Digital Research Toolkit for Linguists

Week 10: LaTeX basics

Anna Prysłopska

June 10, 2024

Psycholinguistics and Cognitive Modeling Lab

Homework

Submit QMD and HTML ✓

Keep **all the code** you need for analyzing and visualizing the data. ✓

Table, list, plot ✓

`python` ⛔🐍

`assignmentqmd.sec` 😵

renamed to `assignment.qmd` ✓

that's why I asked for both `QMD` and `HTML`

Homework

A report should contain your name and title of the report. Also **some** (rudimentary) description of the experiment.

```
---
title: "Reporting and Documenting with Quarto"
author: "Anna Prysłopska"
format: html
editor: visual
…
---
```

`format` output type (HTML, PDF, DOC, ...), not quarto

`editor` type of text editor (visual or not → leave out)

Homework

> Reference the table, list, and plot in the report text by hyperlinking/cross-referencing.

```
: Table caption. {#tbl-id}
```
Table ID & caption

```
[Table reference](#tbl-id)
```
Manual reference

```
@tbl-id
```
Automatically formated reference

````
```{r}
#| label: tbl-id
#| fig-cap: "Table caption."

print(table)
```
````

Now I can cross-reference `@tbl-id` in the text.

Homework

Code type goes in the curly brackets {}. Code itself goes in between the ```:

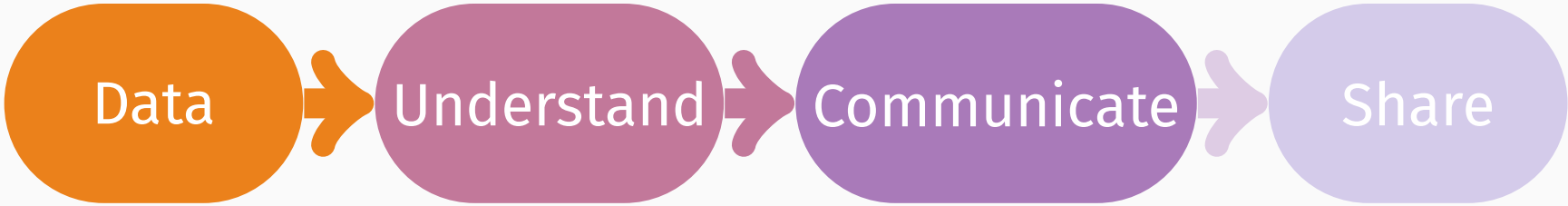
````
```{r}
sessionInfo()
```
````

> Include at least one **plot** of the data.

plot != image

If you want to include an image, include it in the upload.

Questions?



R & RStudio, packages, data types, formats, encoding

import from workspace, assign values, operations, clean, filter, arrange, select, merge, group, summarize, export, visualize

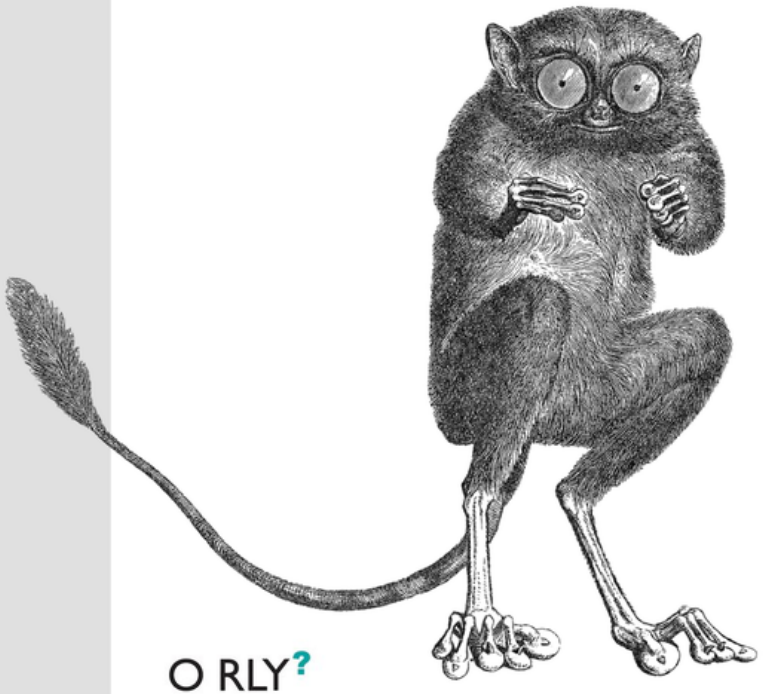
document, create clean and beautiful reports

connect, collaborate, backup

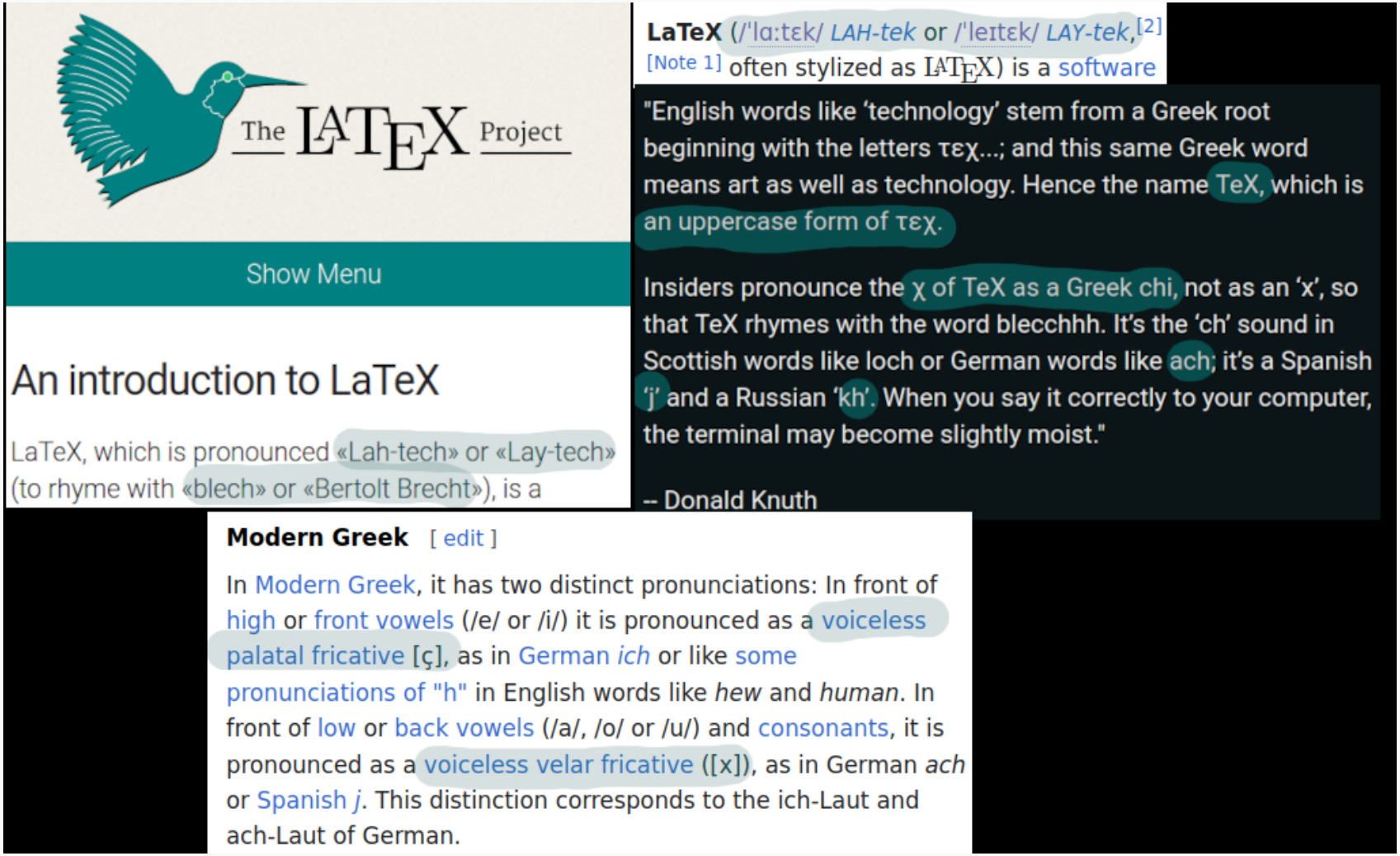
Table of contents

Beautiful Typesetting with LaTeX

Overfull \hbox (9.895pt too wide)

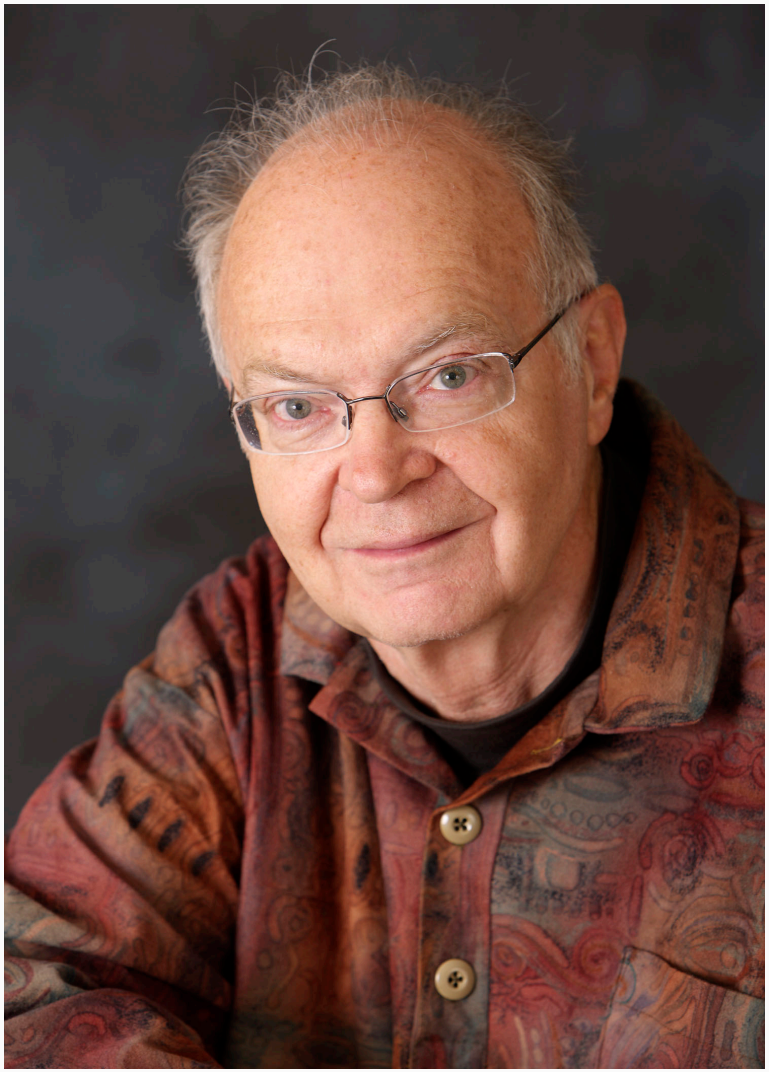


What is LaTeX



Name: ˈlatɛç, ˈlɑːtɛx or ˈleɪtɛx but you can do whatever as long as it's not ˈleɪtɛks.

