

Typographic Perfection with OpenType?

Adam Twardoch

February 26, 2005

Abstract


In September 1999, Adobe Systems declared their PostScript Type 1 font format "obsolete". Until then, this font format was dominating the professional pre-press and printing business, but now was to be replaced with OpenType – a font format developed by Microsoft and Adobe, with collaboration from Apple. Four and a half years later, OpenType is a fact: both the world's largest font foundries and individual type designer publish new fonts in this format.

OpenType fonts have numerous advantages: they can be used in many operating systems without any conversions (Windows 9x/2000/XP, MacOS 9/X, some Unix environments); they use the universal character encoding standard Unicode; finally, they can include typographic layout features that allow for comfortable use of ligatures, small caps, swash alternates or old-style numerals, as well as more advanced functionality such as justification alternates.

You may have heard that Unicode is the only solution for the encoding mess in electronic text processing. You may have also heard that OpenType is the new cross-platform font format that enables unprecedented typographic perfection. Adam Twardoch will present these technologies and discuss how much truth and how much myth these promises hold.

Bio:

Born 1975 in Poland, Adam now lives in Frankfurt (Oder), at the German-Polish border. He is Scripting Products and Marketing Manager at Fontlab Ltd., an international software vendor specializing in font editors and typography products. He serves as typographic consultant to MyFonts, a major online font distributor. Adam provides consulting services in font creation, font tool development, font technology and multilingual typography for Adobe, Bitstream, Corel, Linotype, Microsoft and other clients. Adam regularly writes and lectures about fonts and typography. He is member of Association Typographique Internationale (ATypI) and of the Polish T_EX Users' Group (GUST).



Adam Twardoch EuroTEX 2005

*Typographic perfection
with OpenType?*

Adam Twardoch EuroTEX 2005

3 “No one will ever need more than 128 characters!” – ASCII

0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
10	11	12	13	14	15	16	17	18	19	1A	1B	1C	1D	1E	1F
□	□	□	□	□	□	□	□	□	□	□	□	□	□	□	□
20	21	22	23	24	25	26	27	28	29	2A	2B	2C	2D	2E	2F
!	"	#	\$	%	&	'	()	*	+	,	-	.	/	
30	31	32	33	34	35	36	37	38	39	3A	3B	3C	3D	3E	3F
0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
40	41	42	43	44	45	46	47	48	49	4A	4B	4C	4D	4E	4F
@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
50	51	52	53	54	55	56	57	58	59	5A	5B	5C	5D	5E	5F
P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
60	61	62	63	64	65	66	67	68	69	6A	6B	6C	6D	6E	6F
`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
70	71	72	73	74	75	76	77	78	79	7A	7B	7C	7D	7E	7F
p	q	r	s	t	u	v	w	x	y	z	{		}	~	□

4 “No one will ever need more than 128 characters”?

The quick brown fox jumps over
the lazy dog. Zwei Boxkämpfer
jagen Eva quer durch Sylt.

5 "No one will ever need more than ~~128~~ characters!"
256

80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F
€	,	f	"	"	...	†	‡	ˆ	%	Š	‹	œ		Ž	
‘	’	“	”	”	•	—	—	˜	™	š	›	œ		ž	ÿ
A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	AA	AB	AC	AD	AE	AF
ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı
B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	BA	BB	BC	BD	BE	BF
°	±	²	³	´	µ	¶	·	¸	¹	º	»	¼	½	¾	¿
C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF
A	Á	À	À	À	À	Æ	Ç	È	É	Ê	Ë	Ì	Í	Î	Ï
D0	D1	D2	D3	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD	DE	DF
Đ	Ñ	Ò	Ó	Ô	Õ	Ö	×	Ø	Ù	Ú	Û	Ü	Ý	Þ	ß
E0	E1	E2	E3	E4	E5	E6	E7	E8	E9	EA	EB	EC	ED	EE	EF
à	á	â	ã	ä	å	æ	ç	è	é	ê	ë	ì	í	î	ï
F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	FA	FB	FC	FD	FE	FF
ð	ñ	ò	ó	ô	õ	ö	÷	ø	ù	ú	û	ü	ý	þ	ÿ

