

Hints on Report Writing

Version 7*

Sabih H. Gerez
University of Twente, Department of Electrical Engineering
Laboratory for Network Theory
email: s.h.gerez@el.utwente.nl

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1 Introduction

This text with guidelines on report writing is meant for students working on projects in our group. It is sufficiently general, though, to be beneficial to other students as well. The motivation for it comes from the fact that a lot of a supervisor's time is spent otherwise to explain many of the items listed here. If the student takes them into account from the beginning, the contacts with the supervisor can be dedicated to matters more essential to the project.

The text is by no means meant to replace the good books and courses on written communication. Good courses are offered at the University of Twente and, actually, a basic course is compulsory for the newest generations of students in electrical engineering.

The text consecutively deals with the building blocks of a report, some language-independent hints and a few hints based on frequently made errors for those that write in English and Dutch respectively.

2 Building Blocks of a Report

Below the different building blocks of a report are listed. Each entry is indicated by its English and Dutch names, followed by a short explanation:

1. **Title Page (Titelpagina).** This is the first page of your report. The main component of this page is the title. Try to find a title that clearly describes the work you have done and be as precise as possible. The title that your supervisor gave to your project when you started, might not be the

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best title, as your results were unknown at that time. Note that it is the convention in English to capitalize all words in the title except for articles and prepositions, whereas in Dutch only the first word in the title should be capitalized. Other things to be mentioned on the title page are: your own name, the project type (240-hours, D1, Master's, etc.), the specification of our group (University of Twente, Department of Electrical Engineering, Laboratory for Signals & Systems – Network Theory), the names of your supervisor or the names of the members of the graduation committee (provide also their affiliation if they do not belong to Network Theory), the date on which you have completed your report, and the period in which you have been working. The title page should also contain a report number that you can obtain from our secretary. Put the prefix 'EL-S&S' in front of this number. Example: "Report number: EL-S&S-115N95". The secretary keeps the originals of your report after reproduction and can retrieve these originals by means of the number when more copies are necessary in the future. Think of the window that the cover has: at least the title, your name, and the report number should be visible through this window. You can also make two title pages: a short one meant for the window and a long one with all the elements mentioned above.

2. **Abstract (Samenvatting).** On a separate page you summarize the main points of the report. People that became interested in your report after reading the title, should be able to judge from the abstract whether the report is really interesting for them. So, you briefly formulate the problem that you have investigated, the solution that you have chosen, the results that you have achieved, and your conclusions. Normally, the abstract shouldn't occupy more than one third of a page.
3. **Table of Contents (Inhoudsopgave).** Here you list the chapters (1, 2, etc. followed by the name of the chapter), sections within chapters (e.g. 1.1, 2.4, etc. + name) and subsections within sections (e.g. 1.1.1 + name) and the page numbers where they start. Do not forget to list the appendices (A, B, etc. + name) and other entities like the preface and bibliography (the so-called "unnumbered chapters"). If you use a good text processor (e.g. \LaTeX), it is possible to generate the table of contents automatically. Note: do not include the abstract and the table of contents itself in the table of contents.
4. **Preface (Voorwoord).** This is an optional part of your report. If you want, you can mention here something on the context of your project (e.g. if it is part of a larger cooperation between the group and a certain company). This is also the place where you can thank those people that have helped you during your project. Remember that it is the task of your supervisor to help you; you do not need to thank her/him for that. If thanking is the only purpose of the preface, it is better to call the building block **Acknowledgments (Dankwoord)**.
5. **The Chapters.** The number of chapters you need and their contents strongly depend on your project. Roughly the following chapters should be present:
 - **Introduction.** In this chapter you formulate the problem that you want to solve, the initial goals you had, etc. without going into details. Here you also describe the structure of the rest of your report, indicating which chapter will address which issue.
 - **Theory-Oriented Chapters.** Present here the theory that is necessary to understand what you have done. Summarize the literature that you have read. Rather than literally copying the texts that you have read, you should present your own interpretation of the theory. You can assume the reader to know what you already knew before starting to work on the project. Present issues that are not strongly related in separate chapters with well-chosen names.
 - **Practice-Oriented Chapters.** Depending on the work that you have done, it might be important to write about the practical starting point of your project. If your task was to design

hardware, it is sometimes wise to explain the CAD tools that you have used, especially when these tools have influenced your design. If you had to evaluate or modify a certain software package, you can shortly describe the main features of this package.

