

Angular.js vs Vue.js

Cornelia Langsenlehner, Sandra Hartlauer, Michael Nußbaumer



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Declaration

I hereby declare and confirm that this thesis is entirely the result of my own original work. Where other sources of information have been used, they have been indicated as such and properly acknowledged. I further declare that this or similar work has not been submitted for credit elsewhere. This printed copy is identical to the submitted electronic version.

Hagenberg, June 25, 2024

Cornelia Langsenlehner, Sandra Hartlauer, Michael Nußbaumer

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Preface

This is version **2023/11/06** of the LaTeX document template for various theses at the School of Informatics, Communication and Media at the University of Applied Sciences Upper Austria in Hagenberg. We are pleased to learn that this document collection is meanwhile also used at various other institutions in Austria and abroad.

The document was initially created in response to requests from students after the 2000/01 academic year when an official LaTeX introductory course was offered in Hagenberg for the first time. The fundamental idea was to “simply” convert the already existing *Microsoft Word* template for diploma theses to LaTeX and possibly to add some unique features. This quickly turned out to be not very useful since LaTeX, especially concerning the handling of literature and graphics, requires a substantially different way of working. The result is—rewritten from scratch and much more extensive than the previous document—a manual for writing with LaTeX, supplemented with additional (meanwhile removed) hints for *Word* users. Technical details of the current version can be found in Appendix.

While this document was initially intended exclusively for the preparation of diploma theses, it now also covers *master theses*, *bachelor theses*, and *internship reports*. The differences between these documents have been deliberately kept small.

When creating this template, an attempt was made to work with the basic functionality of LaTeX and—as far as possible—to achieve this without additional packages. This was only partially successful; several supplementary “packages” are necessary, but only common extensions have been used. Of course, there is a large number of additional packages which can be helpful for further improvements and refinements. Everyone is encouraged to experiment with these as soon as they have the necessary self-confidence and sufficient time to experiment. Many details and tricks are not explicitly mentioned in this document but can be explored in the underlying source code at any time.

Numerous colleagues have provided valuable support through careful proofreading and constructive suggestions for improvement. We thank Heinz Dobler for consistently improving our “computer slang” and Elisabeth Mitterbauer for her proven “orthographic eye”.

Usage of this template is free without any restrictions and not bound to any mention. However, when used as a basis for one’s work, one should not simply start working on it, but at least *read* the essential parts of the document and, if possible, take them to heart. Experience has shown that this improves the quality of the results significantly.

This document and the associated LaTeX classes have been available since November

2017 on CTAN¹ as package `hagenberg-thesis`,

<https://ctan.org/pkg/hagenberg-thesis>.

The current source code, as well as additional materials—such as a wiki with instructions for the integration of often requested functionalities and extensions—can be found at

<https://github.com/Digital-Media/HagenbergThesis>.²

Despite great efforts, a document like this always contains errors and shortcomings. Comments, suggestions, and helpful additions are welcome. Ideally, as comments or issues on GitHub.

By the way, here, in the preface (which is common in diploma and master theses but dispensable for bachelor's theses), you may briefly describe the genesis of the document. This is also the place for any acknowledgments (e.g., to the supervisor, the examiner, the family, the dog, etc.) as well as dedications and philosophical remarks. These should be balanced and limited to a maximum of two pages.

W. Burger (em.) and W. Hochleitner

University of Applied Sciences Upper Austria

Department of Digital Media, Hagenberg

<https://www.fh-ooe.at/campus-hagenberg/>

¹Comprehensive TeX Archive Network

²<https://github.com/Digital-Media/HagenbergThesis/blob/main/CHANGELOG.md> contains a list of chronological changes (formerly included in the appendix of this document).

Abstract

Here goes an abstract of the work, with a maximum of 1 page. Unlike other chapters, the abstract is usually not divided into sections and subsections. Footnotes are also not used here.

By the way, abstracts are often included in literature databases with the author and title of the work. It is, therefore, essential to ensure that the information in the abstract is coherent and complete in itself (i.e., without other parts of the work). In particular, *no literature references* are typically used at this point (as is the case also in the *title* of the thesis and the German *Kurzfassung*)! If such is needed—for example, because the paper is a further development of a particular, earlier publication—then *full* references are necessary for the abstract itself, e.g., [ZOBEL J.: *Writing for Computer Science – The Art of Effective Communication*. Springer, Singapore, 1997].

It should also be noted that special characters or list items are usually lost when records are added to a database. The same applies, of course, to the German *Kurzfassung*.