7 Typesetting multilingual text has always been a challenge
in GUI layout applications and in T_EX

Рієć флаконów wody „Экземпляръ”.
actual text

Рієć флаконów wody „Ÿęćłēđē·đú”.
text encoded as Windows 1250 (Central European)

Рієж флаконуw wody „Экземпляръ”.
text encoded as Windows 1251 (Cyrillic)

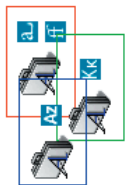
6 Codepage soup: incompatible 8-bit encodings
that only cover a subset of the necessary character set

80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F
Ä	Å	Ç	É	Ñ	Ö	Ü	à	á	â	ä	ä	å	ç	é	è
90	91	92	93	94	95	96	97	98	99	9A	9B	9C	9D	9E	9F
ê	ë	í	ì	ï	ñ	ó	ò	õ	ö	ü	ü	ù	ú	û	ü
A0	A1	A2	A3	A4	A5	A6	A7	A8	A9	AA	AB	AC	AD	AE	AF
†	°	φ	£	¥	•	¶	β	Ⓢ	™	’	”	#	Æ	Ø	
B0	B1	B2	B3	B4	B5	B6	B7	B8	B9	BA	BB	BC	BD	BE	BF
∞	±	≤	≥	¥	μ	∂	Σ	Π	∏	∏	∏	∏	∏	∏	∏
C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF
¿	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı	ı
D0	D1	D2	D3	D4	D5	D6	D7	D8	D9	DA	DB	DC	DD	DE	DF
—	—	“	”	”	’	÷	◊	ÿ	ÿ	/	∏	◊	◊	ı	ı
E0	E1	E2	E3	E4	E5	E6	E7	E8	E9	EA	EB	EC	ED	EE	EF
‡	·	·	·	%	À	É	Á	È	É	Í	Î	Ï	Ì	Ó	Ô
F0	F1	F2	F3	F4	F5	F6	F7	F8	F9	FA	FB	FC	FD	FE	FF
□	◊	◊	◊	◊	ı	ˆ	˜	—	—	·	·	·	·	·	·

8 Typesetting multilingual text has always been a challenge
in GUI layout applications and in T_EX

§89. Zdanie, w którym występują wszystkie litery alfabetu, nazywamy pangramem. Autorem najstarszego polskiego pangramu „Pójdźże, kiń tę chmurność w głąb flaszyl!” jest J. G. H. PAWLIKOWSKI. Autorem filigranowego quasi-pangramu „Książących spóźnień czułość” jest WALDEMAR PAŁASZ. Ogłosił on w 1998 roku konkurs na polskie pangramy

9 Different character groups stored in separate fonts, switching fonts often necessary



§89. Zdanie, w którym występują wszystkie litery alfabetu, nazywamy pan mem. Autorem najstarszego polskiego pangramu „Pójdźcie, kiń tę chmurność w głąb **fl**aszy!” jest **J. G. H. PAWLIKOWSKI**
Autorem **fl**igranowego quasi-pangramu „Książących spóźnień czulość” jest **WALDEMAR PAŁASZ**. Ogłosił on w 1998 roku konkurs na polskie pangramy

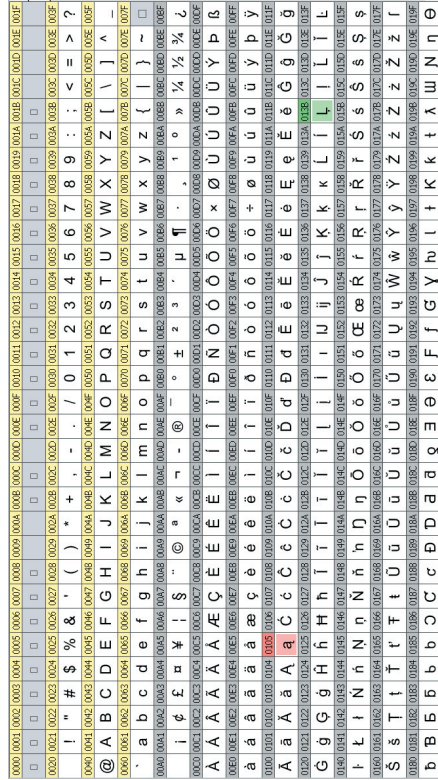
11 Unicode assigns numeric codes to characters

