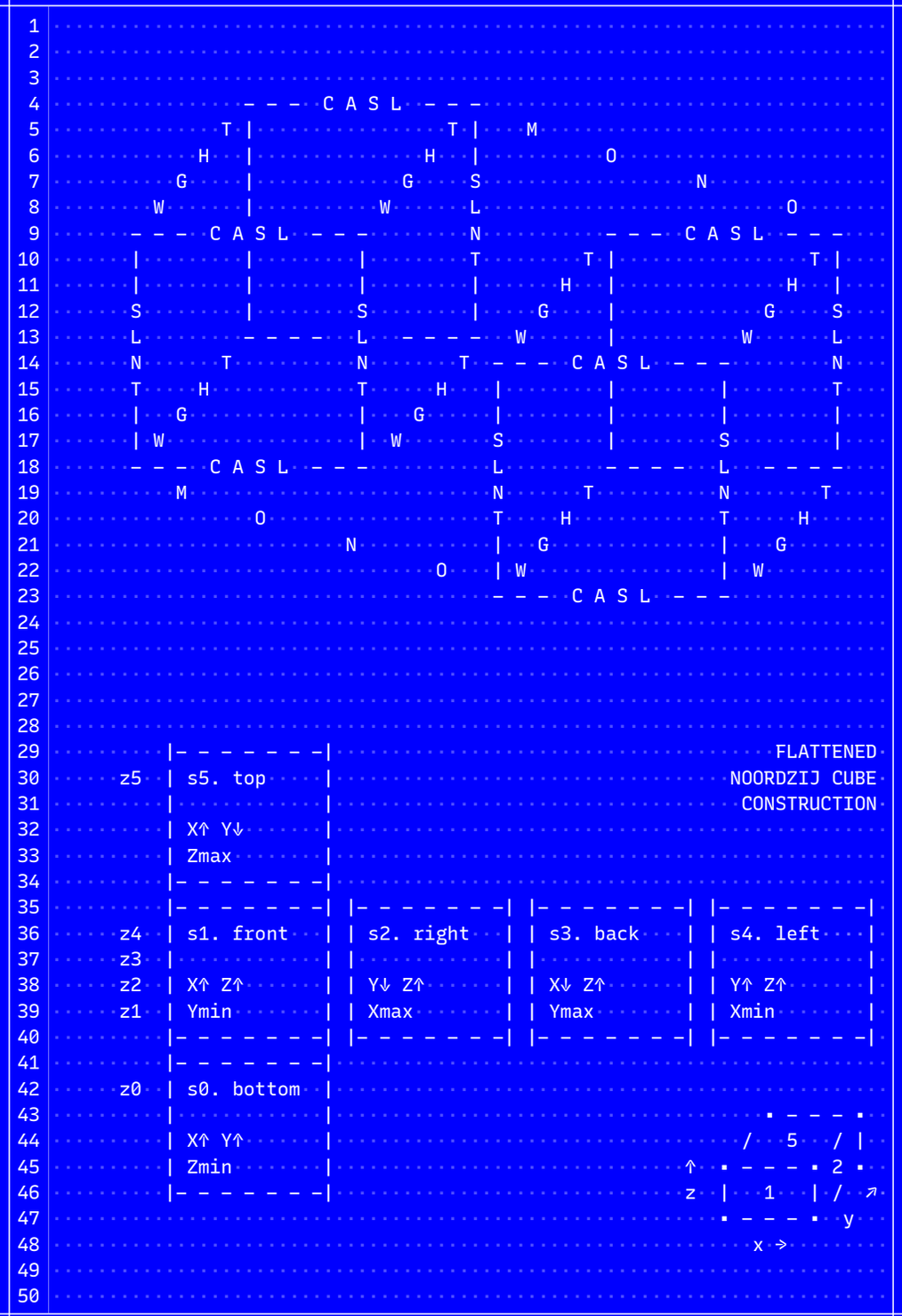
Mono Casual Light Italic

A new, highly-flexible, variable font.

Built to maximize versatility, control, and performance, Recursive is a five-axis variable font. This enables you to choose from a wide range of predefined styles or dial in exactly what you want for each of its axes: *Monospace, Casual, Weight, Slant, and Cursive*. Taking full advantage of variable font technology, Recursive offers an unprecedented level of flexibility, all from a single font file.

Extraordinarily versatile.

Recursive draws inspiration from single-stroke casual signpainting, a style of brush writing that is stylistically flexible and warmly energetic. Adapting this aesthetic basis into a type system, Recursive is designed to excel in digital interactive environments. This makes the typeface ideal for a wide range of uses, including data-rich apps, technical documentation and code editors.



Foreword

Recursive was born from a desire to explore how the emerging technology of variable fonts can maximize both utility and creativity on the web. From the start, every aspect of this project was motivated by a will to push boundaries – from drawing to proofing to engineering. Recursive – whose name encompasses ideas of recursion and cursive[1] writing – builds on its designer's range of interests, experiences, and needs as a user of type.

Taking the forms and structure of single-stroke casual lettering as a base, Stephen Nixon has done more than simply adapt these examples to the screen. Instead, he's delivered a typeface that offers unique possibilities for interactive design. Combining the spontaneity of a script typeface with the versatility of multiple classifications, weights, and cuts, Recursive takes the notion of what a 'variable font' is to a new level.

Brought to you by Arrow Type and commissioned by Google Fonts, Recursive is now free to use in any personal or commercial project.

Noemi Stauffer,
Editor

1 A typographic glossary provides a definition for this term and others on p. 68

Designing a five-axis variable font

In 2018, I graduated with an MA in Type Design from TypeMedia, a 10-month immersion in type at the Royal Academy of Art (KABK) in The Hague, Netherlands. For my thesis project, I created **Recursive**, a typeface exploring the intersection of sign painting, monospaced type, and the emerging technology of variable fonts. In 2019, Google Fonts commissioned me to complete the project for open-source distribution. Recursive is now the first release of my new type foundry, Arrow Type.

An origin in painted letters

One of my favorite styles of signwriting is a genre broadly referred to as **casual**. It includes **casual script**, in which letters are handwritten with a brush and connected together. It also includes **single-stroke casual**, which is typically painted in uppercase, forward-slanted letters.

Example of casual lettering in NYC (Painter unknown; Brooklyn, NY, near Myrtle & Wyckoff Aves; 2019)

Verdana used at inappropriately large scale in street signage. This inspired the flattened terminals of Recursive.

A foundational style for sign painters, single-stroke casual is comprised of just a few basic strokes which are assembled together to create letters. As a result, this style is highly practical, easy to learn, and (relatively) easy to paint. Its features are deliberately informal and "unbalanced": letters are somewhat condensed and have curved stems, stroke connections are left visibly imperfect, and midpoints are low-slung. These qualities allow a sign painter to avoid some of the aspects of letter shaping that can be most challenging: perfectly straight lines, rigid symmetry, and optically-centered elements like the spine of the letter 'S'.

Living in New York City, I come across striking works of casual lettering almost daily in the vernacular signage of diners, laundromats, and bodegas. Recursive is shaped by my love of these signs, as well as by lessons learned from classmates & teachers at TypeMedia, educators like John Downer, personal sketching, and technical experimentation.

Crafting a casual for code

Early on in the design process, one thing stood out about single-stroke casuals: not only could they be squeezed into condensed proportions or stretched into extremely wide styles, but they were particularly eye-catching when worked into the confines of monospaced letters. This realization left me wanting to explore what a **single-stroke casual monospace** font could be. With my background in web design and

Recursive Casual Mono
Early sketches (2018)

development, creating a font for use in programming that would be both highly readable and aesthetically pleasing was an exciting challenge. Moreover, it was a perfect opportunity for me to design a font that would meet my requirements both as a designer and as a developer.

Most typefaces with both sans-serif and monospace variants are first designed to be proportional and later adapted into a fixed-width alternative. With Recursive, I decided to design going in the other direction. Starting with a monospace and adapting it into a sans-serif was an unconventional approach, but because I was most curious to see how casual letters might look in code, it felt natural to follow this direction.

In this project, I have given particular attention to adapting the key visual aspects of single-stroke casuals into simplified monospaced and semi-proportional letterforms. I preserved their low center points and chiseled stroke endings but set their forward slant to a variable axis. Keeping some casual gestures helps to maintain the warmth and

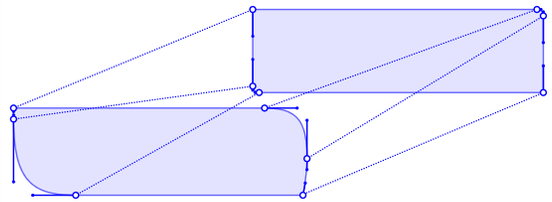
energy of the style, while simplification makes it practical for everyday typographic use.

The need for multiple voices

Because the typeface was started from painted letters, it possessed a lot of personality from the start. For it to work well in code and on screen, however, I knew I needed to temper its personality and improve its readability. Finding the exact right voice was challenging. From my own experience, I knew that developers have different typographic needs based on the task at hand. Some monospace fonts are drawn with attention-grabbing details, which lends them a strong visual impact for display settings like posters and signage, but can make them distracting to code with. Other monospace fonts are designed with only traditional legibility in mind, but this can give them a cold and monotonous tone when used in settings such as docs and blogs.

This was a contradiction that I began to realize from my earliest sketches. Still, I wanted to make Recursive a monospace font that could be ideal in different contexts, from serious to casual. I soon had the idea to solve this issue with the addition of a variable axis, but knew that it would have clear design constraints. I needed to find two ends of a continuous spectrum that could be different enough to be striking counterparts while also both functioning well at the small sizes used for code. Finding the ends of this spectrum was a process of many rounds of trial and failure, but things gradually improved, helped greatly by a steady stream of critique from professors and visiting designers at TypeMedia.

Adding a variable axe for stylistic range was not just a design challenge, but also a demanding technical endeavor. When adding the Casual axis, I had to draw for interpolation compatibility, making every glyph



The hyphen in Casual versus Linear drawings, showing how the point structure of each must closely match its counterpart to allow interpolation.

twice – first with brushy contours for the Casual end of the axis, then again with rectangular shaping for the Linear end of the axis. What made this difficult is that both versions of each glyph had to match in the number and order of contours, nodes, anchors, and more. This was to ensure that they would be compatible for the interpolation required to morph along this stylistic range.

Despite the challenge of production, a spectrum of expression within a single typeface has clear advantages for users. Some of the most compelling typographic layouts use multiple, complementary fonts. However, because different fonts usually have different metrics, such layouts can easily become a headache for visual design and technical implementation. Recursive, by contrast, provides multiple voices from a single, easy-to-use font file.

Expanding the possibilities to interactive design

No matter how versatile, a monospace font is only truly suited for a particular set of tasks[1]. Because I intended Recursive for a wide range of use, I knew from early on that it needed a proportional counterpart. However, starting with a monospace design helped me find opportunities to make a Sans that could offer unique possibilities for interactive design.

Just as a monospace font maintains the same widths for letters between all weights and styles, I realized that my sans-serif could do the same: while all characters would have natural widths, each could keep its same width across all stylistic variations. I therefore built Recursive Sans as a **superplexed** family – all of its 32 instances have shared glyph width, kerning, and overall letterforms for every character. Of course, this also applies to in-between variations. The fact that characters within Recursive Sans have shared metrics ensures that line length is not affected when changing between its different font styles. This also allows smooth, animated transitions between any of the subfamily's **Weight, Slant, & Casual** axes.

1 These include tasks which benefit from characters that are tabular and non-ambiguous, such as code, financial data, passwords, receipts, license numbers, serial numbers, captions, and more.

These design decisions were based on my understanding of user needs: before moving into type design, I worked as a visual designer for websites and software. In these past roles, my responsibility was to enhance the user experience of digital products, with a particular focus on typographic clarity and *microinteractions*[2]. Through this, I found that most typefaces are terrible when used in animated transitions due to their shifting metrics and non-variable styles. With Recursive, I realized that I could find a way around these limitations.

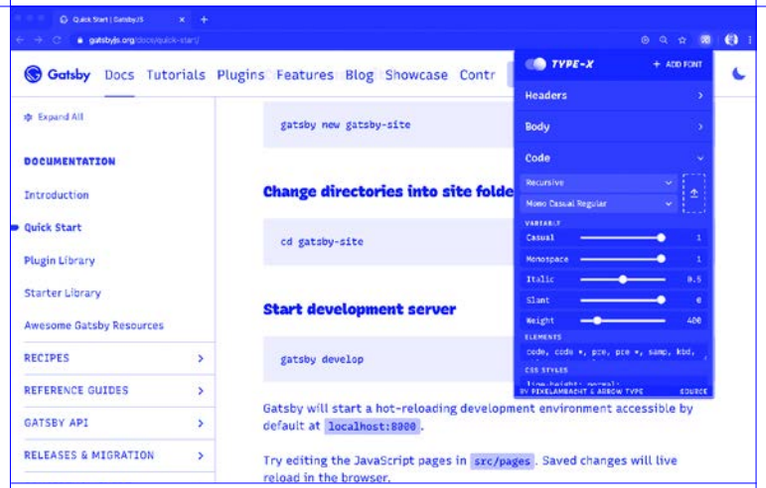
Bringing a five-axis variable font to life sometimes seemed like a never-ending process. In a variable font, the number of drawings required for each glyph tends to go up with the addition of every axis. Between Casual, Monospace, Weight, Slant, & Cursive axes, Recursive required 24 total source font files. Each character required **at least** 12 compatible drawings to cover Casual, Weight, and Slant variations – and characters with Monospace and Cursive variations required even more drawings. All told, Recursive has 1,248 glyphs per source – and between its 24 sources, Recursive includes 29,952 total glyphs. Of course, a significant portion of these are composed from other glyphs (as is the case for most accented characters) or copied between sources ("normal-width" glyphs were copied from Mono to Sans sources), but there are still 6,804 hand-edited glyphs. This staggering amount of complexity made it critical to embrace scripting to automate parts of the process. This is also why it was so incredibly helpful to have the contribution of type designers Lisa Huang and Katja Schimmel and good software from many type-tool engineers.

A new design proofing tool

While designing Recursive, it was important to search for typographic problems across all styles in order to fix them and improve the font. This process, called proofing, typically means physically printing pages to show a broad character set in all styles across a range of point sizes. Proofs are often typeset in realistic graphic layouts, then carefully examined and marked for revision. A concise proof may easily have two to four pages per style – so repeatedly proofing all 64 instances of Recursive wasn't a good option.

2 Microinteractions are subtle animations in digital user interfaces that respond to user interaction through visual changes such as color, size, and position. This and other definitions can be found in a typographic glossary on page 68.

