Your Fancy Title

Subtitle?

First name Last name

Your Fancy Title

First name Last name

Abstract

Abstract, always in English, about 10-20 lines. Do not use references, and do not use formulas if they can be avoided.

1. What is the problem/issue/subject?

2. How was the problem solved/attacked?

3. What are the results, how well was the problem solved?

4. How good are the results, how useful are they?

The abstract should be understandable without reading the whole report (and the rest of the report should be understandable without reading the abstract). You can reuse text/phrases from the Introduction.

Sammanfattning

Sammanfattning, alltid på svenska. Se till att det står samma saker i den svenska sammanfattningen och det engelska abstractet.

1. Vad är problemet, ämnet?

2. Hur angreps/löstes problemet?

3. Vad är resultaten, hur väl löstes problemet?

4. Hur bra blev resultaten, hur användbara är de?

Ca 10-20 rader. Använd inte referenser; ej heller formler om det går att undvika.

Sammanfattningen ska vara förståelig utan att läsa resten av rapporten, och resten av rapporten ska kunna läsas utan att läsa sammanfattningen. Det är helt OK att återanvända text från introduktionen.

Acknowledgement Acknowledgment is not always necessary, only sometimes: if you have received significant help/feedback/support from someone (beyond what can be expected, e.g., from a supervisor), if you have received special permission to use some material or equipment, or if you have received financial sponsorship (which, for example, could affect scientific impartiality). The section should be brief and concise, typically one paragraph.

Contents

Acronyms

latex Is a markup language specially suited for scientific documents. 10

mathematics Mathematics is what mathematicians do. 10

UU Uppsala University. 10

NOTE: The order and types of chapters/sections provided are just examples.   You should decide on the best chapters and order for your work.

1   Introduction

Describe at least the same things as in the abstract, but in more detail – typically 1-2 pages. Save technical details for later, as the reader is not yet familiar with them.

1. What is the area you are working in? What is the problem, subject, context?

2. Why is the problem important/interesting to solve?

3. How was the problem approached/solved?

4. What are the results, how well was the problem solved?

5. How good are the results, how useful are they?

Remember to start the introduction with a sentence or, even better, a whole paragraph that ”captures” the reader and motivates them to keep reading. Starting with ”We have chosen to do a project about X” might be relevant for you, but it won't make anyone want to read further. Try to include some background/context and (preferably) motivation to keep reading.

Make sure to get to the point quickly – the reader doesn't want to go through two paragraphs of text before finding out what you plan to do in your project. For example, don't start by presenting all the ideas you didn't choose – the reader wants to know what you are going to do, not what you are not going to do.

The introduction should be understandable to, for example, a student in the year below you, and preferably to an even broader audience. Feel free to conclude with an overview of the entire report, briefly describing what the different chapters are about. For example, Chapter 2 describes the purpose, aims and motivation. Chapter 3 outlines...

2   Purpose, Aims and Motivation

Here you essentially describe your problem formulation. This section should state the purpose, goals, and motivation for the project. These do not need to be separate subheadings.

Purpose: What is the project striving for? What is the overall goal, benefit, or effect of the project? (e.g., better health through dietary monitoring, easier planning of studies...)

Goals: What specific deliverables or actions will the project accomplish to bring us closer to the purpose?

Motivation: Why is your project important? Who is it important for, and which external stakeholders are there? How significant is the problem, what are the consequences if it isn't solved, and how beneficial would it be to solve it? What "gap" in the field are you addressing? Why is your solution better/different than others'?

Avoid discussing your internal motivation, as it is rarely of interest to the reader.

Make sure to convince the reader in this section that the problem exists, that it isn't solved, and that it is important to solve. The stronger the argumentation and motivation (with sources), the better.

1. Show that there is a problem.

2. Show that the problem is important to solve and needs solving.

3. Show that the problem is not already solved.

In this section, you can also start describing ethical aspects and sustainability aspects, this could be in subsections.

2.1   Delimitations

Here you describe what you have not done, i.e., how you have chosen to limit yourselves, and justify these limitations. This clarifies for the reader who may have had expectations you have not met.

3   Background

Here, you describe the background of your project, i.e., what leads up to your problem formulation. What is the area, environment, context, and background for the project

(more detailed and deeper than in the introduction)? Describe the area (e.g., sound processing, study plans, visualization, autism...). Describe the client, if you have one (but not too detailed). Keep in mind that the background and the problem must be at a general academic level and not just related to a specific client.

Remember that the background can look further back – how was the problem solved before? Before computerization? Sometimes it is both important and interesting (but sometimes not).

After reading the background, it should be easy to understand the purpose/goals and why they are important, and it should be clear that you are well-versed in the subject.

4   Method

Here, you describe which methods/tools/techniques/approaches you used to solve the problem/answer the question. What methods did you concretely use to solve the problem? Which techniques/tools did you use?