→	a	97	0x0061
→	á	225	0x00E1
→	ą	261	0x0105
→	α	945	0x03B1
→	Я	1103	0x044F
→	Ź	1488	0x05D0
→	練	9787	0x263B
→		32244	0x7DF4

10 In GUI applications, switching fonts may lead to unwanted effects, in T_EX ligature information stored in separate files (.tfm)

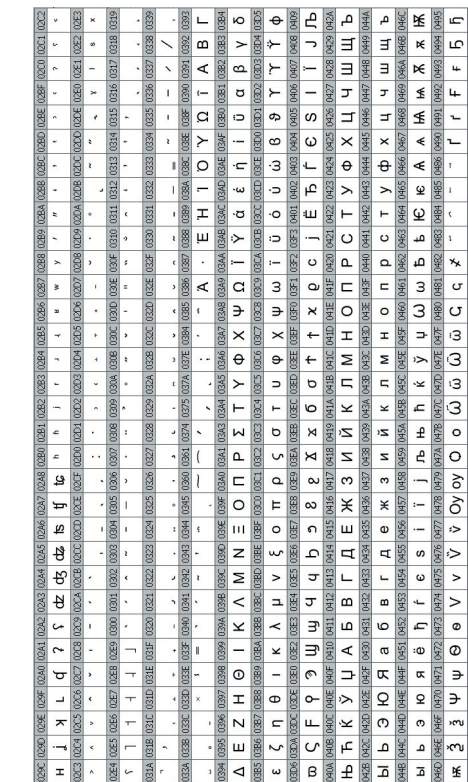
§89. Zdanie, w którym występują wszystkie litery alfabetu, nazywamy pangramem. Autorem najstarszego polskiego pangramu „Pójdźcie, kiń tę chmurność w głąb **fl**aszy!” je **fl** **j. g. h. pawlikowski**.
Autorem **fl**igranowego quasi-pangramu „Książących spóźnień czulość” jest **waldemar pałasz**. Ogłosił on w 1998 roku konkurs na polskie pangramy i quasi-

12 The Unicode Standard encodes 100 000 characters, 1 million possible



練

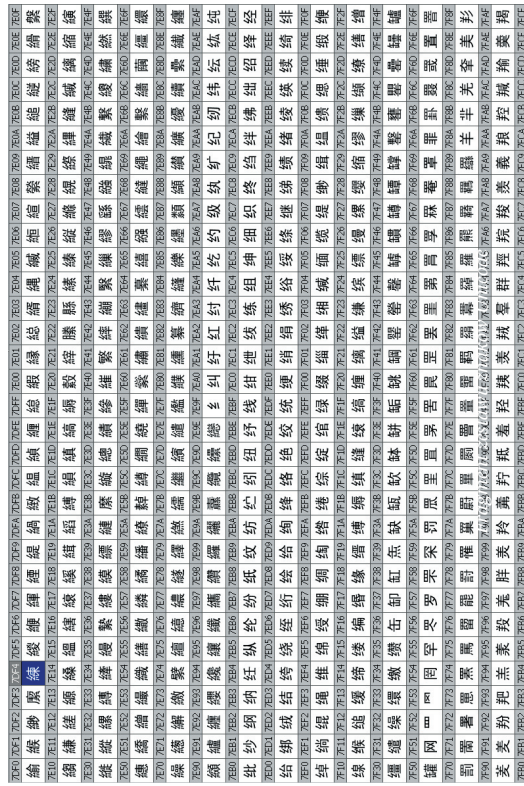
13 The Unicode Standard encodes 100 000 characters, 1 million possible



15 Brief history of the Unicode Standard

- 1984 ISO working group created to define universal character set
- 1987 Unicode working group created to define universal character set (Apple, Xerox)
- 1990 Distinct Unicode 1.0 and DIS-1 10646 published
- 1991 “Two universal character sets? Not a good idea!”: Unicode and ISO 10646 merged
- 1993 Merged Unicode 1.1 and ISO 10646-1:1993 published
- 1996 Unicode 2.0 published, 38 885 encoded characters
- 1998 Unicode 2.1 published, adding e.g. the euro character
- 1999 Unicode 3.0 published, 49 194 encoded characters
- 2000 ISO/IEC 10646-1:2000 published (Unicode 3.0 equivalent)
- 2002 Unicode 3.2 published, 95 156 encoded characters (> 65 536!)
- 2003 Unicode 4.0 published, 96 513 encoded characters
- 2005 Unicode 4.1 beta, 97 786 encoded characters