Overriding fonts on GatsbyJS.org to test Recursive, with Type-X



It wouldn't have just been a waste of resources, but also a disregard of time constraints: most collaborative proofing sessions only have time to analyze a few pages in detail.

From the start, then, I sought ways of testing Recursive that would require printing fewer pages, instead relying on better screen-based tests. I started making JavaScript-generated layouts and other digital examples as the basis of my critique. However, I soon felt limited by trying to create realistic web typography examples without actually using real web content and styling. Eventually, it became clear that the best way to assess Recursive's design on screen was to see how it performed on real, live websites. I began to browse different websites, adding custom CSS rules to override their fonts with Recursive. In this way, I could preview and test the different styles of Recursive at the same time in a more-realistic context.

This process was useful, but it was also repetitive and time consuming. Worse, it didn't allow me to sit back and actually *experience* the fonts. I eventually realized that I could automate this workflow. To do so, I created a simple Google Chrome extension that could override fonts on any webpage at the touch of a button, imposing my own font files onto those pages. It made proofing Recursive online much more efficient, and it helped me find many opportunities for refinements that I may have otherwise missed.

In the past year, I worked with developer Roel Nieskens to redesign and rebuild this Chrome extension, in what we now call *Type-X*. Whereas my earlier tool was limited to a single, hard-coded font family, Type-X allows users to easily override websites with any font on their system. Font files can also be drag-and-dropped into the extension to activate advanced features like variable axis control. These new capabilities make Type-X far more powerful than a simple type-proofing tool: it is now useful to anyone wanting to better understand how different fonts look and feel in the context of the websites they use. Thanks to the sponsorship of Google Fonts, Type-X is now open source and available to anyone for free on the Chrome Web Store.

Designing Recursive has been a long but enriching (and fun!) process. It would not have been possible without the help of the many people who contributed their knowledge, critique, and time. I am especially grateful to Google Fonts for commissioning me to complete my thesis, to E Roon Kang, Bon Hae Koo, Minkyoung Kim, Talia Cotton, Irin Kim, and Noemi Stauffer for helping make the project look and sound so good, to Lisa Huang and Katja Schimmel for helping me to complete the drawing of it, to Ben Kiel for helping to engineer the final fonts, to Rafał Buchner, Erik van Blokland, Tal Lemming, and Frederik Berlaen (and many other type tool developers) for making tools that made this design possible, to Gen Ramírez, Seán Donohoe, and John Downer for inspiration and lessons in sign painting, and to the faculty and alumni of TypeMedia for their mentorship and guidance.

Stephen Nixon
Designer, Recursive

Get Recursive and learn more about it at
https://recursive.design

```
recursive/src/ufo/
├── mono/
│   ├── Recursive Mono-Casual A Slanted.ufo
│   ├── Recursive Mono-Casual A.ufo
│   ├── Recursive Mono-Casual B Slanted.ufo
│   ├── Recursive Mono-Casual B.ufo
│   ├── Recursive Mono-Casual C Slanted.ufo
│   ├── Recursive Mono-Casual C.ufo
│   ├── Recursive Mono-Linear A Slanted.ufo
│   ├── Recursive Mono-Linear A.ufo
│   ├── Recursive Mono-Linear B Slanted.ufo
│   ├── Recursive Mono-Linear B.ufo
│   ├── Recursive Mono-Linear C Slanted.ufo
│   └── Recursive Mono-Linear C.ufo
├── sans/
│   ├── Recursive Sans-Casual A Slanted.ufo
│   ├── Recursive Sans-Casual A.ufo
│   ├── Recursive Sans-Casual B Slanted.ufo
│   ├── Recursive Sans-Casual B.ufo
│   ├── Recursive Sans-Casual C Slanted.ufo
│   ├── Recursive Sans-Casual C.ufo
│   ├── Recursive Sans-Linear A Slanted.ufo
│   ├── Recursive Sans-Linear A.ufo
│   ├── Recursive Sans-Linear B Slanted.ufo
│   ├── Recursive Sans-Linear B.ufo
│   ├── Recursive Sans-Linear C Slanted.ufo
│   └── Recursive Sans-Linear C.ufo
└── recursive-MONO_CASL_wght_slnt_ital.designspace
```

Sans & Mono. In one file.

The typeface comes in two practical and highly readable subfamilies, Sans & Mono. Thanks to its **Monospace** axis (`MONO`), both of these subfamilies can be used in a single font file. You can even select custom instances that are semi-proportional or semi-monospaced.

Of course, vertical metrics such as line height, cap height, and x-height are shared across the entire **Monospace** axis. This allows harmonious and performant layouts, even where different proportions are mixed, such as in data-rich applications and technical documentation.

Recursive Sans (`MONO 0`) is made for text & user interface design. While its proportional characters deliver comfortable reading at text sizes, its heaviest weights are perfect to create punchy, tightly-spaced headlines.

Recursive Mono (`MONO 1`) is made for code. Its characters share the same width for clear legibility and perfect alignment. This is particularly helpful for use in programming and data-heavy design tasks, but also allows for creative possibilities in display typography.

A Sans for more robust layouts.

The characters within both subfamilies, Sans & Mono, maintain the exact same width across all font styles, independently of the values set on the *Weight, Casual, Slant, & Cursive* axes. You can therefore use Recursive to create animated font transitions without breaking the layout of UI elements like menus and buttons.

Sans Casual

same
same
same
same
same
same

Sans Linear

widths
widths
widths
widths
widths
widths
widths

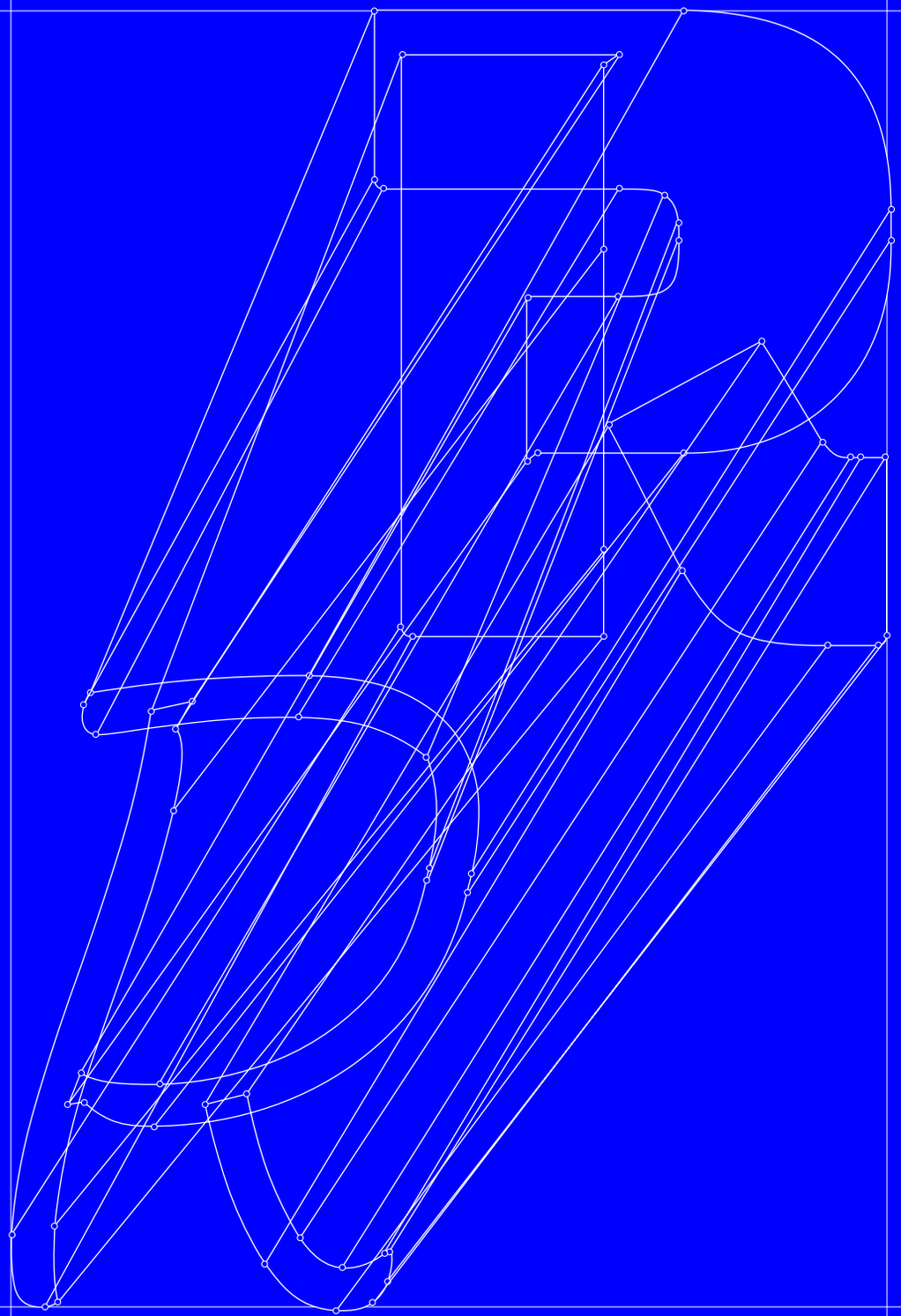
600 600 600 600 600 600

w7i#fs

900 600 350 600 400 550

w7i#fs

-20



Ready for work. Ready for play.

Recursive uses its *Casual* axis (`CASL`) to offer a range of personality, allowing you to adjust tone for different contexts. Along this axis, letterforms adjust in stroke curvature, contrast, and terminals to go from a sturdy, rational *Linear* to a friendly, energetic *Casual*. All the styles along this axis are designed to maintain high legibility at medium and text sizes. At display sizes, it is most effective to use either end of the *Casual* axis.

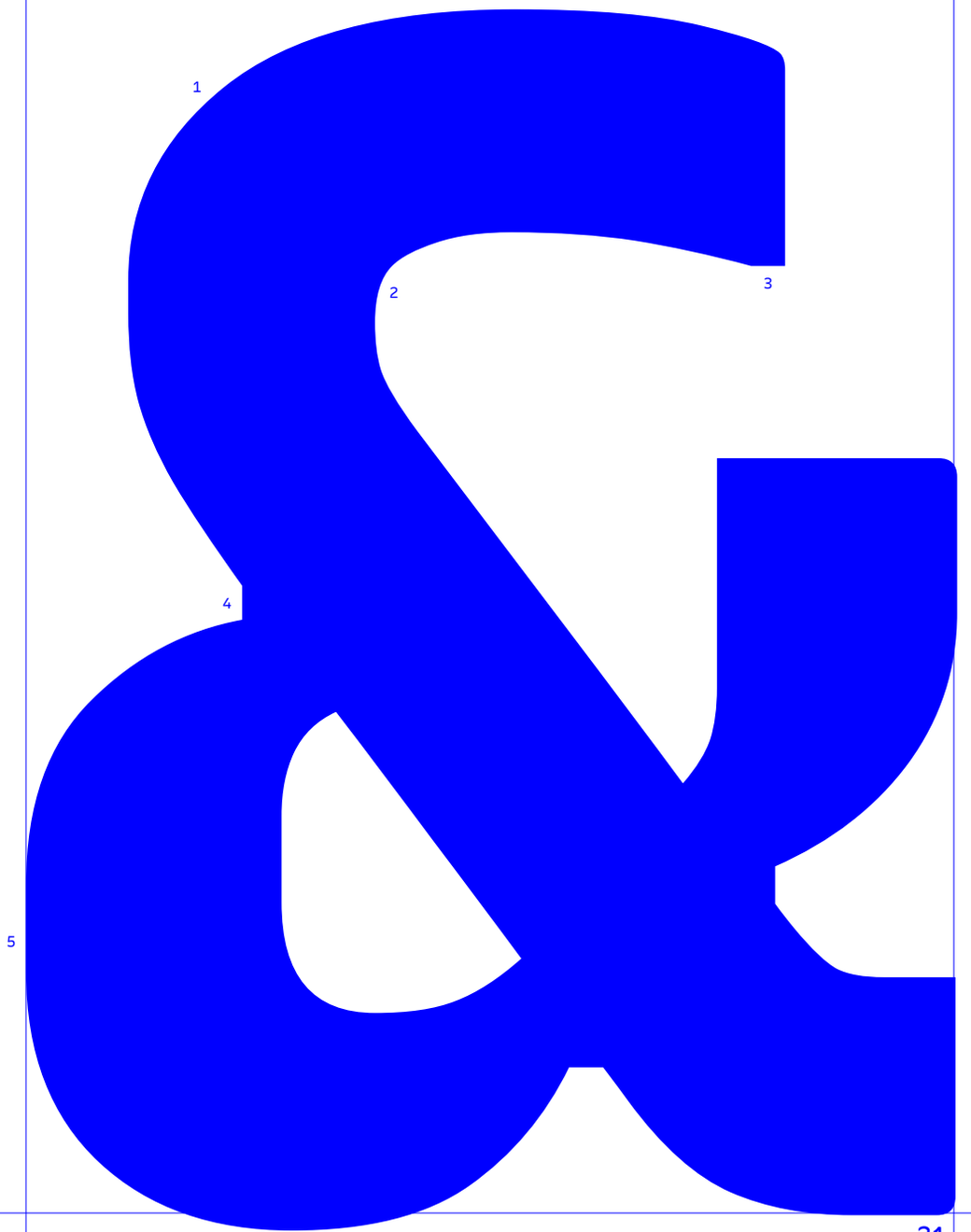
Linear (`CASL 0`) styles have subtly-flattened edges and simple, open forms. This optimizes readability and enables enhanced focus in dense information, such as long-form text and complex code.

Casual (`CASL 1`) echoes the soft & curvy brush strokes of casual signpainting, but simplifies these forms for a striking and inviting tone. This makes it ideal for web headlines, code snippets, and command line interfaces.

