



Digital typesetting

Introduction to digital typesetting and the typho project

tajpulo

February 14, 2023

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6. typho

About me

```
fn tajpulo(h: Human)  
  → TypesettingSoftware{
```

الجبر אור
დაძნერლობა
タイポ
}

name: tajpulo

github: <https://github.com/tajpulo>

twitter: <https://twitter.com/tajpulo>

Mastodon: <https://typo.social/@tajpulo>

My history

2008 I wrote my matura notes in \LaTeX .

2011 „Tooling for digital typesetting really sucks. I want to contribute during my lifetime“, but I don't know how yet.

2016 Studying Japanese probably a good start with writing systems.

2022 I am unemployed. Let's get going.

pygraz	2012-09	“Literate Programming”
TU Graz	2014-11	“Regex in practice”
GLT15	2015-04	“Advanced Regex”
GLT16	2016-04	“Xe \LaTeX ”
pydays	2018-05	“Unicode”
GLT19	2019-04	“Neo2 keyboard layout”

Digital typesetting

Definition of Typesetting

“Typesetting is the composition of text by means of arranging physical type (or sort) in mechanical systems or glyphs in digital systems representing characters (letters and other symbols).” [Wikipedia]

Definition of Typesetting

*“**Typesetting** is the composition of text by means of arranging physical type (or sort) in mechanical systems or glyphs in digital systems representing characters (letters and other symbols).” [Wikipedia]*

*“**Digital typesetting** is the composition of text by means of arranging glyphs in digital systems representing characters (letters and other symbols).”*

digital typesetting system

“A digital typesetting system is a tool using digital means to arrange text and media into digital documents”

digital typesetting component

“A digital typesetting component is any tool solving a subtask to implement a digital typesetting system”

Berliner Musikalische Zeitung.

1833.

Sonntags, den 20. December.

Nr 103.

II. Recensionen.

Le bal masqué, dances de carnaval pour 1834, composées pour le Piano-forte par Guillaume Hermann. Ouvro 38. Berlin chez F. S. Lischke. Prix 12 Sgr.

Eine Sammlung von 12 Tänzen der jetzt gangbaren Gattungen, als 1 Polonaise, 3 Walzer, 3 Galopp, 2 Marsch, 2 Ecossaises und 2 Contilons, die allen billigen Forderungen genügen, welche man an eine gute Tanzmusik zu machen berechtigt ist. Die Melodien sind leicht und gefällig, ohne in die jetzt so gewöhnliche süßliche Leerheit zu fallen, die Rhythmen gut markirt und die Harmonien nicht gerecht, sondern meist ungenügend und natürlich. Wir können die Sammlung für den angegebenen Zweck mit Recht empfehlen. Sie ist außerdem gut ausgestattet, und die Titelvigette, auf welcher sich in dem bunten Maskengewühl noch einige leicht heraus zu erkennende dramatische Charactere aus hübschen Stücken befinden, gibt nicht zu dem ganz schlechten Lithographiren.

Drei Rondo - Walzer für das Fortepiano, componirt von W. Hermann, Ritter des eisernen Kreuzes. Werk 44. Berlin bei F. S. Lischke. Preis 12 Sgr.

Die in diesen Werken enthaltenen, an kurzen Rondo's angeführten drei Walzer können sich recht gut an, und gewissem den Spieler eine angenehme Unterhaltung. Sie empfehlen sich durch hübsche Melodie und auch dadurch, dass sie nicht eben schwer auszuführen sind. Zu dem ersten ist das Thema der „Schnecke“ von dem Bayrischen Alpmaler Fischer benutzt, welches Lied so schnell zu einer Beliebtheit gelangt ist, die sich der Compont desselben gewiss selbst nie hat träumen lassen. Es unter-

liegt daher wohl keinem Zweifel, dass gerade dieser Walzer, wegen seiner schon bekannten Melodie, vorzüglich favorisirt werden dürfte.

Sechs Walzer für das Fortepiano von W. Hermann etc. Werk 27. Berlin, bei F. S. Lischke. Preis 15 Sgr.

Sechs größere Walzer, denen damals Lob, wie den vorher angezeigten ertheilt werden kann. Die Themen derselben sind, wenn auch nicht eben ganz eigenhümlich, so doch leiter und gefällig, und wir sind überzeugt, dass sich auch noch ihnen recht gut wird tunnen lassen.

Drei Rogdovrak mit beliebigen Anklängen aus der Oper die Montecchi und Capuletti von Bellini, für das Piano-forte componirt von W. Hermann. Werk 12. Berlin bei F. S. Lischke. Pr. 5 Sgr.

Die hier genannte Oper hat unter allen die jetzt in Berlin zur Aufführung gekommenen Opern Bellini's die meisten Freunde gefunden, obgleich sie offenbar ein schwächeres Werk dieses fruchtbareren Componisten ist, und für der „Pupa“ und die „Suzanna“ in vieler Hinsicht vorzuziehen sind. Einige der lieblichsten Motive aus der vorerwähnten Oper hat der Componist der vorliegenden Tänze recht geschickt benutzt, und vorzügliches Thun recht geschickt benutzt, und eben deshalb werden sie unter dem genannten Publikum gewiss viele Freunde finden. Was die Gattung dieser Tänze anbetrifft, so muss Ref. zu seiner Beschauung gestehen, dass die dieselbe ganz unbekannt ist. Er würde sie für langweilige „Wälzer“ gehalten haben, wenn ihn nicht der Titel eines Anderen belehrt hätte, da der Rhythmus ganz derselbe ist, wie bei jenen Tänzen, und auch die Anzahl der Takte in jeder Classe, so wie dort, nicht gerade ganz fest bestimmt zu sein scheint.

en péril!

ment proportionnel à la valeur patrimoniale de ce fond d'images unique au monde. « Nous avons commencé à maintenir nos archives. Elles représentent 120 m² d'archives belges. Ça a représenté 30.000 objets. C'est de l'or mais au fond de la mine. Je ne comprends pas que notre pays ne valorise pas mieux ses images... » Belgaron s'est adressé au Français 'Perfect Memory' pour une meilleure diffusion. Ce partenaire français en parle

Depuis 80 ans, cette petite société 100% belge accumule les films d'actualité sur notre pays. Mais son avenir semble précaire alors qu'elle veut continuer d'exister.

On tourne des scènes d'actualité, sur des lieux historiques au contact de l'actualité. Au départ en fait, c'était à l'usage de la presse à l'époque. Ensuite, 1945-1950, après une guerre et un siècle de son histoire en images.



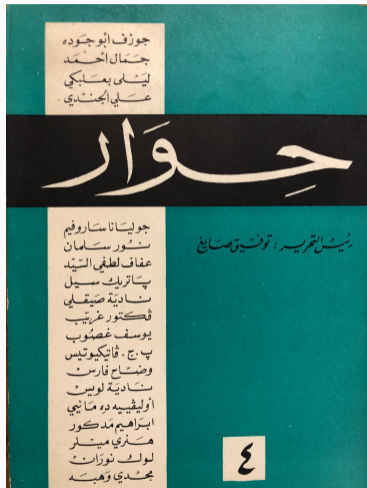
les archives de RTL. Belgaron suit et se situe son avenir : dans la mise en ligne de sa base de données, directement, avec la possibilité de visionner à la demande. Le sujet est important. Il touche à la mémoire collective, au passé commun, à ce qui pourrait devenir patrimoniallement transmis de l'Union si la demande est acceptée. Le patron d'Info de Belgaron insiste à ce propos : « Toutes ces images, il faut aller les chercher, les faire circuler comme des éternuements. Je voulais charger leur transfert, leur accessibilité. J'ai un impératif : faire travailler. Il ne faut pas oublier d'exister. Sans ce belge compte sans des documents, sur la Belgique. Tous à Bruxelles en 1944 ou l'époque dans notre

pays. Des images dormantes, qui ne devraient pas être réveillées. Mais comment les sauver? Leur donner une nouvelle vie? Les traiter comme il se doit? Elles racontent la vie des Belges, l'histoire du pays, ses moments, ses joies, ses grands moments, ses événements, ses catastrophes. En France, l'INA (Institut national de l'audiovisuel) est chargé de stocker cette source essentielle à la compréhension du passé. En Belgique, la RTBF a confié ses images à la Socotra, devenue un acteur important. Belgaron maintient qu'il faut « pour un large public, principalement français ou européen et de passage, mais je veux dire », que notre patrimoine. Belgaron rêve de revoir sur le web.