14 The Unicode Standard encodes 100 000 characters, 1 million possible



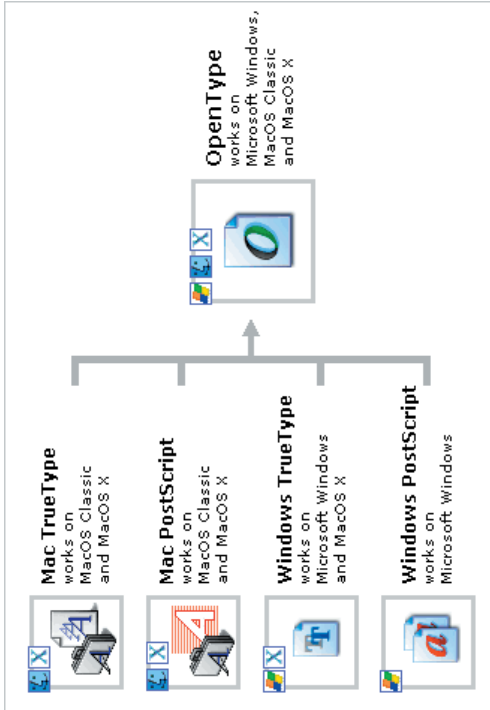
16 Thirty years of digital outline font technology: 1975–2005

- 1975 Peter Karow announces Ikarus at the ATypI conference in Warsaw
- 1985 Adobe Systems creates the PostScript language and defines the PostScript *Type 1* font format (the specification is confidential)
- 1987 Apple Computer and Microsoft Corp start creating their own font format that would be independent from an Adobe license
- 1990 Adobe publishes the PostScript Type 1 specification
- 1991 Adobe publishes ATM, Apple and Microsoft publish the *TrueType* format
- 1993–96 Apple develops *TrueType* into *TrueType GX* (later: AAT), Microsoft develops *TrueType* into *TrueType Open*
- 1998 Adobe joins the Microsoft initiative and creates the *CFF* format that allows placing PostScript font data into the *TrueType* file structure
- 1999 Adobe and Microsoft announce *OpenType* based on *TrueType* Open and *CFF*
- 2000 First *OpenType* fonts published by Adobe and Microsoft

18 One character, many glyphs

a → a a A a a a a

17 One format, many platforms: OpenType



19 In addition to default character forms, OpenType fonts can have variant glyphs associated with so-called layout features

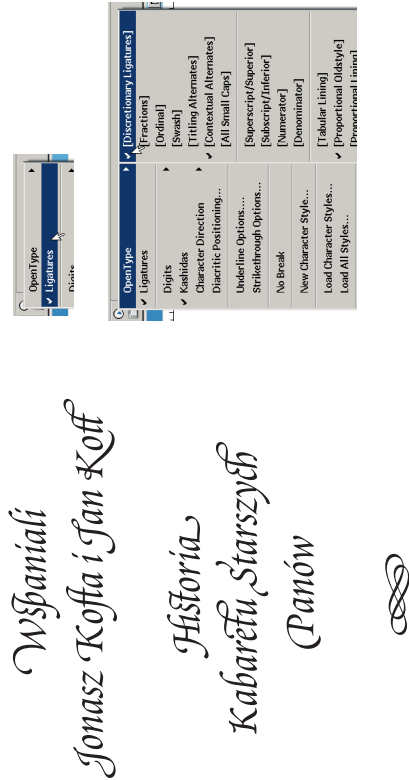
0 0030	1 0031	2 0032	A 0041	K 004B	a 0061	b 0062	e 0065	s 0073
o	l	z	A	K	a	b	e	s
onum								
smcp					A	B	E	S
fina					a		e	
init							œ	
salt								f
hist								

