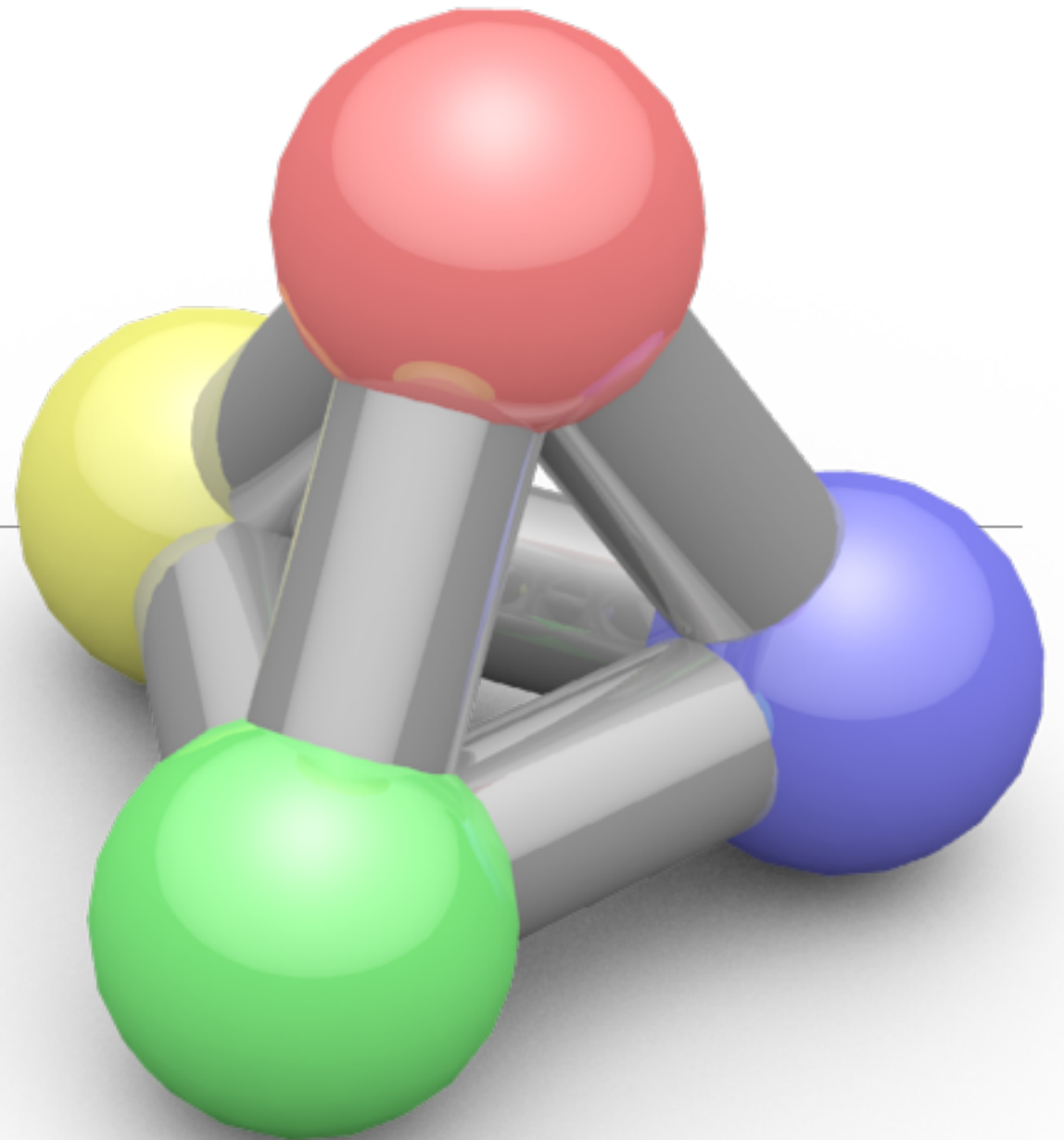


Digital Type

CPSC 453 – Winter 2016
Sonny Chan



Outline for Today

- Terms and nomenclature (remaining from Wednesday)
- Digital representations of typefaces
- Rendering fonts

Terms and **nomenclature**

Kerning: a well-groomed font?

“Ask Jeff” or ‘Ask Jeff’. Take the chef d’œuvre! Two of [of] (of) ‘of’ “of” of? of! of*. Ydes, Yffignac, Grande, Les Woëvres, the Fret de Wœvres, the Voire and Vauvise are in France, but Ypres is in Belgium. Yves is in heaven; D’Amboise is in jail. Lyford’s in Texas & L’Anse-aux-Griffons in Québec.

“Ask Jeff” or ‘Ask Jeff’. Take the chef d’œuvre! Two of {of} (of) ‘of’ “of” of? of! of*. Ydes, Yffignac, Grande, Les Woëvres, the Fret de Wœvres, the Voire and Vauvise are in France, but Ypres is in Belgium. Yves is in heaven; D’Amboise is in jail. Lyford’s in Texas & L’Anse-aux-Griffons in Québec.