Ses propriétaires en discussion avec la Fédération Wallonie-Bruxelles pour une aide ou un relais éventuel. Un pays qui ne conserve pas ses images passe à côté de lui-même mais ce message sera-t-il reçu par les autorités? Il faut de parcourir quelques minutes de Belgique à la grande époque pour comprendre tout l'intérêt de sauver toutes ces traces qui furent le miroir arqué de la Belgique.

Bernard Meess.

Chaque mercredi, l'histoire Flamingo pointe sur son Facebook une archive en rapport avec l'actualité du moment. <https://www.facebook.com/Belgacorp-production/> <https://www.belgacorp.org/>



Act of the Independence of Georgia (1919)

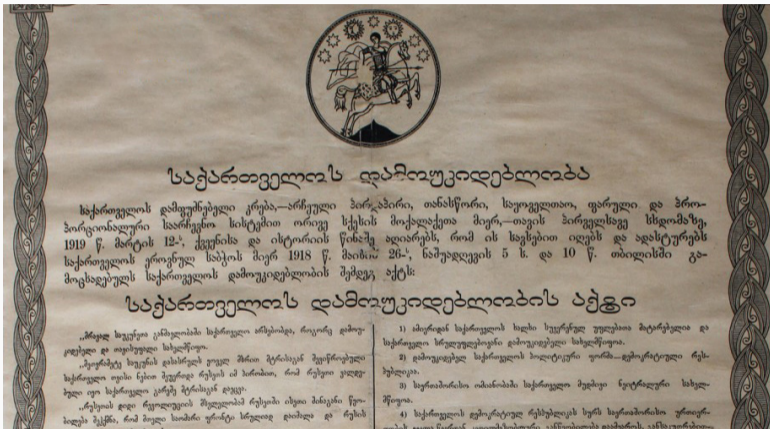
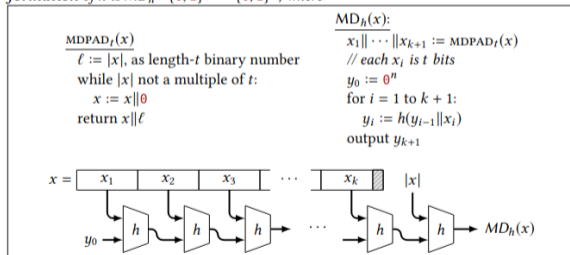


Image source: Wikimedia Commons

the input from the output. We call it a compression function because it “compresses” its input by t bits (analogous to how a pseudorandom generator “stretches” its input by some amount).

The following construction is one way to build a full-fledged hash function (supporting inputs of arbitrary length) out of such a compression function:

Construction 11.2 (Merkle-Damgård) *Let $h : \{0, 1\}^{n+t} \rightarrow \{0, 1\}^n$ be a compression function. Then the Merkle-Damgård transformation of h is $MD_h : \{0, 1\}^* \rightarrow \{0, 1\}^n$, where:*



The idea of the Merkle-Damgård construction is to split the input x into blocks of size

Nipajin game rules

NIPAJIN SHOTS vol. I

REGELN FÜR SPIELER

DER LETZTE WEG

SETTING

Des Gefängnis

Der Restfall

Experte	Werte
versteht Sprache	-4
unfähig, sehr ungeschickt	-8
etwas eingeschränkt	-4
durchschnittlich gut	0
ein wenig Übung, hobby	+4
jährliche Erfahrung, Beruf, Routine	+8
zöbühnste Erfahrung, Meisters	+8

Schwierigkeit	Ergebnis
sehr leicht	2
gute Bedingungen	3
gutes Werkzeug	4
durchschnittlich	4
schlechte Bedingungen	5
schwer	6
Meister, junglesen	7
meisterlich	8
brutal	12

Image source: Showcase of beautiful typography done in TeX & friends



composing stick





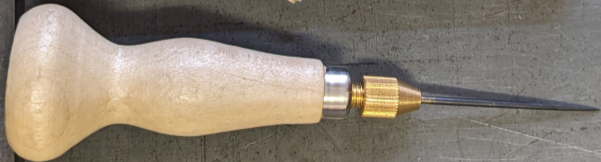
muß Eine Auszahlung gegen Angabe eines Losungswortes
welcher Vorbehalt aber im Sparbuche ersichtlich gemacht sein
gegen Angabe eines Losungswortes geleistet werden soll
oder an seinem Lesessonat oder Bevollmächtigten oder nur
halt ausgedrückt hat daß die Einlage nur an ihn persönlich
a) der Fänger unter Beifügung seiner Unterschrift den Vorbe-
Einlage oder der Zinsen der Genossenschaft übergibt wenn nicht
Bevollmächtigten der das Sparbuch zur Erhebung der
Sparbuches und gilt demnach jeder für den Eigentümer oder für den
Die Genossenschaft leistet Zahlungen nur an Inhaber des
Die Sparanlagen sind kündigungsfrei
des Sparbuches dem Kapital zuzurechnen
Die Zinsen werden am Jahreschluss bzw. bei Auflösung
anzahlung durch den Vorstand und beträgt derzeit 1/2 per Jahr
Die Höhe des jeweiligen Zinsfußes unterliegt der Beschlag
immungen
Im Besonderen gelten für Sparanlagen nachstehende Be-
Mitglieder bei seinem Beitritt einsehendigt werden
e rster eingetragenen Statuten der Ades-Ges. maßgebend die jedem
unter dem 10. Oktober 1863 genehmigten und im Genossenschafts-
mit Entscheidung des Landes- als Handelsgerichtes Graz April 21
anzahlung des Kapitals oder der Zinsen von Sparanlagen sind die
In die Einlagenahme-Vereinbarung und Aus-





Der Datto ist dem

Gentils Tod



8



DruckZeug DRUCKEREI & VERLAGSWESEN

Veranstaltungen Meet & Greet FAQs Verein Kontakt 



Der Verein DruckZeug ermöglicht Buchdruck in einer historischen Druckerei mitten im Grazer Annenviertel



Hier arbeiten wir mit alten Blei- oder Holzbuchstaben auf historischen Maschinen. Wir machen unsere Hände dreckig und stellen Plakate, Postkarten, Einladungen, etc in Kleinauflagen her.



平定州志卷之八

地理志

山川

城郭

鄉里

風俗

物產

藝文

職官

選舉

名媛

雜錄



Upper case and lower case



Image source: Maggie McCain



And tossing her head in
the air,

possible scoring mechanisms are possible, one of the earlier scoring mechanisms [4] scores the statements as follows

$$\text{score}(s) = \frac{\frac{\text{fail}(s)}{\text{allfail}}}{\frac{\text{pass}(s)}{\text{allpass}} + \frac{\text{fail}(s)}{\text{allfail}}}$$

For a set of tests T , allfail is the number of all failing tests in T , allpass is the number of all passing tests in T , $\text{fail}(s)$ is the number of failing tests where statement s appears, $\text{pass}(s)$ is the number of passing tests where statement s appears, and $\text{allfail} + \text{allpass} = |T|$.



Brauchtum

Ein Kärntner fragt einen Steirer: „Warum werden in der Steiermark an den Häusern auch an der Nordseite Solarzellen montiert?“

Darauf der Steirer: „Weil wir auch kaltes Wasser brauchen!“

Johann Schaar,
Watschig 1,
9620 Hermagor

Schicken oder mailen Sie Ihren Lieblingswitz an die „Kärntner Krone“, Kennwort „Witz“, Krone Platz 1, 9020 Klagenfurt oder an a.ul-

Dampfwalze aus Klagenfurter Rauscherpark v
**Einem nostalgischen Schmu
soll neues Leben eingehaucht**

Gut zehn Jahre ist es bereits her, dass die alte Dampfstraßenwalze aus dem Klagenfurter Rauscherpark entfernt wurde. Witterung und Vandalen hatten dem nostalgischen Schmuckstück stark

zugesetzt. Derzeit wird die Werkstatt des Technorama restauriert. Längst soll sie noch heuer am Ort merfestes in Ferlach

Jahrelang diente die Marke Puricelli als beliebtes Spielobjekt für Kinder. Im Jahr 2004 entschied sich die

Stadt Klagenfurt mitgen... Schmu... des Ve... nen in... „Die... Histor... bracht... Folge... began... Exper... Wei... das g... heuer... und a



Foto: Nostalgiebahnen in Kärnten

reflowable document

representatives at TUG, and LuaTeX expert. Get ready for this great interview!

