TYPOGRAPHY

Niels Joubert, 10th August 2010, CS147

WHY DO WE CARE ABOUT FONTS?

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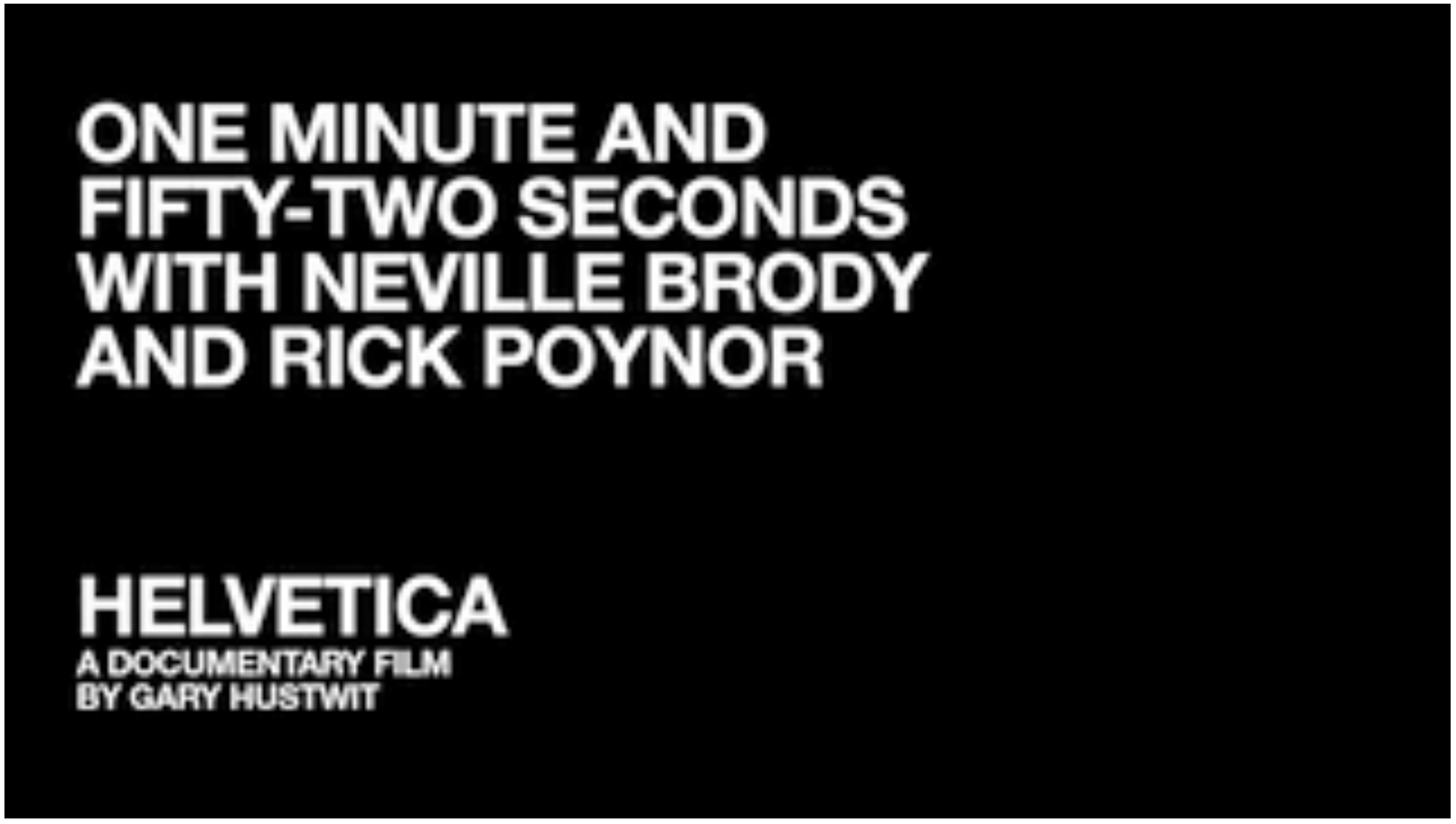
The aim of the new design was to create a neutral typeface that had great clarity, no intrinsic meaning in its form, and could be used on a wide variety of signage.

Helvetica

WHY DO WE CARE ABOUT FONTS?

helveticafilm.com

WHY DO WE CARE ABOUT FONTS?



helveticafilm.com

Introducing Typography

"The Organization of Letters on a blank page ... [for] acts of visual communication"

Designer Mentality

- Using Types to Represent Information

Graphics Mentality

- Representing and Rendering Typography

Designer Mentality

LETTER

- The letterform, represented as a glyph

TEXT

- Ongoing sequences of letters

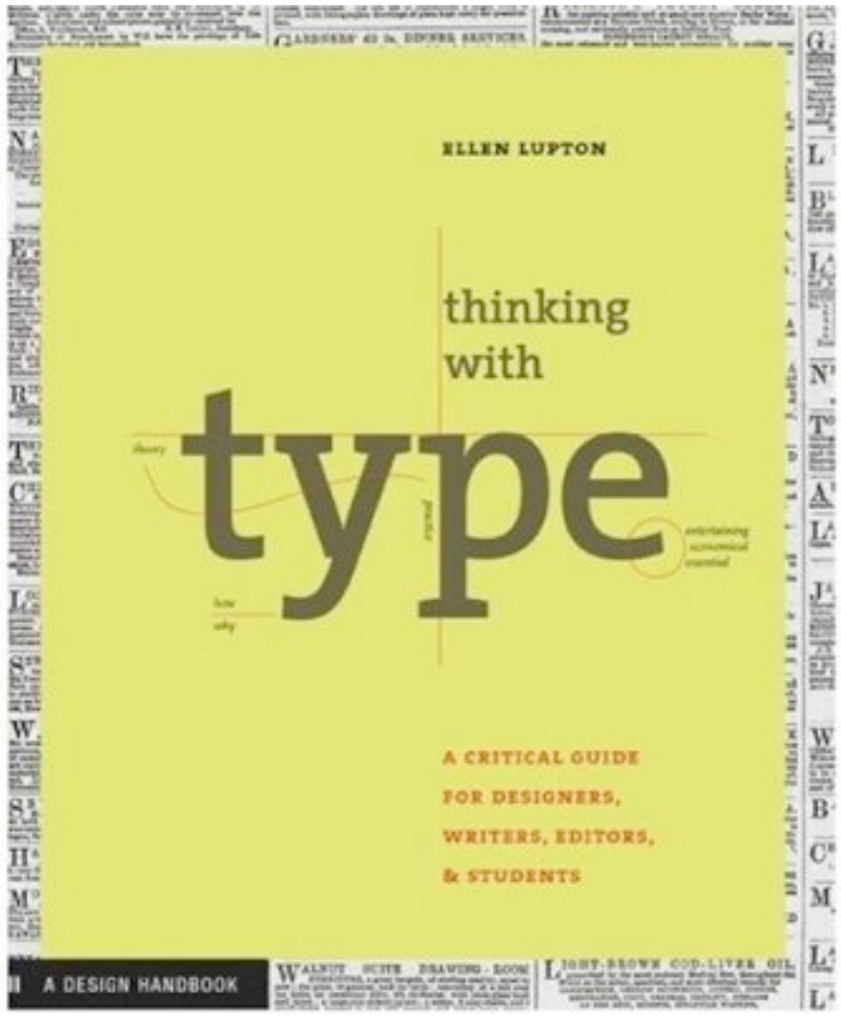
GRID

- The organization of visual elements

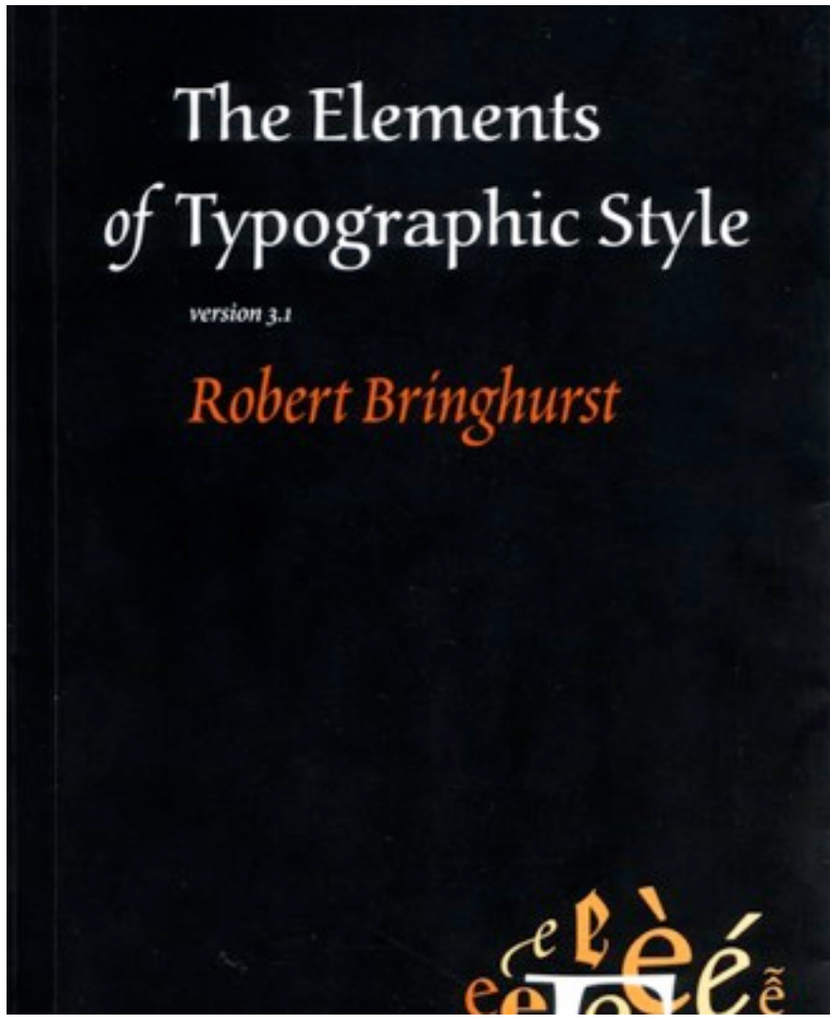
DESIGN MENTALITY

References

Disclaimer: I am not a designer - I can only point you the right way.