W Sans Linear ExtraBold
O Sans Linear Light Italic
R Mono Casual Light Italic
K Sans Casual ExtraBlack Italic

Linear

1 Rationalized form
2 Smooth counters
3 Large inktraps & cuts
4 Flattened sides
5 Simple diagonals
6 Squared strokes



Casual

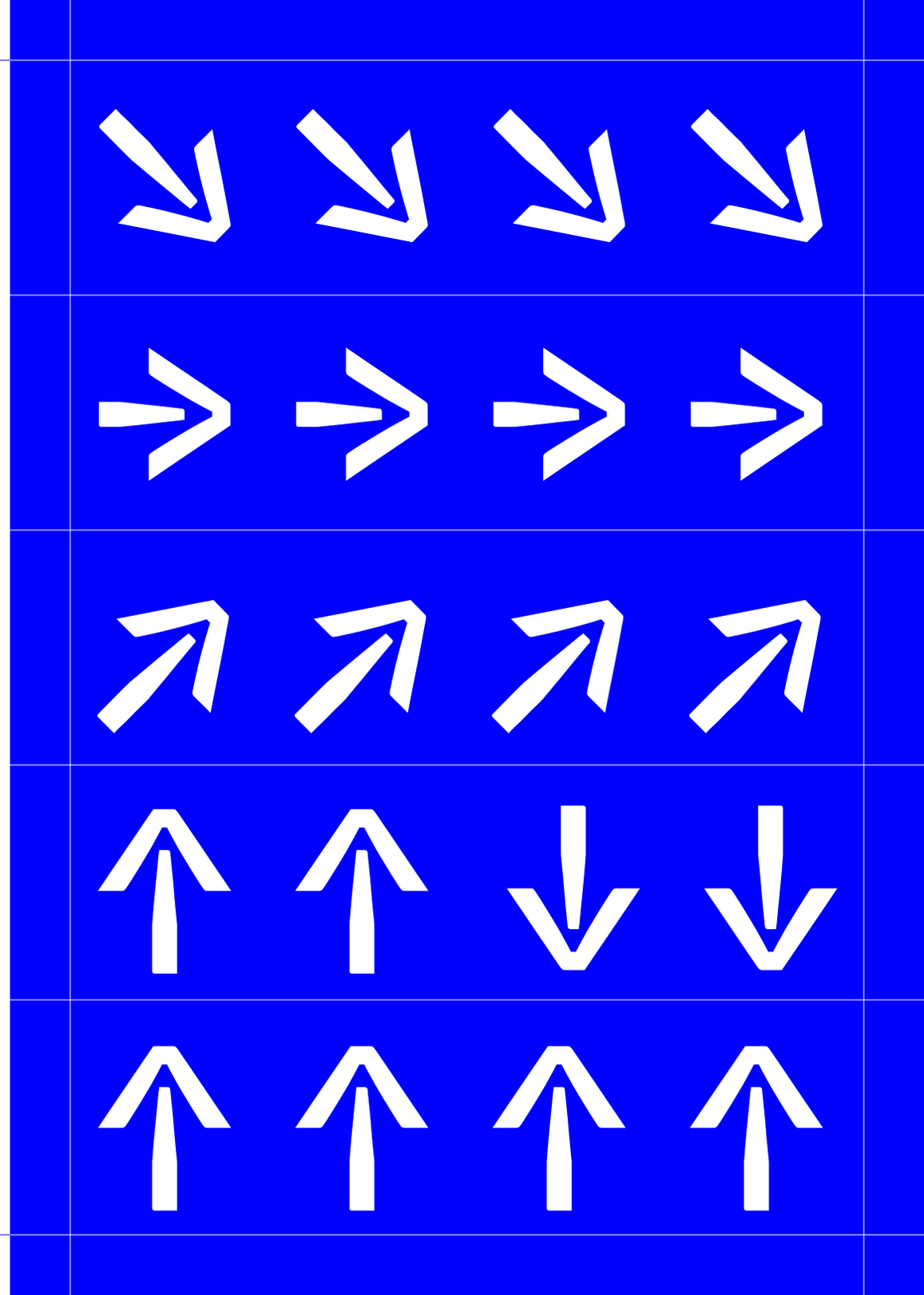
1 Brush-based form
2 Kinked counters
3 Small inktraps & cuts
4 Organic curves
5 Curved diagonals
6 Softened strokes

Linear

1 Rationalized form
2 Smooth counters
3 Large inktraps & cuts
4 Flattened sides
5 Simple diagonals
6 Squared strokes

PLAY

P Sans Casual Black
L Mono Linear ExtraBlack
A Mono Linear Bold
Y Sans Casual ExtraBold Italic



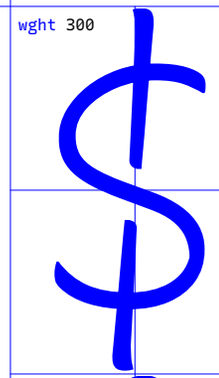
Light
Regular
Medium
SemiBold
Bold
ExtraBold
Black
ExtraBlack

Eight weights. But also way more.

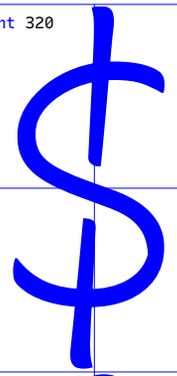
Recursive comes in a wide range of weights, from Light (`300`) to a super-heavy ExtraBlack (`1000`). You can choose from its seven predefined weights, or set a custom value through its *Weight* (`wght`) axis.

And because Recursive maintains consistent letterforms along the entire *Weight* axis, it allows for smooth animations between any of its different weights.

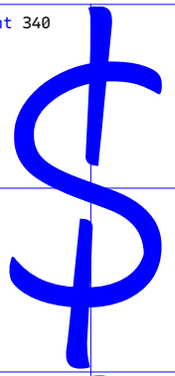
wght 300



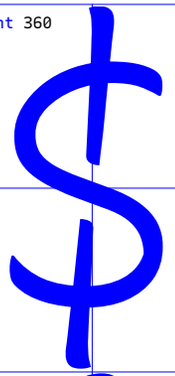
wght 320



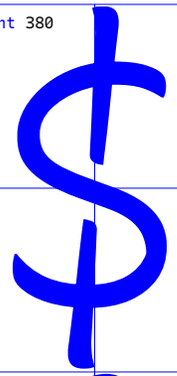
wght 340



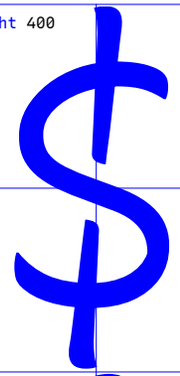
wght 360



wght 380

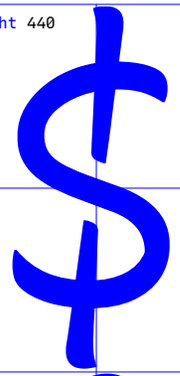


wght 400

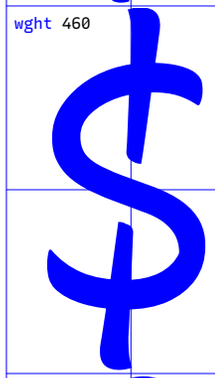


wght 420

wght 440



wght 460



wght 480

wght 500

wght 520

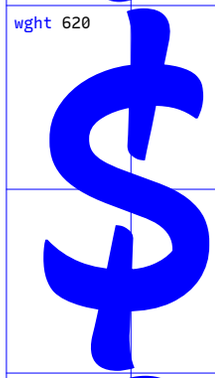
wght 540

wght 560

wght 580

wght 600

wght 620



wght 640

wght 660

wght 680

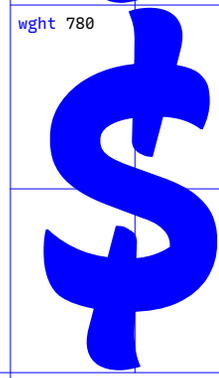
wght 700

wght 720

wght 740

wght 760

wght 780



wght 800

wght 820

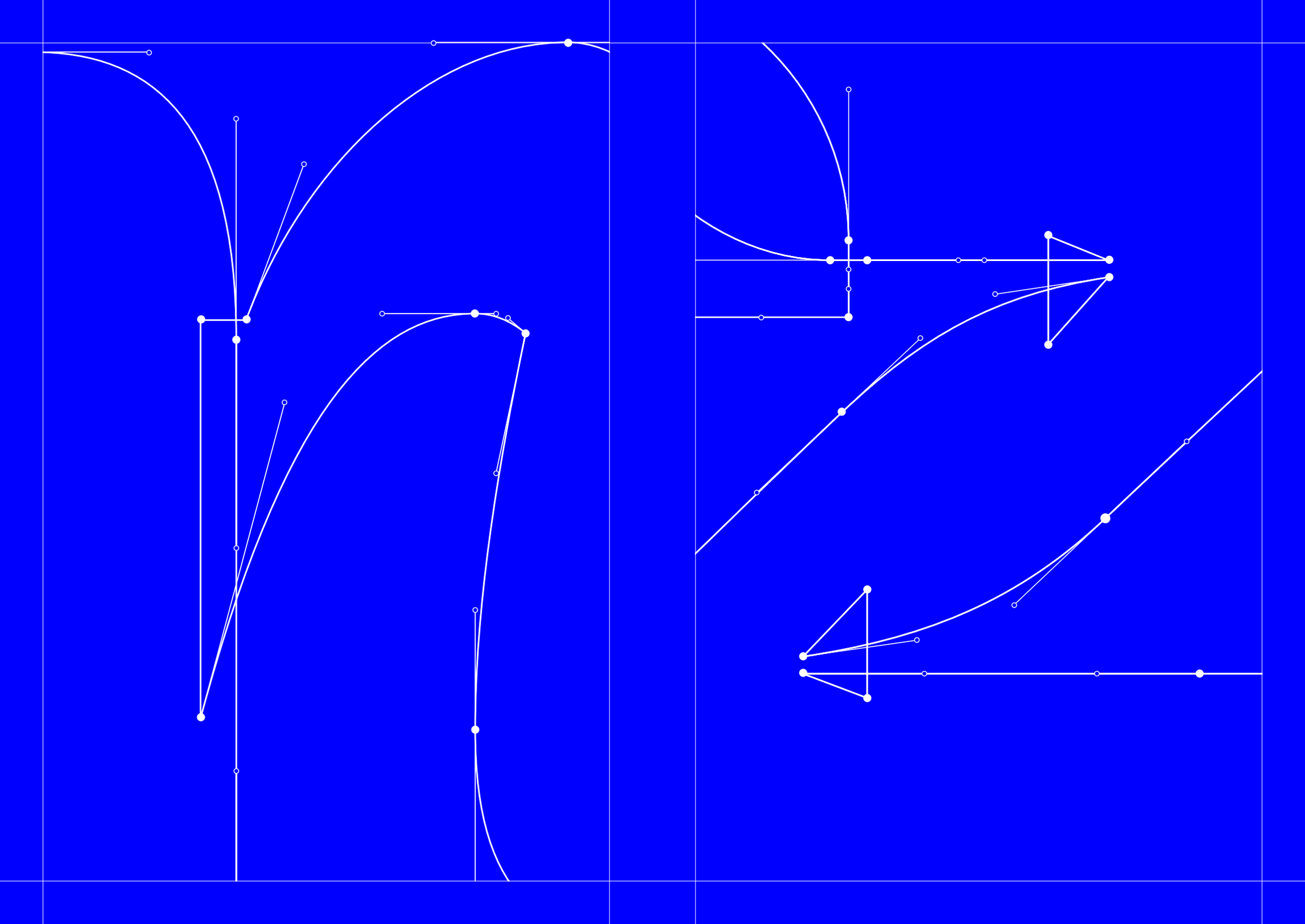
wght 840

wght 860

wght 880

wght 900

wght 1000



Slanted or Cursive. Or both.

In Recursive, slant and cursive styles can be controlled separately. The **Slant** axis (`slnt`) defines the angle of the letters, while the **Cursive** axis (`CRSV`) lets you toggle cursive letterforms. This makes it possible to use sloped romans (`slnt -15, CRSV 0`), upright italics (`slnt 0, CRSV 1`), or set custom values on both axes for more options to play with.

Recursive's cursive letterforms (`CRSV 1`) replace familiar "roman" glyphs with more-handwritten alternates such as the single-story "a" and "g". By default, Recursive will automatically apply these cursive alternates when setting the **Slant** axis (`slnt`) beyond -14. This allows smooth, animated transitions from normal to oblique type up to 13.99° of slope, but also a "true italic" style with cursive letterforms at 14°.

CRSV: 0 (off)

slnt: 0

agkrx

slnt: -5

agkrx

slnt: -10

agkrx

slnt: -15

agkrx

CRSV: 0.5 (auto)

slnt: 0

agkrx

slnt: -5

agkrx

slnt: -10

agkrx

slnt: -15

agkrx

CRSV: 1 (on)

slnt: 0

agkrx

slnt: -5

agkrx

slnt: -10

agkrx

slnt: -15

agkrx

CRSV: 0.5 (auto)

