

The cs-techrep CTAN Package and LaTeX Class Formatting Example: TechRep in Computer Science


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Abstract—This paper demonstrates an example of a technical report in computer science or software engineering, based on the cs-techrep LaTeX class. The example is intended for beginners, e. g., undergraduate students. It contains a basic outline template and usually fills it with dummy text, but some sections are describing the intent of the outline template and its sections. **Graphic exclamation marks highlight important remarks.**


Index Terms—template; lorem ipsum.


{  The abstract does neither mention a thesis in which context a technical report is written nor an institution or any other organizational aspects. It is a summary of the content of the technical report, thus, usually the objectives and architecture of a piece of software. Do NOT remove the abstract, this section is mandatory. Do NOT use special characters, symbols, or math in your title or abstract. Do NOT use references in the abstract, avoid abbreviations or acronyms. The abstract must look as one paragraph only. Ideally, end the abstract with one sentence stressing out the main output of the paper. }


I. INTRODUCTION AND OBJECTIVES | FUNCTIONAL REQUIREMENTS | PROBLEM STATEMENT

The cs-techrep formatting is adopted both from IEEE [1] and IARIA [2] styles. The cs-techrep LaTeX class is based on IEEEtran class [3]. In addition, be aware of the supplementary IARIA editorial rules [4]  that provide a beginner-friendly set of further advices. It is recommended to use a grammar tool, e. g., the LanguageTool [5] browser plugin in combination with Overleaf [6].

The pipe symbol “|” in the headings represents alternatives. Choose one and remove the others. The selectively provided quoted terms are special German alternatives.

The problem statement needs to be written from perspective of a subject-matter expert (“Fachkonzept”). Like an elevator pitch / mission statement . NOT from a technical perspective.

{  At some point you might introduce the types of users, for example, as in Figure 1. }

{  It is recommended to end the first section with a paragraph describing the structure of the paper. }

II. OPTIONAL: RELATED WORK | STATE OF THE ART | METHODS | DATA ACQUISITION

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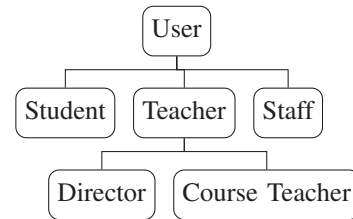


Figure 1. Types of Users

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III. ARCHITECTURAL GOALS

Provides (1) a visualization of the external systems and users with which the system interacts (“Kontextabgrenzung”), (2) the most important technical and organizational preconditions (“Rahmenbedingungen”), (3) quality/non-functional requirements (“Qualitätsziele”), cf. Table I, and/or (4) architectural style design decisions with formative patterns of the solution (“Architekturstil”) as well as (5) the applied programming language.

Table I. QUALITY/NON-FUNCTIONAL REQUIREMENTS (“QUALITÄTSZIELE”)

| Quality Req. | Description |
|------------------------|---|
| Usability | Intuitive operation and easy to learn |
| Security | Content is protected against unauthorised access |
| Maintainability | Easy expandability and modification |
| Easy to operate | The application can be used without major adjustments be used |

IV. ARCHITECTURE OF FANCYNAME | RESULTS | STRUCTURAL DESIGN | “BAUSTEINSICHT”

A. Technology Stack | Overall System

Provides (1) design decisions based on the previously defined requirements and (2) a visualization of the functional structure at top level including relationships (“Grobe Zerlegung”), thus, gives an overview on modules, frameworks, and middleware.

In discussions of multi-tier architecture, layer is often used interchangeably – and mistakenly – for tier. They aren’t the same. A “layer” refers to a functional division of the software, but a “tier” refers to a functional division of the software that runs on infrastructure separate from the other divisions. The Contacts app on your phone, for example, is a three-layer application, but a single-tier application, because all three layers run on your phone.

