Phi variations

The Greek letter Phi is used throughout Greece, maths, physics, and computing.

There are about 20 different versions of the phi character in the Unicode tables, but the three main versions used in computing are:

```
– 03D5: ϕ
– 03C6: φ
– 0278: ɸ
```

These designs are from the JuliaMono font.

Here are the same glyphs shown in Pluto's default text font (Alegreya Sans, unless modified by the browser).

- 03D5: φ
- 03C6: φ
- 0278: ɸ

Remember that font fallbacks are used in browsers: ie, if the required font doesn't have a glyph for a character, then other fonts are searched until a suitable glyph is found. So because Alegreya doesn't have anything for U+0278, the browser shows something similar. (On my system I get U+03C6 from Helvetica here!)

15×5 DataFrame

Row	udec	uhex	glyph	lx	desc
	Int64	String	String	String	String
1	632	278	ɸ	\\ltphi	Latin Small Letter Phi
2	966	3c6	φ	\\varphi	Greek Small Letter Phi
3	981	3d5	ϕ	\\phi	Greek Phi Symbol / Greek Small Letter Script Phi
4	7520	1d60	ᵠ	\\^phi	Modifier Letter Small Greek Phi
5	7529	1d69	ᵩ	_phi	Greek Subscript Small Letter Phi
6	120535	1d6d7	𝛗	\\bfvarphi	Mathematical Bold Small Phi
7	120543	1d6df	𝛟	\\bfphi	Mathematical Bold Phi Symbol
8	120593	1d711	𝜑	\\itphi	Mathematical Italic Small Phi
9	120601	1d719	𝜙	\\itvarphi	Mathematical Italic Phi Symbol
10	120651	1d74b	𝝋	\\biphi	Mathematical Bold Italic Small Phi
11	120659	1d753	𝝓	\\bivarphi	Mathematical Bold Italic Phi Symbol
12	120709	1d785	𝞅	\\bsansphi	Mathematical Sans-Serif Bold Small Phi
13	120717	1d78d	𝞍	\\bsansvarphi	Mathematical Sans-Serif Bold Phi Symbol
14	120767	1d7bf	𝟿	\\bisansphi	Mathematical Sans-Serif Bold Italic Small Phi
15	120775	1d7c7	ϕ	\\bisansvarphi	Mathematical Sans-Serif Bold Italic Phi Symbol

In Julia, the Golden Ratio Phi, 1.618... is available as the constant `MathConstants.golden`. It's known as the `varphi` version of phi, and you can type it in the REPL with the LATEX completion `\\varphi`. The Unicode character code of this is `03C6`

φ = 1.6180339887498...

```
1  MathConstants.golden
```

Phi and varphi

The \varphi (U+03C6) version of Phi is called "the loopy" version in the Unicode documentation:

> For mathematical and technical use, the straight form of the small phi is an important symbol (TEX `\phi` U+03D5) and needs to be consistently distinguishable from the loopy form (TEX `\varphi` U+03C6). The straight form phi glyph at U+03D5 is used as the representative glyph for the phi symbol at U+03D5 to satisfy this distinction.

> ... U+03C6 ... should be reserved for codes or entities that represent the small phi as used in ordinary Greek text.

(http://unicode.org/reports/tr25/)

Font variations

Let's draw these symbols using some different fonts.

U+03D5 ϕ	U+0278 ɸ	U+03C6 φ	
☐	ɸ	φ	Anonymous Pro
φ		φ	AlegreyaSans-Regular
☐	☐	ɸ	CascadiaCode-Regular
☐	ɸ	φ	Consolas
ϕ	ɸ	φ	Courier New
☒	☒	☒	CourierPrime-Regular
ɸ	ɸ	φ	Cousine-Regular
ϕ	ɸ	φ	DejaVuSansMono
☐	ɸ	φ	EnvyCodeR
☐	ɸ	φ	EversonMono
ϕ	?	φ	FiraCode-Regular
☐	ɸ	φ	GoMono
☐	ɸ	φ	Hack-Regular
☐	ɸ	φ	Helvetica
☐	ɸ	φ	InputMono
ϕ	ɸ	φ	JuliaMono
☐	ɸ	φ	LucidaConsole
☐	ɸ	φ	LucidaSansUnicode
ϕ	ɸ	φ	Menlo
▯	ɸ	▯	Monaco
⃞	⃞	⃞	OxygenMono-Regular
☐	ɸ	φ	Pragmata Pro
☐	ɸ	φ	RecMonoLinear-Regular
☐	ɸ	φ	SFMono-Regular
ɸ	ɸ	ɸ	SourceCodePro-Regular
⃞	⃞	φ	Ubuntu Mono
☐	ɸ	φ	Victor Mono

The appearance of this image depends a lot on which fonts you have installed and are active on your computer.

Luxor/Cairo *doesn't* invoke the fallback mehanism that you see (but might not notice) in browsers and editors, so if a font doesn't have the character, you'll see a box or something similar, rather than a replacement from another

font. Typically, you'll see a Helvetica substitute font if the font can't be found on your computer.

If you have Consolas installed, you'll notice that the font has swapped the \phi and \varphi characters. This is a well-known issue with this font, and a few others.

Also note that the Alegreya Sans font used in Pluto uses the same (loopy) glyph for both U+03D5 and U+03C6.