slnt: 0

agkrx

slnt: -5

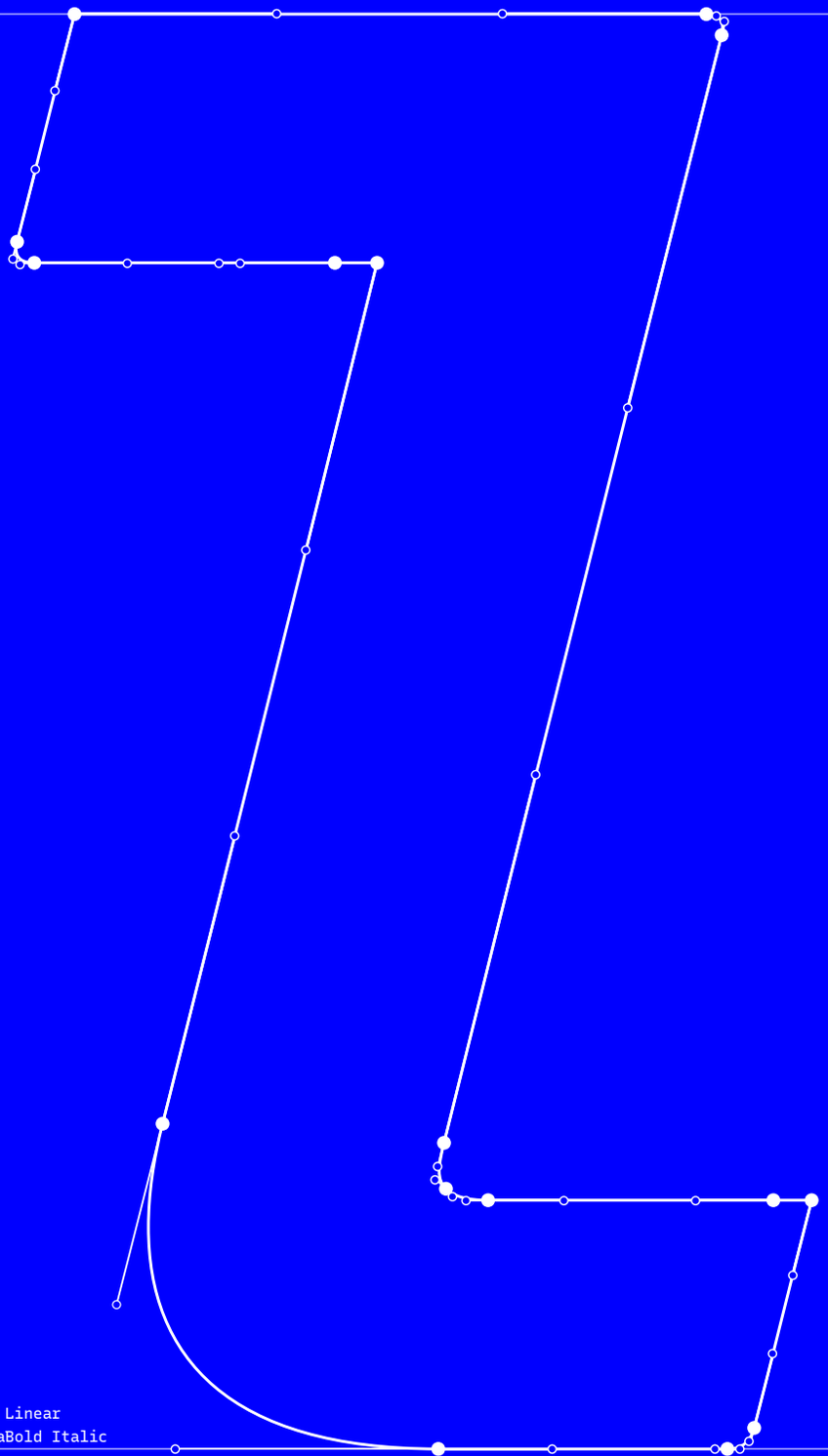
agkrx

slnt: -10

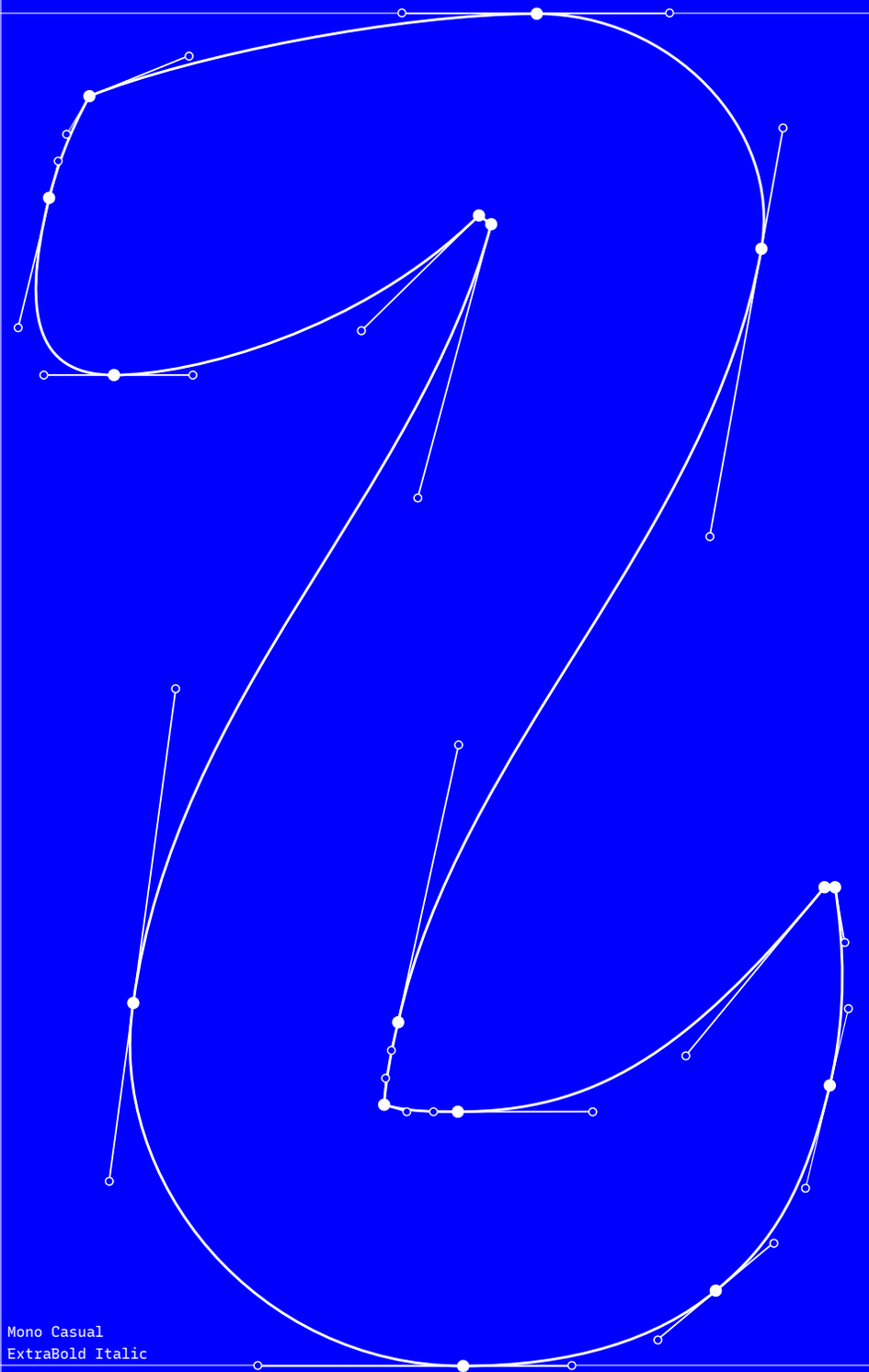
agkrx

slnt: -15

agkrx



Mono Linear
ExtraBold Italic



Mono Casual
ExtraBold Italic

Powerful, yet simple to use.

As a variable font, Recursive gives you fine-grained control over each one of its styles. However, it also comes with 64 predefined styles that are easy to access through your font menu. Called **named instances** [1], these work just like regular static fonts do.