The Intro



The Tome

FONT

Typefaces and Font Families

Pre-Gutenberg (BC-1400s)

Western Alphabet

- Cumae Alphabet (Greet) evolves to Roman Alphabet

Eastern Alphabet

- Chinese invented ‘movable type’ (1040 AD), large alphabet hampers it

Words

- Calligraphy: Gestures of the Body

Font

13th Century
Monk fixes incorrect line

Movable Type

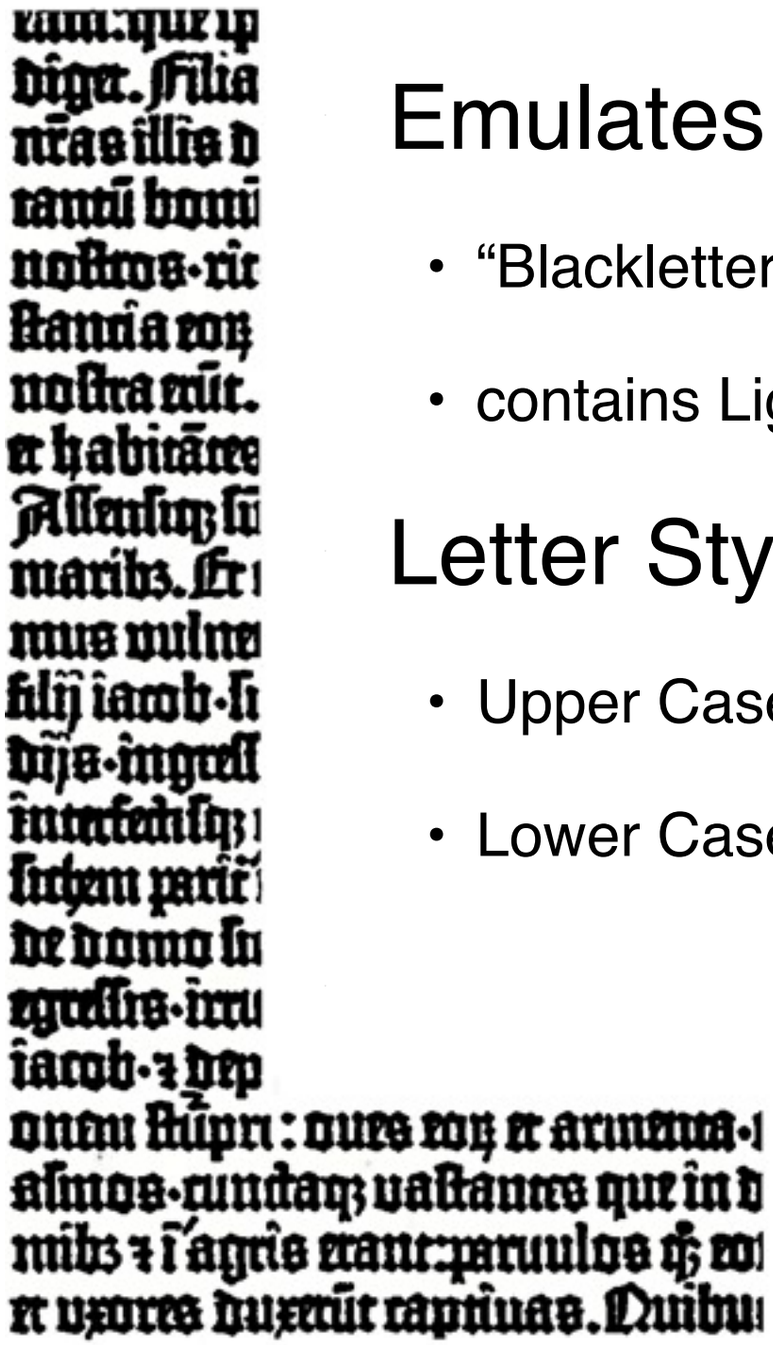
1450

- Johannes Gutenberg independently invents movable type (1st mass production system)
- Large quantites of letters molded, arranged into galley proofs
- Uniform, precise lettering leads to fonts
- Tension:

    Organic, Human Body vs Geometric, Abstract System

Font

JOHANNES
GUTENBERG
Printed text,
1456



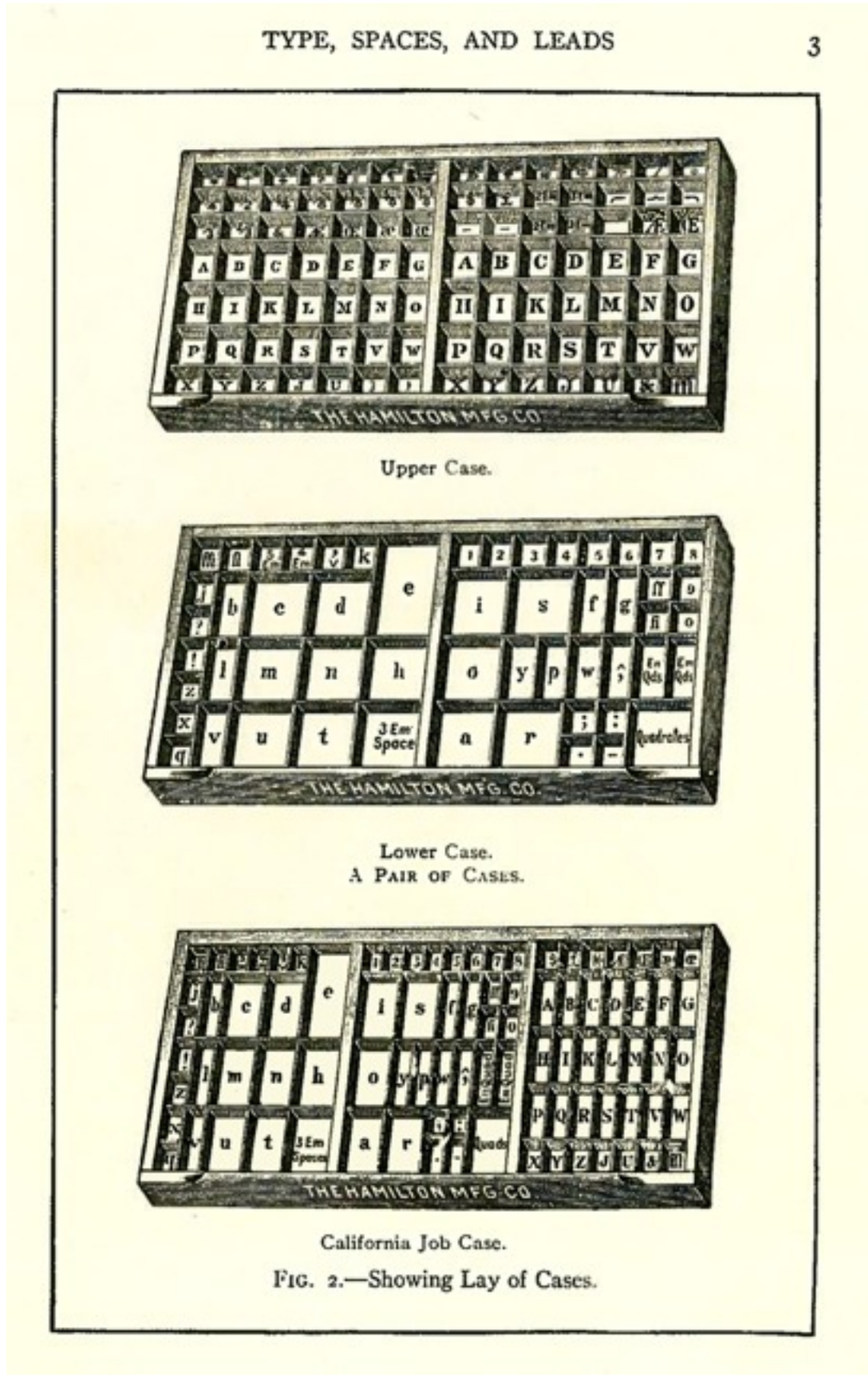
First Fonts

Emulates Scribes

- “Blackletter”
- contains Ligatures

Letter Styles

- Upper Case
- Lower Case



Copyright Laws

Print

- Establishes author as owner of text (commoditizes reproduction)
- Influences 18th Century Lawmaking

Modern Day Struggle

- Fundamental Liberty of Ideas
- Protect investment in authoring and publishing content

Type Classification

Distinguishing groups of types

- Flourishes:
  - Serif
  - Slab Serif
  - Sans Serif
- “Organic”-ness:
  - Humanist / Old-Style
  - Transitional
  - Modern

Serifs

Font - Type Classification

Humanist

SABON

Aa

HUMANIST OR OLD STYLE

The roman typefaces of the fifteenth and sixteenth centuries emulated classical calligraphy. Sabon was designed by Jan Tschichold in 1966, based on the sixteenth-century typefaces of Claude Garamond.

Transitional

BASKERVILLE

Aa

TRANSITIONAL

These typefaces have sharper serifs and a more vertical axis than humanist letters. When the fonts of John Baskerville were introduced in the mid-eighteenth century, their sharp forms and high contrast were considered shocking.

Modern

BODONI

Aa

MODERN

The typefaces designed by Giambattista Bodoni in the late eighteenth and early nineteenth centuries are radically abstract. Note the thin, straight serifs; vertical axis; and sharp contrast from thick to thin strokes.

Slab

CLARENDON

Aa

EGYPTIAN OR SLAB SERIF

Numerous bold and decorative typefaces were introduced in the nineteenth century for use in advertising. Egyptian fonts have heavy, slablike serifs.

Serif

GILL SANS

Aa

HUMANIST SANS SERIF

Sans-serif typefaces became common in the twentieth century. Gill Sans, designed by Eric Gill in 1928, has humanist characteristics. Note the small, lilting counter in the letter a, and the calligraphic variations in line weight.

HELVETICA

Aa

TRANSITIONAL SANS SERIF

Helvetica, designed by Max Miedinger in 1957, is one of the world's most widely used typefaces. Its uniform, upright character makes it similar to transitional serif letters. These fonts are also referred to as "anonymous sans serif."

FUTURA

Aa

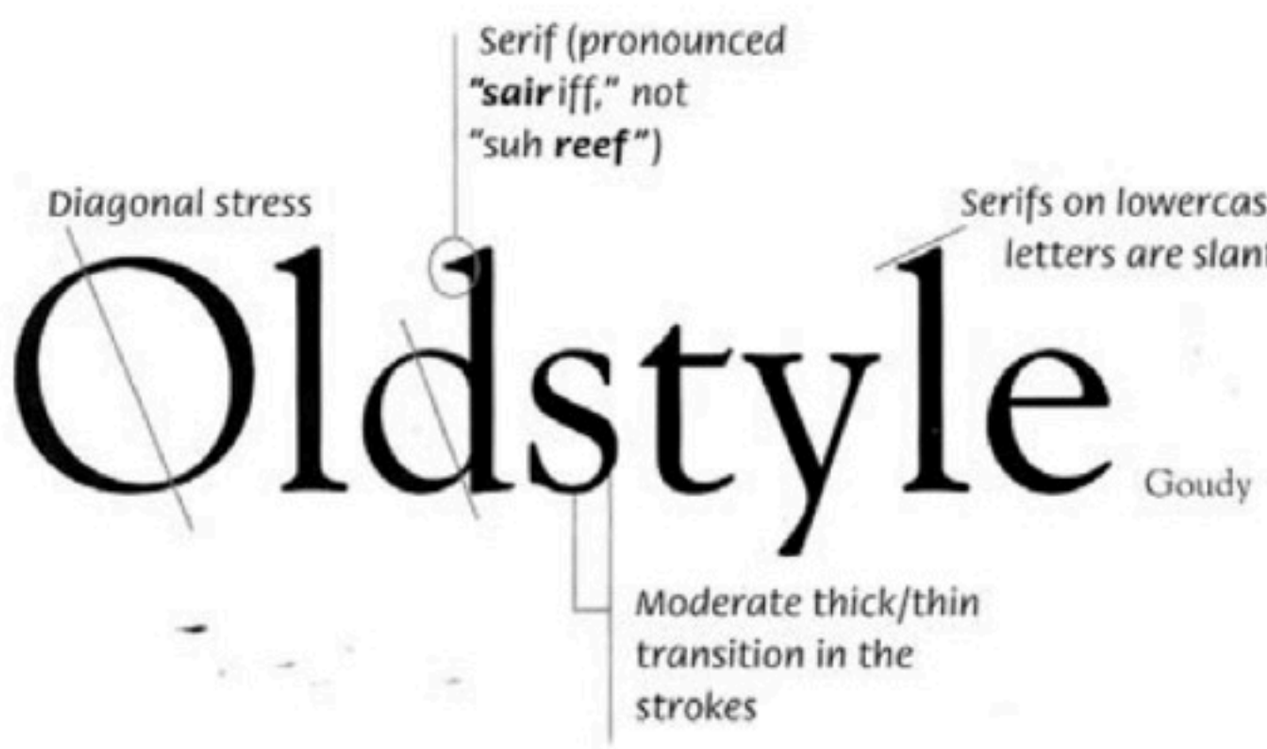
GEOMETRIC SANS SERIF

Some sans-serif types are built around geometric forms. In Futura, designed by Paul Renner in 1927, the Os are perfect circles, and the peaks of the A and M are sharp triangles.