What is LaTeX



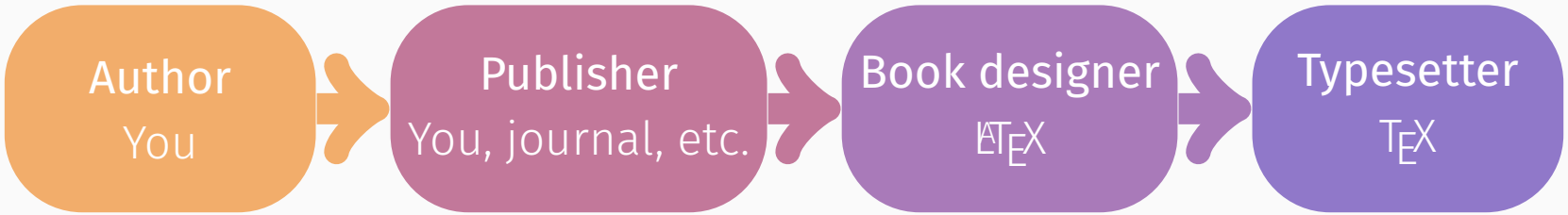
Donald Knuth © Hector Garcia-Molina

Originally: TeX was a computer program for typesetting text and mathematic formulae.

Now it comes in different flavors: LaTeX, pdfTeX, pdfLaTeX, XeTeX, XeLaTeX, LuaTeX, LuaLaTeX, ...

Aim: typeset and print at the highest typographical quality using a predefined, professional layout.

Installation: Base and packages (`https://ctan.org/`)


Author
You
Publisher
You, journal, etc.
Book designer
LaTeX
Typesetter
TeX

LaTeX vs. Word

Reporting and Documenting with Quarto

Anna Prysłopska, , <A-Team@army.org>

Introduction

This a Quarto document. It shows a lot of features. You can use the source or visual editors to write your report and the render the file to the format of your choosing. Quarto primarily works with UTF-8 encoded text.

Structure

Give your file structure. Use sections to organize the content into logical bits:

```
# Header 1
## Header 2
### Header 3
#### You get the idea
```

If you're using the visual editor, simply click on the option you want from the drop down menu, as in Figure 1).

You can also include horizontal rules if you want to be fancy. Just use 3+ asterisks ****** or dashes ------

---

Basic text formatting

You can make your text stand out by making it *italic* *italic* _italic_ or **bold** **bold** __bold__. Spacing matters: * *this is broken**. In the visual editor, a lot of the options are available as the usual keyboard shortcuts, but you can also format text by clicking (Figure 2).

Reporting and Documenting with Quarto

Anna Prysłopska, 孫子, Стамен Гигов Григоров <A-Team@army.org>

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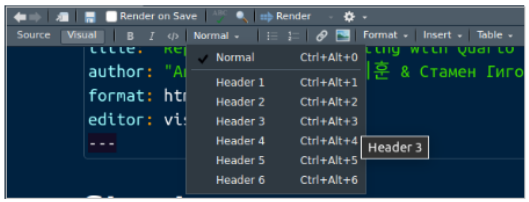

Figure 1: Adding sections to Quarto document.

You can also include horizontal rules if you want to be fancy. Just use 3+ asterisks ****** or dashes ------

---

Basic text formatting

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LaTeX vs. Word

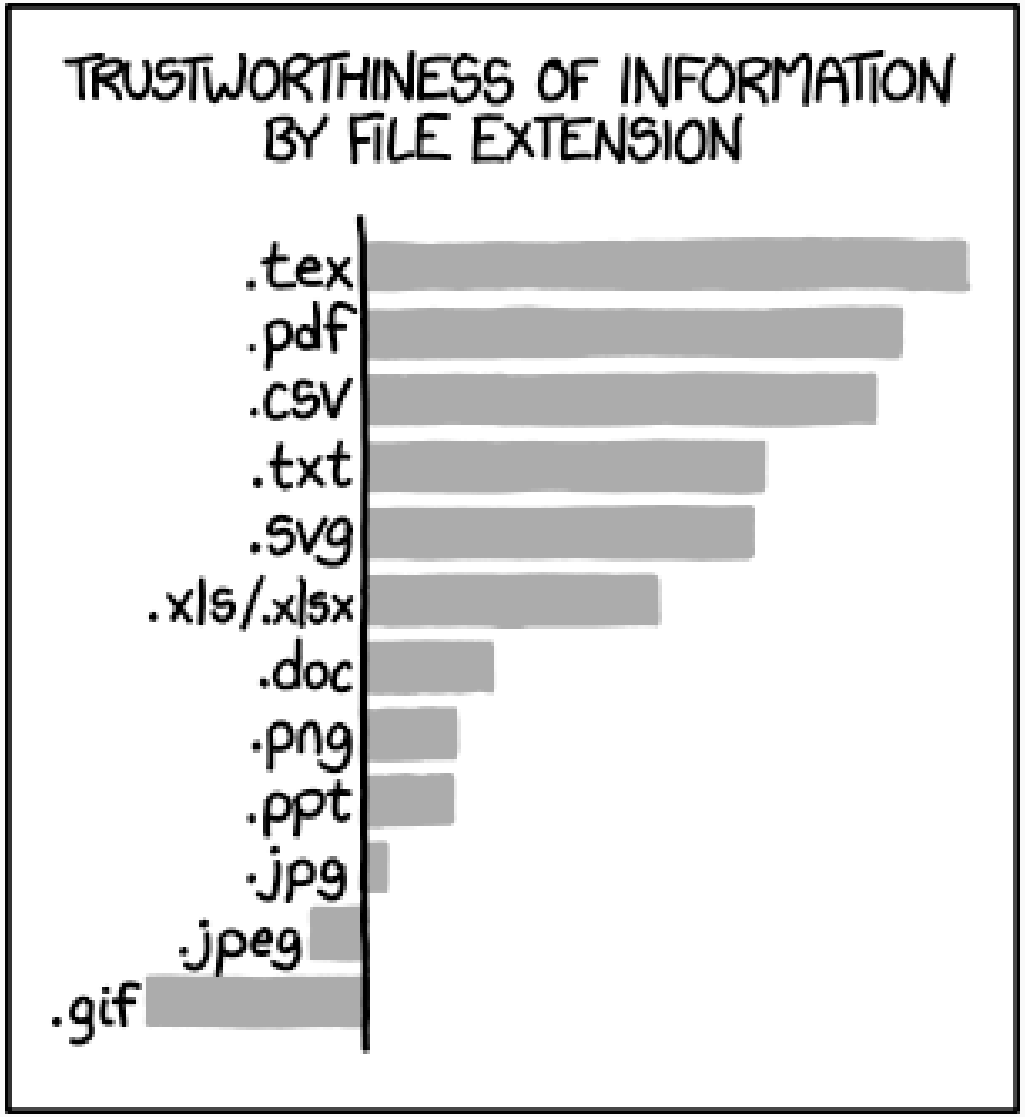
	LaTeX	Word
Typesetting	program	user
Design	program	user
Changes	appear later (after compilation)	updated dynamically (interactively)
Output	abstract thinking	what you see is what you get
Focus	writing	writing, layout, design
Rights	free and OS	proprietary
Documents	literally anything	limited to most common formats

Advantages and disadvantages: LaTeX

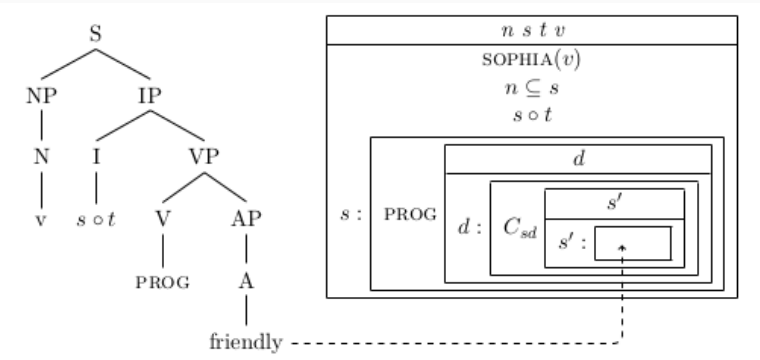
PROS	CONS
Free and portable	Less common
Professionally crafted layouts	Made by opinionated nerds
Beautiful documents with minimal effort	Changing the design requires patience & arcane knowledge
Pictures/tables appear where they should	Naming files matters
Typesetting mathematical & semantic formulae, symbols, syntactic trees, automata, DRSs, IPA etc. is supported & convenient	People might get jealous
Footnotes, TOC, references, bibliographies are easy, dynamic, & automatic	
Free packages for all typographical needs	Some packages hate each other
Just text	Debugging is annoying
Fast once learned	Steep learning curve