1 A typographic glossary provides a definition for these terms and others on p. 68

Mono

Casual

Normal

Italic

Linear

Normal

Italic

Sans

Casual

Normal

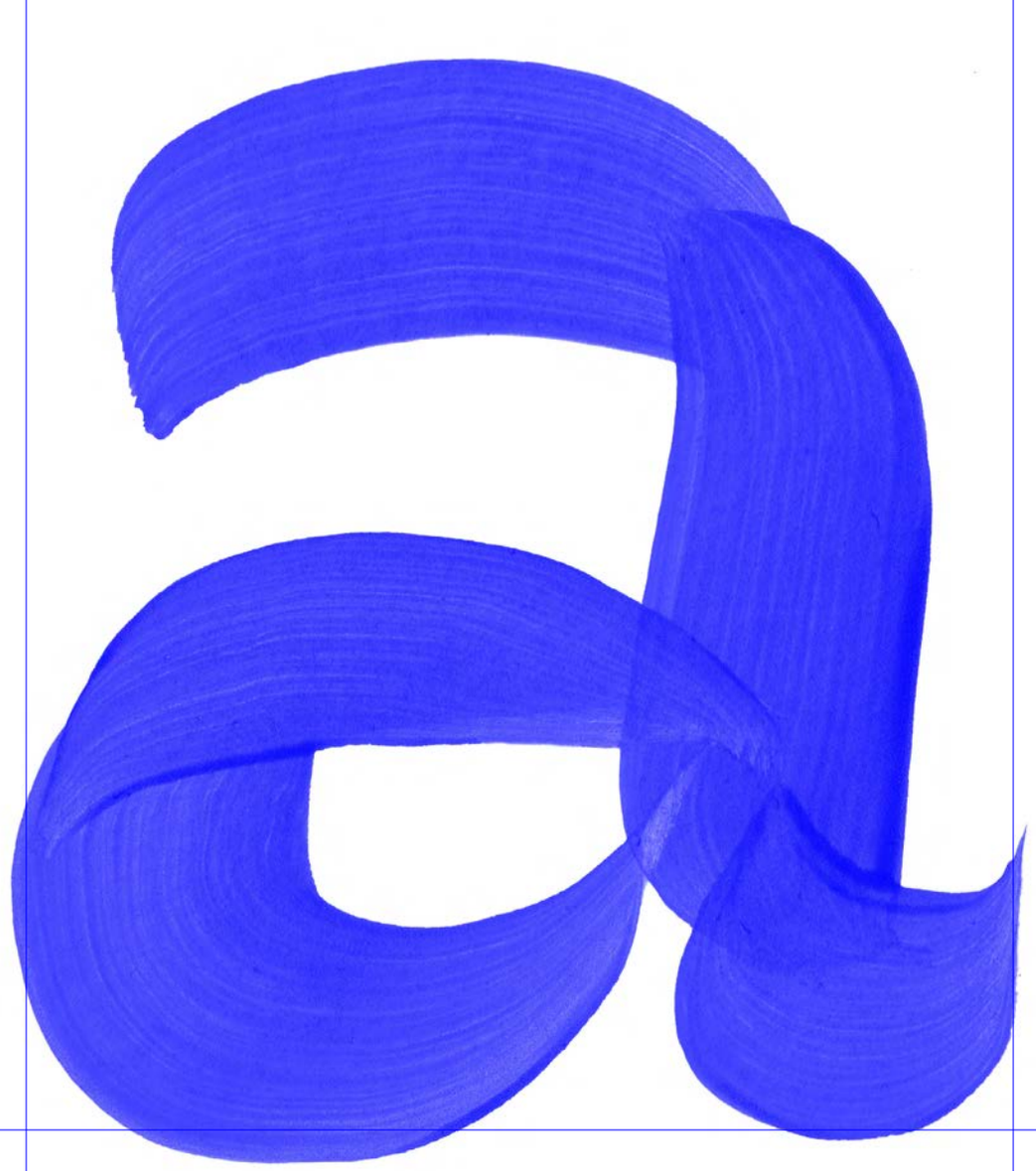
Italic

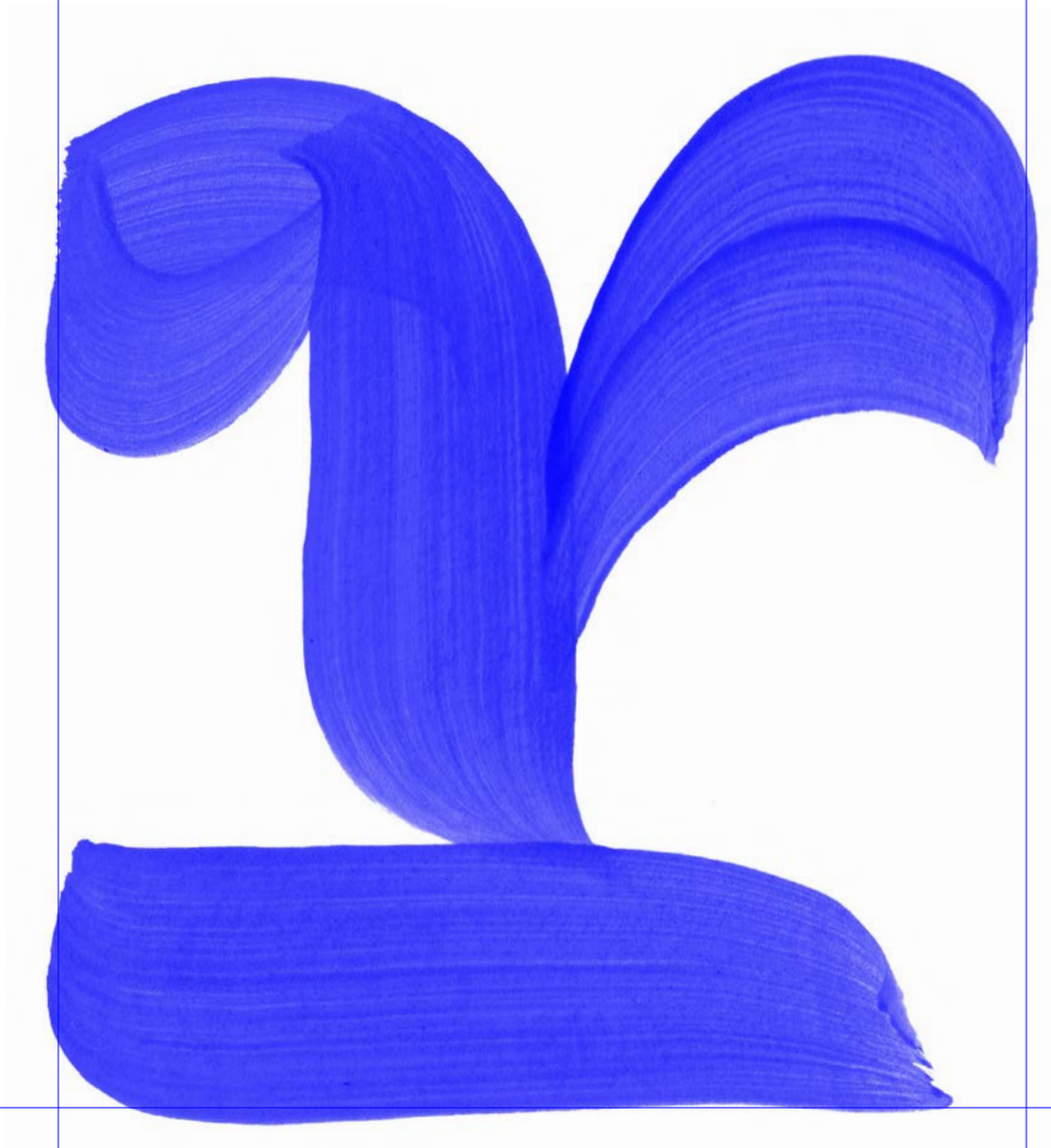
Linear

Normal

Italic

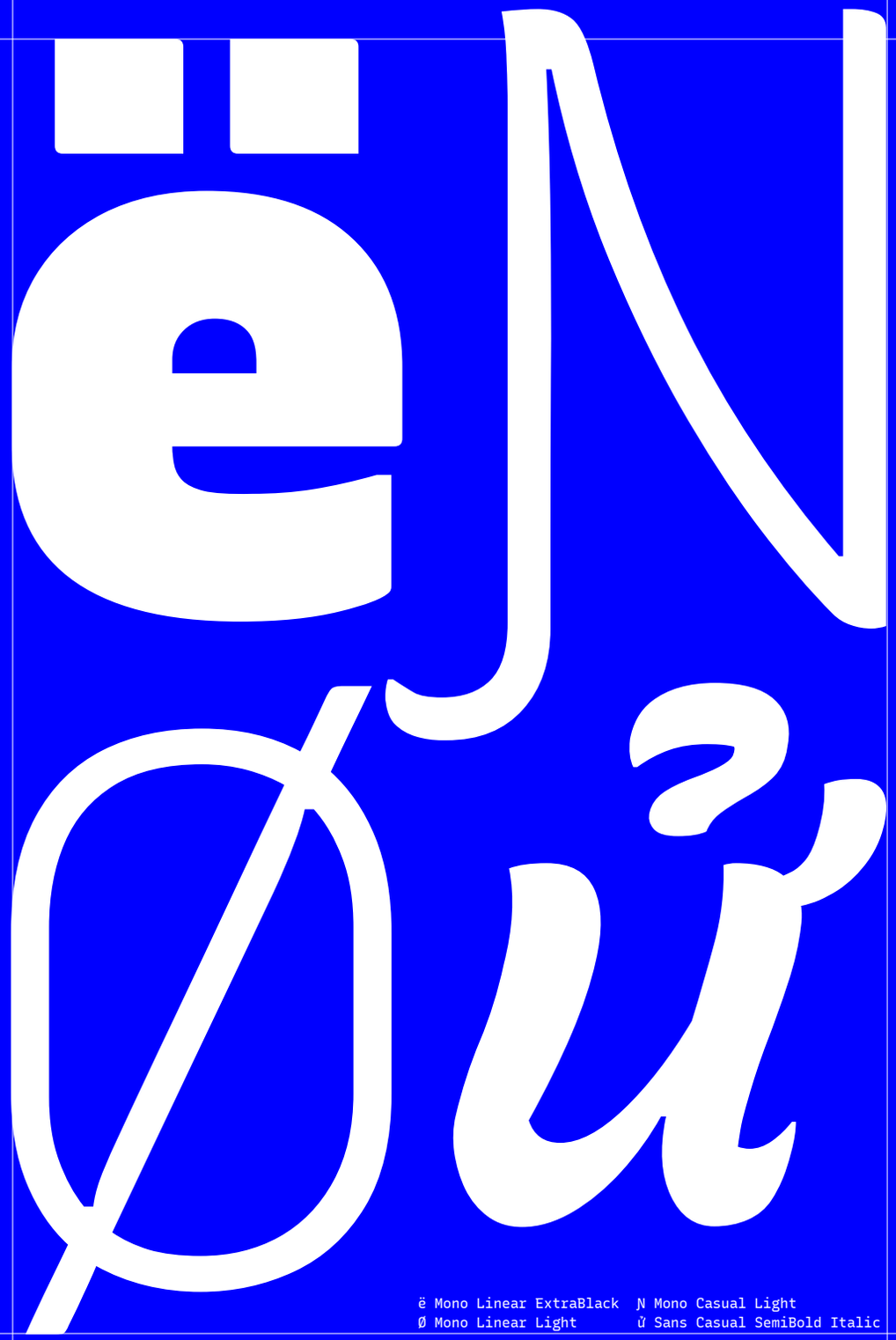
Stroke Logic The shaping of Recursive is derived from the shapes of single-stroke casual signwriting, adapted to a monospace construction.





999.99	998.99	997.99	996.99	995.98	994.98	993.98	992.98	991.98	990.98
989.98	988.97	987.97	986.97	985.97	984.97	983.97	982.97	981.96	980.96
979.96	978.96	977.96	976.96	975.96	974.95	973.95	972.95	971.95	970.95
969.95	968.95	967.94	966.94	965.94	964.94	963.94	962.94	961.94	960.93
959.93	958.93	957.93	956.93	955.93	954.93	953.92	952.92	951.92	950.92
949.92	948.92	947.92	946.91	945.91	944.91	943.91	942.91	941.91	940.91
939.91	938.90	937.90	936.90	935.90	934.90	933.90	932.90	931.89	930.89
929.89	928.89	927.89	926.89	925.89	924.88	923.88	922.88	921.88	920.88
919.88	918.88	917.87	916.87	915.87	914.87	913.87	912.87	911.87	910.86
909.86	908.86	907.86	906.86	905.86	904.86	903.85	902.85	901.85	900.85
899.85	898.85	897.85	896.84	895.84	894.84	893.84	892.84	891.84	890.84
889.83	888.83	887.83	886.83	885.83	884.83	883.83	882.82	881.82	880.82
879.82	878.82	877.82	876.82	875.81	874.81	873.81	872.81	871.81	870.81
869.81	868.80	867.80	866.80	865.80	864.80	863.80	862.80	861.79	860.79
859.79	858.79	857.79	856.79	855.79	854.78	853.78	852.78	851.78	850.78
849.78	848.78	847.77	846.77	845.77	844.77	843.77	842.77	841.77	840.76
839.76	838.76	837.76	836.76	835.76	834.76	833.75	832.75	831.75	830.75
829.75	828.75	827.75	826.74	825.74	824.74	823.74	822.74	821.74	820.74
819.74	818.73	817.73	816.73	815.73	814.73	813.73	812.73	811.72	810.72
809.72	808.72	807.72	806.72	805.72	804.71	803.71	802.71	801.71	800.71
799.71	798.71	797.70	796.70	795.70	794.70	793.70	792.70	791.70	790.69
789.69	788.69	787.69	786.69	785.69	784.69	783.68	782.68	781.68	780.68
779.68	778.68	777.68	776.67	775.67	774.67	773.67	772.67	771.67	770.67
769.66	768.66	767.66	766.66	765.66	764.66	763.66	762.65	761.65	760.65
759.65	758.65	757.65	756.65	755.64	754.64	753.64	752.64	751.64	750.64
749.64	748.63	747.63	746.63	745.63	744.63	743.63	742.63	741.62	740.62
739.62	738.62	737.62	736.62	735.62	734.61	733.61	732.61	731.61	730.61
729.61	728.61	727.60	726.60	725.60	724.60	723.60	722.60	721.60	720.59
719.59	718.59	717.59	716.59	715.59	714.59	713.58	712.58	711.58	710.58
709.58	708.58	707.58	706.58	705.57	704.57	703.57	702.57	701.57	700.57
699.57	698.56	697.56	696.56	695.56	694.56	693.56	692.56	691.55	690.55
689.55	688.55	687.55	686.55	685.55	684.54	683.54	682.54	681.54	680.54
679.54	678.54	677.53	676.53	675.53	674.53	673.53	672.53	671.53	670.52
669.52	668.52	667.52	666.52	665.52	664.52	663.51	662.51	661.51	660.51
659.51	658.51	657.51	656.50	655.50	654.50	653.50	652.50	651.50	650.50

649.49	648.49	647.49	646.49	645.49	644.49	643.49	642.48	641.48	640.48
639.48	638.48	637.48	636.48	635.47	634.47	633.47	632.47	631.47	630.47
629.47	628.46	627.46	626.46	625.46	624.46	623.46	622.46	621.45	620.45
619.45	618.45	617.45	616.45	615.45	614.44	613.44	612.44	611.44	610.44
609.44	608.44	607.43	606.43	605.43	604.43	603.43	602.43	601.43	600.42
599.42	598.42	597.42	596.42	595.42	594.42	593.41	592.41	591.41	590.41
589.41	588.41	587.41	586.41	585.40	584.40	583.40	582.40	581.40	580.40
579.40	578.39	577.39	576.39	575.39	574.39	573.39	572.39	571.38	570.38
569.38	568.38	567.38	566.38	565.38	564.37	563.37	562.37	561.37	560.37
559.37	558.37	557.36	556.36	555.36	554.36	553.36	552.36	551.36	550.35
549.35	548.35	547.35	546.35	545.35	544.35	543.34	542.34	541.34	540.34
539.34	538.34	537.34	536.33	535.33	534.33	533.33	532.33	531.33	530.33
529.32	528.32	527.32	526.32	525.32	524.32	523.32	522.31	521.31	520.31
519.31	518.31	517.31	516.31	515.30	514.30	513.30	512.30	511.30	510.30
509.30	508.29	507.29	506.29	505.29	504.29	503.29	502.29	501.28	500.28
499.28	498.28	497.28	496.28	495.28	494.27	493.27	492.27	491.27	490.27
489.27	488.27	487.26	486.26	485.26	484.26	483.26	482.26	481.26	480.25
479.25	478.25	477.25	476.25	475.25	474.25	473.25	472.24	471.24	470.24
469.24	468.24	467.24	466.24	465.23	464.23	463.23	462.23	461.23	460.23
459.23	458.22	457.22	456.22	455.22	454.22	453.22	452.22	451.21	450.21
449.21	448.21	447.21	446.21	445.21	444.20	443.20	442.20	441.20	440.20
439.20	438.20	437.19	436.19	435.19	434.19	433.19	432.19	431.19	430.18
429.18	428.18	427.18	426.18	425.18	424.18	423.17	422.17	421.17	420.17
419.17	418.17	417.17	416.16	415.16	414.16	413.16	412.16	411.16	410.16
409.15	408.15	407.15	406.15	405.15	404.15	403.15	402.14	401.14	400.14
399.14	398.14	397.14	396.14	395.13	394.13	393.13	392.13	391.13	390.13
389.13	388.12	387.12	386.12	385.12	384.12	383.12	382.12	381.11	380.11
379.11	378.11	377.11	376.11	375.11	374.10	373.10	372.10	371.10	370.10
369.10	368.10	367.09	366.09	365.09	364.09	363.09	362.09	361.09	360.08
359.08	358.08	357.08	356.08	355.08	354.08	353.08	352.07	351.07	350.07
349.07	348.07	347.07	346.07	345.06	344.06	343.06	342.06	341.06	340.06
339.06	338.05	337.05	336.05	335.05	334.05	333.05	332.05	331.04	330.04
329.04	328.04	327.04	326.04	325.04	324.03	323.03	322.03	321.03	320.03
319.03	318.03	317.02	316.02	315.02	314.02	313.02	312.02	311.02	310.01
309.01	308.01	307.01	306.01	305.01	304.01	303.00	302.00	301.00	300.00



ë Mono Linear ExtraBlack
Ø Mono Linear Light
Ɲ Mono Casual Light
ŭ Sans Casual SemiBold Italic

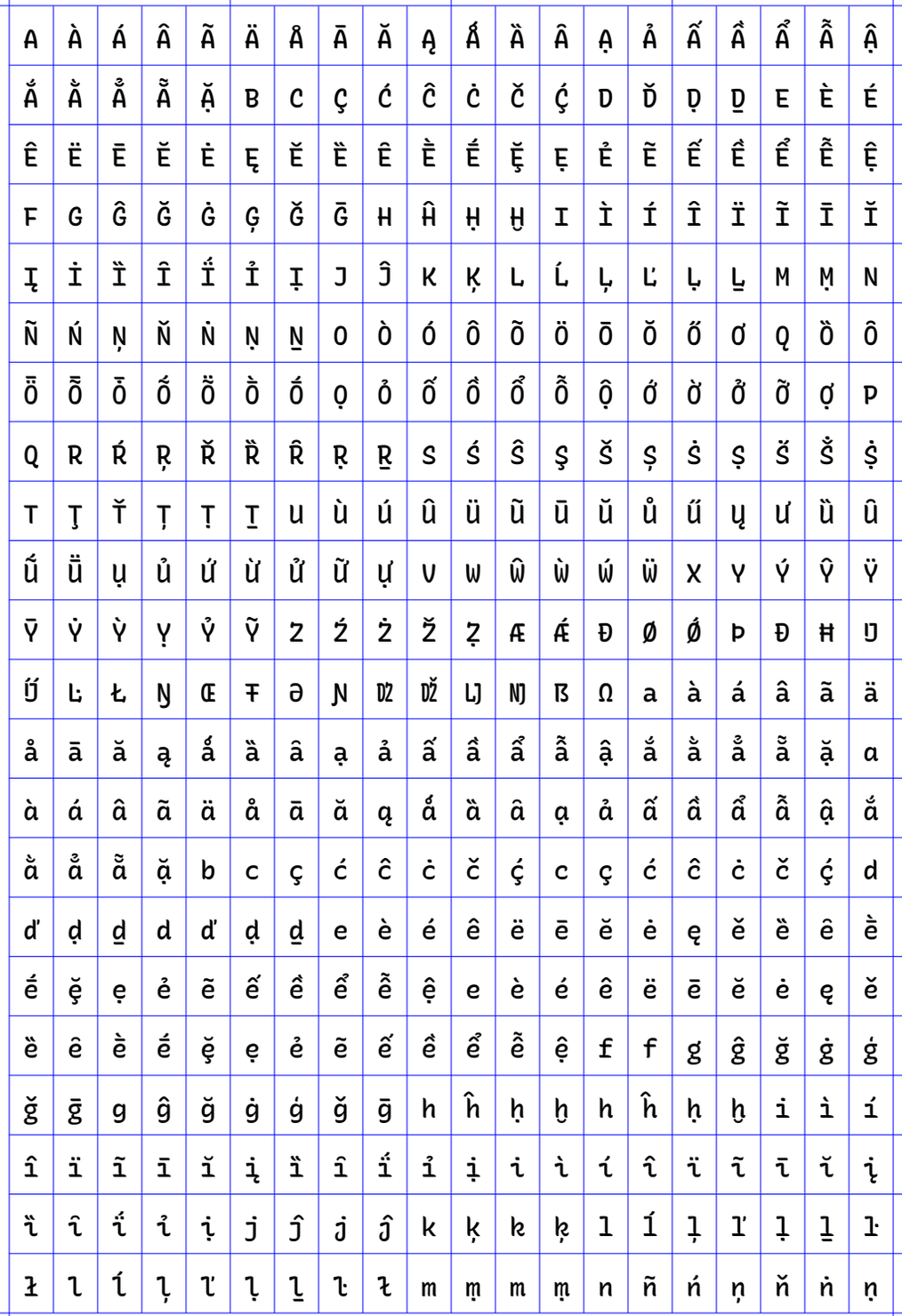
æ Mono Casual Light
ğ Mono Linear ExtraBold
ß Sans Casual ExtraBold
ĸ Sans Casual Regular