20 Brioso Pro (Robert Slimbach, Adobe Systems)
Layout features: standard ligatures (liga)

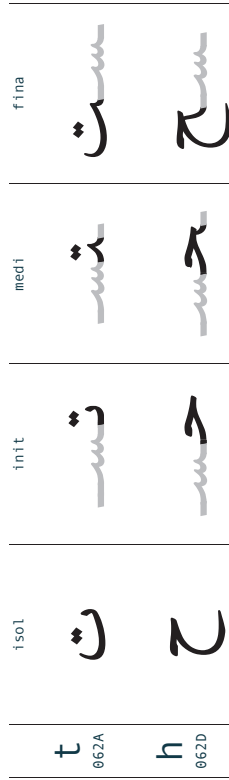
JAN KOIT Jonasz Kofta
 JAN KOIT Jonasz Kofta
 Thorgal fjord szufla firet motto
 Thorgal fjord szufla firet motto



21 Poetica Std (Robert Slimbach, Adobe Systems)
Layout Features: liga, dlig, salt, ormm



22 In the Arabic writing system, each letter has four different forms: isolated, initial, medial and final



23 The OpenType font contains appropriate layout features (init, medi, fina) that map the default form to the contextual forms



24 Some languages have localized glyph forms in handwriting



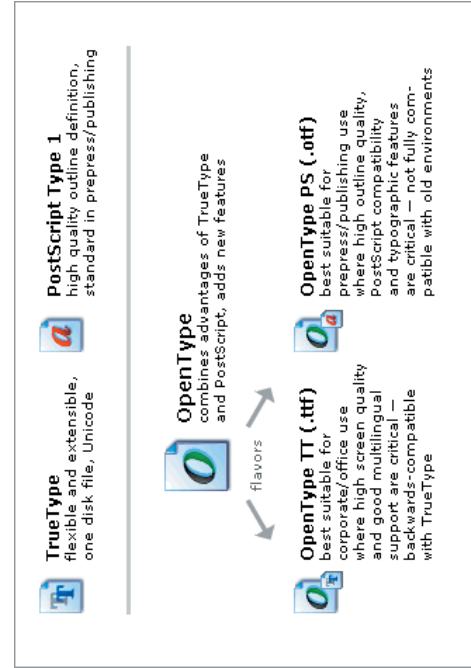
25 OpenType allows for language-sensitive substitutions so for Polish language, the calligraphic slash can be substituted



26 OpenType allows for language-sensitive substitutions so different glyph variants can be selected depending on language



27 OpenType fonts exist in two "flavors": OpenType TT and OpenType PS



28

	MacOS	Microsoft Windows
Microsoft Word 2000, 2002, XP	OpenType TT (.ttf)	OpenType PS (.otf)
Microsoft Word 2003, X	OpenType PS (.otf)	OpenType TT (.ttf)
Adobe InDesign 1.0, 1.5, 2.0	OpenType TT (.ttf)	OpenType PS (.otf)
Adobe Photoshop 7.0	OpenType PS (.otf)	OpenType TT (.ttf)
Adobe Illustrator 10	OpenType TT (.ttf)	OpenType PS (.otf)
Quark XPress 4, 5	OpenType PS (.otf)	OpenType TT (.ttf)
Macromedia Freehand 10, MK	OpenType TT (.ttf)	OpenType PS (.otf)
Coral Draw 10, 11	OpenType PS (.otf)	OpenType TT (.ttf)

AZ basic Roman support
 UN multilingual support
 O advanced features support

29

Calligraphic Typeface
by Hermann Zapf
Published
in OpenType Format
by Linotype Library

30

The Goudy Q & Buz
Vesper Voex Orew
Ebec e& Q Math s!

31 Originally published as a series of Type 1 fonts

→ Zapfino One
A B C D E Q Z a b c d e f g x y z

→ Zapfino Two
A B C D E Q Z a b c d e f g x y z

→ Zapfino Three
A B C D E Q Z a b c d e f g x y z

→ Zapfino Four
A B C D E Q Z a b c d e f g x y z

32 Zapfino Extra LT Pro contains an extensive set of contextual features that simulate calligraphic "randomness"

cal → caligr → calligraph →
→ caligraph → calligraphic

Show Options
Zapfino Extra LT Pro
Regular
A: 3,17,8,85
M: 2,10
→ All Caps
→ Small Caps
→ Superscript
→ Subscript
→ Underline
→ Contextual Alternates
→ All Small Caps