Kerning

Type Await Wreck

Type Await Wreck

Ligatures

ff fi fl *ff fi fl*

staff first floor *suffix waffle*

ff fi fl *ff fi fl*

Fantino

NSERC On-line Presentation and Attachment Standards

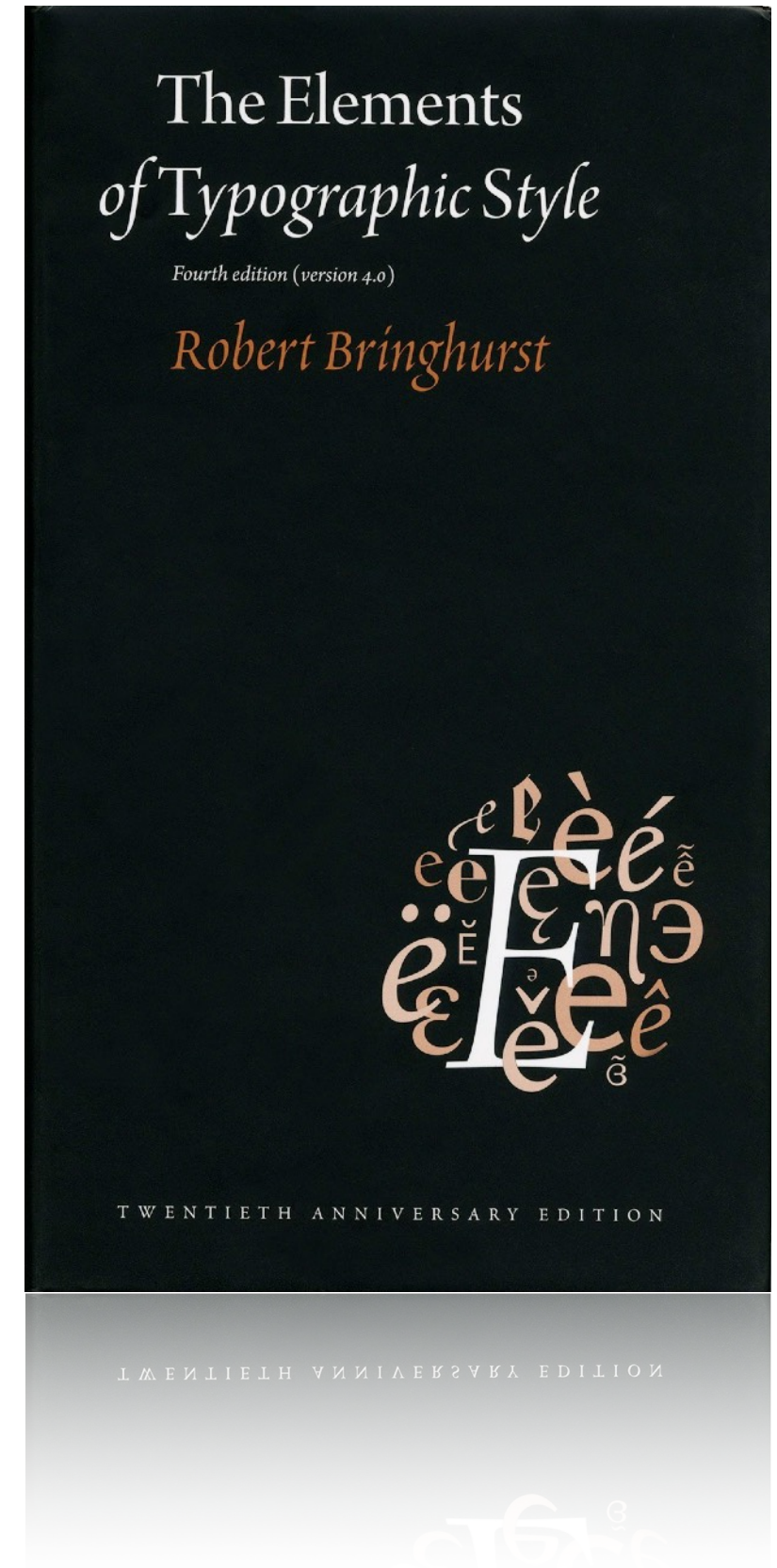
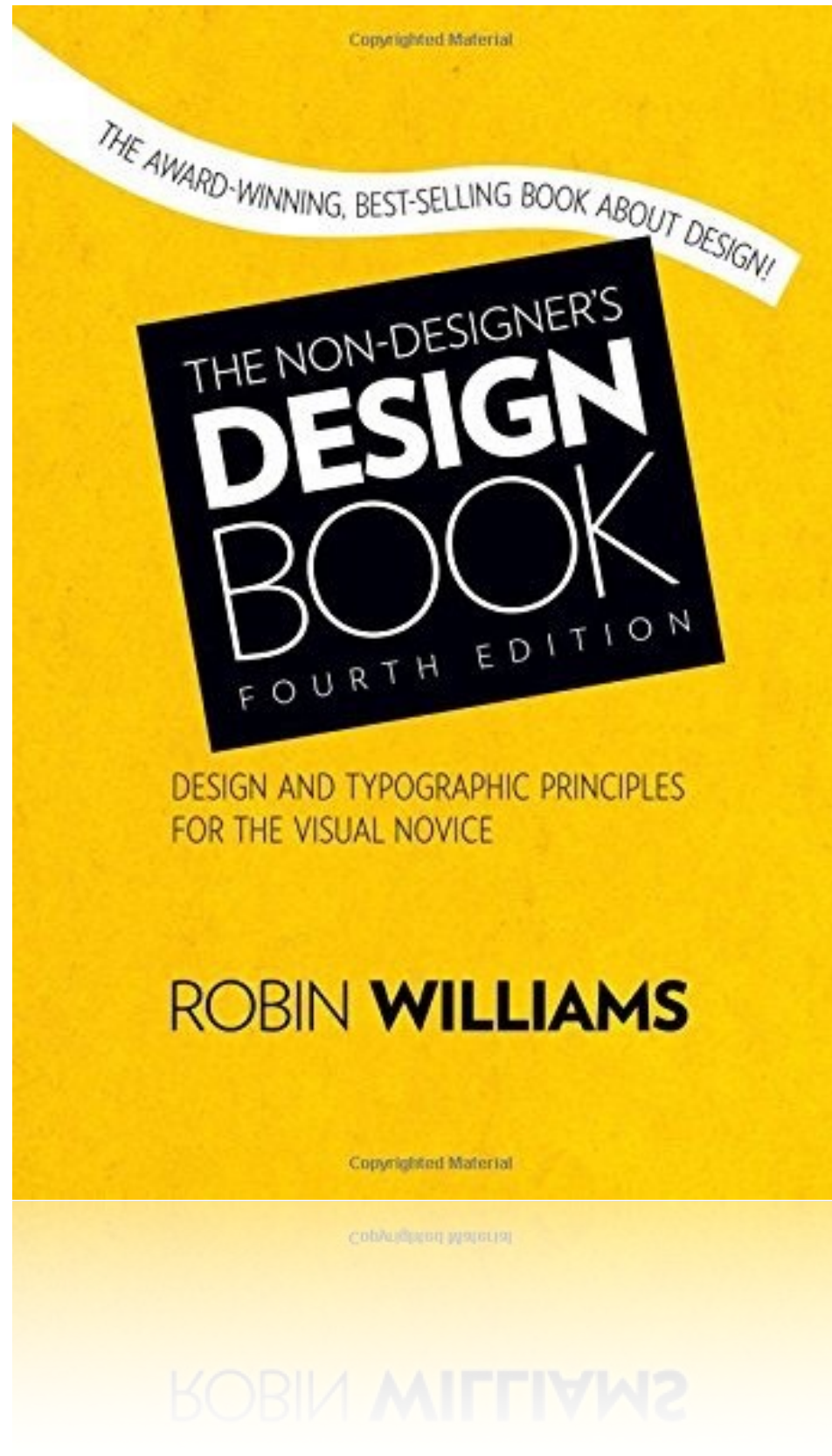
Prepare the documents