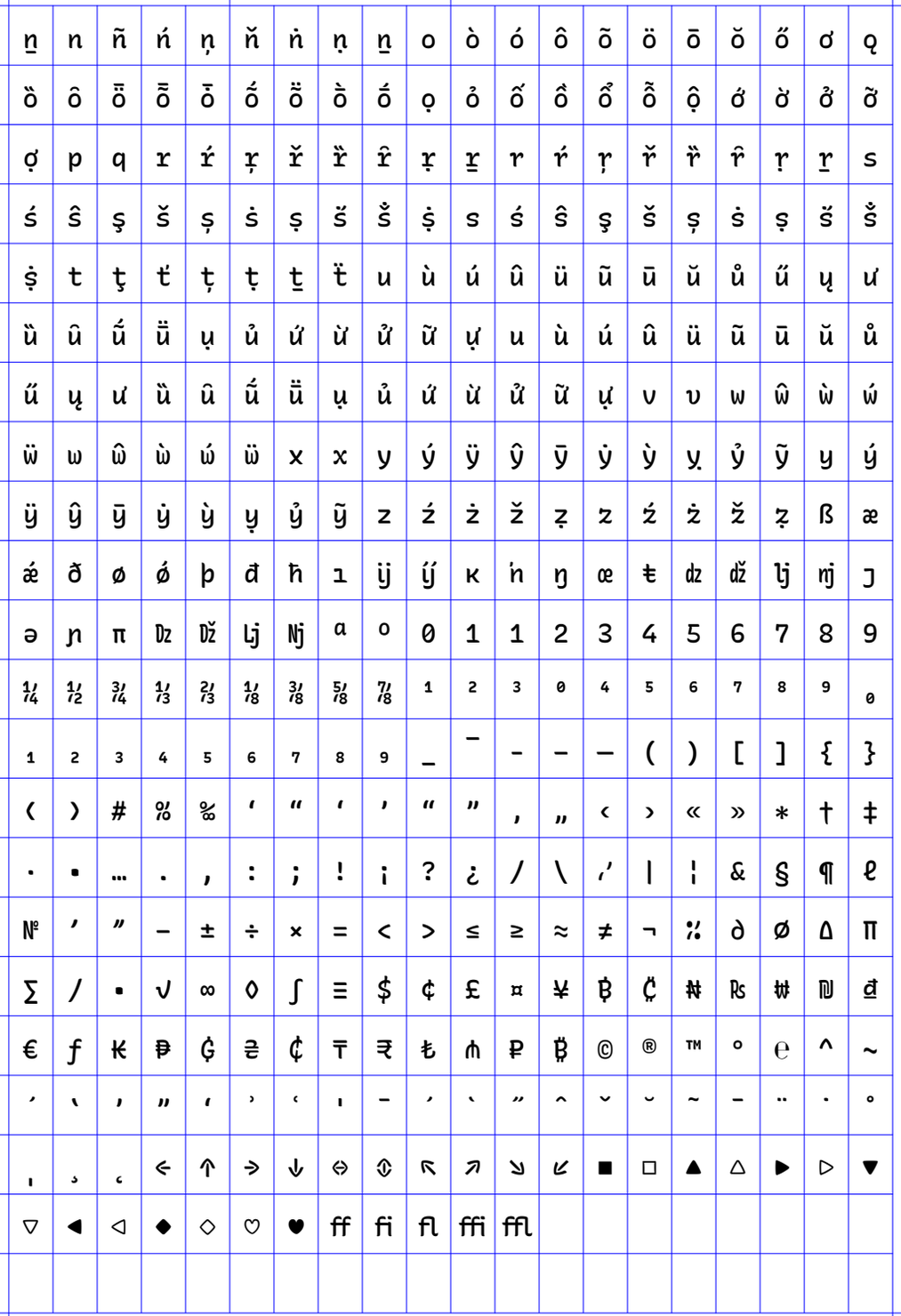
Supports over 200 Languages.

To meet the needs of global communication, Recursive supports a wide range of Latin-based languages, including Vietnamese. It also comes with an extended set of currencies, symbols, fractions, and arrows.

Abenaki
Afaan Oromo
Afar
Afrikaans
Albanian
Alsatian
Amis
Anuta
Aragonese
Aranese
Aromanian
Arrernte
Arvanitic Latin
Asturian
Atayal
Aymara
Azerbaijani
Bashkir Latin
Basque
Belarusian Latin
Bemba
Bikol
Bislama
Bosnian
Breton
Cape Verdean
Creole
Catalan
Cebuano
Chamorro
Chavacano
Chichewa
Chickasaw
Cimbrian
Cofán
Cornish
Corsican
Creek
Crimean Tatar Latin
Croatian
Czech
Danish
Dawan
Delaware
Dholuo
Drehu
Dutch
English
Esperanto
Estonian
Faroese
Fijian
Filipino
Finnish
Folkspraak
French
Frisian
Friulian
Gagauz Latin
Galician
Ganda
Genoese
German
Gikuyu
Gooniyandi
Greenlandic Kalaallisut
Guadeloupean Creole
Gwich'in
Haitian Creole
Hän
Hawaiian
Hiligaynon
Hopi
Hotcąk Latin
Hungarian
Icelandic
Ido
Igbo
Ilocano
Indonesian
Interglossa
Interlingua
Irish
Istro-Romanian
Italian
Jamaican
Javanese Latin
Jèrriais
Kaingang
Kala Lagaw Ya
Kapampangan Latin

Kaqchikel
Karakalpak Latin
Karelian Latin
Kashubian
Kikongo
Kinyarwanda
Kiribati
Kirundi
Klingon
Kurdish Latin
Ladin
Latin
Latino sine Flexione
Latvian
Lithuanian
Lojban
Lombard
Low Saxon
Luxembourgish
Maasai
Makhuwa
Malay
Maltese
Manx
Māori
Marquesan
Megleno-Romanian
Meriam Mir
Mirandese
Mohawk
Moldovan
Montagnais
Montenegrin
Murrinh-Patha
Nagamese Creole
Nahuatl
Ndebele
Neapolitan
Ngiyambaa
Niuean
Noongar
Norwegian
Novial
Occidental
Occitan
Old Icelandic
Old Norse
Oněipŏt
Oshiwambo
Ossetian Latin
Palauan
Papiamento
Piedmontese
Polish
Portuguese
Potawatomi
Q'eqchi'
Quechua
Rarotongan
Romanian
Romansh
Rotokas
Sami Inari Sami
Sami Lule Sami
Sami Northern Sami
Sami Southern Sami
Samoan
Sango
Saramaccan
Sardinian
Scottish Gaelic
Serbian Latin
Seri
Seychellois Creole
Shawnee
Shona
Sicilian
Silesian
Slovak
Slovenian
Slovio Latin
Somali
Sorbian Lower Sorbian
Sorbian Upper Sorbian
Sotho Northern
Sotho Southern
Spanish
Sranan
Sundanese Latin
Swahili
Swazi
Swedish
Tagalog
Tahitian
Tetum
Tok Pisin
Tokelauan
Tongan,
Tshiluba
Tsonga
Tswana
Tumbuka
Turkish
Turkmen Latin
Tuvaluan
Tzotzil
Uzbek Latin
Venetian
Vepsian
Vietnamese
Volapük
Võro
Wallisian
Walloon
Waray-Waray
Warlpiri
Wayuu
Welsh
Wik-Mungkan
Wiradjuri
Wolof
Xavante
Xhosa
Yapese
Yindjibarndi
Zapotec
Zarma
Zazaki
Zulu
Zuni

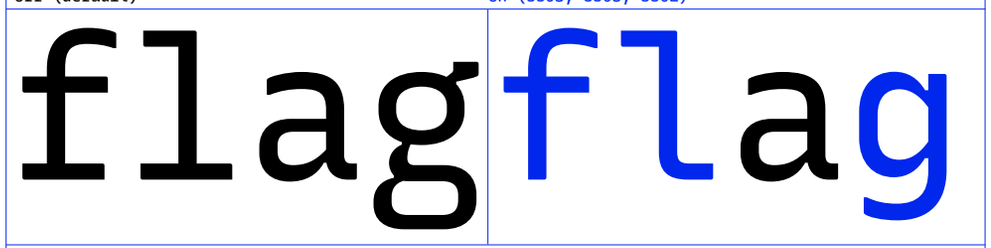




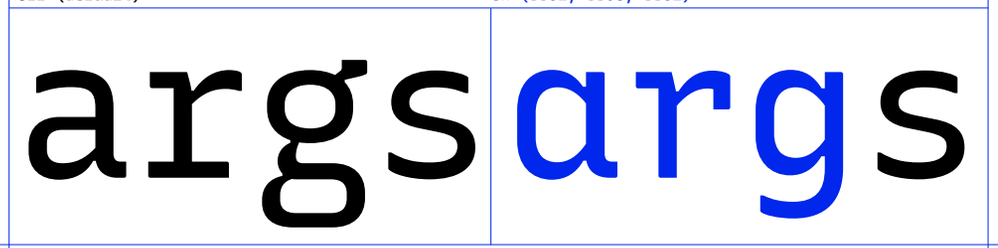
Alternative possibilities.

Recursive includes a carefully-considered set of OpenType features that make it simple to design refined typography and to tailor code to suit personal preferences.

Off (default) | On (ss03, ss05, ss02)



Off (default) | On (ss01, ss06, ss02)



Mostly for code

Feature tag	Description	Off (default)	On
dlig	Code ligatures	=> && ===	⇒ && ≡
ss01	Single-story ‘a’	JavaScript	JɑvɑScript
ss02	Single-story ‘g’	Regex	Regex
ss03	Simplified ‘f’	justify-self	justify-self
ss04	Simplified ‘i’	function	function
ss05	Simplified ‘l’	null	null
ss06	Simplified ‘r’	Browser	Browser
ss07	Simplified italic diagonals	kwxyz *kwxyz*	kwxyz *kwxyz*
ss08	Simplified L & Z	nonZeroLib	nonZeroLib
ss09	Simplified six & nine	6 ⁶ ₆ 9 ⁹ ₉	6 ⁶ ₆ 9 ⁹ ₉
ss10	Dotted zero	0x30	0x30
ss11	Simplified one	#123	#123
ss12	Simplified ‘at’	@font-face	@font-face

Mostly for design

Feature tag	Description	Off (default)	On
case	Caps punctuation	(I)I@I-I	(I)I@I-I
frac	Fractions	1 1/2 3/4	1 ½ ¾
afrc	Alternative fractions	1 1/2 3/4	1 ½ ¾
ordn	Ordinals	1.o 8.a	1.º 8.ª
titl	No descender on ‘Q’	SQL	SQL
sups, numr	Superiors	H0123456789	H⁰¹²³⁴⁵⁶⁷⁸⁹
sinf, dnom	Inferiors	H0123456789	H₀₁₂₃₄₅₆₇₈₉

Sans-only

Feature tag	Description	Off (default)	On
zero, ss20	Slashed zero	0x30	0x30
pnum	Proportional one	#123	#123
liga	Italic ligatures	fi fl ffi ffl	*fi fl ffi ffl*

Designed for faster coding.

Default dlig on

==	==	%%	%%	<-	←	f"	f"
===	===	&&	&&	##	##	f'	f'
!=	≠	&&&	&&&	###	###	${	${
!==	≠=	||	||	####	####	?.	?.
=/=	≠=	|||	|||	//	//	?:	?:
!!	!!	=>	⇒	>=	≥	/*	/*
??	??	->	→	<=	≤	*/	*/

Recursive includes a set of **code ligatures** supporting common multi-character combinations for JavaScript, Python, Markdown, CSS, and other programming languages. When the (`dlig`) OpenType feature is activated, these ligatures snap into place as you write code, automatically correcting spacing. This helps you to read, write, and understand code faster.

