# Title of the Thesis

## Subtitle of the Thesis

## Master's Thesis

for the degree of Master of Science (M.Sc.)

Submitted to
Munich University of Applied Sciences
Department of Computer Science and Mathematics

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| Submission Date: | 01.01.2025 |

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# Abstract

A brief summary of the thesis's purpose, methods, key results, and conclusions.

# Acknowledgments

An optional section thanking people and organizations who supported or contributed to the work.

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# 1 Introduction

## 1.1 Section

This is an example of a section.

### 1.1.1 Subsection

This is an example of a subsection.

#### Subsubsection

This is an example of a subsubsection.

## 1.2 Research Questions

This is an example of how to format research questions.

**RQ$_1$: Is this a research question?**

You can refer to research questions like this: RQ$_1$ is an example of a research question.

## 1.3 Chapter References

You can refer to other chapters like this: Chapter 6 is the conclusion chapter.

# 2 Related Work

## 2.1 Tables

Table 2.1: Inclusion and exclusion criteria for the literature review.

| Inclusion Criteria | Exclusion Criteria |
|---|---|
| English language | Non-English |
| Published 2015–2025 | Published before 2015 |
| Peer-reviewed | Not peer-reviewed |
| Provides method and empirical results | Irrelevant domain or off-topic |

You can create tables and refer to them like this: Table 2.1 shows the inclusion and exclusion criteria for the literature review.

## 2.2 Citations

You can cite sources in parentheses like this: Design patterns make it easier to reuse successful designs and architectures [1].

You can also cite sources in the text like this: Gamma *et al.* [1] provides a comprehensive overview of design patterns.

# 3 Methodology

## 3.1 Abbreviations

You can define abbreviations and refer to them like this: The Design Science Research (DSR) methodology is widely used in information systems research. The DSR approach emphasizes the creation and evaluation of artifacts to solve identified problems.
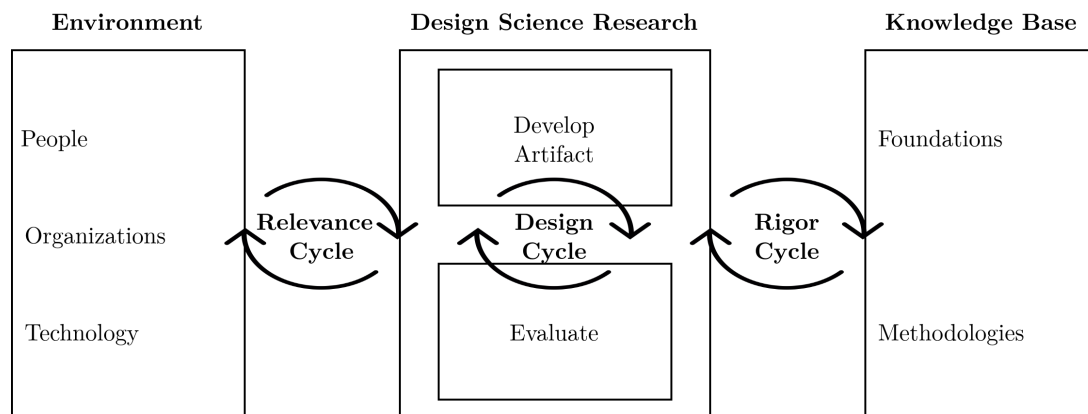
## 3.2 Figures



Figure 3.1: DSR approach with relevance, rigor, and design cycle. Adapted from Hevner *et al.* [2].

You can include figures and refer to them like this: Figure 3.1 shows the DSR approach with relevance, rigor, and design cycle.

# 4 Implementation

## 4.1 Formulas

You can include formulas like this: The file processing problem can be modeled as follows. A file $F$ of size $S$ bytes split into chunks of size at most $c$ is:

$$F = \langle B_1, B_2, \ldots, B_m \rangle, \qquad m = \left\lceil \frac{S}{c} \right\rceil$$

## 4.2 Algorithms

You can describe algorithms using pseudocode like this:

---
**Algorithm 4.1:** Chunk-based file processing with hashing.

---
Input: File $F$, chunk size $c$
Output: Record $\langle size, chunk\_count, sha256 \rangle$
  1: $h \leftarrow \text{INITSHA256}()$                                        ▷ Initialize digest.
  2: $size \leftarrow \text{LENGTH}(F)$
  3: $chunk\_count \leftarrow 0$

  4: **for all** $chunk \in \text{READ}(F, c)$ **do**
  5:     $\text{UPDATE}(h, chunk)$
  6:     $chunk\_count \leftarrow chunk\_count + 1$

  7: $sha256 \leftarrow \text{FINALIZE}(h)$
  8: **return** $\langle size, chunk\_count, sha256 \rangle$

---

You can refer to algorithms like this: Algorithm 4.1 describes a chunk-based file processing algorithm.