Don't forget to justify your choice of methods. Are there several reasonable alternatives? Describe why you did not choose them (e.g., why your chosen method is better). Show that it is reasonable to use this particular approach. This also applies in cases where it is predetermined which technique you should use.

5   Results and Discussion

Here you first describe your results, what you have accomplished. How good did it turn out? Then you critically review your results. Why did it turn out the way it did? Were the results reasonable/good/bad/unexpected...? What could have been done differently? How do your results relate to similar works?

- Show that the evaluation is reasonable.

- Show that the evaluation, results, and analysis are scientific and engineering-based.

Relate to the goals and purposes in Section 2, and use any relevant theory from Section 4 to explain.

6   Conclusions

Here you summarize and restate your contribution (the results of your project) and explain its significance and usage. What was important/new/interesting? (NOT in terms of what you learned, but for those reading the report)

Summarize the most important parts of the project, but not by copy-pasting; preferably with a new formulation. Try to place the most important parts in a larger perspective or context.

6.1   Future Work

Here you describe potential future developments of the thesis. Where is there potential for improvement and what can be built upon? What interesting extensions did you not have time for?

References

[1] E. Bell, A. Bryman, and B. Harley, *Business research methods*, fifth edition ed. Oxford: Oxford University Press, 2019.

[2] U. University. (2024) Almedalen. fetched 2024-06-17. [Online]. Available: https://www.uu.se/

A   Appendix

Appendices can be useful for attachments such as surveys, larger code segments, etc.

Appendices should be placed after the reference list and should start on a new page. Use `\newpage` to create a page break where the rest of the current page is blank. Then write `\appendix` to indicate that the rest is an appendix, and then use the usual `\section{}` for each appendix, which will be "numbered" A, B, C, etc.

To refer to an appendix, do the same as for a section.

B   Some Tips for LaTeX Usage

To **refer** to sections, figures, tables, etc., use `\label{marker}` to "set a mark" in the text or figure, and `\ref{marker}` to refer to it, for example, Read more on page 9 about naming sections, figures, etc.

```
\section{Motivation}
\label{sec:motivation}
```

followed by

```
As mentioned in Section~\ref{sec.motivation}...
```

See also Appendix A for how to handle appendices.

To prevent references from appearing immediately after a **line break**, use a non-breaking space `like~this`, where the tilde character `~` creates a non-breaking space. This is also generally correct to use before numbers (and in large numbers in English, e.g., `100~000` for 100,000), and of course also before `\ref{fig}`.

Never use double backslashes `\\` to create breaks between paragraphs. Always use a double new line for this. Use `\\` only in tables and similar contexts.

To create a **page break** where the rest of the page becomes blank, use `\newpage`; do not use `\pagebreak`. The latter is meant to fine-tune where LaTeX makes an automatic page break, not to end a half-full page.

Never use *math mode* (i.e., `$Text$`) to italicize text or for multi-letter variables in mathematical expressions, as text in math mode is interpreted as multiplication of the

different letters and then gets strange spacing – this is particularly evident where La-TeX would normally create ligatures (like fi). Instead, use `\textit{Text}` (*Text*) or `\textsl{Text}` (*Text*), or perhaps `\textrm{Text}` (Text, especially in mathematical expressions) or `\textsf{Text}` (Text, especially for code).

When writing in Swedish, you sometimes need to "show" where words (especially those with åäö) can **hyphenate** by using `\-` (similar to *soft hyphen*): ämnesöversiktsintroduktion hyphenates with a few inserted at the right places instead as ämnesöversiktsintroduktion

```
ämnes\-över\-sikts\-intro\-duk\-tion
```

B.1 BibTEX

To manage bibliography (**references**) smoothly, use BibTeX! Read more at http://en.wikibooks.org/wiki/LaTeX/Bibliography_Management#BibTeX, below about references, and `IEEEtran_bst_HOWTO.pdf` in the directory `IEEEtran/bibtex`.

To ensure that BibTeX does not convert names, abbreviations, etc., to lowercase, use `{}` and write like this:

```
title = {The {DSP} of {N}ewton applied to {iOS}}
```

Always write publication months using the built-in abbreviations, such as:

```
month = jun
```

instead of `{jun}` or `"jun"` or `"June"` or `"Juni"`. This allows the bibliography style to control how it is abbreviated, etc.

Remember to separate author names with "and," not with commas. Sometimes BibTEX needs extra help to understand what are first and last names, and *then* it is correct to use a comma.

C   References

> **NOTE: important!**   There are at least three purposes for the design of references and the reference list.
>
> 1. One should find the reference (from the text) in the reference list.
>
> 2. One should understand what is being referred to (what type of reference it is) so that one can evaluate it.
>
> 3. One should be able to find the reference in reality.
>
> Always strive to achieve all three.

Use numerical references (IEEE style [42]) or keyword-based [Lam86], not footnote style. The references are sorted alphabetically by author/etc. in the reference list. In LaTeX, use `\bibliographystyle{IEEEtranS}` or `{IEEEtranSA}` (or similar), see the main.tex.