Prepare your attachments in any word processing program, following the requirements below:

1. Explain any acronyms and abbreviations fully;
2. Pages must be 8 ½" x 11" (216mm x 279mm);
3. Pages must be single-spaced, with no more than six lines of type per inch;
4. All text must be in 12 pt Times New Roman font;
5. Condensed fonts will not be accepted;
6. All text should be black, and no colour images should be used;*
7. Margins must be set at a minimum of ¾" (1.87 cm);
8. Your name must appear outside the set margins of the page, at the top right corner of every page;
9. For multi-page attachments, pages must be numbered sequentially; and
10. If you have supporting documents written in a language other than English or French, you are required to provide NSERC with a certified translation of the document.

All text, including references (where applicable), must conform to these standards.

Sources



Representations in **digital form**

0	<NUL>	32	<SPC>	64	@	96	`	128	Ä	160	†	192	¿	224	‡
1	<SOH>	33	!	65	A	97	a	129	Å	161	°	193	¡	225	·
2	<STX>	34	"	66	B	98	b	130	Ç	162	¢	194	¬	226	,
3	<ETX>	35	#	67	C	99	c	131	É	163	£	195	√	227	„
4	<EOT>	36	\$	68	D	100	d	132	Ñ	164	§	196	ƒ	228	‰
5	<ENQ>	37	%	69	E	101	e	133	Ö	165	•	197	≈	229	Â
6	<ACK>	38	&	70	F	102	f	134	Ü	166	¶	198	Δ	230	Ê
7	<BEL>	39	'	71	G	103	g	135	á	167	ß	199	«	231	Á
8	<BS>	40	(72	H	104	h	136	à	168	®	200	»	232	Ë
9	<TAB>	41)	73	I	105	i	137	â	169	©	201	...	233	È
10	<LF>	42	*	74	J	106	j	138	ä	170	™	202		234	Í
11	<VT>	43	+	75	K	107	k	139	ã	171	’	203	À	235	Î
12	<FF>	44	,	76	L	108	l	140	å	172	”	204	Ã	236	Ï
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18	<DC2>	50	2	82	R	114	r	146	í	178	≤	210	“	242	Ú
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22	<SYN	54	6	86	V	118	v	150	ñ	182	ð	214	÷	246	^
23	<ETB>	55	7	87	W	119	w	151	ó	183	Σ	215	◇	247	~
24	<CAN>	56	8	88	X	120	x	152	ò	184	Π	216	ÿ	248	—
25		57	9	89	Y	121	y	153	ô	185	π	217	Ÿ	249	˘
26	<SUB>	58	:	90	Z	122	z	154	ö	186	ƒ	218	/	250	·
27	<ESC>	59	;	91	[123	{	155	õ	187	ª	219	€	251	°
28	<SP>	60	<	92	\	124		156	ü	188	»	220	<	252	¸
29	<GS>	61	=	93]	125	}	157	ù	189	Ω	221	>	253	”
30	<RS>	62	>	94	^	126	~	158	û	190	æ	222	fi	254	˙
31	<US>	63	?	95	_	127		159	ü	191	ø	223	fl	255	˘

American Standard Code for Information Interchange

American Standards Association, 1963 & 1986

궁	궂	궃	궄	궅	궆	궇	궈	궉	궊	궋
ACB3	ACB3	ACT3	ACB3	ACB3	ACA3	ACB3	ACC3	ACD3	ACE3	ACF3
권	궍	궎	궏	궐	궑	궒	궓	궔	궕	궖
ACB4	ACB4	ACT4	ACB4	ACB4	ACA4	ACB4	ACC4	ACD4	ACE4	ACF4
궙	궚	궛	궜	궝	궞	궟	궠	궡	궢	궣
ACB5	ACB5	ACT5	ACB5	ACB5	ACA5	ACB5	ACC5	ACD5	ACE5	ACF5
궥	궦	궧	궨	궩	궪	궫	궬	궭	궮	궯
ACB6	ACB6	ACT6	ACB6	ACB6	ACA6	ACB6	ACC6	ACD6	ACE6	ACF6
궱	궲	궳	궴	궵	궶	궷	궸	궹	궺	궻
ACB7	ACB7	ACT7	ACB7	ACB7	ACA7	ACB7	ACC7	ACD7	ACE7	ACF7
궽	궾	궿	귀	귁	귂	귃	귄	귅	귆	귇
ACB8	ACB8	ACT8	ACB8	ACB8	ACA8	ACB8	ACC8	ACD8	ACE8	ACF8

귈	귉	귊	귋	귌	귍	귎	귏	귐	귑
1030	1030	1030	1030	1040	1050	1060	1070	1080	1090
귒	귓	귔	귕	귖	귗	귘	귙	귚	귛
1001	1011	1021	1031	1041	1051	1061	1071	1081	1091
규	귝	귞	귟	균	귡	귢	귣	귤	귥
1002	1012	1022	1032	1042	1052	1062	1072	1082	1092
귦	귧	귨	귩	귪	귫	귬	귭	귮	귯
1003	1013	1023	1033	1043	1053	1063	1073	1083	1093
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1004	1004	1004	1004	1004	1004	1004	1004	1004	1004