Advantages and disadvantages: Word

PROS	CONS
Minimal learning curve	Creating professional & beautiful documents takes time and effort
WYSIWYG	Math is difficult, slow, & often ugly
Known & ridiculously popular	Glosses, DRSs, syntactic trees are a pain to make and place
Easy-to-use reviewing tools	Bibliography is clunky
	(Cross)references are buggy & slow
	Repositioning elements creates chaos


TRUSTWORTHINESS OF INFORMATION BY FILE EXTENSION
.tex
.pdf
.csv
.txt
.svg
.xls/.xlsx
.doc
.png
.ppt
.jpg
.jpeg
.gif

Munroe (2013)



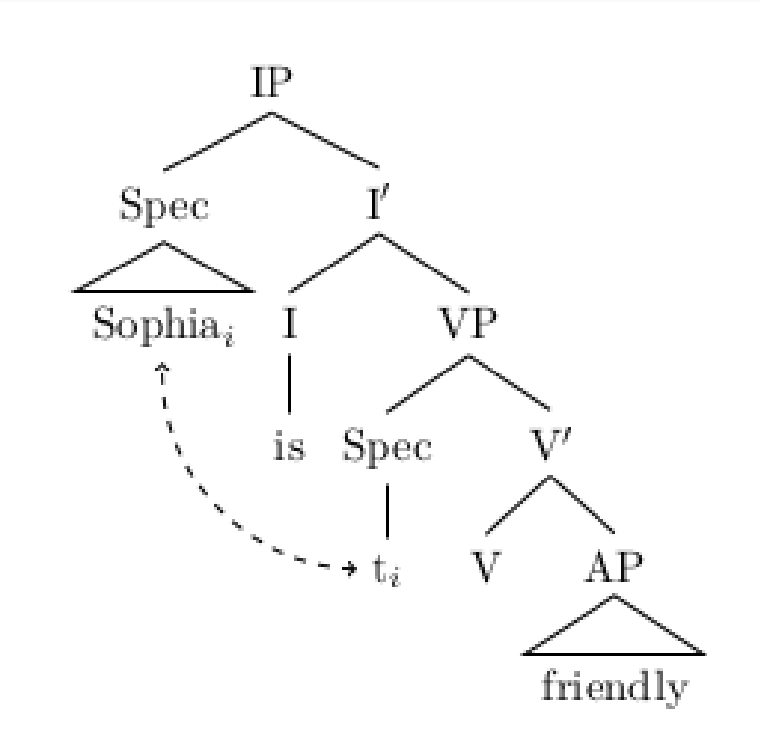
(52) Sophia is being friendly.

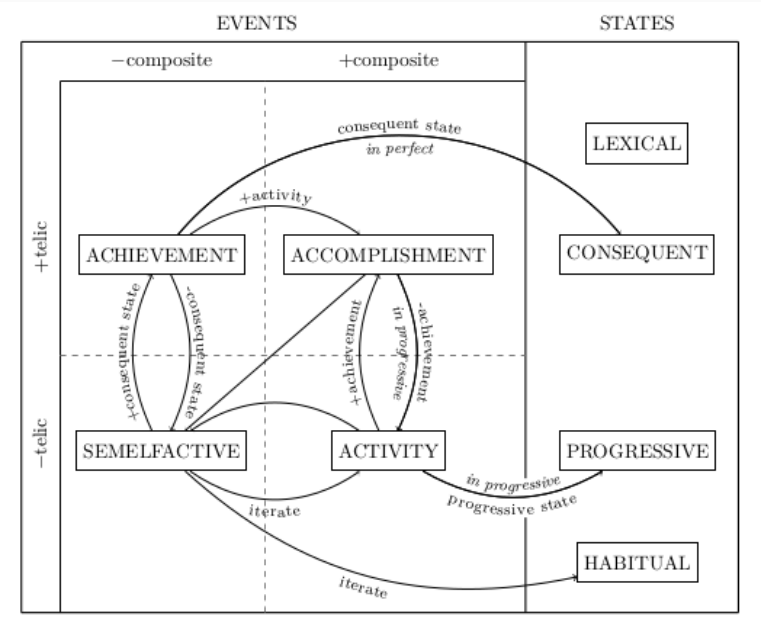
a. $[\![\text{Sophia}]\!] \equiv \text{SOPHIA}_{+animate}$

b. $[\![\text{be}_3]\!] \equiv \lambda P[P_{+active}]$

c. $[\![\text{be}_3\ \text{friendly}]\!] \equiv \lambda P[P_{+active}](\text{FRIENDLY})$
$\equiv \lambda x[\text{FRIENDLY}_{+active}(x)]$

d. $[\![\text{Sophia is being friendly}]\!]$
$\equiv \lambda x[\text{FRIENDLY}_{+active}(x)](\text{SOPHIA}_{+animate})$
$\equiv \text{FRIENDLY}_{+active}(\text{SOPHIA}_{+animate})$



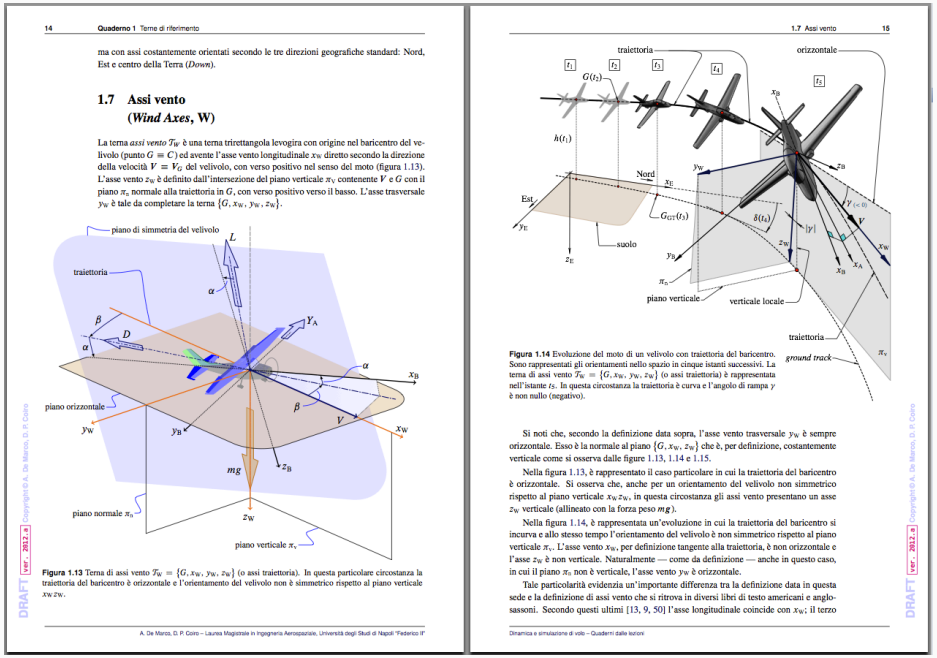


This is just a completely necessary show-off of the endless capabilities of LaTeX. Good luck trying to replicate this in Microsoft Word. Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum. And check this out:

$$\lim_{x\to 0}\frac{e^x-1}{2x}\overset{\left[\frac{0}{0}\right]}{\underset{H}{=}}\lim_{x\to 0}\frac{e^x}{2}=\frac{1}{2};A\xleftarrow{\text{this way}}B\xrightarrow[\text{or that way}]{}C;z=\underbrace{x}_{\text{real}}+i\underbrace{y}_{\text{imaginary}};\frac{1}{\pi}\int_{-\pi}^{\pi}x^2z\,dx$$

Now, these are some professional-looking mathematical equations if you ask me! Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

♡



14 Quaderno 1 Terne di riferimento

ma con assi costantemente orientati secondo le tre direzioni geografiche standard: Nord, Est e centro della Terra (*Down*).

1.7 Assi vento (*Wind Axes*, W)

La terna *assi vento* $\mathcal{T}_W$ è una terna trirettangola levogira con origine nel baricentro del velivolo (punto $G \equiv C$) ed avente l'asse vento longitudinale x_W diretto secondo la direzione della velocità $\boldsymbol{V} = \boldsymbol{V}_G$ del velivolo, con verso positivo nel senso del moto (figura 1.13). L'asse vento z_W è definito dall'intersezione del piano verticale π_V contenente $\boldsymbol{V} \in G$ con il piano π_n normale alla traiettoria in G, con verso positivo verso il basso. L'asse trasversale y_W è tale da completare la terna $\{G, x_W, y_W, z_W\}$.

Figura 1.13 Terna di assi vento $\mathcal{T}_W = \{G, x_W, y_W, z_W\}$ (o assi traiettoria). In questa particolare circostanza la traiettoria del baricentro è orizzontale e l'orientamento del velivolo non è simmetrico rispetto al piano verticale $x_W z_W$.

A. De Marco, G. P. Coiro – Laurea Magistrale in Ingegneria Aerospaziale, Università degli Studi di Napoli "Federico II"

1.7 Assi vento 15

Figura 1.14 Evoluzione del moto di un velivolo con traiettoria del baricentro. Sono rappresentati gli orientamenti nello spazio in cinque istanti successivi. La terna di assi vento $\mathcal{T}_W = \{G, x_W, y_W, z_W\}$ (o assi traiettoria) è rappresentata nell'istante t_5. In questa circostanza la traiettoria è curva e l'angolo di rampa γ è non nullo (negativo).

Si noti che, secondo la definizione data sopra, l'asse vento trasversale y_W è sempre orizzontale. Esso è la normale al piano $\{G, x_W, z_W\}$ che è, per definizione, costantemente verticale come si osserva dalle figure 1.13, 1.14 e 1.15.

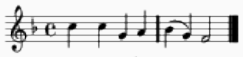
Nella figura 1.13, è rappresentato il caso particolare in cui la traiettoria del baricentro è orizzontale. Si osserva che, anche per un orientamento del velivolo non simmetrico rispetto al piano verticale $x_W z_W$, in questa circostanza gli assi vento presentano un asse z_W verticale (allineato con la forza peso $m\boldsymbol{g}$).