Default dlig on

///	///	-<	-<	++	++	-=	-=
'''	'''	::	::	+++	+++	*=	*=
"""	"""	>>	>>	--	--	/=	/=
``	```	>>>	>>>	---	---		
<!--	<!—	<<	<<	**	**		
-->	—>	<<<	<<<	***	***		
>-	>-	://	://	+=	+=		

```
// threeJS (MIT License), as minified for use on https://recursive.design
(function(h,Fa){"object"===typeof exports&&"undefined"!==typeof module?Fa(exports):"function"===typeof define&&define.amd?define(["exports"],Fa):(h=h||self,Fa(h.TH
function T(a,b,c,d,e,f,g,k,l,m){Object.defineProperty(this,"id",{value:mj++});this.uuid=O.generateUUID();this.name="";this.image=void 0!==a?a:T.DEFAULT_IMAGE;this.
this.center=new x(0,0);this.rotation=0;this.matrixAutoUpdate=!0;this.matrix=new za;this.generateMipmaps=!0;this.premultiplyAlpha=!1;this.flipY=!0;this.unpackAlignm
c.minFilter,c.format,c.type,c.anisotropy,c.encoding);this.texture.image={};this.texture.image.width=a;this.texture.image.height=b;this.texture.generateMipmaps=void
4}function P(){this.elements=[1,0,0,0,0,1,0,0,0,0,1,0,0,0,0,1];0<arguments.length&&console.error("THREE.Matrix4: the constructor no longer reads arguments. use .se
d=new n(1,1,1);b._onChange(function(){c.setFromEuler(b,!1)});c._onChange(function(){b.setFromQuaternion(c,void 0,!1)});Object.defineProperties(this,{position:{conf
!1;this.layers=new $f;this.visible=!0;this.receiveShadow=this.castShadow=!1;this.frustumCulled=!0;this.renderOrder=0;this.userData={}}function pb(){D.call(this);th
-Infinity)}function ag(a,b,c,d,e){var f;var g=0;for(f=a.length-3;g<=f;g+=3){Vb.fromArray(a,g);var k=e.x*Math.abs(Vb.x)+e.y*Math.abs(Vb.y)+e.z*Math.abs(Vb.z),l=b.do
b?b:0}function ma(a,b,c){this.a=void 0!==a?a:new n;this.b=void 0!==b?b:new n;this.c=void 0!==c?c:new n}function y(a,b,c){return void 0===b&&void 0===c?this.set(a):
d.isVector3?d:new n;this.vertexNormals=Array.isArray(d)?d:[];this.color=e&&e.isColor?e:new y;this.vertexColors=Array.isArray(e)?e:[];this.materialIndex=void 0!==f?
this.blendDstAlpha=this.blendSrcAlpha=null;this.depthFunc=3;this.depthWrite=this.depthTest=!0;this.stencilWriteMask=255;this.stencilFunc=519;this.stencilRef=0;this
!1;this.toneMapped=this.visible=!0;this.userData={};this.version=0}function Qa(a){L.call(this);this.type="MeshBasicMaterial";this.color=new y(16777215);this.lightM
function K(a,b,c){if(Array.isArray(a))throw new TypeError("THREE.BufferAttribute: array should be a Typed Array.");this.name="";this.array=a;this.itemSize=b;this.c
b,c)}function Xb(a,b,c){K.call(this,new Uint16Array(a),b,c)}function Ed(a,b,c){K.call(this,new Int32Array(a),b,c)}function Yb(a,b,c){K.call(this,new Uint32Array(a)
this.uvsNeedUpdate=this.colorsNeedUpdate=this.normalsNeedUpdate=this.verticesNeedUpdate=!1}function wh(a){if(0===a.length)return-Infinity;for(var b=a[0],c=1,d=a.le
this.userData={}}function ca(a,b){D.call(this);this.type="Mesh";this.geometry=void 0!==a?a:new G;this.material=void 0!==b?b:new Oa({color:16777215*Math.random()});
m);$b.fromBufferAttribute(e,v);ac.fromBufferAttribute(e,p);e=a.morphTargetInfluences;if(b.morphTargets&&f&&e){Le.set(0,0,0);Me.set(0,0,0);Ne.set(0,0,0);for(var q=0
xh(a,b,c,d,Zb,$b,ac,Gd))k&&(Ec.fromBufferAttribute(k,m),Fc.fromBufferAttribute(k,v),Gc.fromBufferAttribute(k,p),a.uv=ma.getUV(Gd,Zb,$b,ac,Ec,Fc,Gc,new x)),l&&(Ec.f
[];this.faces=[];this.faceVertexUvs=[[]];this.morphTargets=[];this.morphNormals=[];this.skinWeights=[];this.skinIndices=[];this.lineDistances=[];this.boundingSpher
e.isTexture)?b[c][d]=e.clone():Array.isArray(e)?b[c][d]=e.slice():b[c][d]=e}}return b}function na(a){for(var b={},c=0;c<a.length;c++){var d=bc(a[c]),e;for(e in d)b
this.wireframeLinewidth=1;this.morphNormals=this.morphTargets=this.skinning=this.clipping=this.lights=this.fog=!1;this.extensions={derivatives:!1,fragDepth:!1,draw
this.type="Camera";this.matrixWorldInverse=new P;this.projectionMatrix=new P;this.projectionMatrixInverse=new P}function pa(a,b,c,d){db.call(this);this.type="Persp
0,0));this.add(e);var f=new pa(90,1,a,b);f.up.set(0,-1,0);f.lookAt(new n(-1,0,0));this.add(f);var g=new pa(90,1,a,b);g.up.set(0,0,1);g.lookAt(new n(0,1,0));this.ad
"CubeCamera";this.update=function(a,b){null===this.parent&&this.updateMatrixWorld();var c=a.getRenderTarget(),d=this.renderTarget,p=d.texture.generateMipmaps;d.tex
f=this.renderTarget,g=0;6>g;g++)a.setRenderTarget(f,g),a.clear(b,c,d);a.setRenderTarget(e)}}function Eb(a,b,c){va.call(this,a,b,c)}function cc(a,b,c,d,e,f,g,k,l,m,
d?d:new Ta,void 0!==e?e:new Ta,void 0!==f?f:new Ta]}function yh(){function a(e,f){!1!==c&&(d(e,f),b.requestAnimationFrame(a))}var b=null,c=!1,d=null;return{start:f
console.warn("THREE.WebGLAttributes: Unsupported data buffer format: Float64Array.");d instanceof Uint16Array?c=5123:d instanceof Int16Array?c=5122:d instanceof Ui
(b=b.data);var d=c.get(b);d&&(a.deleteBuffer(d.buffer),c.delete(b))},update:function(d,e){d.isInterleavedBufferAttribute&&(d=d.data);var f=c.get(d);if(void 0===f)c
height:b,widthSegments:c,heightSegments:d};this.fromBufferGeometry(new dc(a,b,c,d));this.mergeVertices()}function dc(a,b,c,d){G.call(this);this.type="PlaneBufferGe
f=b+1+g*(a+1),k=b+1+g*a,v.push(b+g*a,e,k),v.push(e,f,k);this.setIndex(v);this.setAttribute("position",new C(p,3));this.setAttribute("normal",new C(q,3));this.setAt
d.background;h=a.xr;(h=h.getSession&&h.getSession())&&"additive"===h.environmentBlendMode&&(d=null);null===d?(e(f,g),m=null,v=0):d&&d.isColor&&(e(d,1),r=!0,m=null,
depthWrite:!1,fog:!1})),l.geometry.deleteAttribute("normal"),l.geometry.deleteAttribute("uv"),l.onBeforeRender=function(a,b,c){this.matrixWorld.copyPosition(c.matr
l.material,0,0,null)}else if(d&&d.isTexture){void 0===k&&(k=new ca(new dc(2,2),new oa({type:"BackgroundMaterial",uniforms:bc(eb.background.uniforms),vertexShader:e
if(m!==d||v!==d.version)k.material.needsUpdate=!0,m=d,v=d.version;b.unshift(k,k.geometry,k.material,0,0,null)}}}function tj(a,b,c,d){var e=d.isWebGL2,f;this.setMo
return}d[g](f,k,l,m);c.update(l,f,m)}}function uj(a,b,c){function d(b){if("highp"===b){if(0<a.getShaderPrecisionFormat(35633,36338).precision&&0<a.getShaderPrecis
a instanceof WebGL2ComputeRenderingContext,g=void 0!==c.precision?c.precision:"highp",k=d(g);k!==g&&(console.warn("THREE.WebGLRenderer:",g,"not supported, using",k
getMaxAnisotropy:function(){if(void 0!==e)return e;var c=b.get("EXT_texture_filter_anisotropic");return e=null!==c?a.getParameter(c.MAX_TEXTURE_MAX_ANISOTROPY_EXT)
0<e);c.numPlanes=e;c.numIntersection=0}function b(a,b,d,e){var f=null!==a?a.length:0,g=null;if(0!==f){g=m.value;if(!0!==e||null===g){e=d+4*f;b=b.matrixWorldInverse
0;this.init=function(a,c,g){var k=0!==a.length||c||0!==e||f;f=c;d=b(a,g,0);e=a.length;return k};this.beginShadows=function(){g=!0;b(null)};this.endShadows=function
switch(c){case "WEBGL_depth_texture":var d=a.getExtension("WEBGL_depth_texture")||a.getExtension("MOZ_WEBGL_depth_texture")||a.getExtension("WEBKIT_WEBGL_depth_tex
a.getExtension("WEBKIT_WEBGL_compressed_texture_s3tc");break;case "WEBGL_compressed_texture_pvrtc":d=a.getExtension("WEBGL_compressed_texture_pvrtc")||a.getExtensi
d);f.delete(e);if(k=g.get(a))b.remove(k),g.delete(a);c.memory.geometries--}function e(a){var c=[],d=a.index,e=a.attributes.position;if(null!==d){var f=d.array;d=d.
b){var e=f.get(b);if(e)return e;b.addEventListener("dispose",d);b.isBufferGeometry?e=b:b.isGeometry&&(void 0===b._bufferGeometry&&(b._bufferGeometry=(new G).setFro
a.index;null!==c&&b.version<c.version&&e(a)}else e(a);return g.get(a)}}function yj(a,b,c,d){var e=d.isWebGL2,f,g,k;this.setMode=function(a){f=a};this.setIndex=fun
return}d[l](f,v,g,m*k,p);c.update(v,f,p)}}function zj(a){var b={frame:0,calls:0,triangles:0,points:0,lines:0};return{memory:{geometries:0,textures:0},render:b,pro
d)}}}function Aj(a,b){return Math.abs(b[1])-Math.abs(a[1])}function Bj(a){var b={},c=new Float32Array(8);return{update:function(d,e,f,g){var k=d.morphTargetInflue
p[1]=k[m];d.sort(Aj);for(m=k=0;8>m;m++){if(p=d[m])if(l=p[0],p=p[1]){v&&e.setAttribute("morphTarget"+m,v[l]);f&&e.setAttribute("morphNormal"+m,f[l]);c[m]=p;k+=p;con
c.update(a.instanceMatrix,34962);return l},dispose:function(){e={}}}}function rb(a,b,c,d,e,f,g,k,l,m){a=void 0!==a?a:[];T.call(this,a,void 0!==b?b:301,c,d,e,f,void
this.minFilter=this.magFilter=1003;this.wrapR=1001;this.flipY=this.generateMipmaps=!1;this.needsUpdate=!0}function Kc(a,b,c){var d=a[0];if(0>=d||0<d)return a;var e
c&&(c=new Int32Array(b),Bh[b]=c);for(var d=0;d!==b;++d)c[d]=a.allocateTextureUnit();return c}function Dj(a,b){var c=this.cache;c[0]!==b&&(a.uniform1f(this.addr,b),
b.r){if(c[0]!==b.r||c[1]!==b.g||c[2]!==b.b)a.uniform3f(this.addr,b.r,b.g,b.b),c[0]=b.r,c[1]=b.g,c[2]=b.b}else Pa(c,b)||(a.uniform3fv(this.addr,b),Ia(c,b))}function
```

Bézier curves / Vectors → Bézier curves are a parametric or mathematical way to draw curves so that they can be scaled infinitely without losing resolution.

Classification → A system used to organize typefaces into categories. There are many systems of classification for fonts, generally based on visual parameters and historical periods. Broadly speaking, typefaces fall into four categories: serif, sans-serif, script, and decorative (or display). Recursive's naming system is derived in part from the CSS `font-family` property, which includes the generic categories `sans-serif` and `monospace`.

Casual (see also **casual script** and **single-stroke casual**) → A genre of sign writing in which the letters are drawn with a brush, in just a few single strokes. Casual letters are often used in informal signage in businesses as well as on hot rods and commercial trucks.

Casual script → A subgenre of casual lettering in which the letters are drawn with a brush and connected together.

Character (see also **glyph**) → A letter, numeral, punctuation mark, or other sign included in a typeface. A character may have multiple glyphs within a font, such as a single-story and a double-story "g." The sum of characters included in a font is usually called a **character set**.

Contours → A single path of any number of points. A glyph usually consists of one or more contours.

Counters → Negative spaces inside letterforms, such as the center area of a "c" or the eye and mouth of an "e."

Cursive (see also **script**) → A style of handwriting in which the letters have a flowing appearance..

Diacritic / Accent → A mark or sign added to a letter to indicate a difference in pronunciation.

Duplexed (see also **superplexed**) → Duplexed fonts are two fonts which share the same width in every character, allowing styles to be used interchangeably.

Expression → The personality or feeling conveyed by the design of a typeface.

Glyph (see also **character**) → A glyph is the digital expression of a character. Glyphs are made of strokes and stems that are connected together. A font may contain more than one glyph for the same character, with non-default glyphs usually called **alternates**.

Ink traps → A design feature of some typefaces traditionally used in print to trap excess ink and retain the sharpness of interior corners. Ink traps are still used in digital type to maintain the crisp appearance of corners by increasing the amount of light drawn into them by pixels. They are also used for their striking visual appearance at larger scales.

Instance (see also **named instances**) → A specific style within a larger variable font.

Interpolation → The process of generating font instances by means of calculating intermediate values between the control-point coordinates of two or more sources.

Kerning → Corrections to the default spacing between two adjacent glyphs to make a typeface appear evenly spaced. For example, "VA" often has negative kerning.

Letterform → The specific visual shaping of a character.

Legibility (see also **readability**) → Legibility refers to the ease with which individual glyphs in a typeface can be perceived as the characters they represent, based on their appearance.

Ligature → A glyph that includes two or more characters, often visually combined into a single shape. Ligatures can have different purposes: either purely decorative, to handle problems of spacing, or (in the case of code ligatures), to help users understand and read code faster.

Microinteractions → Subtle animations in digital user interfaces that respond to user interaction through visual changes such as color, size, and position.

Monospaced font / Fixed-width font / Fixed-pitch font / Non-proportional font → A typeface in which all characters have the same width and occupy the same amount of horizontal space. This allows for perfectly aligned columns of text and is particularly useful when writing code.

Named instances (see also **instances**) → Predefined styles in a variable font, such as "Bold Italic." Named instances are easy to use in typical text and design software because they can be selected through familiar font-style controls and menus.

OFL → The SIL Open Font License 1.1 is one of the most common licenses for open-source fonts. It allows a font to be freely used and modified (so long as derivative fonts adopt the same OFL license). Its full conditions are described at http://scripts.sil.org/OFL

OpenType → The modern format for digital font files, created in a joint effort between Microsoft and Adobe and contributed to by Google, Apple, many and others. Just as websites are built on the technical foundation of HTML, CSS, and JavaScript, OpenType is the technical specification that underlies modern fonts. The OpenType data format describes every aspect of a font, including glyph shaping, accent placement, kerning, font naming, and much more.

OpenType features → Special features that a font may include to coordinate text layout and glyph substitution. These special features may include ligatures, alternate characters, uppercase-aligned punctuation, tabular or proportional numbers, and different "stylistic sets". OpenType Features are controllable in most design software, code editors, and in CSS via the property `font-feature-settings`.

Proportional font → A typeface in which characters and spacings have different widths, each occupying a "natural" amount of horizontal space.

Readability (see also **legibility**) → Readability refers to the ease with which text can be read in a given typeface and typographic context.

Recursion (see also **recursion**) → When an object's definition contains a reference to itself. In programming, recursion happens when a function calls itself, using its outputs
as inputs. More generally, recursion is a method of solving a problem where the solution depends on solutions to smaller instances of the same problem.

Sans-serif / Sans → A style of type that excludes the small "feet" of serifs fonts and typically has a low amount of contrast in stroke thickness.

Script (see also **cursive**) → Classification for typefaces that imitate handwriting. In cursive scripts, letters are typically connected, but script typefaces can also have disconnected letters. **Script** is also a synonym for alphabetic systems. For example, the Latin alphabet is commonly called the Latin script.

Semi-proportional font / Semi-monospaced font → A font designed with a limited set of widths for glyph spacing. While the glyphs in a proportional font have arbitrary widths based on what looks natural ("o" might be 623 units wide and "w" might be 871 units wide) and the glyphs in a monospaced font all have the same width (for example, "o" and "w" are both 600 units wide), in a semi-proportional font, glyphs are arranged into a few groups sharing the same glyph width. For example, most glyphs in a semi-proportional font might be 600 units wide, while the rest are 300 or 900 units wide. Recursive Sans uses spacing based on 50-unit increments (400, 450, 500, and so on) to deliver an aesthetic that falls somewhere between monospaced and natural.

Single-stroke casual → A subgenre of casual lettering, where the letters are disconnected and usually written in all capitals.

Sources (see also **instances**) → Source fonts are drawn by a designer and are used to generate or interpolate in-between instances.

Stems (see also **strokes**) → A vertical stroke in a glyph.

Strokes (see also **stems**) → Strokes are the different segments that collectively make up a glyph.

Styles / Cuts → A font style is a specific variant comprised in a type family. The styles in a font family can differ in weight, width, slope, or other parameters.