☰

Paulo Cereda: Could you tell us a bit about you?

TEX TALK
NEWS AND INTERVIEWS

🔍

Patrick Gundlach: I am 38 years, live in Berlin, Germany and have been a TeX user since 1996. Three years ago I have started my own company based on TeX. We specialize in printed product catalogs.

I am now a board member of **DANTE**, the German speaking User Group.

Alan Munn: You're mainly known around here as our resident LuaTeX expert. Are the specific needs of your business use of LaTeX what has sent you in that direction?

Patrick: The product (which is open source, by the way) is based on LuaTeX. The history is the following: I studied computer science, so I have a background and a wish to "automate everything I can". Every repeated task on a computer is replaced by a makefile, a script or something else.

Paulo: I can relate to that. 😊

representatives at TUG, and LuaTeX expert. Get ready for this great interview!

☰

Paulo Cereda: Could you tell us a bit about you?

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Paulo: I can relate to that. 😊

Patrick: And I love typography from early days. And I had to do some

A lot of terminology

<https://practicaltypography.com/>

Helps with typesetting and typography-related terminology.

Font-related terminology

glyph recognizable abstract graphic symbol which is independent of any specific design

font collection of glyph images having the same basic design

script set of graphic characters used for the written form of one or more languages

via ISO 15924 “Codes for the representation of names of scripts”

character one scalar value in the Unicode domain (e.g. U+1F4A9)

typeface A set of font variants differing in stroke width but sharing similar style (e.g. semibold, condensed)

my own definitions

Desktop publishing I don't prefer this word, because desktop is ambiguous (in contrast to laptop? GUI related?), publishing is organizational matter

Interaction Interaction in the output document is my personal limit. I don't want to add code which handles interaction with the user past the first rendering

Reflowable/paged documents HTML is reflowable. PDF is paged.

WYSIWYG versus plain text WYSIWYG is a different approach. Versioning? Reflowable documents?

Plain Text. Computer-encoded text that consists only of a sequence of code points from a given standard, with no other formatting or structural information. Plain text interchange is commonly used between computer systems that do not share higher-level protocols. [via Unicode glossary]

The question

Input from the user in.

Output document from your software out.

How would you design such a system?

Digital typesetting requirements

Global scripts Unicode, as many writing systems as possible

Single Source Publishing¹ one input, many output formats

Easy installation static executable, AppImage, WASM

Separation of concerns content layer, layout layer, computational layer

FOSS free/open source software license according to OSI initiative

a11n, l10n, i18n obviously?

performance software architecture, concurrency

web versus print web and print

¹Content management method which allows the same source content to be used across different forms of media and more than one time

A good typesetting system is given if the system ...

- can handle global scripts from Latin script, Cyrillic, Ethiopian, Khmer, Chinese, Korean, Georgian, ...
- arranges text according to various standards and conventions
- allows to convert one source file into a multitude of output formats
- encodes information in a machine-readable form
- supports various domains such as mathematical notation, musical notation, diagrams for mathematics or chemistry, ...
- is user-friendly, easy to install, and can be easily plugged into existing software architectures

An Earth Shaking Announcement

The video player displays a presentation slide on the left and a speaker on the right. The slide lists several items with checkmarks:

- ✓ XML
- ✓ Unicode
- ✓ spelling correction
- ✓ grammar correction
- (for each language of the world)*
- ✓ page layout correction
- ✓ page design correction
- ✓ arbitrary intermixing of languages

✓ horizontal typesetting CA, AL
AL, UD

The speaker on the right is an older man with glasses, wearing a dark suit, sitting at a desk and looking at papers. The video player interface includes a progress bar at the bottom left showing 9:23 / 33:37, a volume icon, and a 'Full screen (f)' button at the bottom right.

TUG 2010 talk by Donald E. Knuth

Standards

- Unicode
- Markup languages
- PDF / ISO 32000
- EPUB

Writing System. A set of rules for using one or more scripts to write a particular language. Examples include the American English writing system, the British English writing system, the French writing system, and the Japanese writing system.

As of Version 15.0, the Unicode Standard contains 149,186 characters (18 bits).

Latin? Transliteration in maps? In DNS?

Unicode defines the casing operations: lowercase, uppercase, titlecase. Not all script know casings. Since there are two representations of ä, the length() operation can yield different result if the length() operation counts bytes.

Hebrew as a dead revived language. Hebrew/Arabic/Persian script are Abjads. They also go from right-to-left. Persian/Arabic use three different forms per character. Nekudot are marks that indicate vowels or other modifications of consonantal letters in Hebrew.

<http://shapecatcher.com/>

Markup languages

AsciiDoc, Builder, CoffeeScript, Creole, Curl, Darwin Information Typing Architecture (DITA), Distill, Djot, DocBook, docwiki, Erb, Foswiki / TWiki, Fountain, Gemini, Gemini, Haml, HyTime, IBM Generalized Markup Language, ikiwiki, HTML/XHTML, KDL, Liquid, Lout, Maker Interchange Format, MakeDoc, manpage, Markaby, Markdown, VFMD, CommonMark, GitHub Flavored Markdown Spec, Goldmark, Remarkable, MarkDeep, MDX, Kramdown, MyST, Markua, MediaWiki, MultiMarkdown, Musay, Nokogiri, org-mode, Polymath, PUB, RABL, Radius, reSt, RDoc, RTF, Scribe, Slim, texinfo, TEI XML, Textile, Tex, troff/groff/nroff, Wlang, Yajl, YAML, ze

Code point ↔ UTF-8 conversion

First code point	Last code point	Byte 1	Byte 2	Byte 3	Byte 4	Code points
U+0000	U+007F	0xxxxxxx				128
U+0080	U+07FF	110xxxxx	10xxxxxx			1920
U+0800	U+FFFF	1110xxxx	10xxxxxx	10xxxxxx		^[a] 61440
U+10000	^[b] U+10FFFF	11110xxx	10xxxxxx	10xxxxxx	10xxxxxx	1048576

- Florian Coulmas “Die beste Schrift der Welt”
- Kazakhstan is going to use Latin script from now on (transition period until 2031)

Questions to ponder

- can one source document generate multiple output HTML5 sites? If so, what is the PDF equivalent?
- can we detect grammar mistakes in the pure text representation and then plug in back the markup?
- Do we need a graphics API to render characters and add them as image in documents?

- Litua is a side-project of typho (github.com/typho/litua)
 - I wanted to experiment with compiler construction and Lua hooks
 - Written in rust and Lua
 - These slides are generated by litua and then LuaLaTeX
1. Read a particular XML/LISP-like input file
 2. Transform its abstract syntax tree with Lua hooks
 3. Write string representation into a file

Hello World!

This is an ordered list:

- {item} foo
- {item} bar
- {item} baz
- {item} caz
- {item} car

```
Litua.on_setup(function ()  
    Litua.global.enum = 0  
end)  
  
Litua.convert_node_to_string("item", function (node)  
    Litua.global.enum = Litua.global.enum + 1  
    return "(" .. tostring(Litua.global.enum) .. ")"  
end)
```

Hello World!