- **Chapters on Analysis and Solution.** These chapters contain the result of the creative work you have performed during the project: you have perhaps constructed an algorithm, designed some hardware, developed a new theory, etc. Use different chapters if this is logically justified. If you have implemented an algorithm, do not forget to pay attention to its time complexity.
- **Experimental Results.** Present here qualitative and quantitative aspects of your work: the benchmark results of the algorithm that you have implemented, a summary of the simulation results of the hardware that you have designed, etc. It may, of course, happen that some projects have a theoretical nature and that experimental results do not exist.
- **Conclusions.** This is one of the most important chapters and should be carefully written. Here you evaluate your results, state which of the initial goals were reached and which not, mention the strong and weak points of your work, etc. You also point out the issues recommended for future research.

6. **The Appendices.** Appendices are useful for those things that you consider important, but that do not fit in the main presentation of your work. There could be several reasons for using appendices: the material is too long and has too many details (e.g. the specification of something), you have formulated a theorem, the proof of which is too long for the main text, you want to include a user manual for the software that you have written (strongly recommended!), you want to present the schematics of a hardware design, etc.

Appendices tend to occupy many pages. Think carefully on what you want to include. For example, complete listings of the source code that you have written are seldom interesting for all members of your committee. Unless you are asked to do otherwise, the best thing to do is to give a copy to your supervisor only.

7. **Bibliography (Literatuur).** Each entry in the bibliography has a label. Any reference from the main text to the entry should use this label. It can be a numeric label or a label derived from the author's name and the year of publication. It is the habit to enclose this label in square brackets. In the bibliography, you provide the details of each entry sorted by label. These details differ depending on the type of bibliographic entry:

- *For a book:* name of the authors, title, publisher, city of publication and year of publication.
- *For an article in a journal:* name of the authors, title, name of the journal, volume number, issue number within a volume, range of pages, and (month and) year.
- *For an article in conference proceedings:* name of the authors, title, name of conference, editors (if present), range of pages and year.
- *A chapter in a book:* authors of the chapter, title of the chapter, editors of the book, title of the book, publisher, city of publication, range of pages, and year of publication.
- *A report:* authors, title, university/company, report number, year.
- *A Ph.D. or Master's Thesis:* author, title, university, department, year.
- *A manual/handbook:* company name (if there are no authors), title, reference number, year.

Below is a fragment of text with bibliographic references:

Lee's theoretical results on the scheduling of synchronous data-flow graphs [1, 2] have found practical applications in Gabriel [3].

In the bibliography, you will find:

- [1] E.A. Lee and D.G. Messerschmitt. Synchronous data flow. *Proceedings of the IEEE*, 75(9):1235–1245, September 1987.
- [2] E.A. Lee and D.G. Messerschmitt. Static scheduling of synchronous data flow programs for digital signal processing. *IEEE Transactions on Computers*, C-36(1):24–35, January 1987.
- [3] E.A. Lee, W.H. Ho, E.E. Goei, J.C. Bier, and S. Bhattacharyya. Gabriel: A design environment for DSP. *IEEE Transactions on Acoustics, Speech and Signal Processing*, 37(11):1751–1762, November 1989.

Instead of using the labels [1], [2], and [3], you could as well have used [Lee87a], [Lee87b] and [Lee89] respectively both in the text and the bibliography. Many citation styles, different from the two just mentioned, also exist. You can, of course, use them as well once that you have verified that the style of your choice is generally accepted.

Do not list any entries to which you do not refer from the text. If you really want to list this type of entries, make a separate list (without labels) called “Consulted Works (Geraadpleegde literatuur)”.

3 General Remarks on Report Writing

The list of remarks below is mainly based on frequently made mistakes.