Sans Serif

Font - Type Classification

Humanist (Oldstyle)



Goudy Palatino Times

Baskerville Garamond

Font - Type Classification

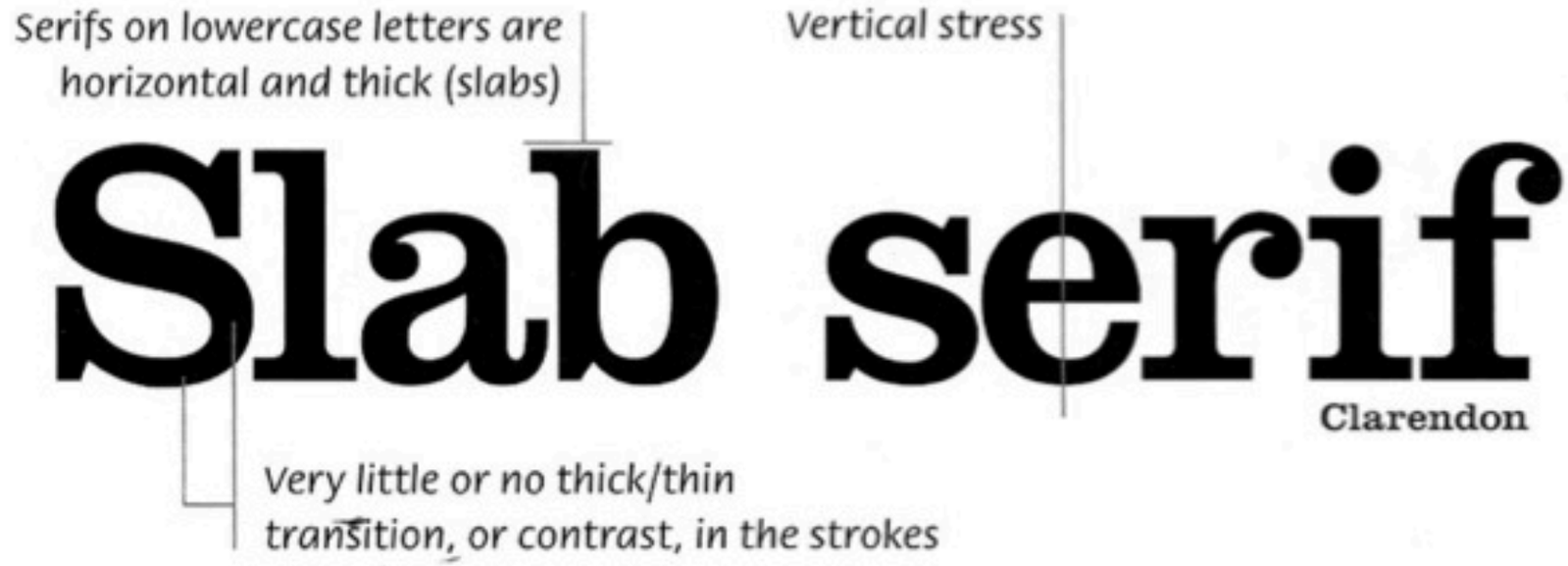
Modern

Bodoni **Times Bold** Onyx

Fenice, **Ultra** Walbaum

Font - Type Classification

Slab Serif



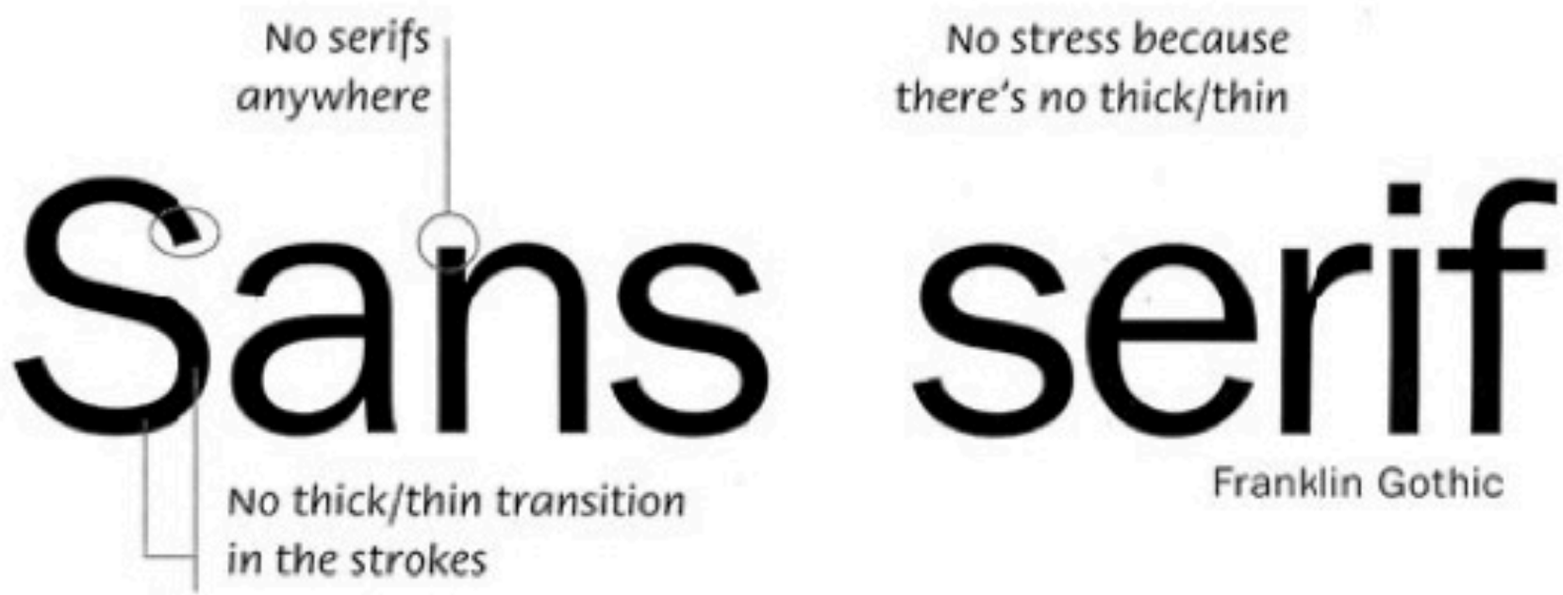
Clarendon Memphis

Memphis Extra Bold

New Century Schoolbook

Font - Type Classification

Sans Serif



Antique Olive **Formata**

Folio **Franklin Gothic**

Futura, Condensed **Syntax**

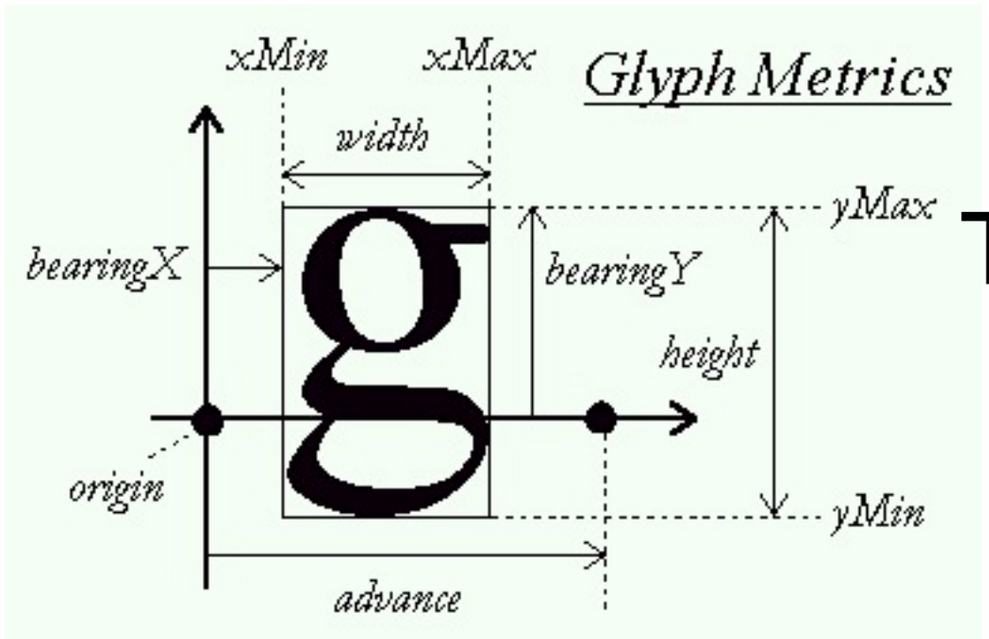
Example: Helvetica

Generations are *defined* by their typeface

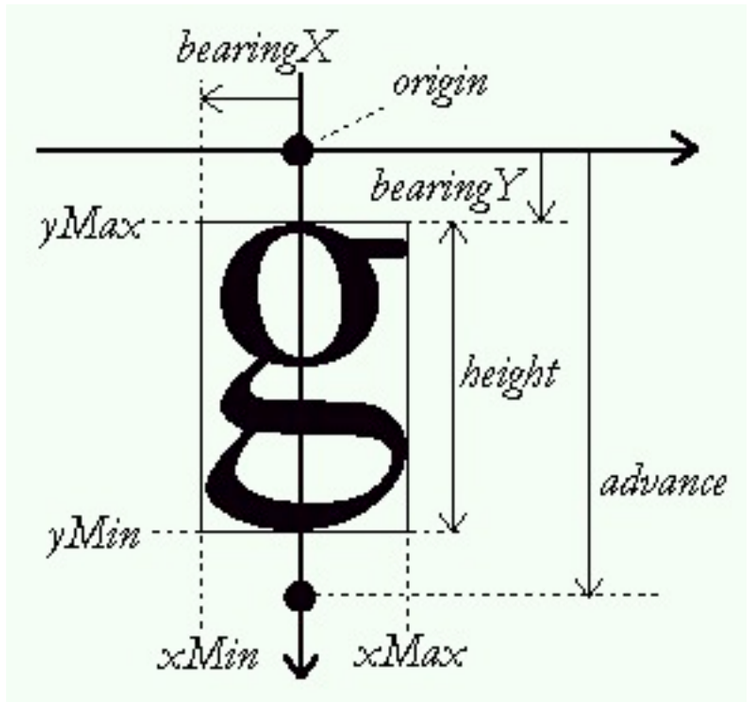
Example: Helvetica

Generations are *defined* by their typeface

Glyph Metrics



Text



(No need to know all this)

Anatomy (Font Metrics)

Baseline:

- Stable line on which letters sit

Cap Height:

- Baseline to capital top

x-Height:

- height of body of lowercase

Height:

- “Pt”, Capital top to lowest decender + buffer

(Know all this)

Font x-height

Both have the same cap height.

Larger x-height gives Times a bigger feel

- Small fonts for screen usage has large x-heights.