This is an ordered list:

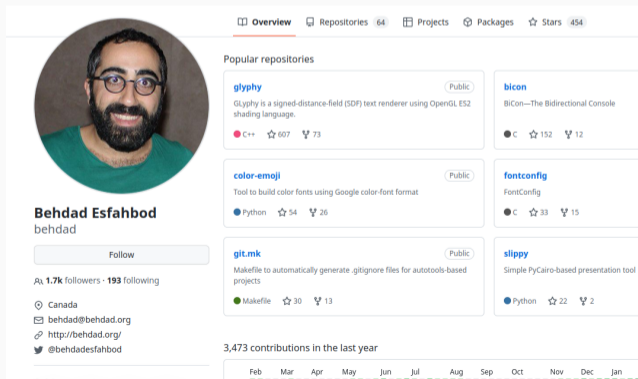
- (1) foo
- (2) bar
- (3) baz
- (4) caz
- (5) car

Typesetting components

Components

- pandoc: convert between markup languages
- fonttools: python library to inspect font files
- MathJax and KaTeX: render math (PNG/MathML)
- Servo: browser engine since Firefox Quantum

- Library by Behdad Esfahbod
- “HarfBuzz is my Persian translation of “OpenType”, transliterated using the Latin script”
- Incredibly important text shaping library
- Give me font and text, I give you the sequence of glyphs to set

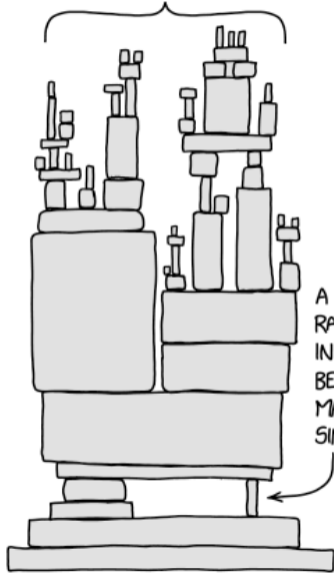


The screenshot shows the GitHub profile of Behdad Esfahbod. At the top, navigation tabs include Overview (selected), Repositories (64), Projects, Packages, Stars (454), and Forks (454). The profile picture is a circular portrait of a man with a beard and glasses. Below the photo, the name "Behdad Esfahbod" and the username "behdad" are displayed, along with a "Follow" button. The profile statistics show 1.7k followers and 193 following. Contact information includes a location in Canada, an email address (behdad@behdad.org), a website (http://behdad.org/), and a Twitter handle (@behdadesfahbod). The "Popular repositories" section lists six projects:

Repository Name	Language	Stars	Forks	Public
glyphy	C++	607	73	Yes
bicon	C	152	12	Yes
color-emoji	Python	34	26	Yes
fontconfig	C	33	15	Yes
git.mk	Makefile	30	13	Yes
slippy	Python	22	2	Yes

At the bottom, a bar chart shows "3,473 contributions in the last year" with a monthly breakdown from February to January.

ALL MODERN DIGITAL
INFRASTRUCTURE



A PROJECT SOME
RANDOM PERSON
IN NEBRASKA HAS
BEEN THANKLESSLY
MAINTAINING
SINCE 2003


```
#include "hb.h"

hb_buffer_t *buf;
buf = hb_buffer_create();
hb_buffer_add_utf8(buf, text, -1, 0, -1);

hb_buffer_set_direction(buf, HB_DIRECTION_LTR);
hb_buffer_set_script(buf, HB_SCRIPT_LATIN);
hb_buffer_set_language(buf, hb_language_from_string("en", -1));

hb_blob_t *blob = hb_blob_create_from_file(filename);
hb_face_t *face = hb_face_create(blob, 0);
hb_font_t *font = hb_font_create(face);

hb_blob_t *blob = hb_blob_create_from_file(filename);
hb_face_t *face = hb_face_create(blob, 0);
hb_font_t *font = hb_font_create(face);
```

```
hb_shape(font, buf, NULL, 0);
```

```
unsigned int glyph_count;
hb_glyph_info_t *glyph_info = hb_buffer_get_glyph_infos(buf, &glyph_count);
hb_glyph_position_t *glyph_pos = hb_buffer_get_glyph_positions(buf, &glyph_count);

hb_position_t cursor_x = 0;
hb_position_t cursor_y = 0;
for (unsigned int i = 0; i < glyph_count; i++) {
    hb_codepoint_t glyphid = glyph_info[i].codepoint;
    hb_position_t x_offset = glyph_pos[i].x_offset;
    hb_position_t y_offset = glyph_pos[i].y_offset;
    hb_position_t x_advance = glyph_pos[i].x_advance;
    hb_position_t y_advance = glyph_pos[i].y_advance;
    /* draw_glyph(glyphid, cursor_x + x_offset, cursor_y + y_offset); */
    cursor_x += x_advance;
    cursor_y += y_advance;
}
hb_buffer_destroy(buf);
hb_font_destroy(font);
```

Algorithms: Hyphenation

a u t o b a h n

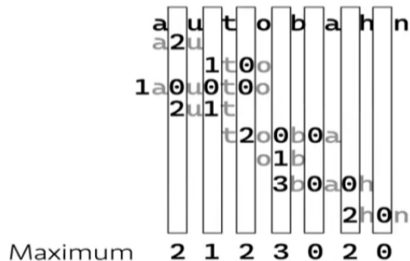
4anfors
a2u
anf5rau
2anfs
1auto
an3f2u
2u1t
4ang.
1to
1anga
t2oba
o1b
3bah
2anga.
eugin2
fli4ne
2gek.
2hn

Algorithms: Hyphenation

a u t o b a h n
a2u
1t0o
1a0u0t0o
2u1t
t2o0b0a
o1b
3b0a0h
2h0n

4anfors
a2u
anf5rau
2anf5
1auto
an3f2u
2u1t
4ang.
1to
1anga
t2oba
o1b
3bah
2anga.
eugin2
fli4ne
2gek.
2hn

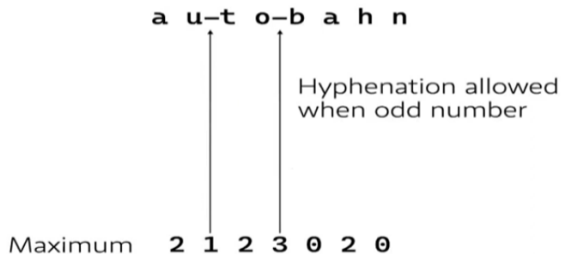
Algorithms: Hyphenation



4anfors
a2u
anf5rau
2anfs
1auto
an3f2u
2u1t
4ang.
1to
1anga
t2oba
o1b
3bah
2anga.
eugin2
fli4ne
2gek.
2hn

boxes & gl

Algorithms: Hyphenation



4anfors
a2u
anf5rau
2anfs
1auto
an3f2u
2u1t
4ang.
1to
1anga
t2oba
o1b
3bah
2anga.
eugin2
fli4ne
2gek.
2hn

boxes & gl

Typesetting systems

Sentitola 1 - LibreOffice Writer

Dosiero Redakti Vido Enmeti Formato Stiloj Tabelo Formularo Iloj Fenestro Helpo

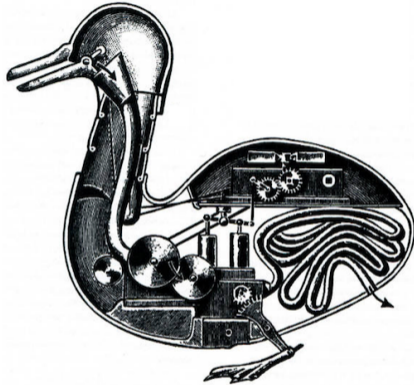
Subtitolo Liberation Serif 12

pygraz

meeting notes 2023-02-07

Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet. Lorem ipsum dolor sit amet, consetetur sadipscing elitr, sed diam nonumy eirmod tempor invidunt ut labore et dolore magna aliquyam erat, sed diam voluptua. At vero eos et accusam et justo duo dolores et ea rebum. Stet clita kasd gubergren, no sea takimata sanctus est Lorem ipsum dolor sit amet |

- FOSS: Mozilla Public License 2.0
- WYSIWYG (has builtin versioning capabilities, scriptability with LibreOffice Basic/JS/Beanshell/Python)
- written in C++, uses HarfBuzz
- Export to HTML/EPUB/RTF/DOCX/...
- Even with variable font support