In terms of content, the abstract should not be a list of the individual chapters (the introduction chapter is intended for this purpose). However, it should provide the reader with a concise summary of your thesis. Therefore, the structure used here is necessarily different from that used in the introduction.

Kurzfassung

Dies sollte eine maximal 1-seitige Zusammenfassung Ihrer Arbeit in deutscher Sprache sein.

The German “Kurzfassung” should contain the same content as the English abstract. Therefore, try to translate the abstract precisely but not word for word. When translating, remember that certain idioms from English have no counterpart in German or must be formulated differently. Also, word order in German is very different from English. Without knowledge of the German language, it is acceptable to resort to translators. Nevertheless, hiring a skillful person for proofreading is recommended even with the highest confidence in one’s German knowledge.

The correct translation for “diploma thesis” is *Diplomarbeit*, a “master thesis” is called *Masterarbeit*. For “bachelor’s thesis”, *Bachelorarbeit* is the appropriate translation.

By the way, for this section, the *language setting* in LaTeX should be switched from English to German to get the correct form of hyphenation. However, the correct quotation marks must be set manually.

Chapter 1

Introduction

1.1 ToDo -> Chapters

Web apps are fundamentally important in today's digital world as they provide a flexible and efficient way to access content and services across various platforms. The platform independence of web apps allows developers to reach a broad user base without the need to create separate applications for each operating system or device. By implementing and comparing an application developed with both the Vue and Angular frameworks, relevant metrics such as load times, performance, and developer-friendliness can be effectively evaluated. This analysis aims to provide a comprehensive overview of both frameworks and serve as a decision-making guide, offering valuable insights into the strengths and weaknesses of both technologies. These insights aid development teams in making informed decisions about the most suitable technologies for specific application requirements, and facilitate the identification of optimization opportunities to continuously improve the end-user experience and enhance development efficiency.

Chapter 2

Theoretical background

Every thesis¹ is different, yet good theses are usually very similar in structure, especially in the fields of engineering and natural sciences.

2.1 Elements of a Thesis

The following basic structure has proven itself as a starting point, which can, of course, be varied and refined as desired:

1. **Introduction and motivation:** What is the problem statement or task at hand, and why should someone be interested in it?
2. **Spfication of the topic in greater detail:** Here, the current state of the art of the technology or science is described, and existing deficits or open questions are pointed out. The direction of one's work is developed from this.
3. **Own approach:** This is, of course, the core of the thesis. Here it is shown how the previously described task is solved and implemented, often in the form of a prototype. Illustrative examples supplement this part.
4. **Summary:** What has been achieved, and what goals remain open? Which parts of the thesis are possible origins for further work?

Of course, a certain dramaturgical structure of the thesis is also important. Remember that readers usually have little time and—unlike in a novel—their patience should not be tried. Explain already in the introduction (not in the last chapter) how you approached the problem, your proposed solutions, and if you successfully applied them.

Errors and dead ends may (and should) be described as well; their knowledge often helps to avoid duplicate experiments and other errors and is thus certainly more helpful than any whitewashing. And, of course, it is acceptable to express one's own ideas and opinions as long as they are rationally stated.

¹Most of the following remarks apply equally to bachelor's, master's, and diploma theses.

2.2 Language and Writing Style

A thesis is a piece of scientific work and should therefore be formulated concisely and factually. The author's person takes a back seat to the subject of the work; avoid the first person or wordings such as "the author". Passive voice can be a remedy, although it is vital to ensure that this does not result in an overly complicated sentence structure. Also, remember that the active voice makes writing sound stronger and more direct and helps to deliver essential aspects more precisely.

Expressions such as colloquialisms, polemical formulations, or even irony and cynicism are out of place, as is the excessive use of overly specific technical terms.

Furthermore, the language used in a thesis should be gender-inclusive and non-discriminatory, making all people equally visible in their diversity, both in words and images. In English, this includes using nouns that are not gender-specific to refer to roles or professions, formation of phrases in a coequal manner, and avoiding the blanket use of male or female terms.

Avoid gender-specific job titles such as "fireman" or "stewardess" and replace them with the more neutral terms "firefighter" or "flight attendant". When using pronouns, refrain from using "he" or "she". Replace these with the more inclusive "they" to include people who identify as non-binary.

Also, check the writing for terms that might be considered racially inappropriate. Expressions such as "master" and "slave" or "whitelist" and "blacklist" might be considered offensive by certain groups of people. Keep this in mind when naming things in the project or prototype. Especially in a scientific thesis, the potential of language should be used to counter stereotypical ideas about social roles.