  Small difference between capitals and lower case.

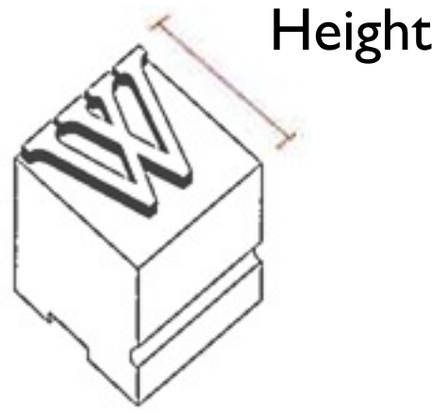
Sizes and Units

Height measures in Points (1700s)

- 72 pt = p72 = 1 inch (Adobe's standard. Traditionally, 0.996in)
- 12 pts = 1pica = 1p (column width measurement)

Font Size today: Pixels

- Problem: Displays at various resolutions
- How to get consistency across hardware?



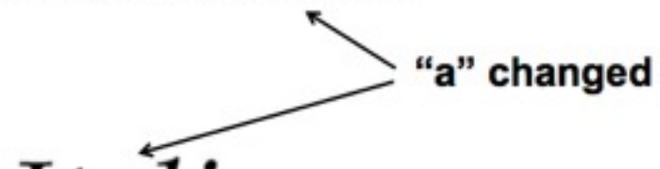
Font Families

A set of variations on a typeface

Thesis Serif Medium Roman, Thesis Serif Medium Italic, Thesis Serif Medium Small Caps, ...

Style

Roman



Italic

Oblique

Emphases

Light

Regular

Semibold

Bold

Stretch

Condensed

Regular

Expanded

Font Families Example

THESIS FAMILY

Designed by Lucas de Groot, LucasFonts, 1994
Thesis is one of the world's largest type families.

This is not a book about fonts. It is a book about how to use them. Typefaces
THESIS SERIF MEDIUM ROMAN

are essential resources for the graphic designer, just as glass, stone, steel, and
THESIS SERIF MEDIUM ITALIC

OTHER MATERIALS ARE EMPLOYED BY THE ARCHITECT. SOME DESIGNERS CREATE
THESIS SERIF MEDIUM SMALL CAPS

their own custom fonts. But most
THESIS SERIF BLACK ROMAN

graphic designers will tap the vast
THESIS SERIF EXTRA BOLD ROMAN

store of already existing typefaces,
THESIS SERIF BOLD ROMAN

choosing and combining each with
THESIS SERIF SEMI BOLD ROMAN

regard to the audience or situation.
THESIS SERIF MEDIUM ROMAN

Selecting type with wit and wisdom
THESIS SERIF SEMI LIGHT

requires knowledge of how and why
THESIS SERIF LIGHT ROMAN

letterforms have evolved. The history
THESIS SERIF EXTRA LIGHT ROMAN

of typography reflects a continual tension between the hand and machine, the
THESIS SANS MEDIUM ROMAN

organic and geometric, the human body and the abstract system. These tensions
THESIS SANS MEDIUM ITALIC

MARKED THE BIRTH OF PRINTED LETTERS FIVE CENTURIES AGO, AND THEY CONTINUE TO
THESIS SANS MEDIUM SMALL CAPS

energize typography today. Writing
THESIS SANS BLACK ROMAN

in the West was revolutionized early
THESIS SANS EXTRA BOLD ROMAN

in the Renaissance, when Johannes
THESIS SANS BOLD ROMAN

Gutenberg introduced moveable type
THESIS SANS SEMI BOLD ROMAN

in Germany. Whereas documents and
THESIS SANS MEDIUM ROMAN

books had previously been written by
THESIS SANS SEMI LIGHT ROMAN

hand, printing with type mobilized all
THESIS SANS LIGHT ROMAN

of the techniques of mass production.
THESIS SANS EXTRA LIGHT ROMAN

TEXT

Coherent Arrangement of Words & Sentences

Text

Letters -> Words -> Sentences

Question: How do we relate individual font elements to each other?

"Typography manipulates the silent dimensions of the alphabet, employing habit and technique - such as spacing and punctuation - that are seen but not heard or spoken." - Ellen Lupton

"Frees the reader from the bounds of linearity"

Dominant Subject

Humans interacting with information:

- No longer “reader” or “writer”
- “User”

  Bundle of needs and impairments

  Should be cared for but controlled and guided.

  Typography is designed to do this.

“Productive” vs “Contemplative”

Kerning

Variable spacing between letters depending on the letter pair

- Automatically Adjusted
- Manually Tweaked by Typesetter

LOVE LETTERS

The VE and TT combinations make the words look mismatched.

LOVE LETTERS

Kerning has been manually adjusted for a more even appearance.

Takes two

SCALA, WITH KERNING SUPPRESSED

Spacing appears uneven, with gaps around the T and w.

Takes two

SCALA, WITH KERNING

Spacing seems more even, although some characters nearly touch.

nearly touch

SCALA ITALIC, WITH KERNING SUPPRESSED

A gap appears between the l and y.

nearly touch

SCALA ITALIC, WITH KERNING

The characteristic intimacy of italic requires kerning.

Leading

The distance from the baseline of one line of type to another. “Line Spacing”

“Leading”

- Reference to strips of lead inserted between lines of type

Text

The distance from the baseline of one line of type to another is called *line spacing*. It is also called *leading*, in reference to the strips of lead used to separate lines of metal type. The default setting in most layout and imaging software is slightly greater than the cap height of the letters. Expanding this distance creates a text block with a lighter, more open color. As line spacing increases further, the lines of type become independent linear elements rather than parts of an overall texture.

7/7 SCALA
7-pt type with 7 pts line spacing

The distance from the baseline of one line of type to another is called *line spacing*. It is also called *leading*, in reference to the strips of lead used to separate lines of metal type. The default setting in most layout and imaging software is slightly greater than the cap height of the letters. Expanding this distance creates a text block with a lighter, more open color. As line spacing increases further, the lines of type become independent linear elements rather than parts of an overall texture.

7/8.5 SCALA
Auto spacing; 7-pt type with 8.5 pts line spacing

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7/9 SCALA
7-pt type with 9 pts line spacing

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7/10 SCALA
7-pt type with 10 pts line spacing

Ligatures

Multiple ‘letters’ form a single glyph.

Used to create correct kerning.

Paragraphs

Unlike Sentences, Paragraphs do not occur in nature. Literary convention to help reader.

- Start with indent
- End with line break

Text: Paragraphs

The table is covered with a table cloth which itself is protected by a plastic table cloth. Drapes and double drapes are at the windows. We have carpets, slipcovers, coasters, wainscoting, lampshades. Each trinket sits on a doily, each flower in its pot, and each pot in its saucer.
Everything is protected and surrounded. Even in the garden, each cluster is encircled with wire netting, each path is outlined by bricks, mosaics, or flagstones.
This could be analyzed as an anxious sequestration, as an obsessional symbolism: the obsession of the cottage owner and small capitalist not only to possess, but to underline what he possesses two or three times. There, as other places, the unconscious speaks in the redundancy of signs, in their connotations and overworking.

— Jean Baudrillard, 1969

LINE BREAK ONLY, WITHOUT INDENT

The table is covered with a table cloth which itself is protected by a plastic table cloth. Drapes and double drapes are at the windows. We have carpets, slipcovers, coasters, wainscoting, lampshades. Each trinket sits on a doily, each flower in its pot, and each pot in its saucer. Everything is protected and surrounded. Even in the garden, each cluster is encircled with wire netting, each path is outlined by bricks, mosaics, or flagstones. This could be analyzed as an anxious sequestration, as an obsessional symbolism: the obsession of the cottage owner and small capitalist not only to possess, but to underline what he possesses two or three times. There, as other places, the unconscious speaks in the redundancy of signs, in their connotations and overworking.

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EXTRA SPACE INSIDE LINE, WITHOUT LINE BREAK

The table is covered with a table cloth which itself is protected by a plastic table cloth. Drapes and double drapes are at the windows. We have carpets, slipcovers, coasters, wainscoting, lampshades. Each trinket sits on a doily, each flower in its pot, and each pot in its saucer.

Everything is protected and surrounded. Even in the garden, each cluster is encircled with wire netting, each path is outlined by bricks, mosaics, or flagstones.

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— Jean Baudrillard, 1969

LINE BREAK AND 1/2 LINE SPACE

The table is covered with a table cloth which itself is protected by a plastic table cloth. Drapes and double drapes are at the windows. We have carpets, slipcovers, coasters, wainscoting, lampshades. Each trinket sits on a doily, each flower in its pot, and each pot in its saucer. ■ Everything is protected and surrounded. Even in the garden, each cluster is encircled with wire netting, each path is outlined by bricks, mosaics, or flagstones. ■ This could be analyzed as an anxious sequestration, as an obsessional symbolism: the obsession of the cottage owner and small capitalist not only to possess, but to underline what he possesses two or three times. There, as other places, the unconscious speaks in the redundancy of signs, in their connotations and overworking.

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SYMBOL; NO INDENT OR LINE BREAK

Text: Takeaway

Eg: Words

Typography manipulates the meaning of words though visual cues

Student Work at Maryland Institute College of Art

GRID

Layout of Visual Elements

Context for Arrangement

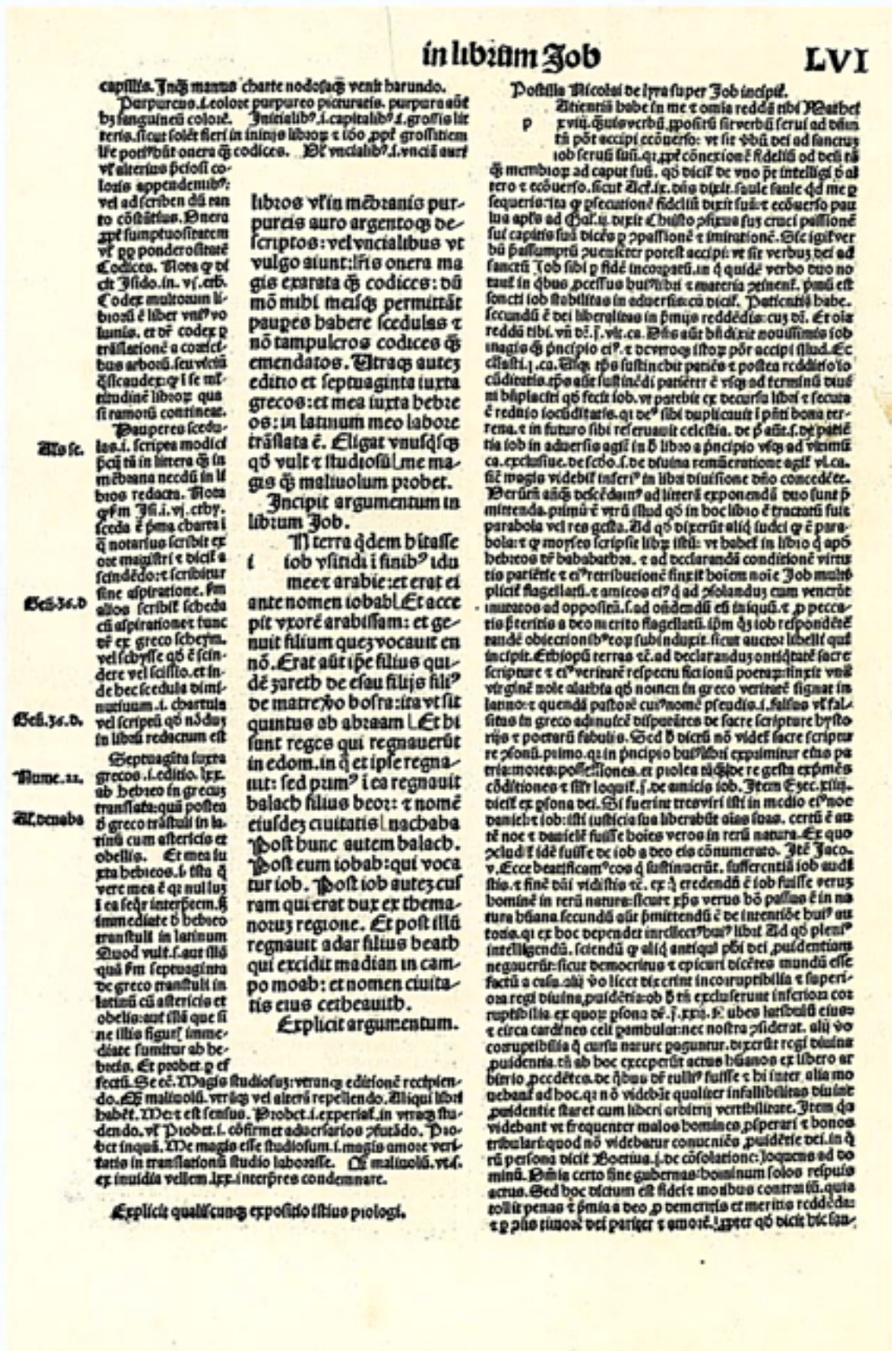
All traditional design is built from a grid