In discussions concerning multi-tier architecture, the term “layer” is frequently misused interchangeably with “tier”, despite their distinct meanings. A layer denotes a functional partition within the software, whereas a tier signifies a functional division that operates on separate infrastructure from other divisions/tiers. For instance, the Camera app or Settings app on your phone exemplifies a three-layer application but remains a single-tier application since all three layers run on your phone.

B. Presentation Tier | Frontend

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C. Application Tier | Backend | “Anwendungskern”

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D. Data Tier | Persistence

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E. Optional: Infrastructure and Deployment | Distribution Perspective | “Verteilungssicht”

Provides (1) information about configuration, exact software versions, SBOM, DevOps, Cloud, AWS, and others. Should add (2) security-related considerations or disclaimers. Could include (3) a software bill of materials (SBOM), at least for the major libraries or frameworks.

V. DISCUSSION | EVALUATION | LESSONS LEARNED | IMPEDIMENTS

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VI. CONCLUSION AND FUTURE WORK | “FAZIT UND AUSBLICK”

{ **▲** **Beginners’ guide against kindergarten mistakes:** Expand each acronym only when first used; then use only the acronym (however, do not take the abstract into account of this rule). Insert at least a sentence between a section title and subsection title! In-text references (i.e., “text [x][y]...”), leave a space between “text” and “[x]”! Prefer references to footnotes. Explain abbreviations in the paper text. All “section x”, “figure x”, “table x” must be “Section x”, “Figure x”, “Table x” (i.e., capital letter)! Across the entire paper; always e.g., and i.e., are followed by a comma “,”! Across the entire paper; “which” is preceded by a comma “,” or replace a which-without-a-preceding-comma with “that”. Check your raster images for appropriate quality!}

{ **▲** You must not leave the bibliography blank! Add appropriate references to your related work.} A selection of previous technical reports of the CyberLytics lab [7–16] is included as reference and further example.

REFERENCES

- [1] IEEE. *Conference Template and Formatting Specifications*. 2018. URL: <https://www.ieee.org/content/dam/ieee-org/ieee/web/org/conferences/Conference-template-A4.doc> (visited on 03/10/2025).
- [2] IARIA. *Formatting Rules*. 2014. URL: <http://www.iaria.org/formatting.doc> (visited on 03/10/2025).