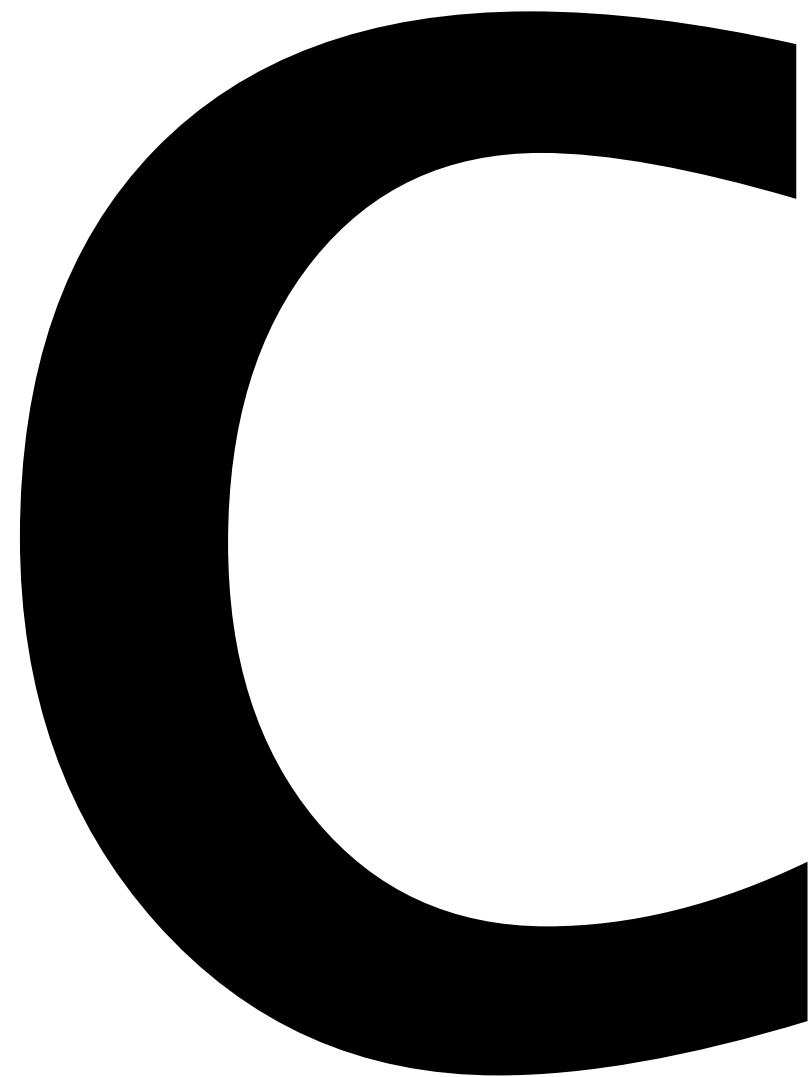


귺	귻	근	귽	귾	귿	글	긁	긂	긃
1001	1011	1021	1031	1041	1051	1061	1071	1081	1091
긄	긅	긆	긇	금	급	긊	긋	긌	긍
1002	1012	1022	1032	1042	1052	1062	1072	1082	1092
긎	긏	긐	긑	긒	긓	긔	긕	긖	긗
1003	1013	1023	1033	1043	1053	1063	1073	1083	1093
긘	긙	긚	긛	긜	긝	긞	긟	긠	긡
1004	1014	1024	1034	1044	1054	1064	1074	1084	1094
긣	긤	긥	긦	긧	긨	긩	긪	긫	긬
1005	1015	1025	1035	1045	1055	1065	1075	1085	1095
긭	긮	긯	기	긱	긲	긳	긴	긵	긶
1006	1016	1026	1036	1046	1056	1066	1076	1086	1096
긷	길	긹	긺	긻	긼	긽	긾	긿	김
1007	1017	1027	1037	1047	1057	1067	1077	1087	1097
깁	깂	깃	깄	깅	깆	깇	깈	깉	깊
1010	1020	1030	1040	1050	1060	1070	1080	1090	1090
깋	까	깍	깎	깏	깐	깑	깒	깓	깔
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깕	깖	깗	깘	깙	깚	깛	깜	깝	깞
1012	1022	1032	1042	1052	1062	1072	1082	1092	1092
깟	깠	깡	깢	깣	깤	깥	깦	깧	깨
1013	1023	1033	1043	1053	1063	1073	1083	1093	1093
깩	깪	깬	깭	깮	깯	깰	깱	깲	깳
1014	1024	1034	1044	1054	1064	1074	1084	1094	1094

Unicode Consortium, 1991

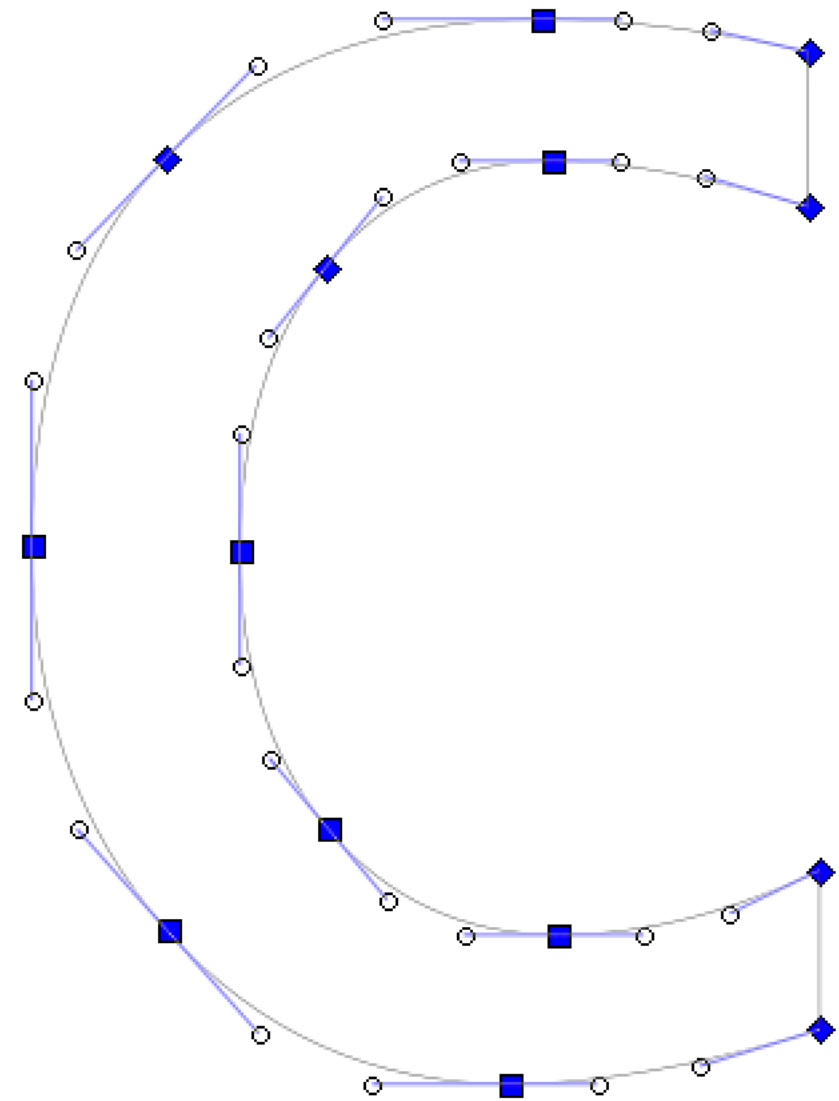
A Glyph

of the letter ‘c’



A Glyph

of the letter 'c'



What is the difference between
a **character** and a **glyph**?