To configure `\bibliographystyle{IEEEtranS/SA}`, you can use a special bibtex entry called `@IEEEtranBSTCTL`, see more info in the file `IEEEtran_bst_HOWTO.pdf` in the directory `IEEEtran/bibtex`, section VII, or the last part of `IEEEexample.bib` in the same directory.

References are written in direct connection to what prompted the reference (e.g., a statement or result), before any punctuation, and with a non-breaking space to the previous word. In LaTeX, `write~\cite{lam86}` to get a "non-breaking space."

One should *not* write the references after a longer paragraph (as some seem to be taught to do, somewhere). This usually makes it unclear what is actually taken from, or supported by, the references. In some cases, you may want to provide a short summary of what an author writes in an article, etc., but just adding a reference at the end of the paragraph is not clear enough. It is much better and clearer to start the paragraph by writing something like "Lisa Lagom describes~`\cite{lagom-bok}` how X depends on Y and in her analysis, she shows in detail how the relationship looks..."

Repeating the same reference often in a paragraph (maybe after every sentence) makes it more difficult to read. Try to rewrite the paragraph so that it becomes clear that it is all based on the reference, which should preferably be used early. Example: "In a study by WHO~`\ref{who}`, the consequences of XYZ and the indirect risks that arise are described," and then the different consequences and risks can be discussed in the same paragraph without it becoming unclear.

When referencing "thick" items like books, it is appropriate to specify page numbers (as `\cite[pp. 211–214]{example:alma}`) which becomes [1, pp. 211-214], but for "thinner" items, you only need to do this to specifically point out if you mean a particular part of the reference (maybe it describes three different ways to do X and you want to point to the 3rd, not the first two).

To refer to multiple things simultaneously, write multiple BibTeX keys in the same `\cite{example:alma, example:dependability}`.

Note that news articles (newspaper articles and the like) almost always have a publication date, which should be shown (e.g., in the `note` field), and usually also an article author.

Even if a reference has a URL to the actual text, it is not necessarily a web reference, but sometimes an article/book, etc., that happens to be available online. It should then be described as an article/book/etc. (but of course preferably with the URL) so that one can make a preliminary assessment of the reference already when reading the reference list.

Try to find authors and publication dates (year, month) even for web references, and **always** specify when they were accessed, as they can be updated at any time. An example is [2] (see `refs.bib`).

D   Formulas, Figures, Images, Code

Formulas, figures, and equations must be described. This means, for example, that each symbol must be explained in the text.

Let figures and tables ("floats") end up where LaTeX thinks they should, and adjust the placement only in the final version and if it is really necessary, for example, if they float away several pages.

Figure captions should describe what we see in the figure, not just what type of figure it is. Writing "System structure" or "The structure of our system" for a picture of the system structure is not sufficient. Help the reader understand by also (or instead) describing the content, e.g., "The green circles represent users, and components with shaded background are external. Input comes from the left, and output is delivered to the right." It is therefore *not* enough to describe the figure in the running text – but of course, it should also be described there.

In English text, you write "Figure 3," not "figure 3," since it functions as a name for the

figure (and similarly for Table, Section, Appendix, etc.).

All figures and images that are not your own must have references to the source.

The report template is set so that figures are presented with a line above, one below, and one between the caption and the image itself. For other presentations, see the macro `\floatstyle` (google) – for example, `\floatstyle{boxed}` gives a frame around the figure instead.

If you include code snippets, make sure they are relevant and commented, so they can be understood. Alternatively, for short snippets: provide the corresponding explanation in the text. Use a sensible LaTeX package for code, such as `listings`.

E   Examples

Some examples for different commands in LaTeX.

E.1   References

Uppsala University has 52 917 students [2].

Bell et al. [1, p. 312] describes...

Chapter 3 outlines ... and check out Section 4.

E.2   Acronyms

This is how you use acronyms: Uppsala University (UU) and UU.

This is how you use glossaries: Latex typesetting markup language is specially suitable for documents that include mathematics.

E.3   Figures

Look at this fabulous building in Figure 1.

Figure 1 University Hall or the University Main Building is the main building of Uppsala University in Uppsala, Sweden.

E.4 Tables

You can create tables easy at https://www.tablesgenerator.com/ and look at Table 1.

	Students	**Employees**
Quantity	52 917	7 622

Table 1 Number of students and employees at Uppsala University.

E.5 Listings

You can insert code in a Listing 1.

```python
# Sum
def sum(x, y):
    return x + y

print("Sum:", sum(1,1))
```

Listing 1: Python implementation of adding two numbers.

E.6   Math

$$A = \frac{\pi r^2}{2} = \frac{1}{2}\pi r^2 \tag{1}$$

$$e^{\pi i} + 1 = 0 \tag{2}$$

The beautiful equation 2 is known as the Euler equation.