1. Make a structure of your report before starting to write. The structure contains the hierarchical partitioning of your text in chapters, sections, etc. with keywords for each partition. Discuss this structure with your supervisor.
2. Do not try to achieve perfection directly. It will take you too much time if you try to carefully choose the words of every sentence. You should rather write a “quick and dirty” version of the text based on the structure that you have designed, and refine the text iteratively.
3. Describe explicitly in your text why you have chosen for a specific structure of your report and help the reader in relating the topics discussed in different chapters with each other. This should be done in the introductory chapter and also at the beginning and end of each chapter.
4. Do not make your sentences too long. A long sentence often can be split into separate sentences.
5. Use a well-chosen terminology. As far as the non-technical words are concerned, you should avoid to use the same words too often. For technical terms, however, always use the same words when you mean the same thing. Do not invent your own terminology if the literature you have read already provides you with the terms you need (it can happen that two different authors use different terms for the same thing; this often does not justify that you introduce yet a third term).
6. Avoid colloquial language and humor. Spoken language is different from written language. Therefore, do not use e.g. the language of popular TV programs in your report. Humor is justified

in exceptional cases, but does not help the reader to understand your text when used too often.
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7. Check your spelling. Most text processors have spelling checking possibilities; use them! You should also check for grammatically correct spelling (e.g. a singular subject requires the verb to be in singular).
8. Start all chapters, appendices and unnumbered chapters on a new page.
9. Many word processors have a multitude of fonts available. A controlled use of them can be recommended. The main text uses the roman version of some font with proportional spacing (e.g. Times, Helvetica or Computer Modern). Bold text should normally not be used outside headings of chapters and sections. Italic text is used to emphasize words: for a notion that is introduced for the first time, for cited text, etc. A typewriter font, such as Courier, can be used for text written in a programming language or text related in some other way to interactions with a computer.
10. Never use an abbreviation before defining it. If you use many abbreviations, include a list of abbreviations in your report (as an appendix). Although most abbreviations consist of capital letters, you should not use initial capitals in the words that compose the abbreviation (unless any of the words is a proper noun). You can, of course, use the italics font for emphasis. Example: This report investigates the applicability of *digital signal processing* (DSP) to the problem just formulated.
11. Punctuation marks as the dot, comma, semicolon, etc. should be placed immediately after the preceding word and should be followed by a space. An open parenthesis has only space at its left and a close parenthesis has only space at its right (and no space around it when followed by a dot, comma, etc.).
12. A dash ('-') is used to group words in nouns consisting of multiple words to indicate that a word belongs to its predecessor(s) rather than its successors. One e.g. writes *data-path synthesis* with a dash because one refers to the synthesis of "data paths", while one writes *digital signal processing* without a dash because one refers to a special case of "signal processing". (Consider the wrongly written version: "data path synthesis" would be interpreted as some special case of "path synthesis", which is an unknown notion.)
13. Always refer to a figure or table from the main text (using the figure or table number). Otherwise the reader neither knows how to relate the figure to the text nor when the moment has come to look at the figure. It is a good habit that the first reference to a figure is on the same page as the figure itself or on a preceding page. Use a meaningful caption (Dutch: onderschrift) for every figure or table. Example: *Figure $\langle n \rangle$: the data-flow graph of a second-order filter section.*
14. In the main text, the words "figure", "table", "section", etc. followed by a specific number should be treated as proper nouns and should start with a capital. Example: *The data obtained for the graph displayed in Figure 3 of Section 2.1, are summarized in Table 7. But: The tables in the previous section lead to a clear conclusion.*
15. Be always fair when making use of somebody else's work. Never copy a text, idea or figure without referring to the source. Even when you mention the source, try to limit the length of literal citations to at most one or two sentences. Longer citations will give the impression that you are unable to formulate an idea in your own words.

16. Avoid the use of the word “we”, if you are the only author of the report. Use “I” instead, or the passive voice. You can also use the third person and refer to yourself as “the author”. However, try as much as possible to minimize references to yourself.
17. Often you can arrange with your supervisor that he or she reads intermediate versions of the text. Pay some attention to the presentation of the text already at this stage. The fact that the version is intermediate does not justify that page numbers are missing or spelling mistakes have not been corrected.
18. Always use your common sense and, if you have good reason, deviate from the rules given here.