<i>a</i>	<i>d</i>	<i>a</i>
<i>z</i>	<i>a</i>	<i>a</i>
<i>a</i>	<i>d</i>	<i>a</i>

In a font, is the mapping
one-to-one?

å å é è ò ó ü ü

ff fi A ff ff ft

Kerning Tables

StartKernData
StartKernPairs 602

KPX	A z	6
KPX	A w	-42
KPX	A v	-42
KPX	A u	-18
KPX	A t	-6
KPX	A quoteright	-90
KPX	A q	-6
KPX	A p	-12
KPX	A o	-6
KPX	A e	-6
KPX	A d	-12
KPX	A c	-12
KPX	A b	-12
KPX	A Y	-62
KPX	A W	-100
KPX	A V	-80
KPX	A U	-20
KPX	A T	-70

“Tell me how.”

“Tell me how.”
├┤ └┘ └┘ └┘ └┘ └┘ └┘ └┘
18 -130 -0 -0 -0 -0 -0 -56 -0

“Tell me how.”
├┤ └┘ └┘ └┘ └┘ └┘ └┘ └┘
23 -70 -12 12 -7 -8 -14 -47 -61

“Tell me how.”
├┤ └┘ └┘ └┘ └┘ └┘ └┘ └┘
20 -110 -10 0 -10 -20 -20 -60 -110

Stick all these things into a file...



TrueType
Apple/Microsoft
late 1980s



Adobe Type 1
Adobe Systems
1984



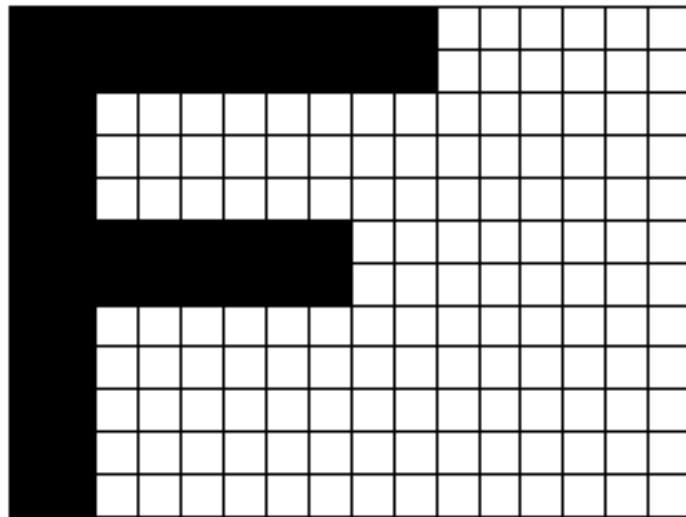
OpenType
Microsoft/Adobe
1996

Rendering text with
digital type

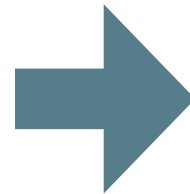
In the old days...

- e.g. "Friday"