Subfamily → One of the font families included in a super family.

Superfamily / Type system → A typeface consisting of various related subfamilies that fit into multiple classifications – for example, sans and serif companions, text and display counterparts. Because the different families in a type system share similar proportions and structure, they normally pair well together.

Superplexed (see also **duplexed**) →
In a superplexed family, all styles have consistent character widths and kerning.

Terminals → The shape at the end of a stroke that doesn't include a serif. Terminals can be straight or curved.

True italics → Unlike oblique italics, true italics have different letterforms than their upright counterparts. The letterforms of true italics are derived from cursive writing.

UI (User Interface) → A system by which a human interacts with software. **UI** most often refers to visual elements of a Graphic User Interface (GUI) such as menus, buttons, and text input fields, and to Command Line Interfaces (CLIs) as used in terminal-based, text-only software.

Unicode → A standard for consistent encoding, representation, and handling of text in most of the world's languages (including, for example, Latin, Korean, Cherokee, and Emoji). Each character has its own Unicode codepoint: "A" is `0041`, "a" is `0061`, "❤" is `2665`, and so on. These codepoints allow computers to properly represent (almost) any written language.

UPM (Units Per eM) → The size of the coordinate grid in which the glyphs of digital fonts are drawn. Recursive has a UPM of 1000.

Variable axis / Stylistic axis → A visual parameter along which a variable font can be adjusted, the most common being a font's weight (e.g. Light to Bold). Axes have four-letter tags which are commonly used to denote them in software. Several axes are registered in the OpenType spec and given lowercase abbreviations for tags, while non-registered axes must be assigned uppercase tags.

Variable font → A single font file which includes a continuous range of styles. This allows the users to modify the visual parameters of the typeface by selecting different values on its axes of variation.

Afterword

Google Fonts' mission is to make web typography better, more accessible, and more performant for everyone. We've invested deeply in variable fonts – supporting new variable typefaces, like Recursive, as well as in tools for the production, testing, and use of variable font technology – because this new technology has immense potential to improve digital typography.

Variable fonts make it possible for web and app designers to leverage the full expressive power of large typefaces, while ensuring great performance on all kinds of networks. But variable fonts are more than just a way to save font download bandwidth on the web. We believe they will help designers and developers feel more empowered to express themselves typographically with more range and nuance, moving typography as a whole toward a future of greater elegance, creativity, and readability.

Developers (from beginners to experts) are some of our core users, and Recursive is a typeface made especially for them. In apps, technical docs, & blogs, Recursive offers new possibilities for digital design & interaction, allowing you to mix tones and visual textures with a single font. It's also a beautiful, useful typeface for writing code in your favorite terminal or text editor, with the playful "Casual" styles, utilitarian "Linear" styles, and semi-cursive Italics.

We hope you're as excited for the future of typography as we are, and we hope you enjoy designing and developing with Recursive!

The Google Fonts team

Recursive Sans & Mono
By Arrow Type
→ Design by Stephen Nixon
→ Contributions from Lisa Huang,
Katja Schimmel, and Rafał Buchner
→ Font Engineering by Ben Kiel
→ Early guidance from KABK TypeMedia

Specimen Design
By Math Practice
→ E Roon Kang
→ Bon Hae Koo

Specimen Editing
→ Noemi Stauffer

Printing
Top Process, Inc.
Seoul, South Korea

Paper
→ Dust Jacket
Snow White 150gsm with gloss finish
→ Cover
Woodfree Printing Paper (Mojo) 180gsm
→ pp.3-30, 33-44, 47-74
Woodfree Printing Paper (Mojo) 80gsm
→ pp.31-32, 45-46
Yopo 90gsm

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The views expressed in *Recursive Sans & Mono* are those of the authors and are not necessarily shared by Google LLC.

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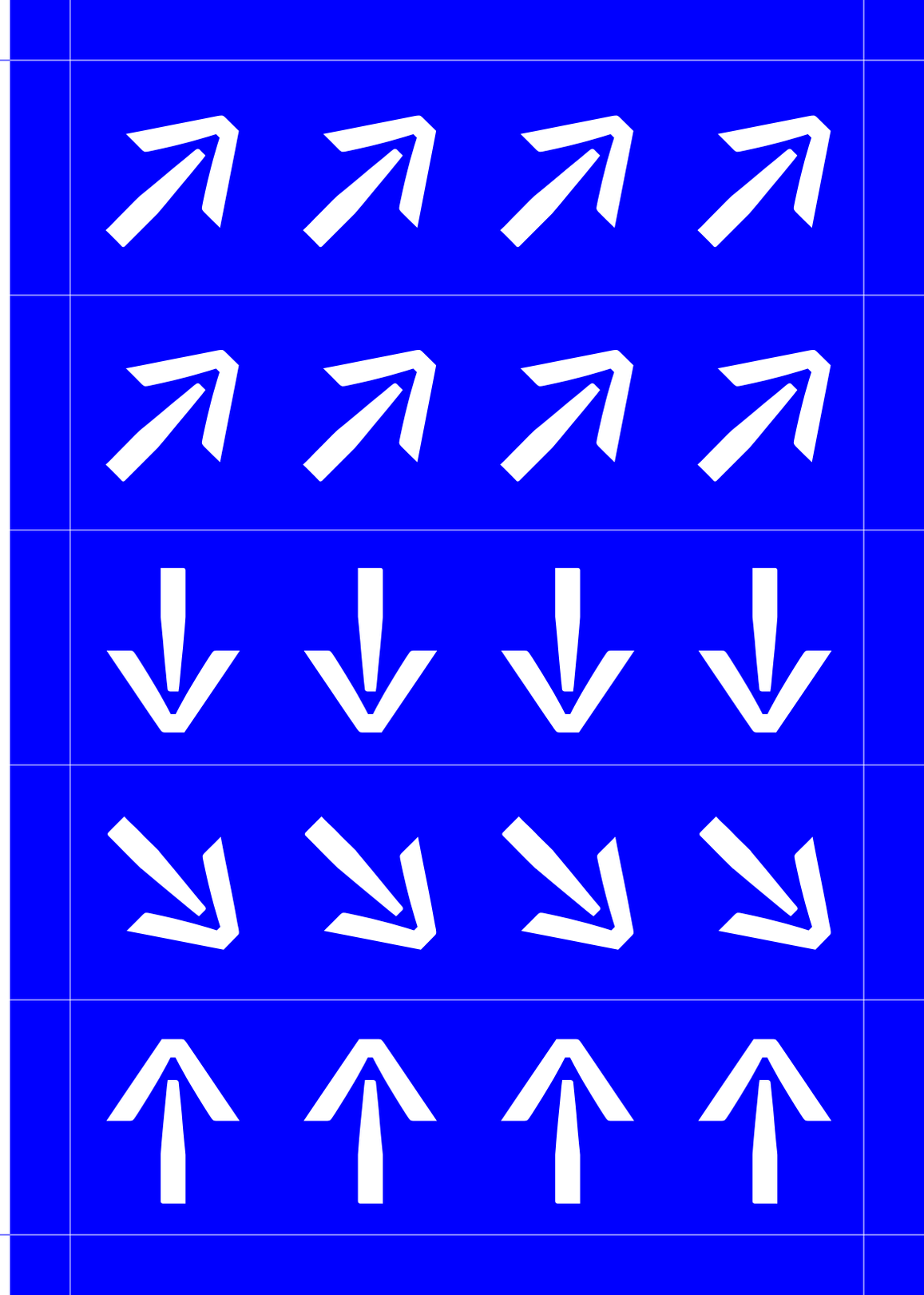
Google Fonts



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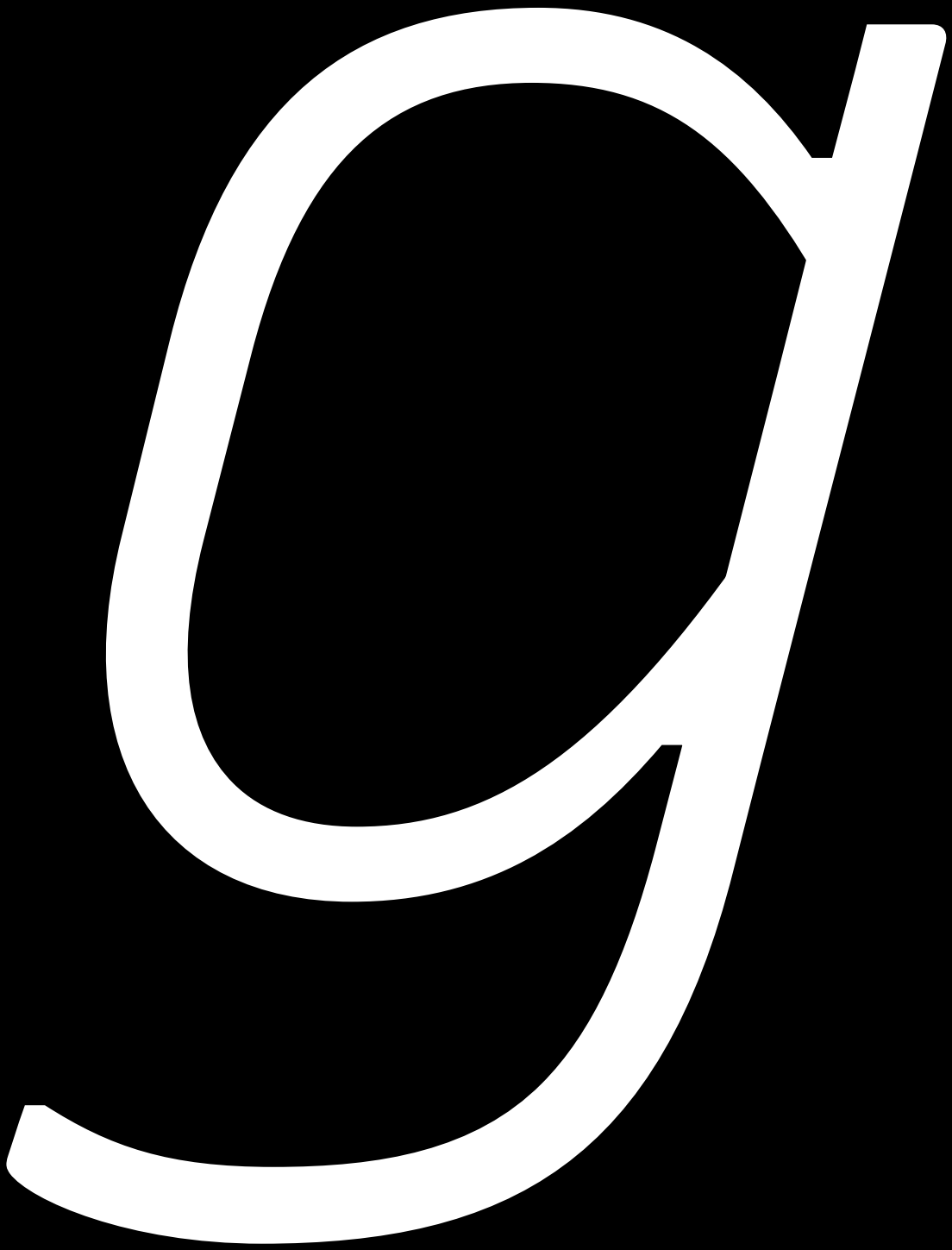
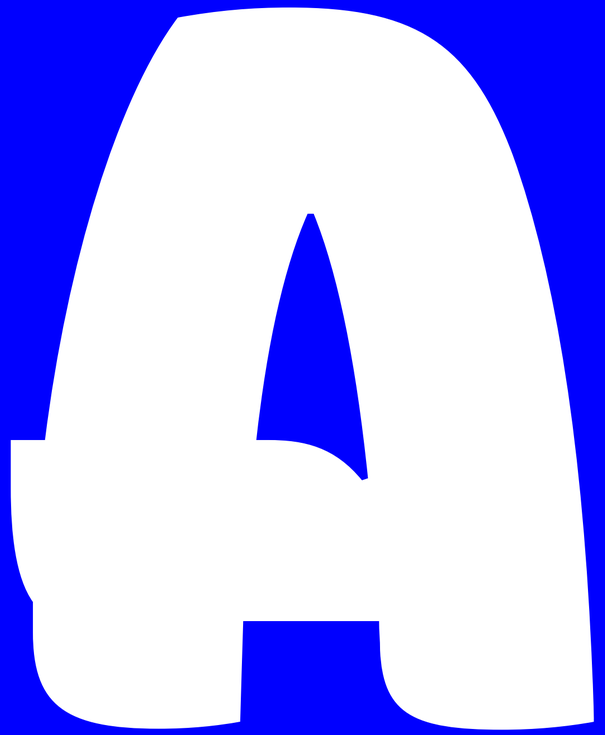


https://recursive.design

Recursive Sans & Mono
by Arrow Type



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1.0	CRSV

https://recursive.design


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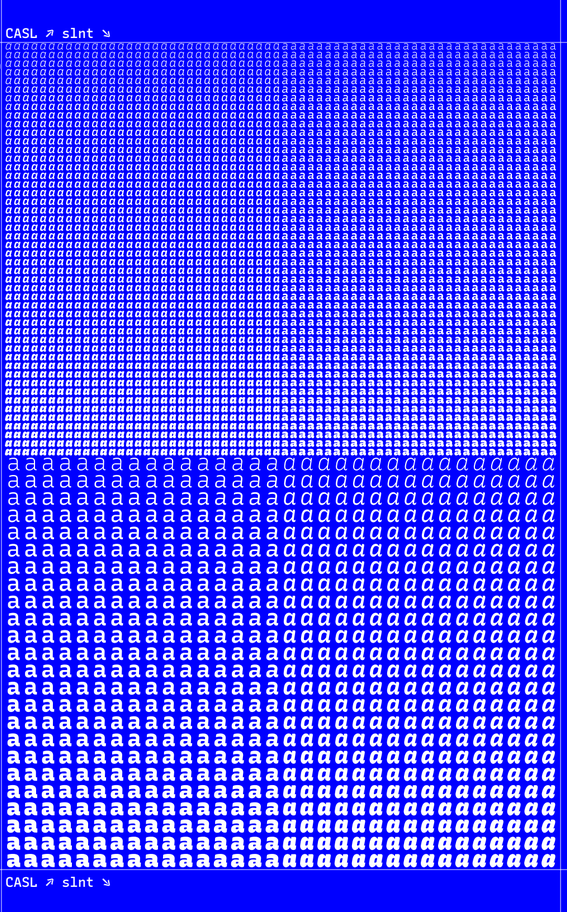
CASL ↗ slnt ↘
wght ↙
CASL ↗ slnt ↘