- Legacy of printing press grids that was painstakingly built
- Skeleton for layout of typography

Design Pro-tip:

- Make a grid, and align things with it.

Grid



in librum Job LVI

capillis. Inde manus charte nodosaq; venit harundo.

Purpurea. i. coloret purpureo picturatis. purpura aut by sanguineu colore. Initialib⁹ .i. capitalib⁹ i. grossis literis. sicut solet fieri in initijs libroꝝ et ibo ppt grossitiem lre portabilit onera q̄ codices. Vncialib⁹ .i. vncialibus aut vt alterius pcisi coloris appendentib⁹: vel ad scriben dū tanto cōstantius. Onera ppt sumptuositatem vt pp ponderositatē Codices. Nota q̄ vt dicit Ysido. in. vi. etymo. Codex multorum librorū e liber vnus⁹ voluminis. et dr codex p traslationē a caudicibus arboꝝ. seu vetustate scindendo: q̄ i se multitudinē librorū quasi ramorū contineat.

Pauperes scedulas .i. scripas modicis pciis tū in littera q̄ in mēbrana necdū in libros redacta. Nota q̄ sm Ysi. i. vi. etymo. sceda e pma charta i q̄ notarius scribit ex ore magistri et dicit a scindendo: et scribitur sine aspiratione. Sm alios scribit schedula cū aspiratione: tunc ē ex greco schedia. vel schysse q̄ e scindere vel scissio. et inde hec scedula diminutiuum .i. chartula vel scripeū q̄ nōdum in librū redactum est

Septuaginta interpretes greco .i. editio. lxx. ab hebreo in grecū translata: quā postea ō greco trāstuli in latinū cum astericis et obelis. Et mea iuxta hebreos .i. illa q̄ vere mea e q̄ nullius i ea scripturā interpecm. q̄ immediate ō hebreo transtuli in latinum. Quod vult .i. aut illō quā sm septuaginta de greco transtuli in latinū cū astericis et obelis: aut illā que sine illis figuris immediate sumitur ab hebreis. Et probet p effectū. Se ēt. Magis studiosus: veraciq; editionē recipiendo. Ē malitiosū. veritatē vel alterū repellendo. Aliqui libri habēt. Met est sensus. Probet .i. experiat. in veritate studendo. vt Probet .i. cōfirmet aduersarios confutādo. Probet inquā. Me magis esse studiosum .i. magis amore veritatis in translationū studio laborasse. Ē malitiosū. vt .i. ex inuidia vellem .lxx. interpres condemnare.

Explicit qualitercunq; expositio istius prologi.

libros vtin mēbranis purpureis auro argentoq; descriptos: vel uncialibus vt vulgo aiunt: litteris onera magis exarata q̄ codices: dū mō mihi meaq; permittat paupes habere sceduias et nō tumpulcros codices q̄ emendatos. Utraq; autez editio et septuaginta iuxta grecos: et mea iuxta hebreos: in latinum meo labore trāslata e. Eligat vnusq;q; qđ vult et studiosū me magis q̄ maliuolum probet.

Incipit argumentum in librum Job.

Terra qđem bitalle i iob vsitati i finib⁹ idumee arabie: et erat ei ante nomen iobab. Et accepit vxorē arabissam: et genuit filium quez vocauit enō. Erat aūt ipse filius quidē zareth de esau filijs filij⁹ de matre Bosra: ita vt sit quintus ab abraam. Et hi sunt reges qui regnauerūt in edom. in q̄ et ipse regnauit: sed pum⁹ i ea regnauit balach filius beor: et nomē ciuitatis eius nachabaa. Post hunc autem balach. Post eum iobab: qui vocatur iob. Post iob autez cursum qui erat dux ex themanorum regione. Et post illū regnauit adar filius beath qui excidit madian in campo moab: et nomen ciuitatis eius cethaauith.

Explicit argumentum.

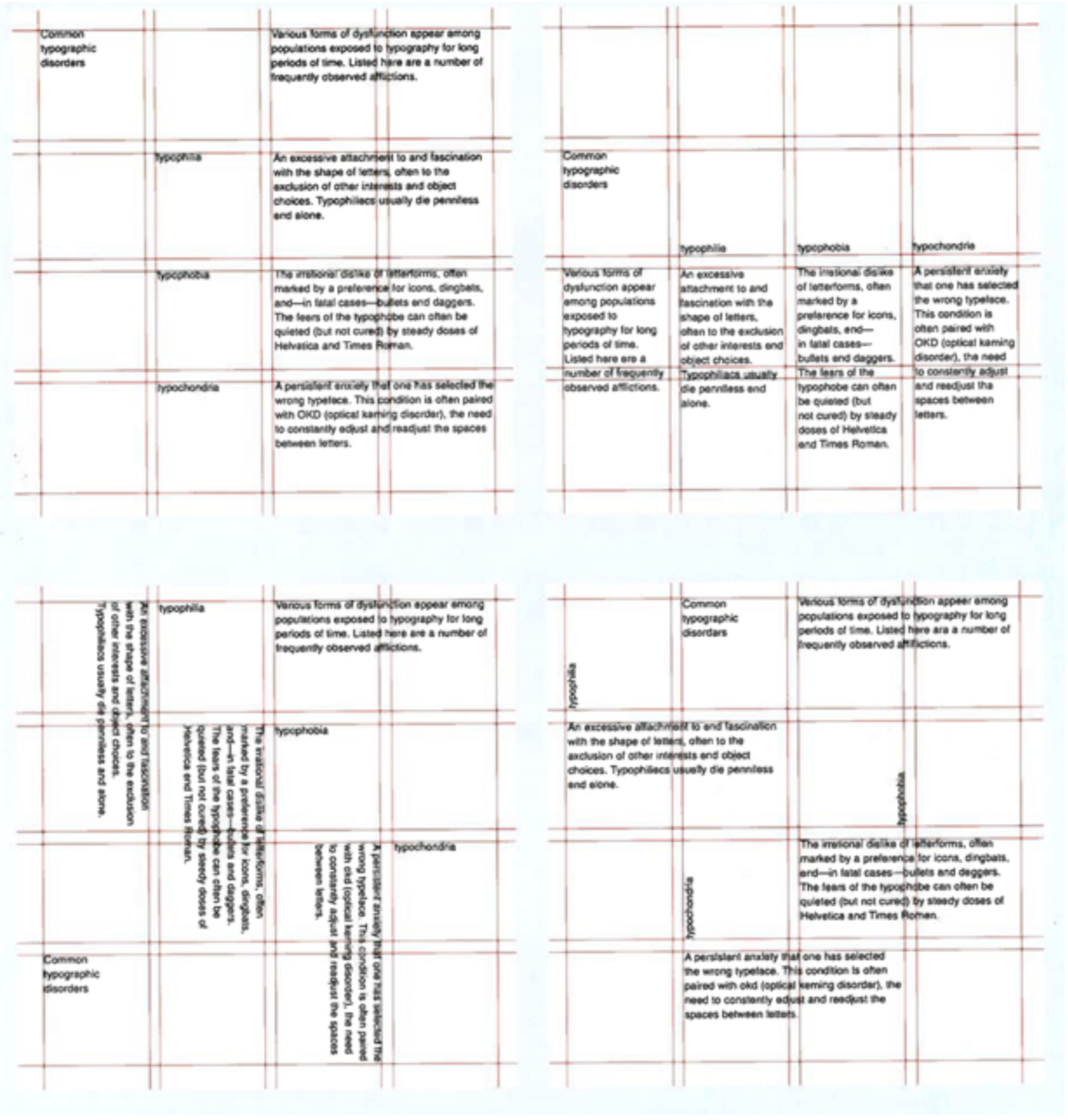
Prologus Nicolai de lyra super Job incipit.

Patientiā habe in me et omnia reddā tibi. Matthei xviii. Quia verbū apositū siue verbū serui ad dominū pōt accipi ecōuerso: vt sit ꝓbū dei ad sanctum iob seruū suū. qz ppt cōnexionē fidelis ad deū nā q̄ membroꝝ ad caput fuit. qđ dicit de vno pōt intelligi ꝑ alterō et ecōuerso. sicut Act. ix. dōs dixit. saule saule qđ me p sequeris. ita q̄ ꝓsecutionē fidelium dixit sibi: et ecōuerso paulus apls ad Gal. vi. dixit Christo pigus suꝰ cruci passionē sui capitis sui dicēs q̄ ꝓpassionē et imitationē. Sic igit verbū assumptū quemlibet potest accipi: vt sit verbum dei ad sanctū Job sibi p fidē incorporatū. in q̄ quidē verbo duo notant in quo ꝓcessus humilitatis et amaritia patiendi. primū est sancti iob stabilitas in aduersis. cū dicit. Patientiā habe. secundū e dei liberalitas in ꝑmijs reddēdis. cum dī. Et ola reddā tibi. vñ dr. i. vlt. ca. Dñs aūt dīxit nouissimo iob magis q̄ principio eius. et ideo nō accipi illud. Ecclesiastici. i. ca. Melior ira sustinedit paciēs et postea reddidit locū cōdolatis. ipse aūt sustinēdi patientē e vsq; ad terminū vite sue in hoc pacti. qđ fecit iob. vt patebit ex decursu libri et secunda e redditio locū dilectis. qz deꝰ sibi duplicauit i ꝑtī bona terrena. et in futuro sibi reseruauit celestia. de ꝓ aūt. i. de patientia iob in aduersis agit in ō libro a principio vsq; ad vltimū ca. exclusiue. de ecce. i. de diuina remūeratione agit vl. ca. sic magis videbit inferi⁹ in libri diuisione dño concedente.