Nella figura 1.14, è rappresentata un'evoluzione in cui la traiettoria del baricentro si incurva e allo stesso tempo l'orientamento del velivolo è non simmetrico rispetto al piano verticale π_v. L'asse vento x_W, per definizione tangente alla traiettoria, è non orizzontale e l'asse z_W è non verticale. Naturalmente — come da definizione — anche in questo caso, in cui il piano π_n non è verticale, l'asse vento y_W è orizzontale.

Tale particolarità evidenzia un'importante differenza tra la definizione data in questa sede e la definizione di assi vento che si ritrova in diversi libri di testo americani e anglosassoni. Secondo questi ultimi [13, 9, 50] l'asse longitudinale coincide con x_W; il terzo

Dinamica e simulazione di volo – Quaderni dalle lezioni

Tilburg Science Hub (2024)

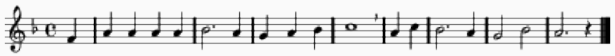


Credincioșii: Doamne miluieste.

Preotul: *Pe Preasfânta, curata, preabinecuvântata, mărita stăpâna noastră, de Dumnezeu Născătoarea și pururea Fecioara Maria, cu toți sfinții să o pomenim.*

People: Lord, have mercy.

Priest: *Let us remember our most holy, pure, blessed, and glorious Lady, the Mother of God and ever virgin Mary, with all the saints.*

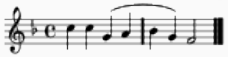


Credincioșii: Preasfântă Născătoare de Dumnezeu, miluiește-ne pe noi.

Preotul: *Pe noi înșine și unii pe alții și toată viața noastră, lui Hristos, Dumnezeu să o dăm.*

People: Most holy Mother of God, have mercy upon us.

Priest: *Let us commit ourselves and one another and all our life to Christ our God.*

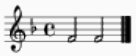


Credincioșii: Ție, Doamne.

Preotul: *Că Ție se cuvine toată slava, cinstea și închinăciunea, Tatălui și Fiului și Sfântului Duh, acum și pururea și în vecii vecilor.*

People: To You, O Lord.

Priest: *For to You belong all glory, honor, and worship to the Father and the Son and the Holy Spirit, now and forever and to the ages of ages.*

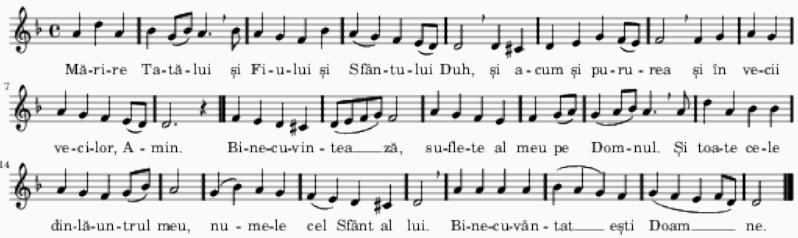


Credincioșii: Amin.

People: Amen.

ANTIFONUL ÎNTÂI[2]

THE FIRST ANTIPHON[2]

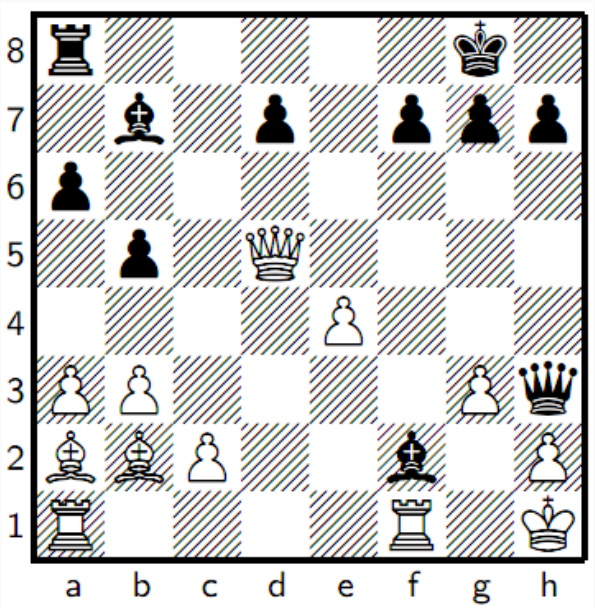


Credincioșii: Mărire Tatălui și Fiului și Sfântului Duh, și acum și pururea și în vecii vecilor. Amin. Binecuvintează, suflete al meu pe Domnul. Și toate cele dinlăuntrul meu, numele cel Sfânt al lui. Binecuvântat ești Doamne.

People: Glory to the Father, and to the Son, and to the Holy Spirit, now and ever, and to the ages of ages. Amen. Bless the Lord, O my soul. And all that is within me, bless His holy Name. Blessed are You, O Lord.

[2]Cuvântul «antifon» vine din limba greacă și înseamnă «treaptă». Antifonul Întâi cuprinde începutul *Psalmului 102* și este o cântare de slăvire a lui Dumnezeu.

[2]The word «antiphon» comes from Greek, meaning «step». The First Antiphon encompasses the beginning of *Psalm 102*, and it is a song of praise to God.



Le premier liure de Moyſe,

Dict Geneſe.

ARGVMENT.

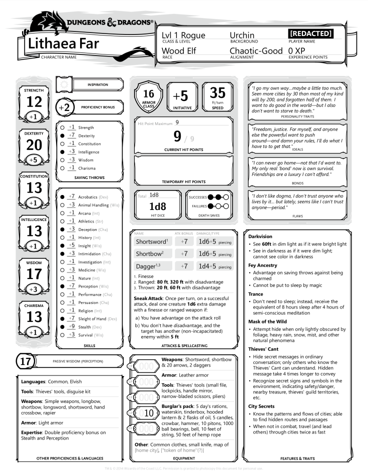
Ce premier liure comprend l'origine & cauſes de toutes choſes, principalement la creation de l'homme, qu'il a eſté du commencement, ſa cheute & releuement : comment d'un tous ont eſté procreés, & pour leurs enormes pechés Dieu les a conſumés, par le deluge, reſerué huict, dont la ſemence a rempli toute la terre. Puis il deſcrit les vies, faicts, religion, & lignees des ſaints Patriarches, qui ont veſcu deuant la Loy : Les benedictions, promeſſes, & alliances du Seigneur faictes auec iceux : Comment de le la terre de Chanaan ſont deſcendus en Egypte. Aucuns ont appelé ce liure, le liure des Iuſtes. Toutefois ceci a obtenu entre nos predeceſſeurs & nous, qu'il eſt appelé Geneſe, qui eſt vn mot Grec, ſignifiant generation & origine : d'autant qu'en icelui eſt deſcrite l'origine & procreation de toutes choſes : & nommément des Peres anciens, qui ont eſté tant deuant qu'apres le deluge, & eu eſgard à IESVS CHRIST deſcendu d'iceux ſelon la chair.

CHAPITRE I.

[1] Creation du ciel & de la terre, II, 20. & de tout ce qui y eſt compris. 3.14 De la lumiere auſſi, 26 & de l'homme, 28 Auquel tout eſt aſſubietti. 2.2. 28 Dieu benit toutes ſes œuures, 31 qu'il a accomplies en ſix iours.

D[1]Ieu [a]crea
[b]au com
mence-
ment [c]le
ciel & la
terre.
2 Or la
terre eſ-
toit ſans
forme, &
vuide,& les tenebres eſtoyent ſur les
abyſmes : & l'Eſprit de Dieu [d]eſtoit
eſpandu par deſſus les eaux.
3 Adonc Dieu dît, [2]Qu'il y ait lumie-
re. [e]Et la lumiere fut.
4 Et Dieu vid q̃ la lumiere eſtoit bon-
ne : & ſepara la lumiere des tenebres.
5 Et Dieu appela la lumiere iour,& les
tenebres nuict. Lors fut faict le [f]ſoir &
le matin du premier iour.
6 ¶ Puis Dieu dît, [3]Qu'il y ait vne [g]eſ-
tendue entre les eaux, & qu'elle ſepare
les [h]eaux d'auec les eaux.
7 Dieu donc fit l'eſtendue, & diuiſa
les eaux, qui eſtoyent ſous l'eſtendue,
d'auec celles, qui eſtoyent ſur l'eſten-
due. Et fut ainſi faict.
8 Et Dieu appela l'eſtendue, Ciel. Lors
fut faict le ſoir & le matin du ſecond
iour.
9 ¶ Puis Dieu dît, [4] [i]Que les eaux, qui
ſont ſous le ciel, ſoyent aſſemblees en
vn lieu, & que le ſec apparoiſſe. Et fut
ainſi faict.
10 Et Dieu appela le ſec,Terre,& l'aſſem
blee des eaux, mers. Et Dieu vid que
celà eſtoit bon.
11 Et Dieu dît, Que la terre produiſe
verdure, herbe produiſant ſemence, &
arbre fruictier, faiſant fruict ſelon ſon
eſpece, lequel ait ſa ſemẽce en ſoy-meſ-
me ſur la terre. Et fut ainſi faict.
12 La terre dõc produiſit verdure, her-
be produiſant ſemẽce ſelon ſon eſpece,
& arbre ſans fruict, lequel auoit ſa
ſemence en ſoymeſme ſelon ſon eſpe-
ce. Et Dieu vid que celà eſtoit bon.
13 Lors fut faict le ſoir & le matin du
troiſieme iour.
14 ¶ Apres Dieu dît, [5] [k]Qu'il y ait lumi
naires en l'eſtendue du ciel, pour ſepa-
rer la nuict du iour : & ſoyẽt en [l]ſignes,

a en



DUNGEONS & DRAGONS®

CHARACTER NAME	Lithaea Far
CLASS & LEVEL	Lvl 1 Rogue
BACKGROUND	Urchin
PLAYER NAME	[REDACTED]
RACE	Wood Elf
ALIGNMENT	Chaotic-Good
EXPERIENCE POINTS	0 XP

Ability	Score	Modifier
STRENGTH	12	+1
DEXTERITY	20	+5
CONSTITUTION	13	+1
INTELLIGENCE	13	+1
WISDOM	17	+3
CHARISMA	13	+1

INSPIRATION

+2 PROFICIENCY BONUS

SAVING THROWS

Proficient	Bonus	Save
○	+1	Strength
●	+7	Dexterity
○	+1	Constitution
●	+3	Intelligence
○	+3	Wisdom
○	+1	Charisma