0x46

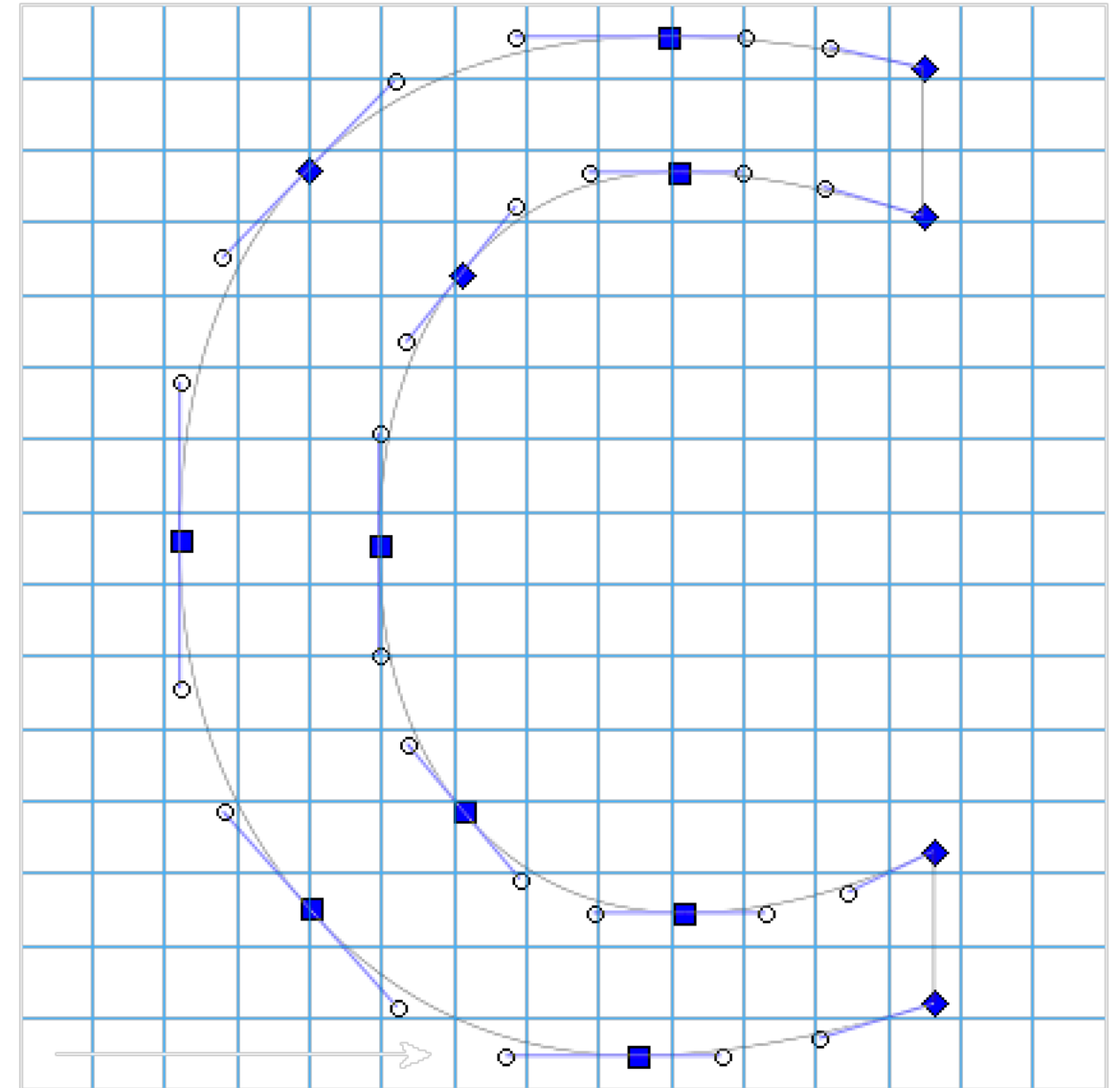


0xff, 0xc0
0xff, 0xc0
0xc0, 0x00
0xc0, 0x00
0xc0, 0x00
0xff, 0x00
0xff, 0x00
0xc0, 0x00
0xc0, 0x00
0xc0, 0x00
0xc0, 0x00



Nowadays...

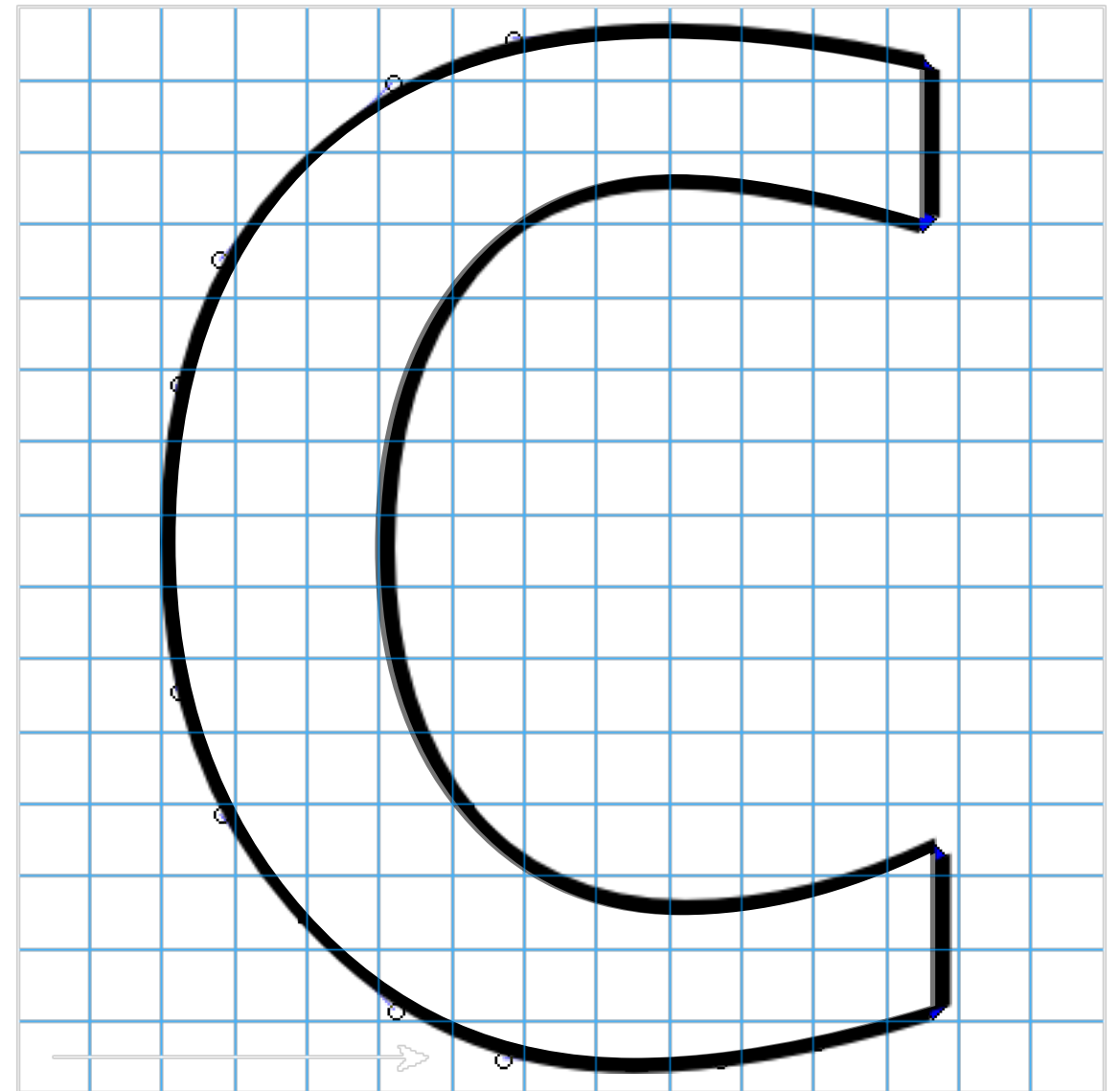
we just have a bunch of points



Good thing we learned all about
Bézier curves!