4 Frequent Mistakes in Writing English

1. Be aware that the British and American spellings of a word may differ (e.g. *behaviour* vs. *behavior*, *organise* vs. *organize*). Choose for either of the two spellings and be consistent throughout your report. As the American influence in our field of science is stronger, it may be preferable to join the main stream and use American spelling.
2. The perfect tense of the passive voice (de voltooid verleden tijd van de lijdende vorm): Use *has/have/had been* instead of *is/are/was/were* when referring to some action that has finished. Example: *A program consisting of more than 1000 lines of code has been written during the project.* And not: *... is written ...*
3. Different words in English for one Dutch word:
 - The use of an adjective as an adverb (het bijwoordelijk gebruik van een bijvoeglijk naamwoord): Do not forget that the adverb is constructed most of the time by adding the suffix *-ly* behind the adjective. Example: *an easy task*; and: *The task is easy*; but: *The task can be performed easily*.
 - *Dan* is *then* when referring to a moment in time (*it happened then*) but *than* in the comparative (vergelijkende trap; *the results were worse than expected*).
 - *Veel* is *much* when referring to something uncountable (*there is much work to do*) and *many* otherwise (*there are many things to do*). Similarly, the words *little*, *less*, and *amount*, that are used for uncountable things, have the counterparts *few*, *fewer*, and *number* for countable things.
4. Words often confused:
 - *Paragraph* in English means *alinea* in Dutch. The English translation of *paragraaf* is *section*.
 - *Eventual(ly)* in English means *uiteindelijk* in Dutch. The meaning of *eventueel* can be approximated in English by *possible/possibly*.
 - Do not interchange *to* (Dutch: *te/aan/tot/naar/...*) with *too* (Dutch: *te/ook*). Examples: *I am going to walk to the city. He drinks a lot and smokes too much too.*
5. Past forms of some irregular verbs: *To send* has *sent* for its past tense and past participle (*As soon as the message has been sent, ...*). In the same way, *to build* becomes *built* and *spend* becomes *spent*.

6. The use of the apostrophe: The use of an apostrophe in contractions like in *shouldn't*, *won't*, *can't* can better be avoided in technical texts (use: *should not*, *will not*, *cannot*). It is a serious mistake to interchange *it's* (a contraction of *it is*) and *its* (the possessive pronoun). Example: *It is (It's) important that the component performs its main task.*
7. The use of *a* and *an*: *an* is only used when the word that follows starts with a vowel sound. So, it is *an uncle* but *a univeristy*, because “university” is pronounced as “you-niversity”. The rule also holds for abbreviations: it is *an FU*, because “FU” is pronounced as “eff you”, although the unabbreviated form is “functional unit”.

5 Frequent Mistakes in Writing Dutch

This section is in Dutch for obvious reasons.

1. Een van de meest irritante fouten is het verkeerde gebruik van de d/t/dt aan het eind van een werkwoord. Vandaar dat hieronder een herhaling volgt van wat iedereen op de lagere school al zou moeten hebben geleerd:

De tweede en derde persoon enkelvoud van de onvoltooid tegenwoordige tijd krijgen altijd een ‘t’ na de werkwoordstam, tenzij de stam al op een ‘t’ eindigt; alleen in de tegenwoordige tijd kan een werkwoord op ‘dt’ eindigen, nl. als de stam zelf op een ‘d’ eindigt; in de onvoltooid verleden tijd en in het voltooid deelwoord wordt een ‘d’ gebruikt, tenzij de werkwoordstam op een van de medeklinkers uit ‘*t kofschip*’ eindigt; in dat geval wordt een ‘t’ gebruikt.

2. Samenstellingen worden in het Engels vaak als twee woorden geschreven, maar in het Nederlands als een woord. *Text processor* wordt dus *tekstverwerker*.
3. Een moeilijk punt is het wel of niet vertalen van Engelse termen in een Nederlandstalig verslag. Over het algemeen is een Nederlandse term te prefereren boven een Engelse, mits die term algemeen bekend is. Veel onvertaald laten komt de leesbaarheid niet ten goede, terwijl het zelf verzinnen van vertalingen tot verwarring kan leiden. Probeer daarom de juiste balans te vinden.

Acknowledgment and Final Remark

I want to thank all friends and colleagues that suggested me valuable modifications to this text as well as the students that triggered the inclusion of many items in this text after having done it wrong once. Please do not hesitate to send me any type of constructive comment on the current version of the text.