University of Basel

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Thesis Template in Typst

Bachelor Thesis

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Abstract

This is a demonstration / tutorial on the usage of the UniBasel Typst template.

Acknowledgments

Special thanks to the Typst community for creating such an excellent typesetting system.

Table of Contents

1 Introduction

This thesis serves as a tutorial and demonstration of the UniBasel Typst thesis template.

The template aims to simplify the thesis writing process by leveraging Typst's modern typesetting capabilities. Throughout this document, you'll find examples of citations [1], cross-references, mathematical formulas, figures, tables, and other essential elements commonly used in academic writing.

By the end of this tutorial, you should be familiar with all the template's features and be ready to write your own thesis using Typst.

2
Background

2.1. What is Typst?

Typst is a modern markup-based typesetting system designed to be a powerful yet user-friendly alternative to LaTeX. Released in 2023, it combines the simplicity of Markdown with the typographic quality and programmability traditionally associated with LaTeX, making it an excellent choice for academic writing.

Key advantages of Typst include:

- **Fast compilation**: Near-instantaneous preview updates as you type
- **Clear error messages**: Helpful diagnostics that pinpoint exactly what went wrong
- **Modern syntax**: Intuitive markup that's easier to learn than LaTeX
- **Built-in scripting**: Powerful programming capabilities for advanced customization
- **Excellent math support**: Beautiful mathematical typesetting out of the box

2.2. Why a Typst Template?

While LaTeX has been the de facto standard for academic typesetting for decades, its steep learning curve and cryptic error messages can be cumbersome. This Typst template maintains compatibility with University of Basel's formatting requirements while offering a more approachable writing experience.

The template handles all the formatting details automatically, allowing you to focus on your content rather than wrestling with compilation errors or obscure package conflicts.

3 Methodology

3.1. Template Structure

This template follows a modular approach to document organization, separating content from formatting. The key components include:

3.1.1. Main Template File

The `template/main.typ` file contains all formatting definitions, including:

- Page layout and margins (3.5cm on all sides)
- Header and footer configuration
- Chapter and section styling
- Custom commands and environments

You can access all functionality provided by this file by importing it directly from the typst template repository: (adjust the version number as needed)

```
#import "@preview/unibas-thesis:0.1.0": *
```

3.1.2. Configuration

The template is configured through parameters passed to the `thesis` function in your main document:

```
#show: thesis.with(
  title: "Your Title",
  author: "Your Name",
  // ... other parameters
)
```

This approach ensures consistency across all theses while allowing customization where needed. The template automatically handles language-specific elements (English/German) based on your language setting.

4 Implementation

4.1. Text Formatting

4.1.1. Basic Formatting

You can use **bold text** for emphasis, *italic text* for titles or foreign words, and `inline code` for technical terms. The template also supports small capitals for certain stylistic choices.

Footnotes are created using the `#footnote` function[1]. You can add them anywhere in your text[2].

For URLs, you have several options:

- Direct URL: https://www.unibas.ch
- Linked text: University of Basel

4.1.2. Lists and Enumerations

Bullet points are created naturally:

- First item
- Second item with sub-items:
  - Sub-item A
  - Sub-item B
- Third item

Numbered lists work similarly:

---

[1] This is an example footnote. Footnotes are automatically numbered and appear at the bottom of the page.

[2] Multiple footnotes on the same page are handled automatically.

1. First step
2. Second step
3. Final step

4.2. Code Listings

Code blocks are beautifully formatted with syntax highlighting:

```
def fibonacci(n):
    """Calculate the nth Fibonacci number."""
    if n <= 1:
        return n
    return fibonacci(n-1) + fibonacci(n-2)
```

For inline code, simply use backticks: `let x = 42`.

4.3. Mathematical Formulas

Typst excels at mathematical typesetting. Here's the famous Euler's identity:

$$e^{i\pi} + 1 = 0 \tag{1}$$

More complex equations can be displayed prominently:

$$\int_0^\infty e^{-x^2} dx = \frac{\sqrt{\pi}}{2} \tag{2}$$

You can also create aligned equations:

$$\begin{aligned} \sum_{k=1}^{n} k &= 1 + 2 + 3 + \ldots + n \\ &= \frac{n(n+1)}{2} \end{aligned} \tag{3}$$

4.4. Figures and Tables

Figures can be inserted with captions and labels for cross-referencing:

Figure 1: Example figure showing the template's figure environment

As shown in Figure 1, figures are automatically numbered and can be referenced throughout the document.

Tables are equally straightforward:

Language	Type System	Performance
Typst	Static	Fast
LaTeX	Macro-based	Slow
Markdown	None	Very Fast

Table 1: Comparison of different markup languages

Table 1 demonstrates the three-column table format with different alignments.

4.5. Custom Environments

The template provides several custom environments for academic writing:

Definition 1. A **markup language** is a text-encoding system consisting of a set of symbols inserted in a text document to control its structure, formatting, or the relationship between its parts.

Theorem 1. For any typesetting system T, if T is both powerful and user-friendly, then T will eventually replace less user-friendly alternatives.

4.6. Multi-Column Layout

Sometimes you need to present content in multiple columns. This is particularly useful for:

- Comparing two approaches
- Presenting definitions side by side
- Creating compact layouts for listings

The column break command `#colbreak()` allows you to manually control where the column break occurs, giving you precise control over the layout.