SKILLS

Proficient	Bonus	Skill
●	+7	Acrobatics (Dex)
○	+3	Animal Handling (Wis)
○	+1	Arcana (Int)
○	+1	Athletics (Str)
●	+3	Deception (Cha)
○	+1	History (Int)
●	+5	Insight (Wis)
●	+3	Intimidation (Cha)
○	+1	Investigation (Int)
○	+3	Medicine (Wis)
○	+1	Nature (Int)
●	+7	Perception (Wis)
○	+1	Performance (Cha)
○	+1	Persuasion (Cha)
○	+1	Religion (Int)
●	+7	Sleight of Hand (Dex)
●	+9	Stealth (Dex)
○	+3	Survival (Wis)

17 PASSIVE WISDOM (PERCEPTION)

16 ARMOR CLASS | +5 INITIATIVE | 35 ft/turn SPEED

Hit Point Maximum 9

9 / 9 CURRENT HIT POINTS

TEMPORARY HIT POINTS

Total 1d8 — 1d8 HIT DICE

DEATH SAVES — SUCCESSES ●●○ FAILURES ●○○

ATTACKS & SPELLCASTING

NAME	ATK BONUS	DAMAGE/TYPE
Shortsword[1]	+7	1d6+5 piercing
Shortbow[2]	+7	1d6+5 piercing
Dagger[1,3]	+7	1d4+5 piercing

1. Finesse
2. Ranged: **80 ft**, **320 ft** with disadvantage
3. Thrown: **20 ft**, **60 ft** with disadvantage

Sneak Attack: Once per turn, on a successful attack, deal one creature **1d6** extra damage with a finesse or ranged weapon if:

a) You have advantage on the attack roll
b) You don't have *dis*advantage, and the target has another (non-incapacitated) enemy within **5 ft**

OTHER PROFICIENCIES & LANGUAGES

Languages: Common, Elvish

Tools: Thieves' tools, disguise kit

Weapons: Simple weapons, longbow, shortbow, longsword, shortsword, hand crossbow, rapier

Armor: Light armor

Expertise: Double proficiency bonus on Stealth and Perception

EQUIPMENT

CP 000 · SP 000 · EP 000 · GP 10 · PP 000

Weapons: Shortsword, shortbow & 20 arrows, 2 daggers

Armor: Leather armor

Tools: Thieves' tools (small file, lockpicks, handle mirror, narrow-bladed scissors, pliers)

Burglar's pack: 5 day's rations, waterskin, tinderbox, hooded lantern & 2 flasks of oil, 5 candles, crowbar, hammer, 10 pitons, 1000 ball bearings, bell, 10 feet of string, 50 feet of hemp rope

Other: Common clothes, small knife, map of [home city], ["token of home"(?)]

PERSONALITY TRAITS: *"I go my own way...maybe a little too much. Seen more cities by 30 than most of my kind will by 200, and forgotten half of them. I want to do good in the world—but I also don't want to starve to death."*

IDEALS: *"Freedom, justice. For myself, and anyone else the powerful want to push around—and damn your rules, I'll do what I have to to get that."*

BONDS: *"I can never go home—not that I'd want to. My only real 'bond' now is own survival. Friendships are a luxury I can't afford."*

FLAWS: *"I don't like dogma, I don't trust anyone who lives by it... but lately, seems like I can't trust anyone—period."*

FEATURES & TRAITS

Darkvision
- See **60ft** in dim light as if it were bright light
- See in darkness as if it were dim light; cannot see color in darkness

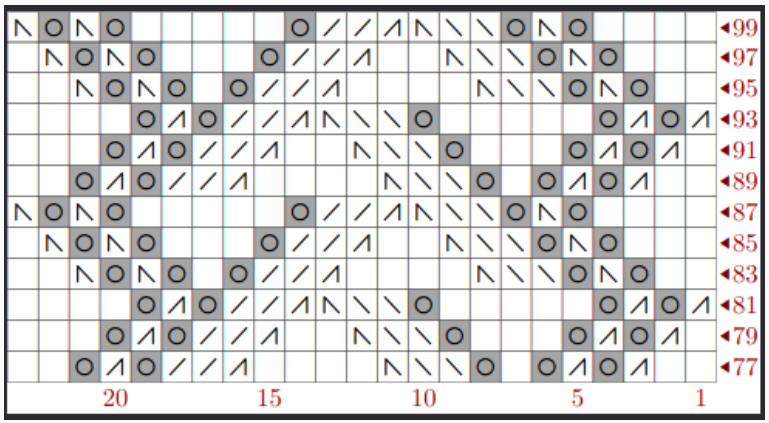
Fey Ancestry
- Advantage on saving throws against being charmed
- Cannot be put to sleep by magic

Trance
- Don't need to sleep; instead, receive the equivalent of 8 hours sleep after 4 hours of semi-conscious meditation

Mask of the Wild
- Attempt hide when only lightly obscured by foliage, heavy rain, snow, mist, and other natural phenomena

Thieves' Cant
- Hide secret messages in ordinary conversation; only others who know the Thieves' Cant can understand. Hidden message take 4 times longer to convey
- Recognize secret signs and symbols in the environment, indicating safety/danger, nearby treasure, thieves' guild territories, etc.

City Secrets
- Know the patterns and flows of cities; able to find hidden routes and passages
- When not in combat, travel (and lead others) through cities twice as fast



3 Example

Mousse au Chocolat

1 h
5 Personen
R. Gaus

Zubereitung

1 Eier trennen, Eiweiß und Sahne separat steif schlagen. Butter und Schokolade vorsichtig im Wasserbad schmelzen.

2 Eigelb in einer großen Schüssel mit 2 EL heißem Wasser cremig schlagen, den Zucker einrühren bis die Masse hell und cremig ist.

3 Die geschmolzene Schokolade unterheben, anschließend sofort Eischnee und Sahne unterheben (nicht mit dem Elektro-Mixer!)

4 Mindestens 2 Stunden im Kühlschrank kalt stellen. Aber nicht zu kalt servieren.

Zutaten

2 Tafeln	dunkle Schokolade (über 70 %)
3	Eier
200 ml	Sahne
40 g	Zucker
50 g	Butter

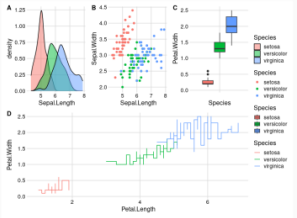
Mathematics

In mathematics he was greater
Than Tycho Brahe, or Erra Pater:
For he, by geometric scale,
Could take the size of pots of ale;
Resolve, by sines
and tangents straight,
If bread or butter wanted weight;
And wisely tell what hour o the day
The clock does strike, by Algebra.

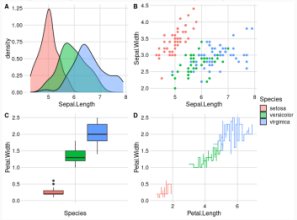
Samuel Butler (1612–1680)

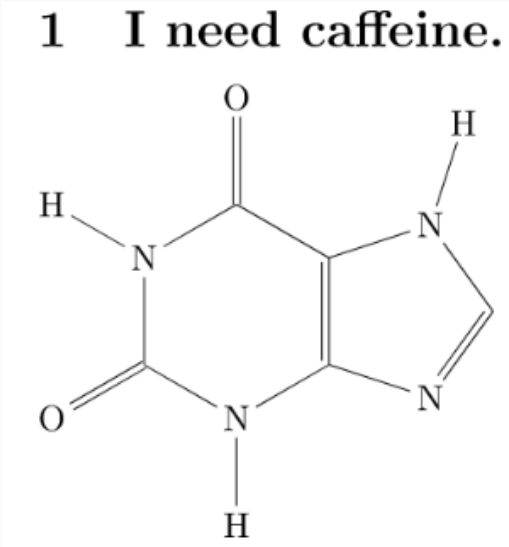
Arranging plots

`patchwork`
makes it ridiculously simple to combine separate ggplots into the same graphic.



`cowplot`
provides various features to make plots beautiful, including aligning and arranging plots.





\scsnowman

\scsnowman[eyes, mouth, nose, arms, hat, muffler, buttons, snow, broom]

\mathwitch

\reversemathwitch

\mathwitch*

\reversemathwitch*

\bigpumpkin[1]

\bigskull

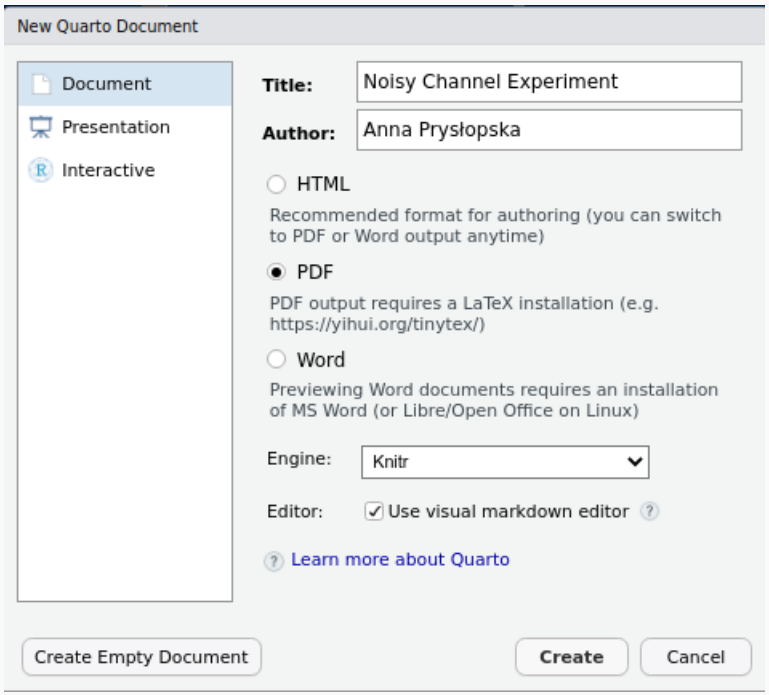
... and more!