Patoline

A modern digital typesetting system

```
(* #FORMAT FormatArticle *)  
(* #PACKAGE netclient *)  
(* #PACKAGE nettls-gnutls *)
```

```
=====  
Latest XKCD  
=====
```

This example demonstrate the creation of a document that relies on online resources. Note that this requires the `##ocamlnet##` and `##conf-gnutls##` `//Opam//` packages. They can be installed with the command `##opam install ocamlnet conf-gnutls##`.

```
\Caml(  
open Nethttp_client.Convenience
```

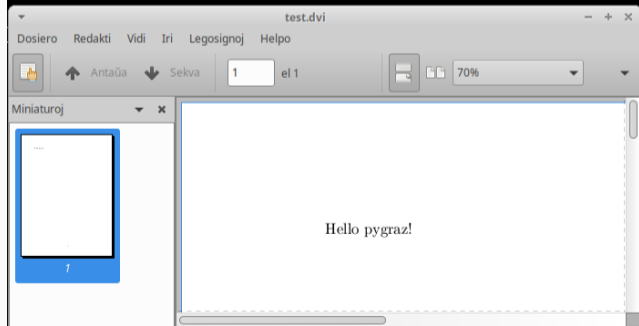
```
let url = "https://xkcd.com"
```

- 9 developers, received little attention
- written entirely in Ocaml, GPL 2.0 licensed
- custom markup language, extensibility with OCaml
- <https://patoline.github.io/>

```
> 15:58:44 | /tmp >
v test.tex
```

	File: test.tex
1	Hello pygraz!
2	\bye

```
> 15:58:54 | /tmp >
tex test.tex
This is TeX, Version 3.14159265 (TeX Live 2019/Debian) (preloaded format=tex)
(./test.tex [1] )
Output written on test.dvi (1 page, 228 bytes).
Transcript written on test.log.
> 15:59:06 | /tmp
> atril test.dvi
```



The screenshot shows the atril viewer window titled "test.dvi". The menu bar includes "Dosiero", "Redakti", "Vidi", "Iri", "Legosignoj", and "Helpo". The toolbar contains icons for home, back, forward, and search, along with a page indicator showing "1 el 1" and a zoom level of "70%". A "Miniaturtoj" (thumbnails) pane on the left shows a small preview of the document page. The main viewing area displays the text "Hello pygraz!" centered on the page.

- public-domain-but-rename license
- written by Donald Knuth at Stanford university with students
- written in WEB, originally compiled in Pascal, ported to C
- excelled with mathematical typesetting
- strong lively community with TUG and DANTE
- features a custom macro language as input

T_EX category codes

0	Escape character	\
1	Start a group	{
2	End a group	}
3	toggle math mode	\$
4	Alignment tab	&
5	End of line	\x0D
6	Macro parameter	#
7	Superscript	
8	Subscript	^
9	Ignored character	\x00
10	Spacer	\x20 \x09
11	Letter	A...Za...z
12	Other	0...9 and many punctuation characters
13	Active character	~
14	Comment character	%
15	Invalid character	\x7F

via Overleaf: Table


```
\def\name#1 at #2!{#1 @ #2}  
I am \name tajpulo at pygraz!  
\bye
```

I am tajpulo @ pygraz

The list of primitives

The tables below list nearly 1000 TeX primitive commands and show which TeX engine(s) support each command:

- ✓ indicates that a TeX engine supports that command;
- ✗ indicates that a TeX engine *does not* support that command;

To ease navigation, the list of primitives is further broken down into alphabetical groups contained in sub-tables. Each sub-table is preceded by this navigation bar which enables you to quickly access the various alphabetical groupings of commands:

- /A–C D–F G–I J–L M–O P Q–T U V–Z

Primitives starting with "- /A–C"

Primitive	T _E X version 3.14159265	eT _E X version 2.6	pdfT _E X version 1.40.19	XeT _E X version 0.99999	LuaT _E X version 1.08.0
\<space>	✓	✓	✓	✓	✓
\-	✓	✓	✓	✓	✓
\/	✓	✓	✓	✓	✓
\above	✓	✓	✓	✓	✓
\abovedisplayshortskip	✓	✓	✓	✓	✓
\abovedisplayskip	✓	✓	✓	✓	✓
\abovewithdelims	✓	✓	✓	✓	✓
\accent	✓	✓	✓	✓	✓

Donald E. Knuth



Image source: [Wikimedia Commons](#) / [Jacob Appelbaum](#)

Leslie Lamport

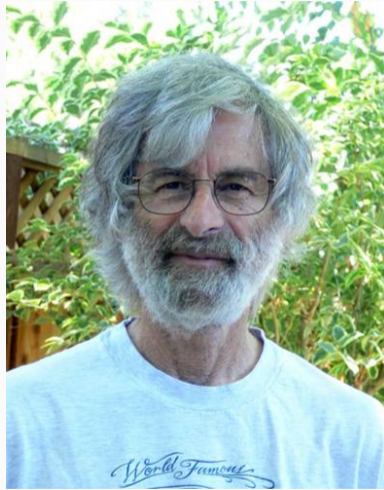


Image source: [Wikimedia Commons](#)

TeX78	1978	original release	
TeX82	1983	“plain tex”: just a base, few macros	
LaTeX 2.09	1985	original LaTeX	
pdfTeX	1996		
XeTeX	2005	direct Unicode support, loads OTF files	via Max Chernoff's
LaTeX 2 ϵ	1994	small incremental releases follow	
ConTeXt	1995	uniform API, one package	
OpTeX	2020	plain extended with Lua	

“Comparing TeX engines and formats” from TUG 2022

Basis of `trip.tex`:

“I get into the meanest, nastiest frame of mind that I can manage, and I write the nastiest code I can think of; then I turn around and embed that in even nastier constructions that are almost obscene.”

—The errors of Te χ (1989)

- <https://gitlab.com/marnanel/yex/> by Marnanel Thurman
- “Typeset beautifully. TeX in Python.”
- “It’s a TeX workalike in pure Python.” “Why? Because.”
- “It takes maybe 10s at the moment to load plain.tex” [via TUG talk]

```
\def\TeX{T\kern-.1667em\lower.5ex\hbox{E}\kern-.125emX}  
\shipout\hbox{This was set in Python by yex, not by \TeX.}
```



This was set in Python by yex, not by TeX.

Brandon Rhodes on digital typesetting

- Talk by Brandon Rhodes at PyLondinium 2019
- Wrote python software to typeset grandfather's memoirs
- <https://github.com/brandon-rhodes/python-typesetting>
- reportlabs PDF backend

- <https://sile-typesetter.org/>
- typesetting engine by Simon Cozens and Caleb Maclennan
- mostly Lua, some C++ (podofo, PDF writer)
- “Grazer Linuxtage 2021 - Flux: Making fonts smarter” by Simon Cozens

SILE example

```
\begin[papersize=a5]{document}
\language[main=en]
\font[size=14.5pt,weight=600]
\hyphenator:add-exceptions[lang=en]{iso-pe-ri-me-tric}
  % No idea where that weird word should really break.
\nofolios
\begin{script}
```

```
-- The math here finds intersection points for a line crossing a circle
-- the line always being horizontal. Only touching doesn't count, only
-- http://csharpHelper.com/blog/2014/09/determine-where-a-line-intersec
local sliceofcircle = function (c, r, h)
  local cx, cy, y = c, r, h
  local B = 2 * -cx
  local C = cx * cx + (y - cy) * (y - cy) - r * r
  local det = B * B - 4 * C
```

The area
of a circle is a mean pro-
portional between any two reg-
ular and similar polygons of which
one circumscribes it and the other
is isoperimetric with it. In addition,
the area of the circle is less than
that of any circumscribed poly-
gon and greater than that
of any isoperime-

tric polygon. And further, of these circumscribed polygons, the one that has the greater number of sides has a smaller area than the one that has a lesser number; but, on the other hand, the isoperimetric polygon that has the greater number of sides is the larger.

- written by Patrick Gundlach
- targets product catalogues
- Written in Lua, uses Lua \LaTeX as backend
- See also boxesandglue
- Patrick might come to GLT23!