4.7. Algorithms

```
function binarySearch(arr, target):
    left = 0
    right = length(arr) - 1

    while left <= right:
        mid = (left + right) / 2
        if arr[mid] == target:
            return mid
        else if arr[mid] < target:
            left = mid + 1
        else:
            right = mid - 1

    return -1
```

Algorithm 1: Binary search algorithm

4.8. Citations and References

Citations are handled naturally using the @ symbol: [1] for single citations or [2], [3] for multiple. The bibliography style can be customized in the main document.

4.9. Draft Features

The template includes helpful TODO markers for draft versions:

TODO: Add more examples here

TODO: Include performance benchmarks

TODO: Verify this equation

TODO: Improve this explanation

TODO: Add proper reference

TODO: Check grammar

TODO: Is this the best approach?

TODO: Remember to update this section

4.10. Cross-References

The template supports automatic cross-referencing for all numbered elements. You can reference:

- Chapters: Section 3
- Sections: Section 2
- Figures: Figure 1
- Tables: Table 1
- Equations:

$$F = ma \tag{4.}$$

- Custom labels: Equation 4

4.11. Highlighting

Use the important function to highlight crucial information. In colored mode, this appears as highlighted text; in non-colored mode, it becomes italicized.

4.12. Page Layout Features

The template automatically handles:

- Chapter pages without headers
- Consistent margins and spacing
- Proper page numbering
- Language-specific formatting (English/German)

All these features work together to create a professional, consistent document that meets academic standards while being easy to write and maintain.

5
Evaluation

5.1. Template Performance

The UniBasel Typst template compiles in milliseconds, compared to several seconds for equivalent LaTeX documents. This instant feedback dramatically improves the writing workflow, especially when working with complex documents containing numerous figures and equations.

6
Discussion

Use the `lorem()` command to add some meaningful text quickly.

Lorem ipsum dolor sit amet, consectetur adipiscing elit, sed do eiusmod tempor incididunt ut labore et dolore magnam aliquam quaerat voluptatem. Ut enim aeque doleamus animo, cum corpore dolemus, fieri tamen permagna accessio potest, si aliquod aeternum et infinitum impendere malum nobis opinemur. Quod idem licet transferre in voluptatem, ut postea variari voluptas distinguique possit, augeri amplificarique non possit. At etiam Athenis, ut e patre audiebam facete et urbane Stoicos irridente, statua est in quo a nobis philosophia defensa et collaudata est, cum id, quod maxime placeat, facere possimus, omnis voluptas assumenda est, omnis dolor repellendus. Temporibus autem quibusdam et aut officiis debitis aut rerum necessitatibus saepe eveniet, ut et voluptates repudiandae sint et molestiae non recusandae. Itaque earum rerum defuturum, quas natura non depravata desiderat. Et quem ad me accedis, saluto: 'chaere,' inquam, 'Tite!' lictores, turma omnis chorusque: 'chaere, Tite!' hinc hostis mi Albucius, hinc inimicus. Sed iure Mucius. Ego autem mirari satis non queo unde hoc sit tam insolens domesticarum rerum fastidium. Non est omnino hic docendi locus; sed ita prorsus existimo, neque eum Torquatum, qui hoc primus cognomen invenerit, aut torquem illum hosti detraxisse, ut aliquam ex eo est consecutus? – Laudem et caritatem, quae sunt vitae sine metu degendae praesidia firmissima. – Filium morte multavit. – Si sine causa, nollem me ab eo delectari, quod ista Platonis, Aristoteli, Theophrasti orationis ornamenta neglexerit. Nam illud quidem physici, credere aliquid esse minimum, quod profecto numquam putavisset, si a Polyaeno, familiari suo, geometrica discere maluisset quam illum etiam ipsum dedocere. Sol Democrito magnus videtur, quippe homini erudito in geometriaque perfecto, huic pedalis fortasse; tantum enim esse omnino in nostris poetis aut inertissimae segnitiae est aut fastidii delicatissimi. Mihi quidem videtur, inermis ac nudus est. Tollit definitiones, nihil de dividendo ac partiendo docet, non quo ignorare vos arbitrer, sed ut.

7
Conclusion

This tutorial has demonstrated that Typst provides a viable, modern alternative to LaTeX for academic thesis writing.

By adopting Typst, you can focus on your research and writing rather than fighting with compilation errors. I hope this template helps make thesis writing a more pleasant and productive experience.

8

Future Work

If you want to contribute to this template's development and improve its functionality, usability or just to fix an annoying bug, feel free to open a pull request on Github: https://github.com/Nifalu/dmi-thesis-typst-template

9
Related Work

This Typst template is directly inspired by the LaTeX thesis template created by Ivan Giangreco: https://github.com/ivangiangreco/basilea-latex

10
AI Notice

10.1. Development Assistance

This thesis template and its accompanying tutorial documentation were developed with the assistance of Claude Opus 4, an AI language model created by Anthropic. The AI was utilized to:

- Generate example content demonstrating template features
- Structure and organize the template codebase
- Help with the conversion from the existing LaTeX template into typst.

Bibliography

[1] A. M. Turing, “Computing machinery and intelligence,” *Mind*, vol. 59, no. 236, pp. 433–460, 1950.

[2] I. Goodfellow, Y. Bengio, and A. Courville, *Deep Learning*. MIT Press, 2016.

[3] A. Vaswani and others, “Attention is all you need,” in *Advances in Neural Information Processing Systems*, 2017.

A

Appendix

Here you can put additional information such as code examples, detailed evaluation results and other stuff that does not quite fit into a chapter but is still interesting to the topic.