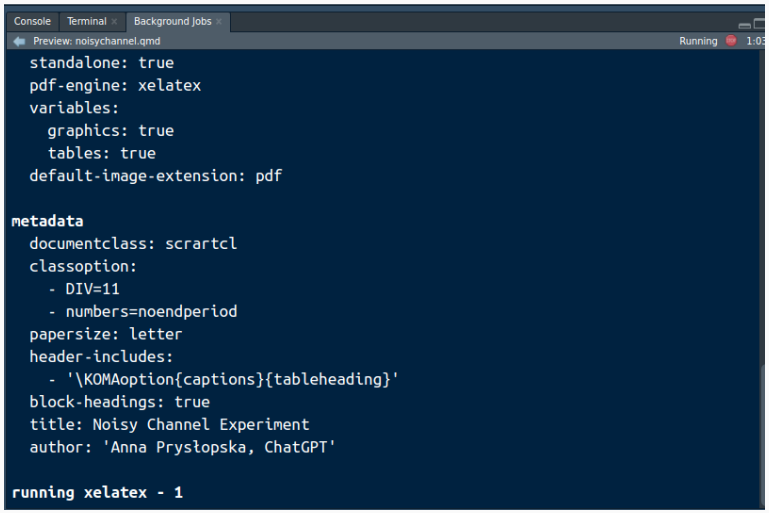
The TeX family tree

TeX	The Original™ but basic and outputs DVI
LaTeX	TeX extended and includes packages
pdfTeX	TeX improved and outputs PDF
pdfLaTeX	LaTeX improved and outputs PDF
XeTeX	TeX expanded beyond English + fonts
XeLaTeX	file format for XeTeX engine
LuaTeX	TeX + Lua (good for macros)
LuaLaTeX	file format for LuaTeX engine
ConTeXt	TeX + interface for advanced typography features
AMSTeX	† TeX extension by American Mathematical Society

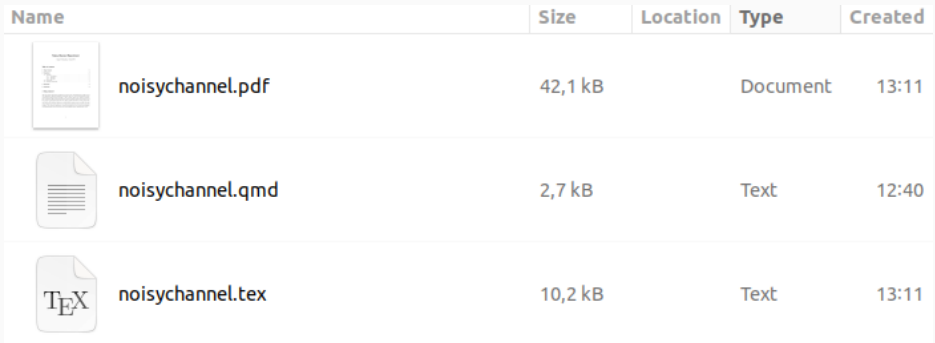
... and more!

Typesetting documents

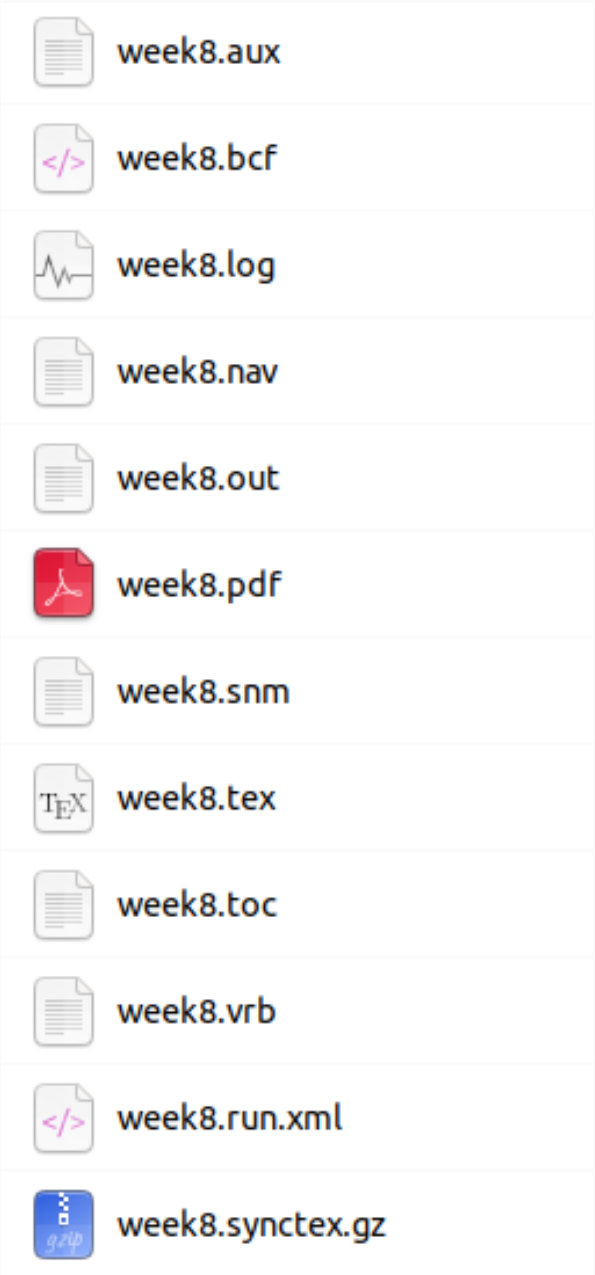

New Quarto Document
Document
Presentation
Interactive
Title:
Noisy Channel Experiment
Author:
Anna Prysłopska
HTML
Recommended format for authoring (you can switch to PDF or Word output anytime)
PDF
PDF output requires a LaTeX installation (e.g. https://yihui.org/tinytex/)
Word
Previewing Word documents requires an installation of MS Word (or Libre/Open Office on Linux)
Engine:
Knitr
Editor:
Use visual markdown editor
Learn more about Quarto
Create Empty Document
Create
Cancel


Console
Terminal
Background Jobs
Preview: noisychannel.qmd
Running
standalone: true
pdf-engine: xelatex
variables:
graphics: true
tables: true
default-image-extension: pdf
metadata
documentclass: scrartcl
classoption:
- DIV=11
- numbers=noendperiod
papersize: letter
header-includes:
- '\KOMAoption{captions}{tableheading}'
block-headings: true
title: Noisy Channel Experiment
author: 'Anna Prysłopska, ChatGPT'
running xelatex - 1

Output

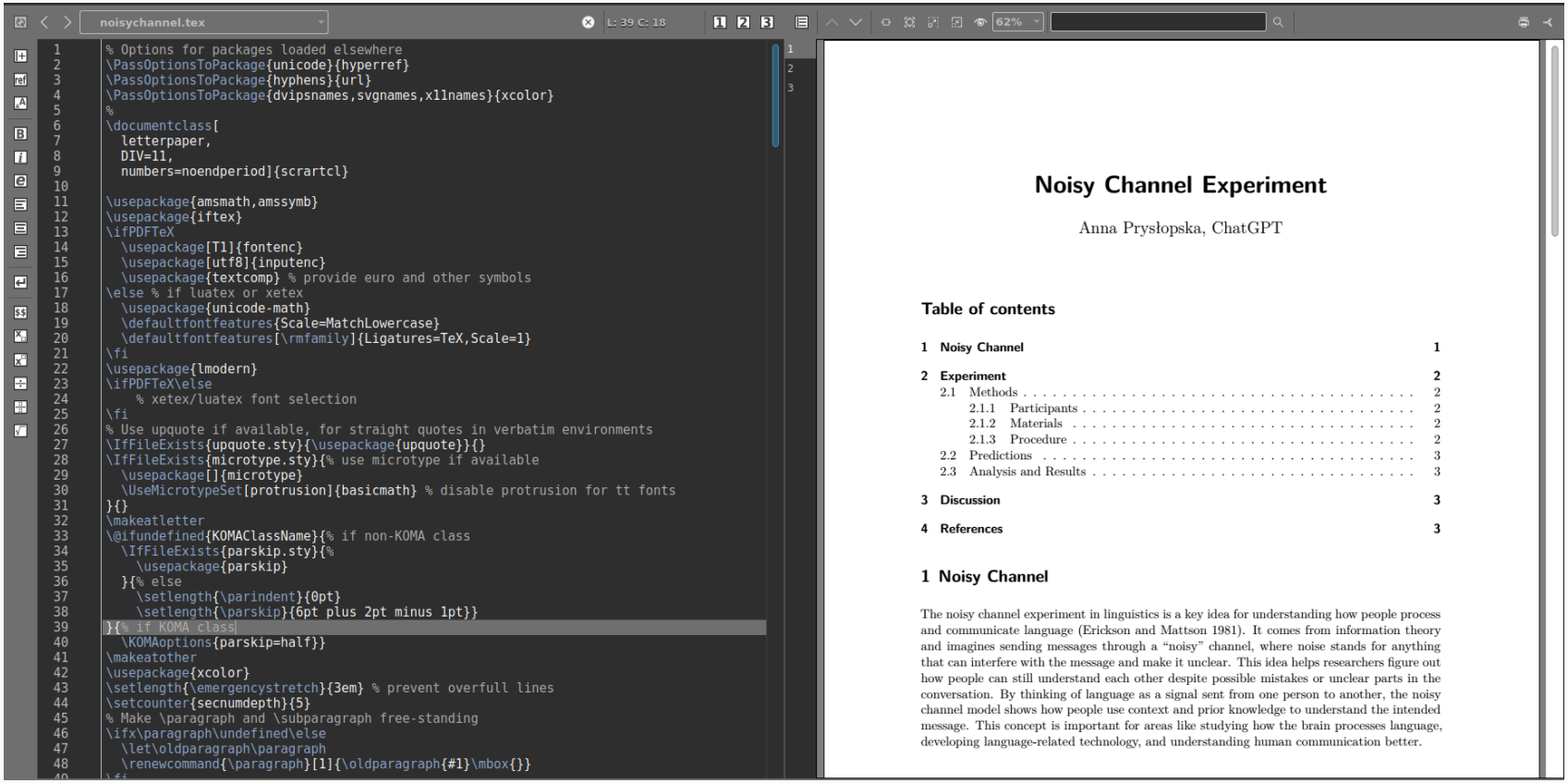


Name	Size	Location	Type	Created
noisychannel.pdf	42,1 kB		Document	13:11
noisychannel.qmd	2,7 kB		Text	12:40
noisychannel.tex	10,2 kB		Text	13:11