Verūm aūt q̄ descendam ad literā exponendā duo sunt ꝓmittenda. primū e vtrū illud qđ in hoc libro e tractatū fuit parabola vel res gesta. Ad qđ dixerūt alii iudei q̄ e parabola: et q̄ moyses scripsit libz istū: vt habet in libro q̄ apō hebreos dr bababatha. et ad declarandū conditionē virtutis patiētie et eiꝰ retributionē finxit deus me Job multū plicit flagellatū. et amicos eiꝰ q̄ ad cōsolandū eum venerūt inuasos ad oppositū. i. ad oūdendū eū iniquū. et ꝓ peccatis ꝑteritis a deo merito flagellatū. illm q̄ iob respondētes eandē obiectionib⁹ eoꝝ subinduxit. sicut auctor libelli qui incipit. Ethiopū terras etc. ad declarandum ontiq; hanc sacre scripture et eiꝰ veritatē respectu fictionū poetaꝝ: finxit vna virginē nole alathia qđ nomen in greco veritatē signat in latino: et quendā pastorē cui⁹ nomē pseudio. i. falsus vel falsitas in greco ethimologice dispositores de sacre scripture hystoriis et poetarū fabulis. Sed ō dictū nō videt sacre scripture ꝓpriū. primo. qz in principio huius libri exponimur etas patria: mores: possessiones. et postea subditur de gesta expressa cōditiones et sibi loquit. i. de amicis iob. Item Exec. xxiii. dicit ex ꝑsona dei. Si fuerint tres viri isti in medio eiꝰ noe daniel et iob: isti iustitia sua liberabūt alios suos. certū e autē noe et daniel fuisse homines veros in rerū natura. Ex quo ꝓcludit idē fuisse de iob a deo eis cōnumerato. Item Jacob. Ecce beatificamꝰ eos q̄ sustinuerūt. sufferentiā iob audistis. et finē dñi vidistis etc. ex q̄ credendū e iob fuisse verum hominē in rerū natura: sicut xp̄s verus hō passus e in natura hūana. secundū aūt ꝓmittendū e de intentione huius autoris. qz hoc dependet intellectus huius libri aut totis. Ad qđ pleni⁹ intelligendū. sciendū q̄ alii antiqui phi dei prudentiam negauerūt: sicut democritus et epicuri dicētes mundū esse factū a casu. alii vo licet dixerint incorruptibilia et superiora regi diuina prudentia: ob hoc tñ excluserunt inferiora corruptibilia. ex quoꝝ ꝑsona dr. i. xxii. Ecce ubes latibulū eius et circa cardines celi pambulat: nec nostra ꝓsiderat. alii vo corruptibilia q̄ cursu naturę pagunt. dixerūt regi diuine prudentia. tñ ab hoc exceperūt actus hūanos ex libero arbitrio pcedētes. de q̄bus dr nullū fuisse et hi inter alia mouebant ad hoc. qz nō videbat qualiter infallibilitas diuine prudentie staret cum liberi arbitrij vertibilitate. Item q̄ videbant vt frequenter malos hominēs ꝓsperari et bonos tribulari: quod nō videbatur conuenire prudētie dei. in q̄ rū persona dicit Boetius. i. de cōsolatione: Joquens ad dominū. Omnia certo fine gubernas: bonorum soloo respuis actus. Sed hoc dictum est fidei et moribus contrarium. quia tollit penas et ꝓmia a deo ꝓ demeritis et meritis reddēdis: et ꝑ plus timor dei pariter et amorē. Propter qđ dicit dic sa-

Latin Bible
1497

Grid



4 layouts
one grid

Grid

This modular grid has four columns and four rows. An image or a text block can occupy one or more modules.

Endless variations are possible.

ENCODING

Representing textual information

Encoding

Storing text in a digital format:

- ASCII - byte-by-byte representation of 256 letters
- Unicode - much expanded variable-length letter representation

Storing typography in a digital format:

- Basic Gylphs - “Font”
- Document Layout - PostScript, TeX, PDF, Word processors

ASCII

Uses a single byte for each character

Limited to 256 characters, mainly roman numerals

Stateless - each character stands alone

Outdated

Unicode

"Unicode provides a unique number for every character, no matter what the platform, no matter what the program, no matter what the language."

- 256 Code Pages, 107k characters (http://www.unicode.org/charts/)
- Defines character numbers but does not specify storage requirements

Encodings:

- UTF-8: uses the ASCII character set (8 bits) and can expand up to 4 bytes for other characters.

OpenType [Adobe, Apple, Microsoft]

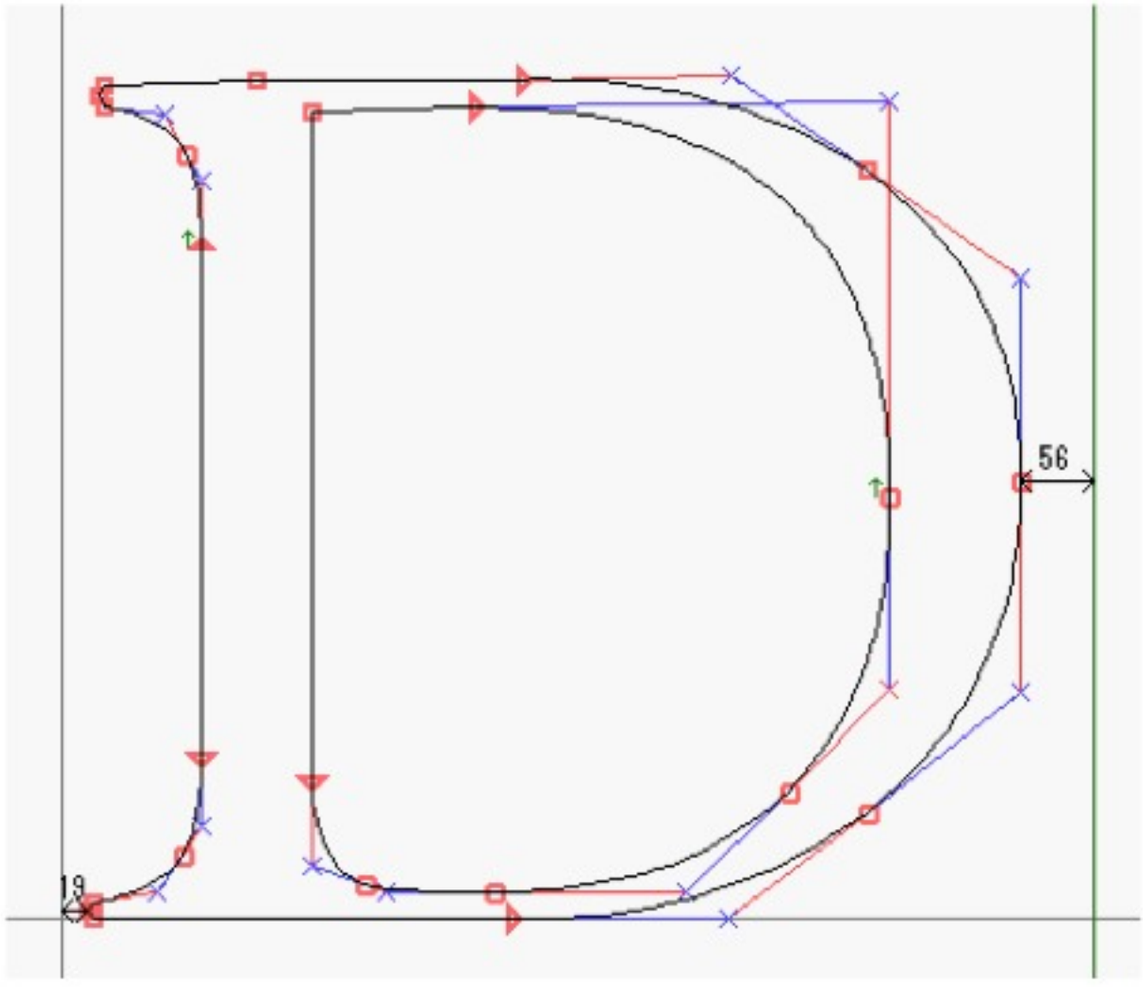
Contains:

- Character map: Unicode # -> Glyph
- Glyphs (Bezier curves), thus it is a vector font
- Glyph Metrics (sized)

May contain:

- Multiple character maps and fonts
- Bitmaps and Outline fonts

Anatomy of a Glyph



BEZIER CURVES

Representing Glyphs

Requirements

Smooth Curves at any resolution

Sharp Corners and Smooth Transitions

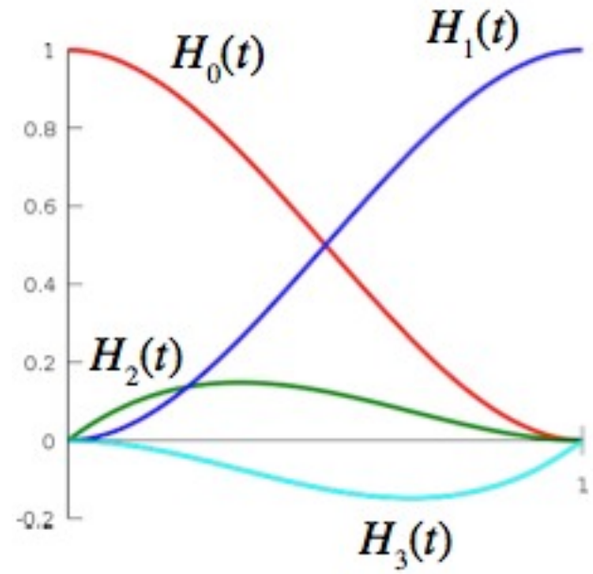
- Choose between C0 and C1 continuity

Fast and simple to calculate

Small storage footprint

Remember Splines

Set of basis functions and control points

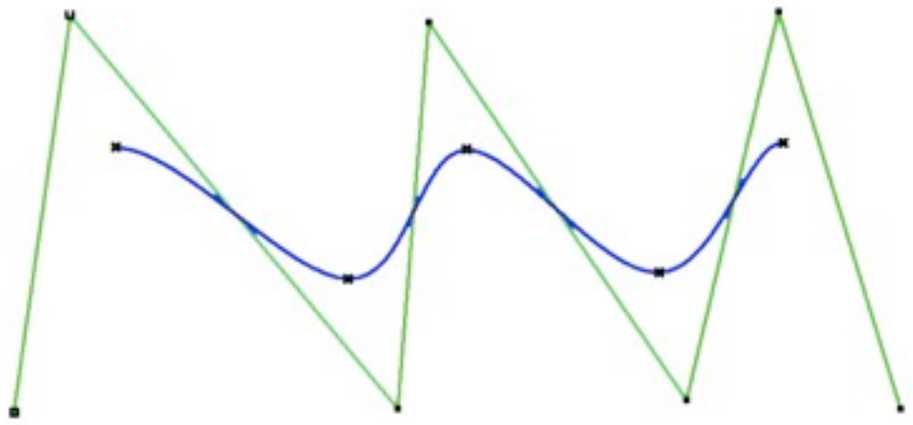


- Different types of splines gives us different curve properties and control points
- Cubic Hermite:

  Two endpoints (interpolates), two tangents

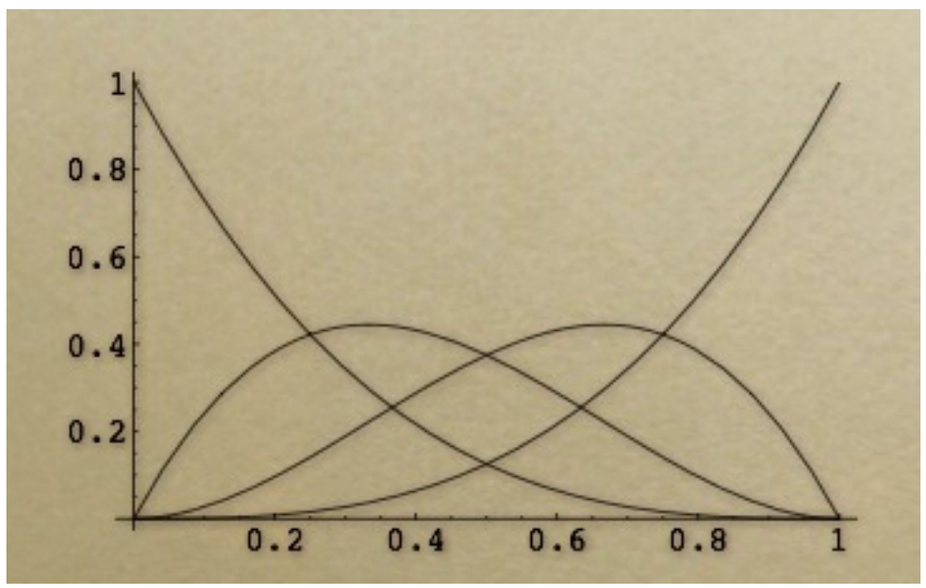
  Catmull-Rom generates Smooth path

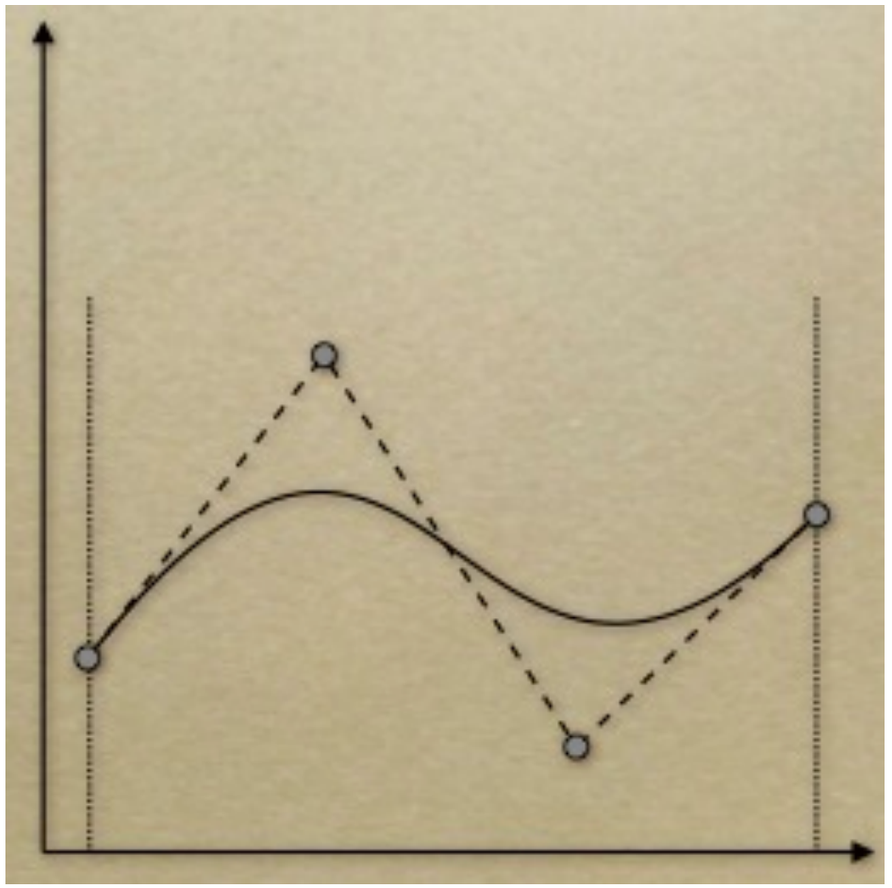
- B-Splines:



Cubic Bézier

Like Hermite splines, but tangents indirectly specified.





Cubic Bézier Properties

Like Hermite splines, but tangents indirectly specified. Just another cubic polynomial

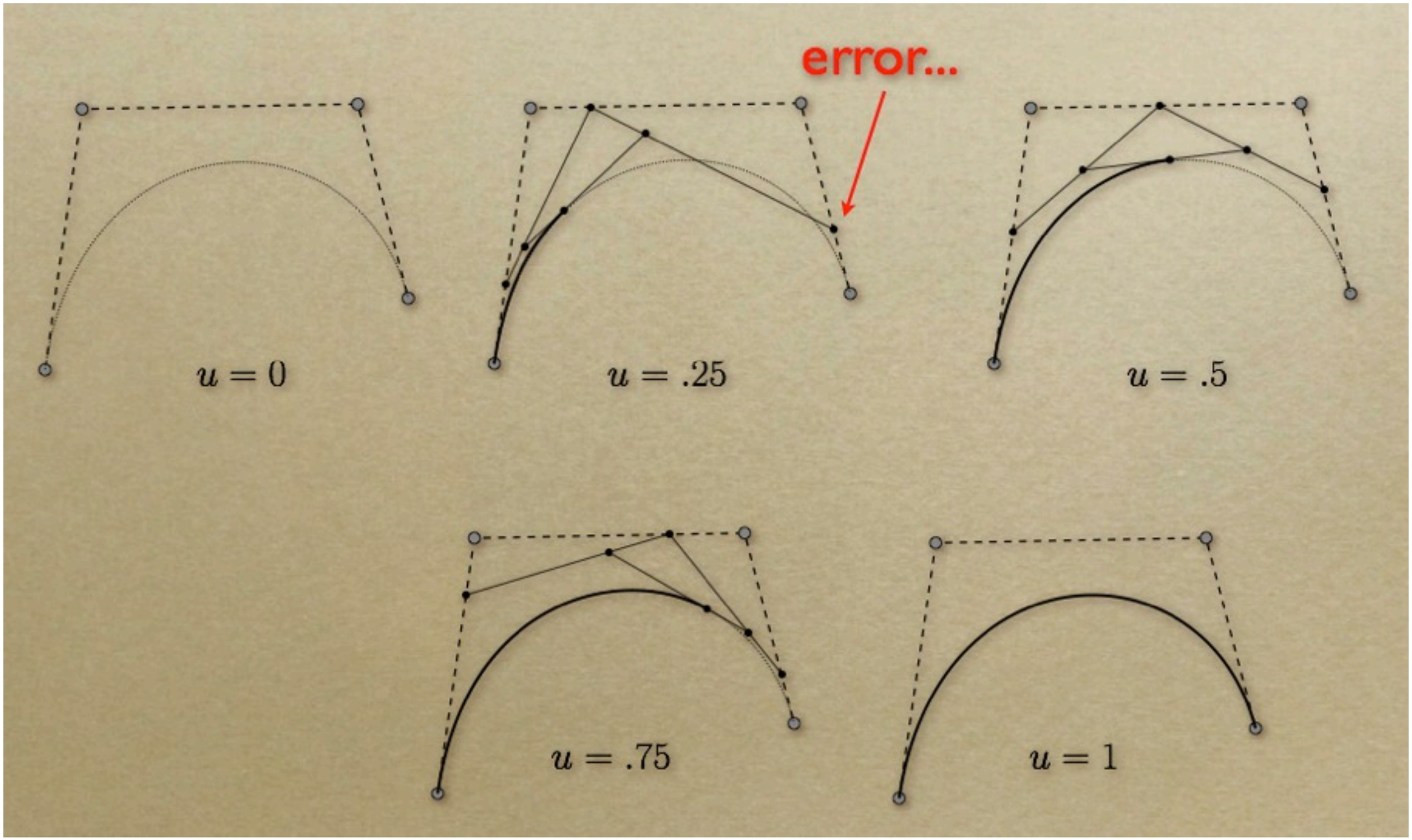
- Local Support
- Interpolates endpoints
- Convex Hull
- Invariance under affine transforms - transforming points is enough
- Extrapolation to subdivide splines

Local Support

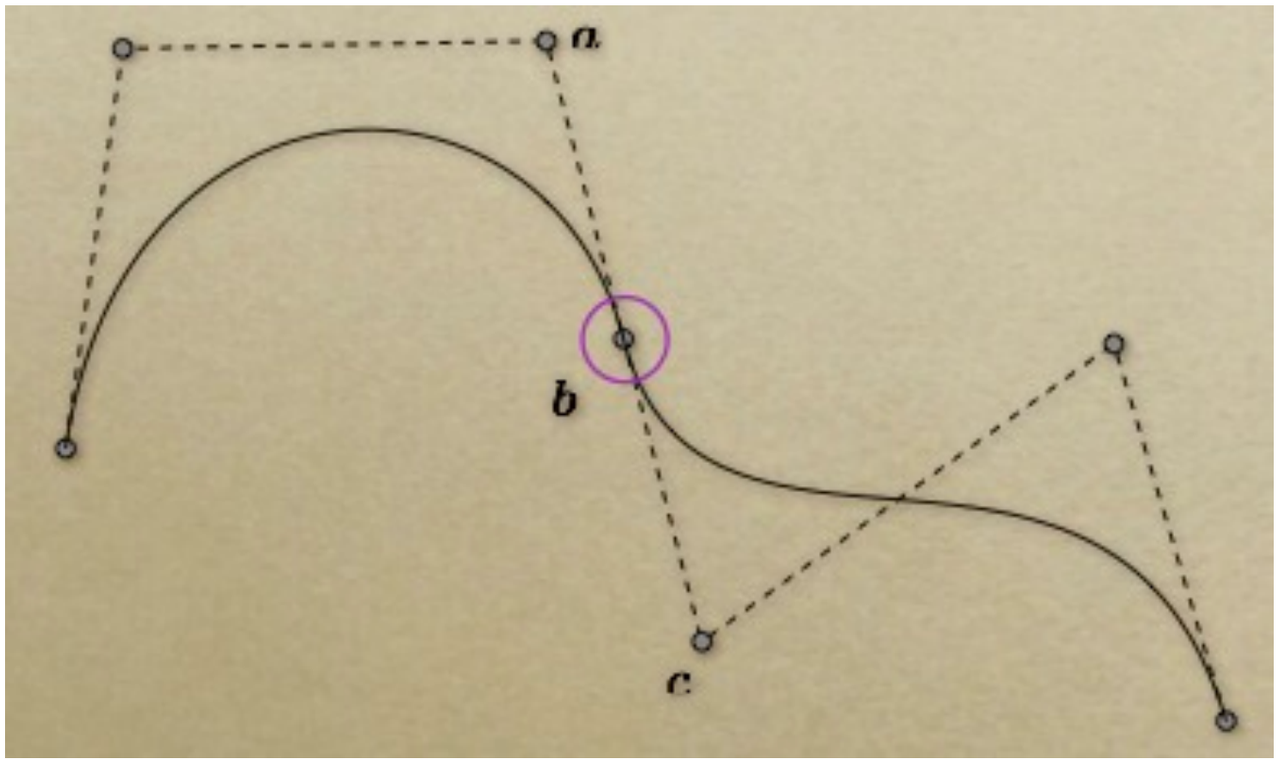
Perturbing a control point does not have a global impact

- Good for editing purposes!
- Fast evaluation - don’t need to do global solves
- Interpolates endpoints