2.3 Writing a Thesis in English at a German-Speaking University

While this template and the contained introduction should make it easy to write a thesis entirely in English, there are still some things that have to remain in German, should the University demand it.

The title page must usually be German and stays the same when the document is set to English. Also, a German Kurzfassung is required together with the English Abstract. Using a translator is a valid option for everyone who is not fluent in German. Having the translation checked by a native German speaker is recommended, however.

The German term "Fachhochschule" (as in Fachhochschule Oberösterreich) is translated with "University of Applied Sciences". A master's thesis is called "Masterarbeit," and a bachelor's thesis is called "Bachelorarbeit".

If one's native language is German, it should be considered that writing a thesis in English (unless the program requires it) does not make writing any easier, even if it might feel that way at first. Particularly in computer science, the dominance of English technical terms makes writing in German seem tedious, and switching to English might appear particularly attractive. However, this is deceptive since one's skill in a foreign language is often overestimated (despite the usually long years of English education). Conciseness and clarity are easily lost, and sometimes the result is an embarrassing drivel without context and solid content. Unless one's English skills are excellent, writing at least the most essential parts of the thesis in German first and only translating them

afterward is advisable. Special care should be taken when translating seemingly familiar technical terms. In addition, it is always helpful to have the finished work checked by a native speaker.

Parallel to this document, there is also a German version, which is largely identical in content. It contains helpful hints for writing a thesis in German and should be used if German is the language of choice. Technically, except for the language setting and the different quotation marks (see Section ??), there is nothing more to consider to use this template in German.

Chapter 3

Comparison criteria

3.1 Getting Started

Chapter 4

Handling References to Literature and Other Sources

Chapter 5

Closing Remarks¹

This should be a summary of your thesis, which may also address the process of its creation, experiences, insights and problems encountered during the implementation (but no personal issues), areas for improvement, possible extensions, etc. Was the topic well chosen, what was eventually achieved, what points remain open and how could work continue from here?

5.1 Read and Let Read

When your thesis is finished, the first thing you should do is to read it over again *completely* and *carefully* yourself, even though you might not feel inclined to once more look at something you have worked on for so long. In addition, it is highly recommended to have another person do this as well—you will be amazed at how many additional mistakes you had missed.

The use of AI-assisted writing assistants such as *Grammarly*² or *LanguageTool*³ can also be quite useful. However, the suggestions from these tools should not simply be accepted blindly but with caution.

5.2 Checklist

Finally, Table 5.1 gives a brief checklist of important items that most frequently are the cause of errors. If an official thesis review is required at your university, such and similar items are typically checked by the assigned *thesis editor* as well.

¹This note only demonstrates the (rarely necessary) use of footnotes in headings. See the source text for how this is done. Make sure the footnote does not appear in the table of contents as well!

²<https://grammarly.com/>

³<https://languagetool.org/>

Table 5.1: List of important items as typically checked during an academic *thesis review*.

- | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <input type="checkbox"/> Title page: length of title (line breaks), name, program of study, date. <input type="checkbox"/> Declaration: complete signature. <input type="checkbox"/> Table of contents: balanced structure, depth, length of headings. <input type="checkbox"/> Abstract/Kurzfassung: precise summary, appropriate length, same content and structure. <input type="checkbox"/> Chapter/section titles: length, style, clarity. <input type="checkbox"/> Layout/typography: clean printout (no raster fonts), no “manual” spacing between paragraphs or indentations, no overlong lines, highlighting, font size, footnote placement. <input type="checkbox"/> Language: gender-appropriate wording (no generic masculine or general clause), objective, factual wording. <input type="checkbox"/> Punctuation: hyphens and dashes placed correctly, proper spacing after periods (especially after abbreviations), correct (front/back) quotation marks. <input type="checkbox"/> Figures: quality of graphics and images, font size and type in figures, proper placement of figures and tables, captions. Are <i>all</i> figures (tables) referenced in the text? <input type="checkbox"/> Equations/formulas: placement of mathematical elements in continuous text, correct use of displayed equations and mathematical symbols. <input type="checkbox"/> References: citations properly referenced, including page and chapter references; no unresolved cross references (??). <input type="checkbox"/> Bibliography: type of publication must be clear in all cases, consistent and complete entries, online sources (URLs) cleanly cited. <input type="checkbox"/> Other: contents of appendix, PDF paper size ($A4 = 8.27 \times 11.69$ inches), print size and quality. |
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References