AUX	mostly reference information
BBL	prepared bibliography data
BCF	citations for PDF
BIB	your list of citations
BLG	bibliography log
LOF	list of figures
LOG	compilation log
LOT	list of tables
NAV	navgation
OUT	bookmarks
PDF	PDF file
RUN.XML	bibliography XML file
SNM	information used by pgfimage for slides
SYNTEX.GZ	correspondence between PDF and TEX
TEX	LaTeX file
TOC	table of contents
VRB	verbatim material for fragile slides

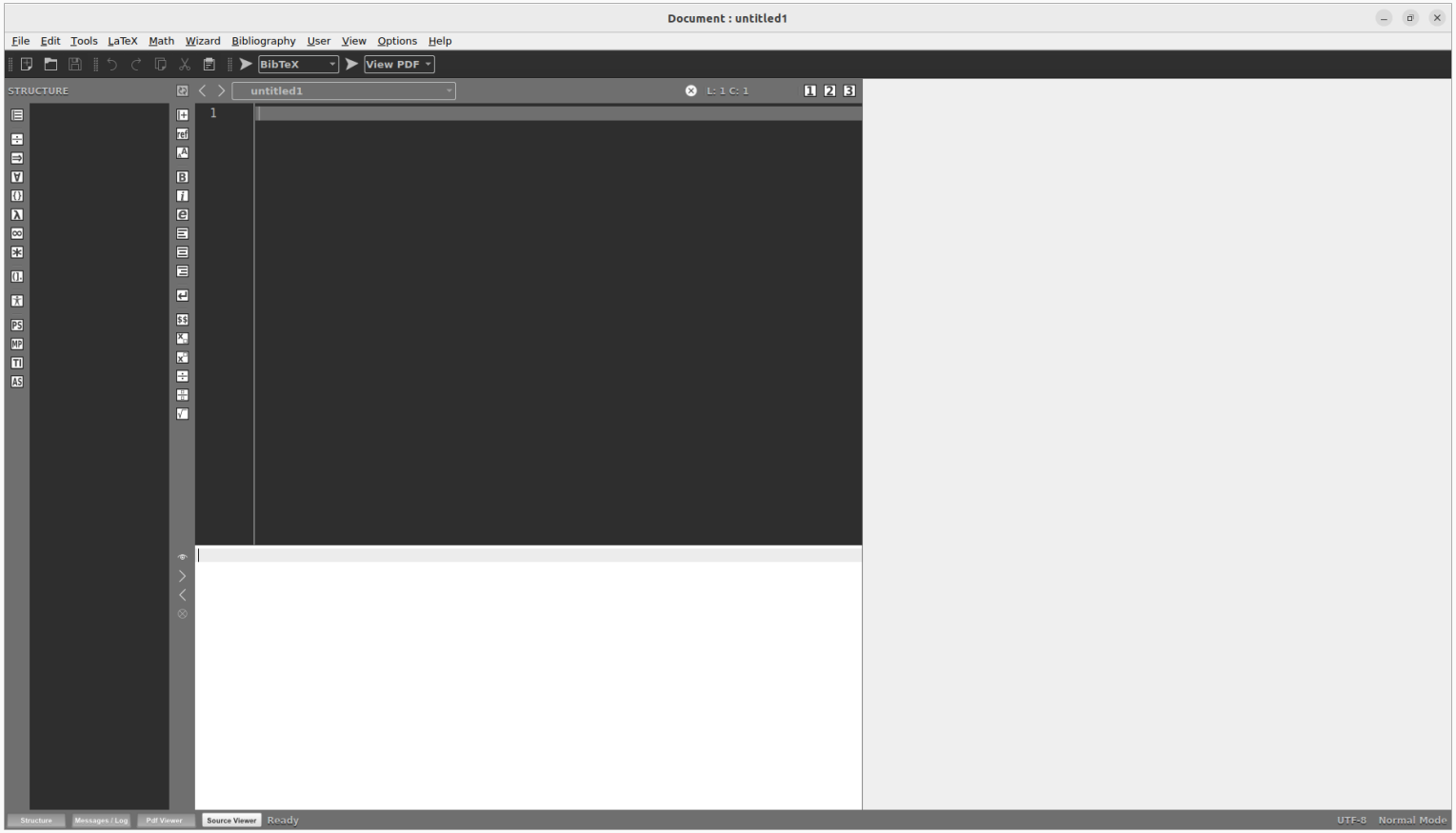
Output


noisychannel.tex
L: 39 C: 18
62%
% Options for packages loaded elsewhere
\PassOptionsToPackage{unicode}{hyperref}
\PassOptionsToPackage{hyphens}{url}
\PassOptionsToPackage{dvipsnames,svgnames,x11names}{xcolor}
%
\documentclass[
letterpaper,
DIV=11,
numbers=noendperiod]{scrartcl}
\usepackage{amsmath,amssymb}
\usepackage{iftex}
\ifPDFTeX
\usepackage[T1]{fontenc}
\usepackage[utf8]{inputenc}
\usepackage{textcomp} % provide euro and other symbols
\else % if luatex or xetex
\usepackage{unicode-math}
\defaultfontfeatures{Scale=MatchLowercase}
\defaultfontfeatures[\rmfamily]{Ligatures=TeX,Scale=1}
\fi
\usepackage{lmodern}
\ifPDFTeX\else
% xetex/luatex font selection
\fi
% Use upquote if available, for straight quotes in verbatim environments
\IfFileExists{upquote.sty}{\usepackage{upquote}}{}
\IfFileExists{microtype.sty}{% use microtype if available
\usepackage[]{microtype}
\UseMicrotypeSet[protrusion]{basicmath} % disable protrusion for tt fonts
}{}
\makeatletter
\@ifundefined{KOMAClassName}{% if non-KOMA class
\IfFileExists{parskip.sty}{%
\usepackage{parskip}
}{% else
\setlength{\parindent}{0pt}
\setlength{\parskip}{6pt plus 2pt minus 1pt}}
}{% if KOMA class
\KOMAoptions{parskip=half}}
\makeatother
\usepackage{xcolor}
\setlength{\emergencystretch}{3em} % prevent overfull lines
\setcounter{secnumdepth}{5}
% Make \paragraph and \subparagraph free-standing
\ifx\paragraph\undefined\else
\let\oldparagraph\paragraph
\renewcommand{\paragraph}[1]{\oldparagraph{#1}\mbox{}}
Noisy Channel Experiment
Anna Prysłopska, ChatGPT
Table of contents
1 Noisy Channel 1
2 Experiment 2
2.1 Methods 2
2.1.1 Participants 2
2.1.2 Materials 2
2.1.3 Procedure 2
2.2 Predictions 3
2.3 Analysis and Results 3
3 Discussion 3
4 References 3
1 Noisy Channel
The noisy channel experiment in linguistics is a key idea for understanding how people process and communicate language (Erickson and Mattson 1981). It comes from information theory and imagines sending messages through a “noisy” channel, where noise stands for anything that can interfere with the message and make it unclear. This idea helps researchers figure out how people can still understand each other despite possible mistakes or unclear parts in the conversation. By thinking of language as a signal sent from one person to another, the noisy channel model shows how people use context and prior knowledge to understand the intended message. This concept is important for areas like studying how the brain processes language, developing language-related technology, and understanding human communication better.

Workflow

1. **Input:** text file = text + commands that tell LaTeX how to typeset the text
2. **Compilation:** run `xelatex myfile.tex` × 1–2, maybe bibliography, then XeLaTeX again 1–2
3. **Output:** PDF + LOG + AUX + …

Texmaker



`https://www.xm1math.net/texmaker/`

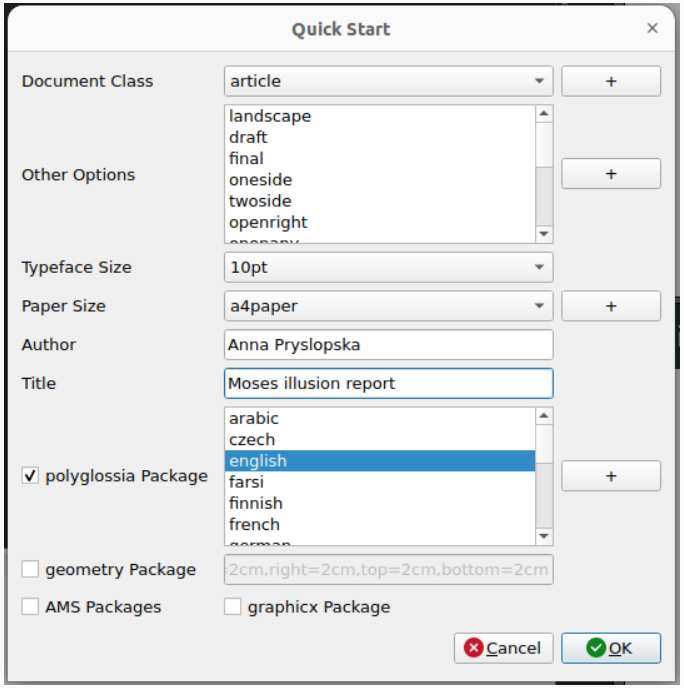
You can also use Overleaf: `https://www.overleaf.com`