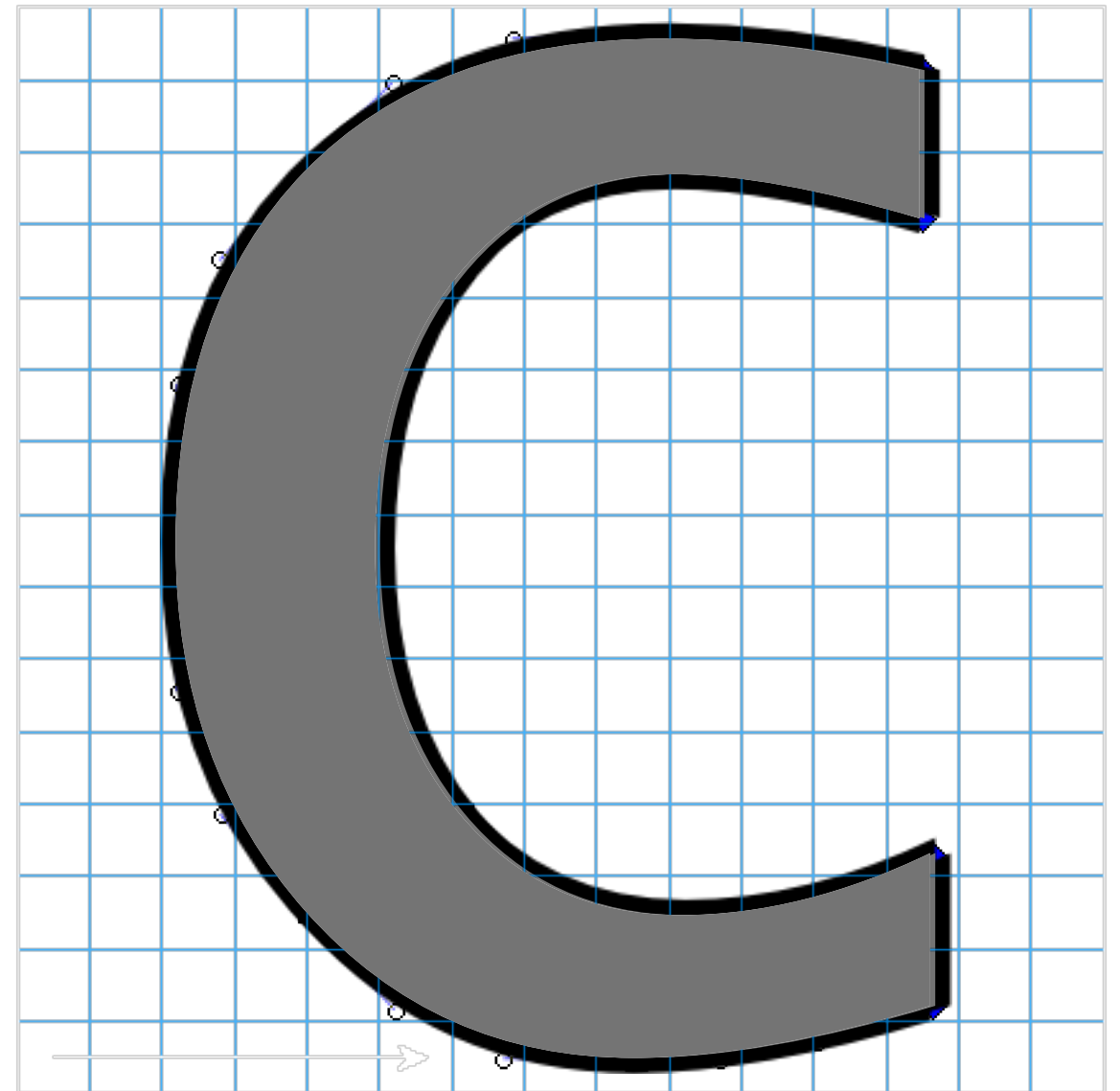
Rendered Outlines

Hardly what Gutenberg wanted...

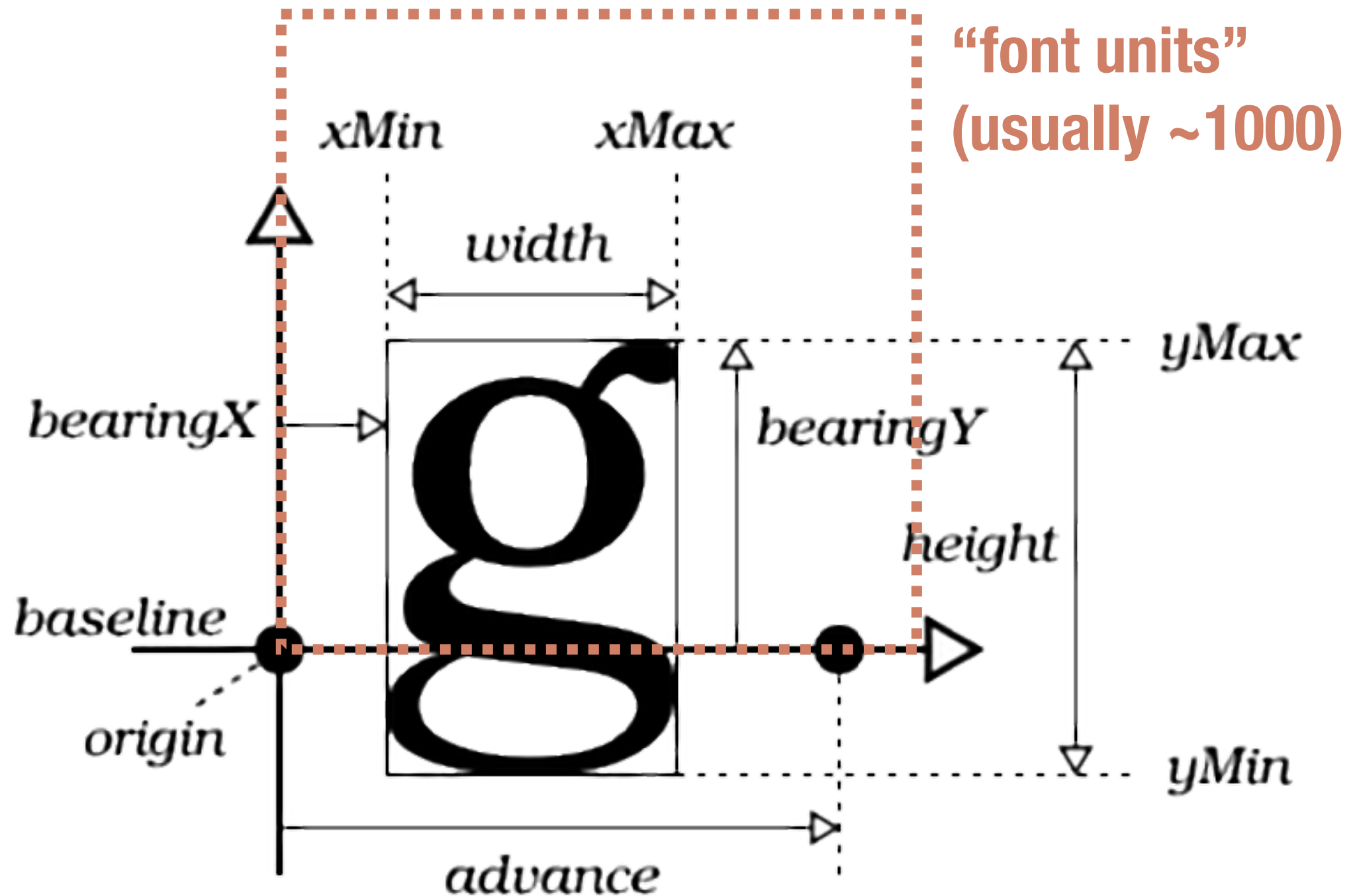


How do we draw a solid glyph?