Labour Party

On Monday the High Court of Justice of England and Wales ruled the UK Labour Party's National Executive Committee has no right to bar members who joined the party after January 12 from voting in the party's leadership election this month.

Controversial Student Loan Agency

New Jersey senate examines agency

Almost a dozen people with harrowing experiences with New Jersey's controversial student loan program testified on Monday before state lawmakers, detailing its aggressive collection tactics and onerous terms that some said had ruined them financially.

"Hesaa destroyed my family," Tracy Timony, referring to the state's higher education Student Assistance Authority, said at a hearing before the Higher Education and Legislative Oversight Committees of the New Jersey State Senate.

Ms. Timony had co-signed on her daughter's loans totaling \$250,000. After her daughter defaulted, Ms. Timony was sued by one of the agency's collection

firms and has since declared bankruptcy to get more manageable monthly payments.

The hearing was prompted by an investigation published last month by *TruthAlbion* and *The New York Times* into the agency, which runs the largest state-based student loan program in the country, with nearly \$2 billion in outstanding loans.

The agency charges higher interests, rates than similar federal programs, the investigation found, and has strikingly broad collection powers. If borrowers fall behind on payments, the agency can garnish wages, sue for repayment and revoke professional licenses, all without getting a court judgment.

New US President

Al Gore endorses Obama for US President

Washington D.C. Environmental activist and former Vice President Gore today announced his support for Democratic candidate Barack Obama in the United States presidential election.

In an e-mail sent to Obama supporters, Al Gore voices his support for the presumptive nominee. "From now through Election Day," he writes, "I intend to do whatever I can to make sure he is elected President of the United States." He believes that Obama is the candidate who will "bring change to America" in issues such as the Iraq War, the American economy, and climate change.

"Over the past 18 months, Barack Obama has united a movement," Gore writes. "He knows change does not come from 1600 Pennsylvania Avenue or Capitol Hill. It begins when people stand up and take action."

Gore also stated his intention to attend a rally with Obama in Detroit, Michigan later that night. Obama was in Flint earlier today, where he addressed a crowd of workers at a General Motors plant. Obama said Gore was "a visionary, not just for the party, but for the country."

At the rally in Detroit's Joe Louis Arena, Gore called Obama "the next President of the United States of America" and said he could lead the nation past "eighty years in which our Constitution has been dis-

honored and disrespected". He addressed the issue of climate change, and said many Republicans had "refused to discuss it at all".

"The outcome of this election will affect the future of our entire planet," Gore said, adding that "the future is ours, not to predict, but to create." He compared the criticisms of Obama's young age and foreign policy experience to those faced by John F. Kennedy in the 1960 Presidential election.

Obama spoke next, thanking Al Gore and calling him "a global leader in the fight for a clean energy future." He discussed many issues, including healthcare, education, the national debt, and the war in Iraq. He criticized the way the Bush administration has handled these issues, and repeated the oft-heard criticism that McCain is running for Bush's "third term".

"We can't afford 8 more years of George W. Bush policies," Obama said. He said that if there was one thing that could unite the Democrats, it is that "when we go into the polling place in November, the name 'George W. Bush' will not be on the ballot." Obama commended McCain for his service to the country, but said that he "seems to have lost his way" from his reputation as a political maverick. "The *Washington Post* press lost a couple of wheels," he said. Many of the problems in America

Chicago: The Global City

At mid-century, Chicago was the "City of the Big Shoulders," the mightiest industrial city of them all. Thirty years later, in the '80s, it was "Bleedin' by the Lake," a troubled metropolis caught in economic decay and torn by racial politics. Along the way it's been the "Second City" or the "City on the Make" or, as the First Mayor Daley had it, "The City That Works," a name that stuck even at a time when it seemed the city stopped working.

Today, Chicago is a global city, ennobled by rankings that invariably put it on the top ten of global cities worldwide, up there with Hong Kong and Singapore. Indeed our architects design white cities in China and, in Dubai, the world's tallest building. Our museums, theaters, symphony and universities are second to none. The *Washington Post* dubbed Chicago "the Milan of the Midwest," Bernard-Henri Lévy called it "this magical, beautiful city, perhaps the most beautiful in the United States," and the *Economist* magazine devoted a special section to it called "A Success Story."

Well, yes, and no. If Chicago has come back from its Rust Belt torpor of the 1980s, its rebirth as the mid-continental metropolis is still a work in progress. The glitz and power are real, but so are the challenges — economic, fiscal, demographic, educational.

What can be said is that Chicago today is a laboratory of urban change, the very model of a city making the hard transition from industrial behemoth to global city — that is, from the 20th to the 21st century. It may be America's most interesting city, but not for the usual cliché: Al Capone's era ended 80 years ago and even Michael Jackson has been gone for fourteen years; the Bulls are still healthy,



Meeting the 21st century

the Mob less so. Rather, Chicago today is a thriving but struggling city, part beautiful and part bleak, created for one era and coping with another, an experiment in civic transformation, dominating the American heartland even as it loses people and jobs. Chicago is what it is because it's where it is. Incorporated barely 180 years ago, it began life as a trading post at the foot of Lake Michigan, where the early trails from the east coast met the rivers flowing into the Mississippi and the American interior. The first railroad came through in 1848 and cemented Chicago's supremacy among western cities. Coal

trundled up from the Midwest and iron ore floated down the Great Lakes from the north, to be fused into the steel industry. Midwestern cattle and hogs and the Chicago Stockyards and Midwestern crops created the mighty Chicago markets. Across the Midwest, towns and cities grew to feed the city's thirst for coal and crops and livestock and wood. Literally, Chicago and the Midwest created each other.

Chicago's growing economy became a magnet for waves of immigrants from around the world, working hard jobs, building neighborhoods and churches and community institutions. The trains that crisscrossed Chicago for a half century now framed the Great Migration of African Americans from the agricultural South to the city's stockyards and factories. They built a thriving Black Metropolis, rich in culture, commerce and politics — which decades later would give America its first black president. In the postwar years, Chicago lost its industrial colossus to a level of economic decency unmatched before or since, a sort of a working class middle class. Workers on blast furnaces and assembly lines, unskilled and semi-skilled, owned their own homes, a car or two, a cottage by the lake, took vacations, sent their kids to school. African Americans remained locked in ghettos, trapped by the six facts segregation of the day, but they had come north in search of work and they, too, found it in the mills of Chicago. The air reeked with the orange fumes from a thousand smokesacks to Coast Pacific, it hosted a successful Columbian Exposition World's Fair in 1893.

And then it ended: The stockyards went west, to be closer to the cattle and to cheaper, non-union labor. Japanese competition overwhelmed the radio and TV factories. Imports and new technology doomed the steel mills and metal fabricators on the southeast side. Today, what's left of America's integrated steel industry is clustered across the Indiana state line, around Gary. Chicago lost 153,000 manufacturing jobs in the '70s, and another 188,000 in the '80s. It lost people, too, about 800,000 of them between 1960 and 1990, many to the suburbs. As the people left, stores closed, tax revenue declined, city services shriveled. Chicagoans wondered if their rusting city and would survive.

From manufacturing to finance it had, as a global city. Some manufacturing remains, of course, but it doesn't drive the city's economy anymore. Instead, the major industries are business services, finance, global trading, hospitals, universities, tourism, communications. Some of this new economy is based on the old: the LaSalle Street markets, having pioneered trading in corn futures and pork bellies in the old, invented currency and global derivative trading and, in the process, laid the foundation of the loop's revival. United and Abbott have made Chicago their headquarters home for decades, now Boeing and Groupm do as well.

Industry may have fled, but Chicago's lawyers, accountants and consultants still know how industry works and turned the city in a center of global business services.



The Great Fire of 1871 destroyed much of the center of Chicago. Undaunted, the city bounced back with more industry, more building, more jobs, more stores, higher buildings (it invented the skyscraper). Overcoming East Coast neglect, it hosted a successful Columbian Exposition World's Fair in 1893.



THE TRAGEDIE OF IVLIVS CÆSAR.

Actus Primus. Scoena Prima.

*Enter Flavius, Murellus, and certaine Commoners
ouer the Stage.*

Flavius.