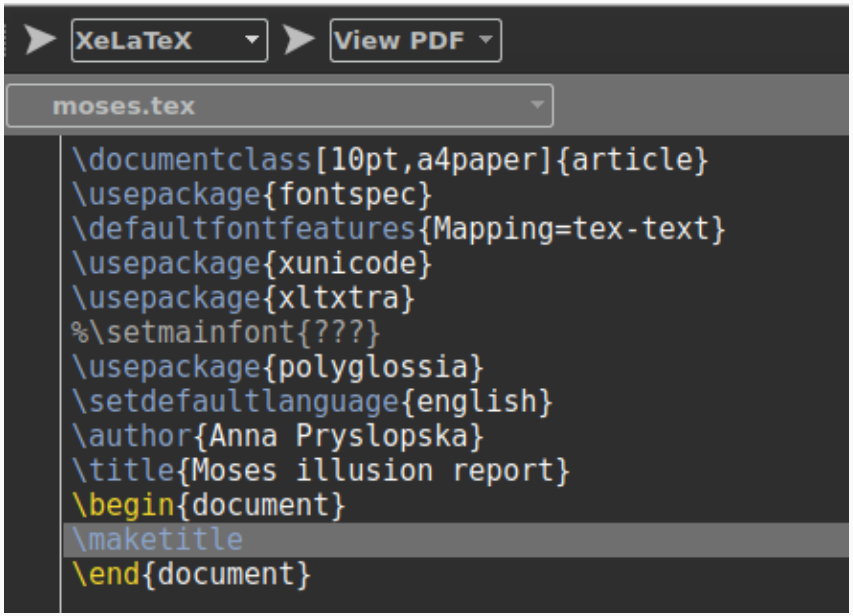
Basic document structure

Global document structure

1. Document class `\documentclass[options]{…}`
2. Preamble
   - Packages `\usepackage[options]{…}`
   - Commands `\newcommand{\xmark}{\ding{55}}`
   - Default settings `\graphicspath{{./images/}}`
   - Title `\title{…}`
   - Author `\author{…}`
   - Date `\date{…}`
   - …
3. Start of document `\begin{document}`
4. Document In a hole in the ground there lived a hobbit.
5. End of document `\end{document}`

First document

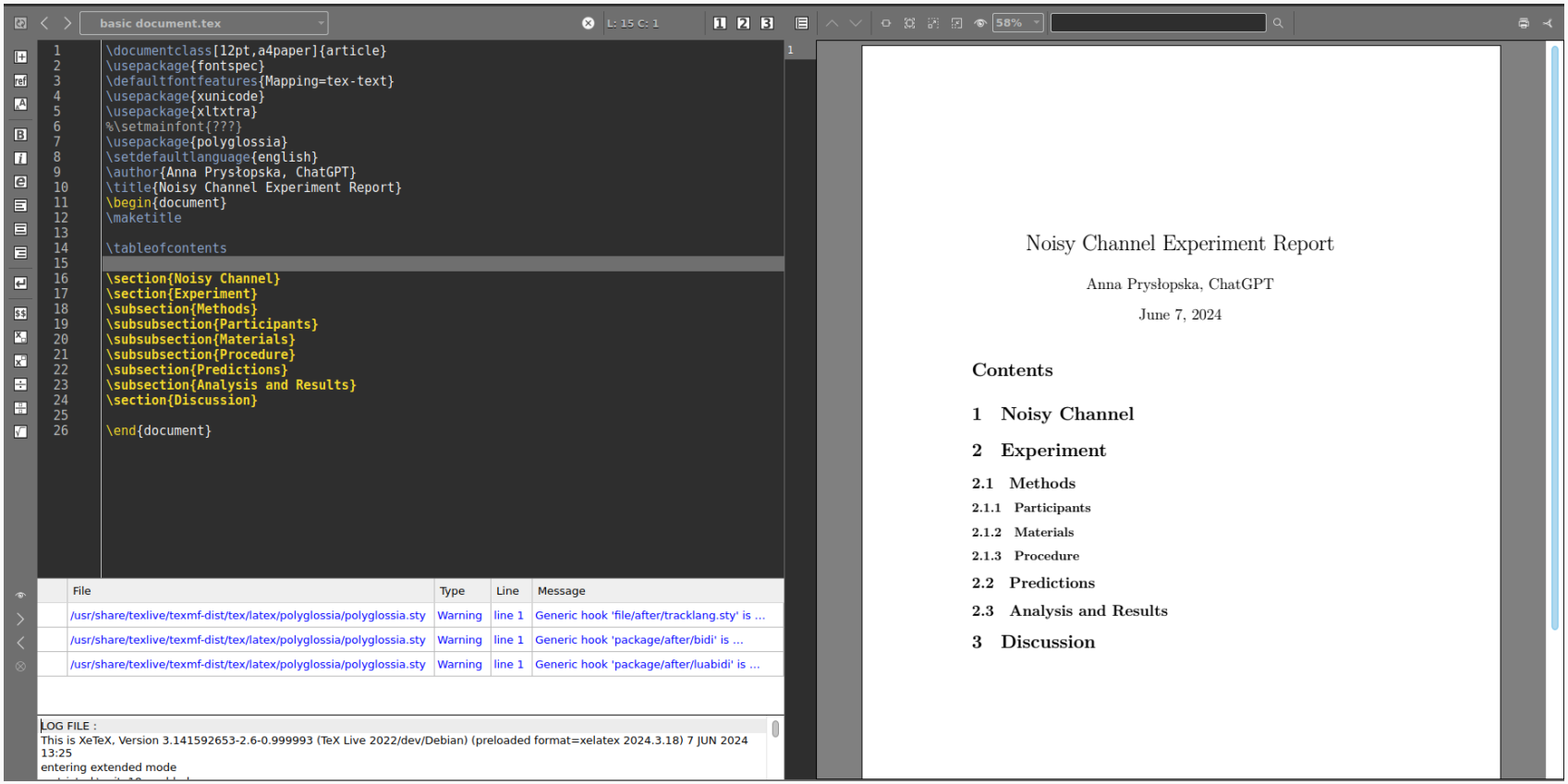




1. Create new file
2. Wizard → Quick XeLaTeX document
3. Save file
4. Run XeLaTeX
5. Run View PDF
6. Profit!

First document

`\maketitle`	Creates title
`\section{…}`	Creates section
`\subsection{…}`	Creates subsection
`\subsection{…}`	Creates subsubsection



Document classes

`\document{…}`

- `article` articles in scientific journals, presentations, short reports, program documentation, etc.
- `minimal` minimal document, mainly used for debugging (see also `standalone`)
- `report` longer reports with several chapters, small books, thesis, etc.
- `book` books
- `memoir` similar to `book` and `report` but supports more design-related options; for poetry, fiction, non-fiction, and mathematical works etc.
- `letter` letters
- `beamer` presentations

(Almost) complete list: `https://ctan.org/topic/class`

Document options

`\document[…]{report}`

- `10pt, 11pt, 12pt` main font size (default is 10pt)
- `a4paper, letterpaper, b5paper, …` paper size
- `titlepage, notitlepage` put the title on a separate page or not
- `twocolumn` typeset the document in 2 columns
- `twoside, oneside` typeset as double or single sided output (affects e.g. margins, not the printer)
- `landscape` typeset in landscape mode
- `openright, openany` chapters begin either only on right hand pages or on the next page available
- `draft` highlights hyphenation and justification problems, shows placeholders instead of included images

Packages

Declared **only** in the preamble

Sometimes the **order** matters

Not all packages are **compatible** with each other or your TEX distribution

`\usepackage{…}`

- `inputenc` accept different input encodings
- `babel` multilingual support (see also `polyglossia`)
- `csquotes` simplified quotation marks
- `amsmath` mathematic equations
- `fontawesome` neat symbols
- `xcolor` defining colors
- `hyperref` crossreferencing and links
- `graphicx` including pictures
- `biblatex` bibliography
- `tikz` making fancy/complicated plots and pictures

Packages for linguistics

`\usepackage{…}`

- `gb4e` or `Covington` glosses and example numbering
- `tipa` IPA symbols (in XeLaTeX you can input them directly)
- `OTtablx` OT Tableaux
- `qtree` & `tree-dvips` syntactic trees (many other alternatives)
- `stmaryrd` semantic brackets
- `drs` Discourse Representation Structures
- `phonrule` phonological rules

See also Dickinson and Herring (2008) and *LaTeX/Linguistics - Wikibooks* (2024).

Package options

```
\usepackage[...]{ }
```

```
\usepackage[utf8]{inputenc}
```

```
\usepackage[english]{babel}
```

```
\usepackage[backend=biber, sorting=nyt, sortcites=true,
indexing=cite, useprefix=false, maxcitenames=2,
style=authoryear-comp]{biblatex}
```

Scientific document structure

Typical scientific document

1. Title — witty or not, but informative
2. Abstract — tl;dr
3. Introduction/background — topic, background, why is this important, hypothesis, aim, ...
4. Methods — description of how the research was conducted
5. Analysis — data analysis info
6. Results — study findings
7. Discussion — interpretation of the results
8. References — works cited
9. Appendices — supplementary material (items, detailed calculations, extra figures etc.)

Questions?

Wrap-up

Summary

- ✔ Knitting to PDF from R
- ✔ LaTeX document structure
- ✔ Scientific document structure
- ⏩ More typesetting with LaTeX

Homework assignment

Homework assignment due June 14th 15:30

- Complete assignment 7 ($\rightarrow$ ILIAS)
  Create a basic XeLaTeX document for the Noisy channel experiment (as on page 29). Upload the resulting files to ILIAS.
- Read chapter 2 of “The Not So Short Introduction to LaTeX 2_ε” (Oetiker et al. 2023).

References

- Dickinson, Markus and Josh Herring (2008). *LaTeXfor Linguists*. Accessed: 2024-06-07. URL: https://cl.indiana.edu/~md7/08/latex/slides.pdf.
- *LaTeX/Linguistics - Wikibooks* (2024). Accessed: 2024-06-07. URL: https://en.wikibooks.org/wiki/LaTeX/Linguistics.
- Munroe, Randall (2013). *xkcd: File Transfer*. Accessed: 2024-06-07. URL: https://xkcd.com/1301/.
- Oetiker, Tobias et al. (2023). *The Not So Short Introduction to LaTeX*. Accessed: 2024-06-07. URL: https://tobi.oetiker.ch/lshort/lshort.pdf.
- *Tilburg Science Hub* (2024). Accessed: 2024-06-07. URL: https://tilburgsciencehub.com.