Just like the professionals do!



Font Units and Glyph Metrics



[from ftgl.sourceforge.net]

Other considerations?

Composite Glyphs

Ligatures

Kerning

Your basic text rendering algorithm

- Load a font (optionally choosing a variant)
- Get a (composite) glyph for your character
 - optionally check for ligatures
- Draw a whole bunch of Bézier curves
- Advance by the glyph's specified amount
 - optionally check kerning table
- Repeat for next character

abcfgop AO *abcfgop*
abcfgop AO *abcfgop*

Manual Hinting

abcfgop

abcfgop

Manual Hinting

There are many different ways of arranging the space for different functions, managerial fashions and the culture of space. Some include, how many people will work within the same space; at the other extreme a large open space or **hundreds of people working** in the same space. *Some studies have shown that they work better on a single software project.* At the same time, the loss of privacy and loss of company secrets. A type of compromise between the cubicle, possibly made most famous by the Dilbert cartoon, and the open office to some extent, but often fails on acoustic separation and security.

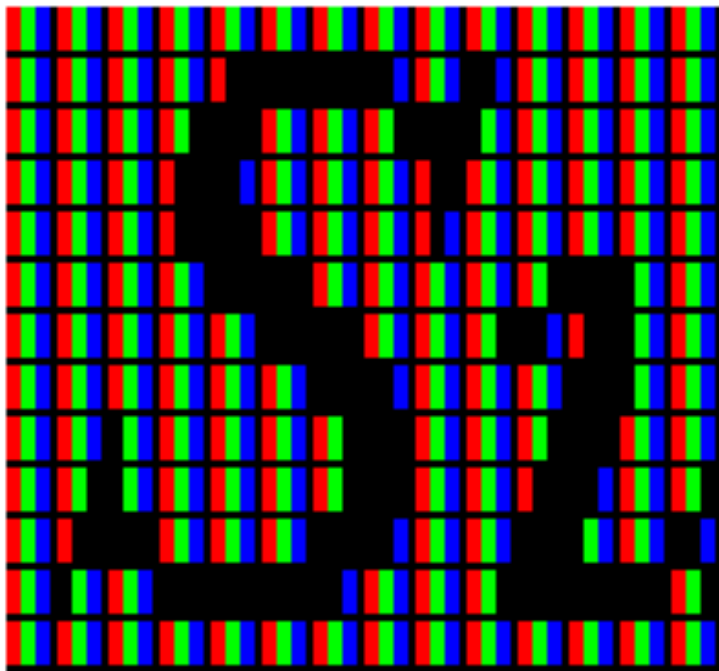
between

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between

Microsoft ClearType

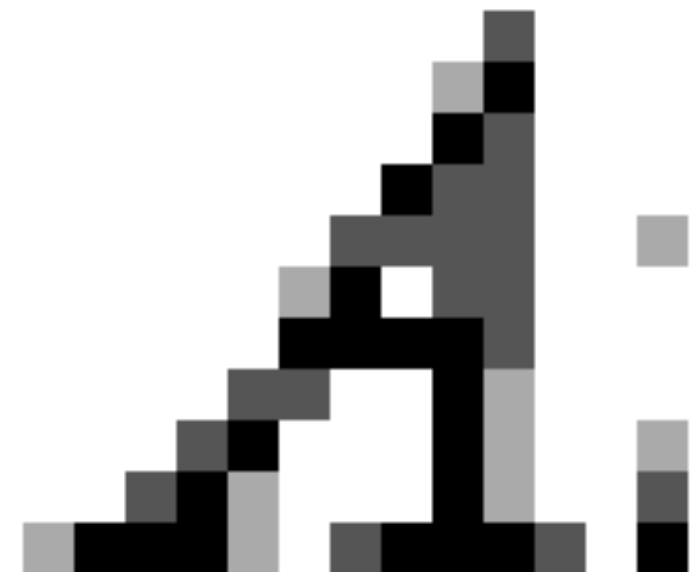
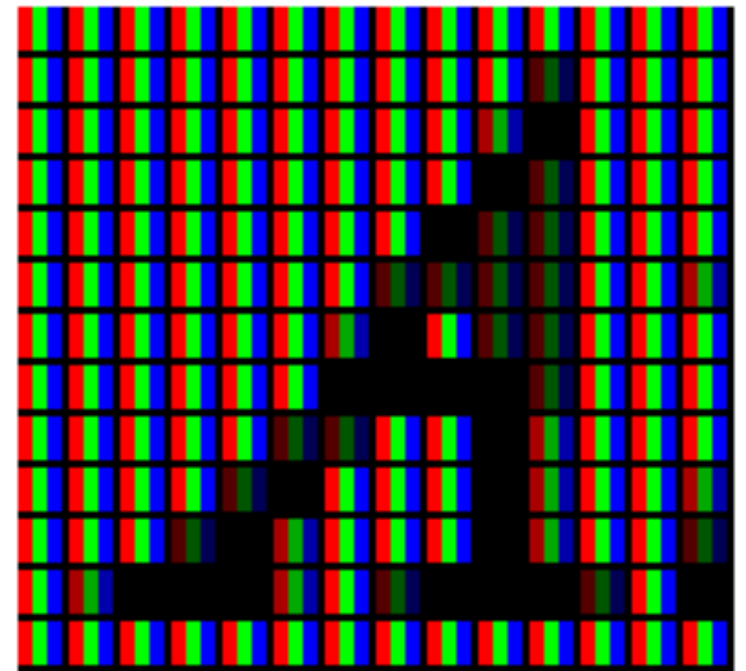
Subpixel



ClearType



Anti-aliasing



Things to Remember

- Typography has a very rich history
 - Don't throw it all out the door when you digitize type!
- Once you learn the terminology, you will be able to identify the important features of typefaces
- Computer fonts are digital encodings of typefaces
 - They are not all made equal
- Have fun rendering text in your next assignment!