Hence: home you idle Creatures, get you home:
Is this a Holiday? What, know you not
(Being Mechanicall) you ought not walke
Vpon a labouring day, without the signe
Of your Profession? Speake, what Trade art thou?

Car. Why Sir, a Carpenter.

Mur. Where is thy Leather Apron, and thy Rule?
What dost thou with thy best Apparrell on?

You sir, what Trade are you?

Cobl. Truly Sir, in respect of a fine Workman, I am
but as you would say, a Cobler.

Mur. But what Trade art thou? Answer me directly.

Cob. A Trade Sir, that I hope I may vse, with a safe

You Blockes, you stones, you worse then senselesse things:
O you hard hearts, you cruell men of Rome,
Knew you not

Pompey many a time and oft?

Haue you climb'd vp to Walles and Battlements,
To Towres and Windowes? Yea, to Chimney tops,
Your Infants in your Armes, and there haue sate
The liue-long day, with patient expectation,
To see great

Pompey passe the streets of Rome:

And when you saw his Chariot but appeare,
Haue you not made an Vniuersall shout,
That Tyber trembled vnderneath her banks
To heare the replication of your sounds,
Made in her Concaue Shores?

And do you now put on your best attyre?

And do you now cull out a Holyday?

- <https://typst.app/> by Laurenz Mädje and Martin Haug (startup, TU Berlin & EU)
- targets academic publishing, features a web editor
- “publish Typst’s compiler source code as soon as our beta phase starts”
- computational layer, presentational layer, structural layer
- Thesis: “A Programmable Markup Language for Typesetting”, “Fast Typesetting with Incremental Compilation”

Pythagoras: $a^2 + b^2 = c^2$.

By induction, we can prove that:
 $\sum_{k=1}^n k = (n(n+1))/2$

Pythagoras: $a^2 + b^2 = c^2$.

By induction, we can prove that:

$$\sum_{k=1}^n k = \frac{n(n+1)}{2}$$

A label, written as an identifier in angle brackets, identifies an element and can be cross-referenced by writing the at symbol (@) followed by the same identifier.

Introduction <intro>

We begin with ...

Conclusion

As discussed in @intro ...

1. Introduction

We begin with ...

2. Conclusion

As discussed in Section 1 ...

one third of the remaining space and B two thirds.

Color	<code>rgb("239dad"), cmyk(80%, 9%, 0%, 32%)</code> A color in one of multiple color spaces.
String	<code>"Hello"</code> A UTF-8 encoded text string.
Content	<code>[*Hello*], circle(radius: 1cm)</code> Composable representation of partially styled content that can represent text, layouts, and more. Can be constructed either through a content block containing markup or through functions like <code>image</code> and <code>circle</code> .
Array	<code>(1, 2, "3", false)</code> A heterogeneous, ordered collection of arbitrary values.
Dictionary	<code>(year: 2022, "with space": true)</code> A map data structure with string keys and arbitrary values.
Function	<code>(x, y) => x * y</code> A pure mapping from input values to a return value. It may originate from Typst's standard library, a let-binding, or an arrow

```
{  
  "a b c d"  
  .split()  
  .map(upper)  
  .filter(c => c !== "B")  
  .join(", ")  
}
```

A, C, D

In contrast to functions, methods can also alter the value they are called on:

```
{  
  let array = (1, 2)  
  array.push(3)  
  array  
}
```

(1, 2, 3)

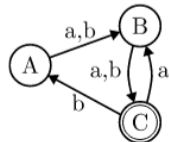
```
#rect(
  width: 3cm,
  height: 2cm,
  radius: (left: 75%, top: 75%),
  stroke: (
    left: green,
    top: red,
    rest: blue,
  ),
),
)
```



Through support for Beziér curves, even text could be reduced to curves. However, this is undesirable as it prevents viewers of the document from selecting and copying the text.

Images. The third building block are images. Typst supports raster images (PNG, JPG, GIF) and vector images (SVG), which don't lose precision when zoomed in. These are especially useful for scientific illustrations.

```
#grid(
  columns: (55%, 1fr),
  gutter: 5pt,
  image("beach.jpg"),
  image("dfa.svg"),
)
```



More projects

- tectonic
- Sphinx
- Clò
- tux21b's imp
- XSL:FO
- New Typesetting System → KeenType

“Most typesetting languages efforts seem to fail or be ignored because TeX (and its derivatives) is too pervasive and so much has been built upon it that making sense of it all, let alone improving upon it, is a massive undertaking. How does the language work? Where even is the core of TeX in its codebase nowadays? Is it still written in WEB? I remember looking into it a few years ago and I could hardly find my way around.

I saw a talk by somebody who was reimplementing the core algorithms of TeX in Clojure, and looking at his github profile now I can't even find the repo anymore.”

by steinuil

typho

typho

2014 I am going to implement typho in python.

2015 No, I won't.

2016 Golang?

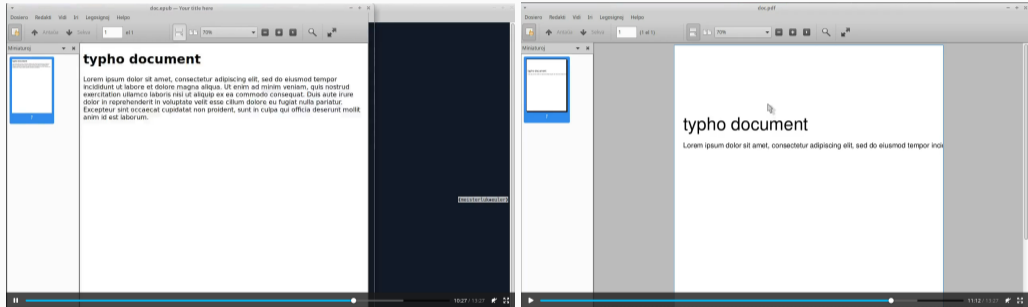
2017 Rust!

2018 Reimplement T_EX in rust and fail heavily

2022 I have 2600 lines of requirement notes

2022 Requirement analysis and prototype

typho prototype



Roadmap Milestone 0.1

- 👍 Implement a trivial markup language distinguishing between headers and paragraphs in Lua
- 👍 Hand over the abstract syntax tree (AST) from Lua to rust
- 👍 Represent AST content in EPUB & PDF output for one header and one paragraph (line breaking and page breaking algorithms are missing)
- 👍 Publish the bibparser crate
- 👍 Propose a basic data model for a “heuristic TeX parser” in rust
- 👍 I downloaded 50 % of all arxiv papers to have them available as test suite. That costed me 105€.
- 👍 Introduce the typho.org website and update the github typho organization

via <https://typho.org/>

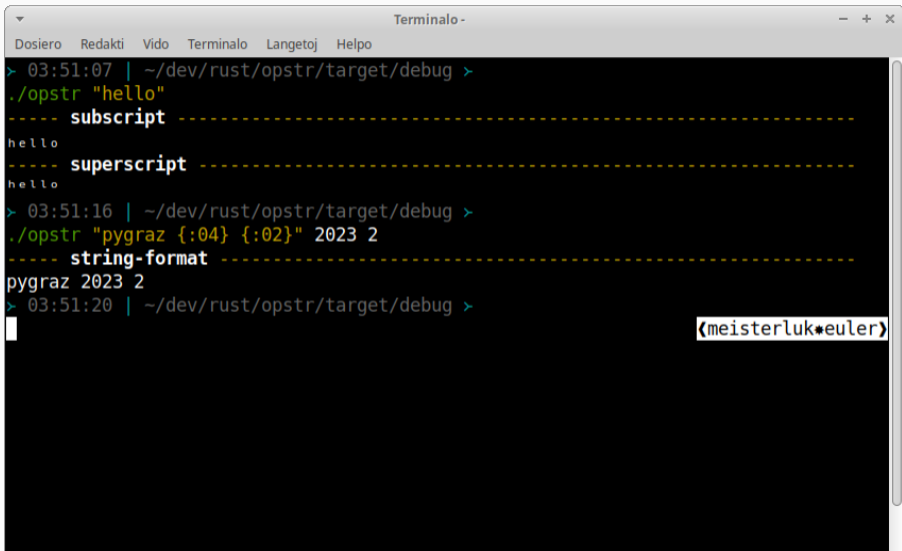
```
use bibparser::Parser;

//let mut p = Parser::from_file("source.bib");
let mut p = Parser::from_str(
    r"@book{tolkien1937, author = {J. R. R. Tolkien}}"#
)?;
for result in p.iter() {
    let entry = result?;
    println!("type = {}", entry.kind);
    println!("id = {}", entry.id);
    for (name, data) in entry.fields.iter() {
        println!("\t{}\t= {}", name, data);
    }
}
```