## 4.3 Lists and Enumerations

You can create lists and enumerations like this:

1. Initialize SHA-256 digest and read the file size.

2. Stream the file in chunks of at most $c$ bytes.

3. For each chunk, update the digest and increment the chunk counter.

4. Finalize the digest to obtain the hash.

5. Return $\langle size,\ chunk\_count,\ sha256 \rangle$.

### 4.3.1   Code Listings

You can include source code listings, for example Python code, like this:

Listing 4.1: Source code of the file processing algorithm.

```python
import hashlib
from pathlib import Path

def process_file(path: str, chunk_size: int = 1 << 20):
    p = Path(path)
    h = hashlib.sha256()
    with p.open("rb") as f:
        while True:
            b = f.read(chunk_size)
            if not b:
                break
            h.update(b)
    return {
        "file": p.name,
        "size_bytes": p.stat().st_size,
        "sha256": h.hexdigest()
    }

if __name__ == "__main__":
    print(process_file("example.dat"))
```

# 5 Results

## 5.1 Graphs

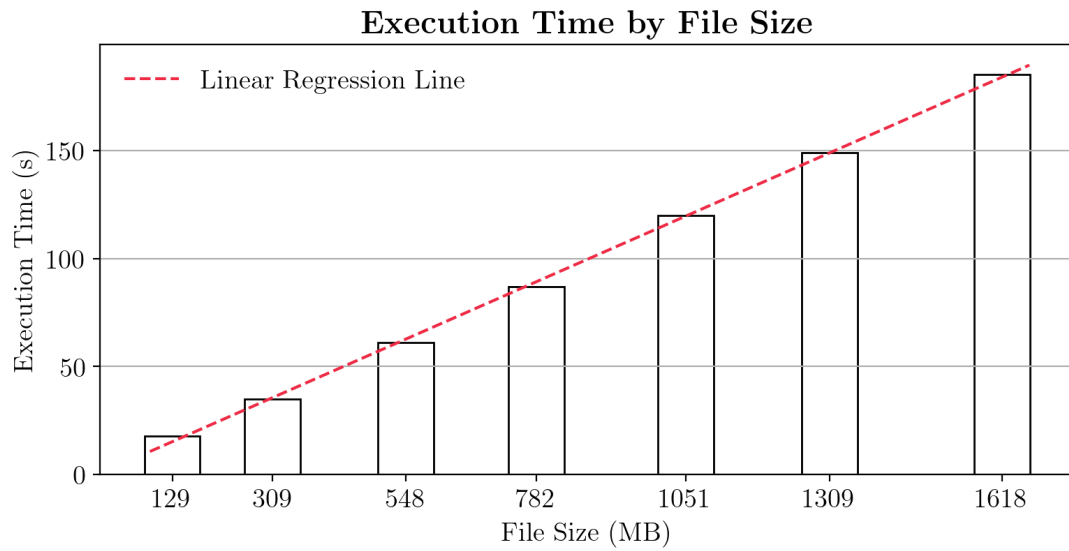This is a graph which was created using Python (Jupyter Notebook) to match the style of the document.



Figure 5.1: Execution time by trace file size of the framework.

# 6 Conclusion

## 6.1 Gantt Chart

This is a Gantt chart which was created using draw.io to match the style of the document.

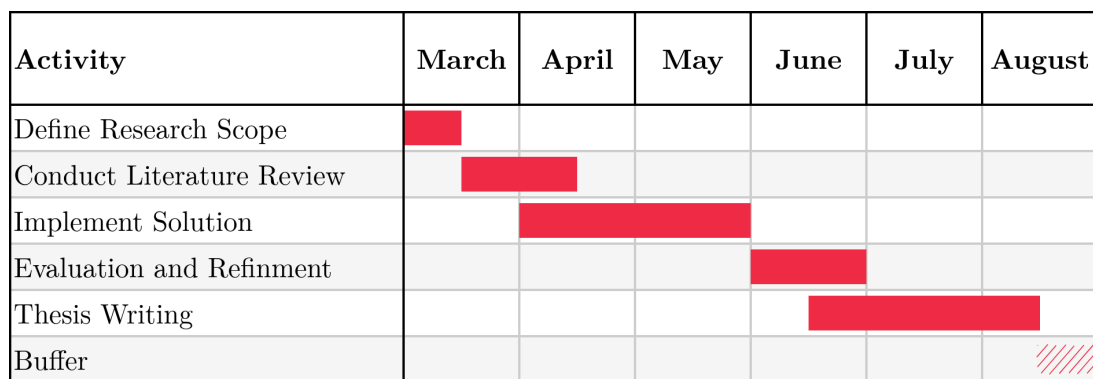| Activity | March | April | May | June | July | August |
|---|---|---|---|---|---|---|
| Define Research Scope | ▮ | | | | | |
| Conduct Literature Review | | ▮ | | | | |
| Implement Solution | | | ▮ | | | |
| Evaluation and Refinment | | | | ▮ | | |
| Thesis Writing | | | | | ▮ | |
| Buffer | | | | | | ▨ |

Figure 6.1: Gantt chart of the project timeline.

# Bibliography

[1] E. Gamma, R. Helm, R. Johnson, and J. M. Vlissides, *Design Patterns: Elements of Reusable Object-Oriented Software*, 1st ed. Addison-Wesley Professional, 1994, ISBN: 0201633612. [Online]. Available: `http://www.amazon.com/Design-Patterns-Elements-Reusable-Object-Oriented/dp/0201633612/ref=ntt_at_ep_dpi_1`.

[2] A. Hevner, A. R, S. March, *et al.*, "Design science in information systems research," *Management Information Systems Quarterly*, vol. 28, pp. 75–, Mar. 2004.

# Declaration of Authorship

I hereby declare that I have written the present Master's thesis independently, that it has not been submitted elsewhere for examination purposes, that I have not used any sources or aids other than those stated, and that I have marked verbatim and paraphrased quotations as such.

*Max Mustermann*

Munich, 01.01.2025

Place, Date

Signature

# A Some Appendix

## A.1  Additional Material