DeCasteljau's Algorithm



Joining Bézier



C0

- Endpoints touch

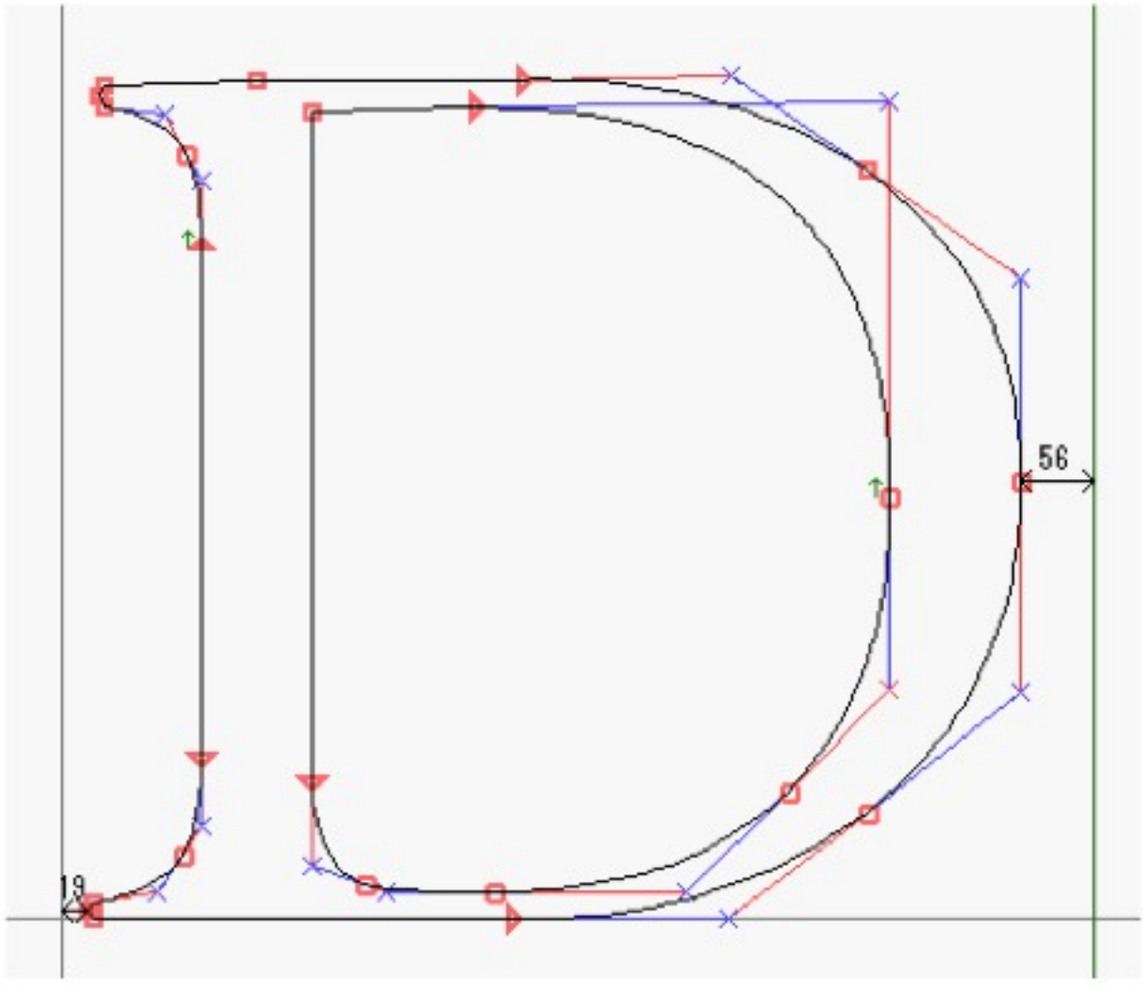
C1

- C0 + ‘tangent’ points (a, c) on line

C2

- C1 + ‘tangent’ points (a, c) equidistant wrt. b

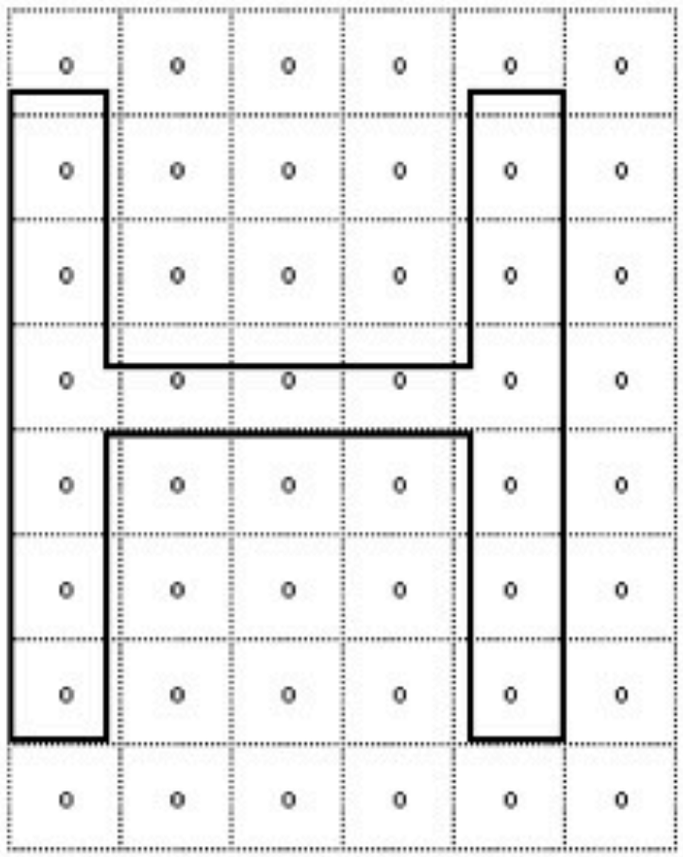
Anatomy of a Glyph



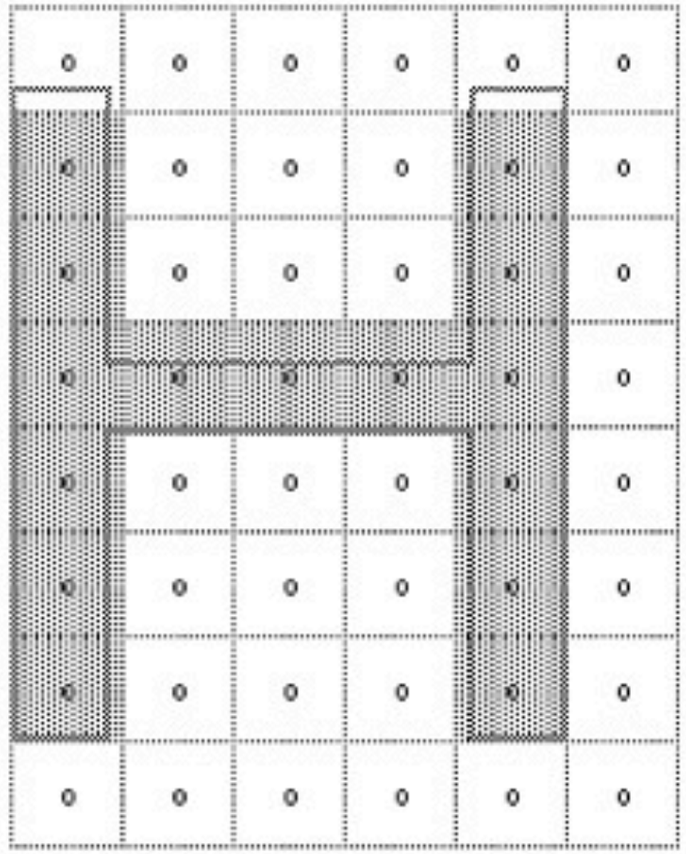
RASTERIZATION

Displaying Glyphs on Bitmap displays

Rasterization



Scaled Outline



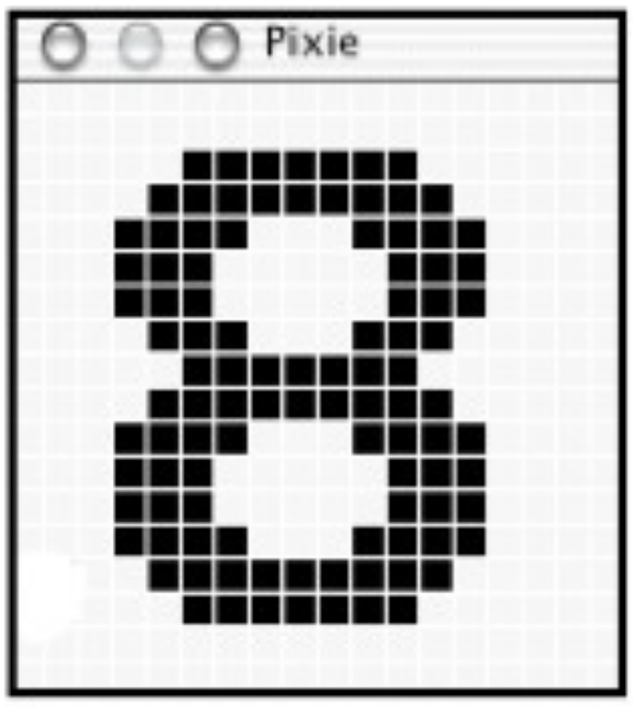
Raster Image

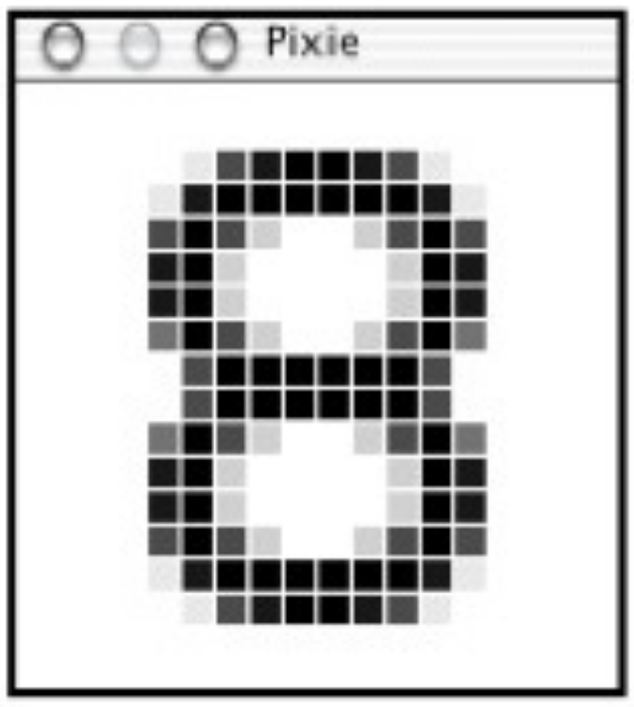
(from Apple TrueType Reference Manual)

Anti-Aliasing

Pixels are partially black

- Make intensity be relative to vector overlap of pixel





Subpixel Smoothing

Exploit pixel arrangement of monitor

- Increases apparent resolution
- Anti-aliases on a per-color value depending on device pixel arrangement

Things to Remember:

- Type Classification
- Font Metrics, Sizes & Units
- Font Families
- Kerning, Leading
- Encoding UTF vs ASCII
- Character Encoding versus Glyph
- Bezier Curve Properties, DeCastaljau, Joining
- Rasterization

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“thinking with type”, Ellen Lupton

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- CS184 Slides Fall 2008 (http://www-inst.eecs.berkeley.edu/~cs184/fa09/lectures.php)