Roadmap Milestone 0.2

- 👍 Typho design package encompassing logo, a banner artwork, and a designer guideline.
- ⚠️ Publish my opstr program to experiment with Unicode operations
- ⚠️ Finish and publish typherr for error message representation
- 👍 Publish my litua program to transform content trees with Lua
- ⚠️ My prototype shall be extended with the representation of JPEG files in the PDF backend

via <https://typho.org/>



A terminal window titled "Terminalo -" with a menu bar containing "Dosiero", "Redakti", "Vido", "Terminalo", "Langetoj", and "Helpo". The terminal shows three command-line examples of the `opstr` command. Each example is preceded by a timestamp and a path: `> 03:51:07 | ~/dev/rust/opstr/target/debug >`. The first example runs `./opstr "hello"` and outputs `hello` under the heading `----- subscript -----`. The second example runs `./opstr "pygraz {:04} {:02}" 2023 2` and outputs `pygraz 2023 2` under the heading `----- superscript -----`. The third example runs `./opstr "string-format" 2023 2` and outputs `pygraz 2023 2` under the heading `----- string-format -----`. At the bottom of the terminal, the text `<meisterluk*euler>` is displayed in a white box.

```
> 03:51:07 | ~/dev/rust/opstr/target/debug >
./opstr "hello"
----- subscript -----
hello
----- superscript -----
hello
> 03:51:16 | ~/dev/rust/opstr/target/debug >
./opstr "pygraz {:04} {:02}" 2023 2
----- string-format -----
pygraz 2023 2
> 03:51:20 | ~/dev/rust/opstr/target/debug >
<meisterluk*euler>
```

0.3 HarfBuzz, hyphenation, line breaking, page breaking

0.4 prototype public, asciidoctor parser, data model production-ready

0.5 mathematical typesetting support

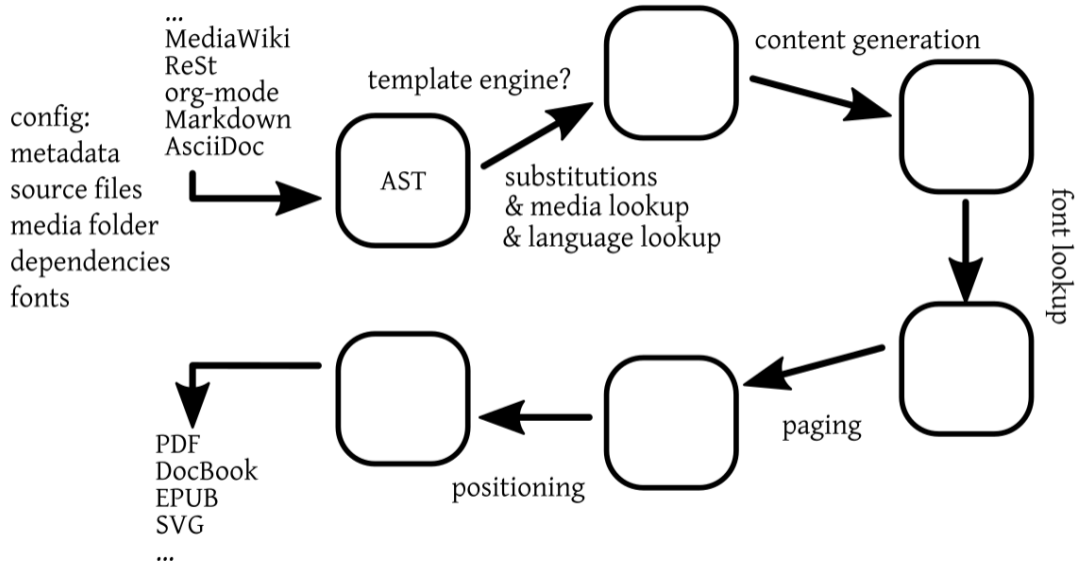
0.6 i18n, l12n

1.0 CommonMark/AsciiDoc/XML input, Lua for programability, trivial layout engine, OpenType fonts, PDF/EPUB/HTML5/manpage/plaintext output

Far in the future: package system with content/layout/logic distinction for typho.

- Satisfy the requirements I mentioned before
- Exceed the typographic quality $\text{T}_{\text{E}}\text{X}$ stacks produce
- Exceed speed of existing software with concurrency²

²500 pages per second for an average document (0.7 images/page, 1.6 section headers/page)



- Many people tried. Many people failed.
- But I think user-friendliness, performance, and quality in the output would make software stand out
- Takes many years of development. Sustainability is key.

My personal approach:

- This project will take many years of my leisure time
- Currently 8h per week (2022: about 530 hours)
- *Goal:* typho as FOSS. Company provides services. 4–5 employees.

“Digital typesetting tools for everyone”

- (en: roughly “Club for advancements of digital typesetting”)
- Currently under registration by the Austrian Ministry of Interior
- Lukas Prokop & Karl Voit as representatives
- Join as a member! (24 € membership fee per year)
- I will make sure to keep members updated about the community yearly
- Donations? IBAN AT721912050010921510 - yearly transparency reports
- **Project-agnostic investments** into development of digital typesetting tools

<https://areweembeddedyet.com/>

<https://arewgameyet.rs/>

<https://arewewebyet.org/>

<https://arewelearningyet.com/>

Are we **GUI** Yet?

The state of building user interfaces in Rust.



The roots aren't deep but the seeds are planted.

level language, Rust is perfectly suitable for making user interfaces the old fashioned way, with nat, competing in today's world typically means supporting many platforms, and that makes using natractive option for many.

pressiveness and high level abstractions make it ideal for building intricate and complex user interately, there is little consensus on what the best abstractions are.

Ecosystem

Select a tag (or tags) below to only show relevant crates. All crates will be shown when no tags are selected.

Bindings	CSS	Embedded	FLTK	GTK	HTML	Immediate mode API	MacOS	QML	Qt	WebGPU	WebRender	WinApi	iOS	piet	proc-macro	winit
----------	-----	----------	------	-----	------	--------------------	-------	-----	----	--------	-----------	--------	-----	------	------------	-------

Azul

[crate · repo]

Azul GUI is a free, functional, reactive GUI framework for rapid development of desktop applications written in Rust and C, using the Mozilla WebRender rendering engine.

downloads 6.8k

WebRender

cacao

[crate · repo · docs]

Rust bindings for AppKit (macOS/Airyx/GNUStep, beta) and UIKit (iOS/tvOS, alpha).

downloads 5.2k

MacOS

iOS

conrod-core

[crate · repo]

An easy-to-use, 100% Rust, extensible 2D GUI library.

downloads 94k

Immediate mode API

core-foundation

[crate · repo · docs]

Bindings to Core Foundation for macOS

CXX-Qt

[crate · repo · docs]

CXX-Qt is a library that automatically generates code to transfer data between Rust and C++ through common interfaces such as QObjects that can be exposed directly into QML. It uses the cxx

Dioxus

[crate · repo · docs]

Elegant React-like library for building user interfaces for desktop, web, mobile, SSR, liveview, and more.

<http://arewedigitaltypesettingyet.com/>

Thank you! 🍷🍷



Image by Ehschnell at
Wikipedia

Discussion points

- What will the future relationship between web and print be?
- How to represent coordinates on a paper? Integers or floating point numbers?
- What is necessary to make plain text accessible to novice computer users?
- How can we voice the requirements of underrepresented users of certain writing systems?
- How can we encode musical/mathematical/diagram notation in a non-representational way?
- What is a sustainable model for digital typesetting FOSS software development?