- [3] Michael Shell. *How to Use the IEEEtran L^AT_EX Class*. 2015. URL: http://mirrors.ctan.org/macros/latex/contrib/IEEEtran/IEEEtran_HOWTO.pdf (visited on 03/10/2025).
- [4] IARIA. *Editorial Rules*. 2009. URL: <https://www.iaria.org/editorialrules.html> (visited on 03/10/2025).
- [5] LanguageTool GmbH. *LangueTool*. URL: <https://languagetool.org/overleaf> (visited on 03/10/2025).
- [6] Digital Science UK Limited. *Overleaf*. URL: <https://www.overleaf.com> (visited on 03/10/2025).
- [7] Andreas Hecht, Linus Heise, Oliver Kneidl, Eva-Maria Maurer, and Christoph P. Neumann. *StockSentinel: AI-Powered Web Tool for Analyzing the Markets Perception of Stocks*. Technical Reports CL-2024-07. Ostbayerische Technische Hochschule Amberg-Weiden, July 2024. DOI: 10.13140/RG.2.2.12488.12802.
- [8] Paul Brandl, Manuel Kalla, Dominik Panzer, Kevin Paulus, Manuel Pickl, Franziska Rubenbauer, Berkay Yurdagül und Christoph P. Neumann. *NeunerIn: Eine MEVN-basierte Webanwendung zum kompetitiven Kartenspielen*. Deutsch. Technische Berichte CL-2023-11. Ostbayerische Technische Hochschule Amberg-Weiden, Juli 2023. DOI: 10.13140/RG.2.2.33933.31209.
- [9] Jakob Götz, Uwe Kölbl, Maximilian Schlosser, Oliver Schmidts, Jan Schuster, Philipp Seufert, Fabian Wagner und Christoph P. Neumann. *Nautical Nonsense: Eine Phaser3- und FastAPI-basierte Webanwendung für Schiffe-Versenken mit Cloud-Deployment*. Deutsch. Technische Berichte CL-2023-07. Ostbayerische Technische Hochschule Amberg-Weiden, Juli 2023. DOI: 10.13140/RG.2.2.17156.09601.
- [10] Rebecca Kietzer, Baran Baygin, Carl Küschall, Jonathan Okorafor, Luca Käsmann, Michael Zimmet, Michael Ippisch und Christoph P. Neumann. *Stockbird: Eine React-basierte Webanwendung mit serverless Cloud-Deployment zur Analyse des Einfluss von Tweets auf Aktienkurs-Schwankungen*. Deutsch. Technische Berichte CL-2023-04. Ostbayerische Technische Hochschule Amberg-Weiden, Juli 2023. DOI: 10.13140/RG.2.2.32675.02083.
- [11] Anastasia Chernysheva, Jakob Götz, Ardian Imeraj, Patrice Korinth, Philipp Stangl und Christoph P. Neumann. *SGDb Semantic Video Game Database: Svelte- und Ontotext-basierte Webanwendung mit einer Graphen-Suche für Videospiele*. Deutsch. Technische Berichte CL-2023-02. Ostbayerische Technische Hochschule Amberg-Weiden, März 2023. DOI: 10.13140/RG.2.2.11272.60160.
- [12] Alexander Ziebell, Anja Stricker, Annika Stadelmann, Leo Schurrer, Philip Bartmann, Ronja Bäumel, Ulrich Stark und Christoph P. Neumann. *Wo ist mein Geld: Eine MERN-basierte Webanwendung für gemeinsame Ausgaben mit Freunden oder Kollegen*. Deutsch. Technische Berichte CL-2022-11. Ostbayerische Technische Hochschule Amberg-Weiden, Juli 2022. DOI: 10.13140/RG.2.2.28888.67847.
- [13] Tobias Bauer, Fabian Beer, Daniel Holl, Ardian Imeraj, Konrad Schweiger, Philipp Stangl, Wolfgang Weigl und Christoph P. Neumann. *Reddiment: Eine SvelteKit- und Elastic-Search-basierte Reddit Sentiment-Analyse*. Deutsch. Technische Berichte CL-2022-06. Ostbayerische Technische Hochschule Amberg-Weiden, Juli 2022. DOI: 10.13140/RG.2.2.32244.12161.
- [14] Tobias Bauer, Albert Hahn, Lukas Kleinlein, Nicolas Proske, Leonard Wöllmer und Christoph P. Neumann. *Covidash: Eine MEAN-Variation-basierte Webanwendung für Inzidenz-Zahlen und Impffortschritt in Deutschland*. Deutsch. Technische Berichte CL-2021-06. Ostbayerische Technische Hochschule Amberg-Weiden, Juli 2021. DOI: 10.13140/RG.2.2.33921.84321.
- [15] Cameron Barbee, Tim Hoffmann, Christian Piffel, Tobias Schotter, Sebastian Schuscha, Philipp Stangl, Thomas Stangl und Christoph P. Neumann. *FireForceDefense: Graphisches Tower-Defense-Spiel mit Kubernetes-Deployment*. Deutsch. Technische Berichte CL-2021-05. Ostbayerische Technische Hochschule Amberg-Weiden, Juli 2021. DOI: 10.13140/RG.2.2.20500.07048.
- [16] Egidia Cenko, Madina Kamalova, Matthias Schön, Christoph Schuster, Andrei Trukhin und Christoph P. Neumann. *Med-Planner: Eine Angular- und Django-basierte Webanwendung um ärztliche Termine übersichtlich zu verwalten*. Deutsch. Technische Berichte CL-2021-04. Ostbayerische Technische Hochschule Amberg-Weiden, Juli 2021. DOI: 10.13140/RG.2.2.19409.71528.