

# A short guide to writing reports

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This document provides a set of guidelines to bear in mind when writing technical reports. It starts by considering the audience of reports, then considers layout and appearance issues. It discusses what material should be incorporated in the report, then the actual organization of the document. References are discussed, as are writing an abstract and final checking of the content.

Note that coloured text in this document is ‘live.’ When viewed using a decent PDF viewer, clicking on coloured text will either move you within the document or bring up the relevant page in your web browser.

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## 1 Introduction

There are many documents that summarize how to write technical reports on the Web. They are generally fairly consistent in their advice, so reading any of them will give you useful advice. The guidelines presented here are closely based on [a document from the University of Sheffield](#), which you are encouraged to read through yourself.

A good report is easy to recognise: it has a precise and informative title, a clear and well-organised layout, is written in a fluent and concise style, using diagrams, tables and graphs to clarify difficult concepts and present results. A good report is a pleasure to read. These properties are perhaps best summarized as a series of guidelines for the author of a report to bear in mind when preparing and writing it:

1. Ensure the *reader* is the most important person, so organise the report for their convenience.
2. Write in a concise, fluent style with no repetition.
3. Put diagrams in the right place with the right titles.
4. Give complete and correct references.
5. Give the whole story in miniature in the abstract.
6. Check the report thoroughly for technical errors, typing errors and inconsistencies.
7. Make the report look as good as you can.

These points will be considered in the remainder of the document, though not in the order listed above.

## 2 Layout and Appearance

Modern word processors and typesetting engines are able to produce beautiful-looking documents. The author's preference is for  $\text{\LaTeX}$  as his reports often include substantial amounts of mathematics; but reports that look almost as good can sometimes be produced using Microsoft Word or other preparation tools.

A good rule of thumb for reports printed on A4-sized paper is to have a 1-inch (2.5 cm) margin around the text and to use 11-point fonts. This keeps the number of printed characters per line to about 80, which is near to the optimum for aiding readability. This document is laid out in this way.

It is normal for reports to be written using a serif font. Good choices are Palatino or Times, and most typesetting and word processing programs offer these and others. This document is typeset using a font called Charter.

## 3 Assimilating the content of the report

Before starting to write a report, the target audience needs to be considered. If no specific audience has been given to you, the report should be written for a reader who is educated to the same level as the report's author but has no knowledge of its subject. A common failing is to write a report that is accessible only to someone who has done the work themselves, and you should try to avoid that mistake. Good questions to ask yourself before putting finger to keyboard are: *Why is the report being written?* and *What is the intended content of the report?* You may find it helpful to list a set of points under each of these headings to help plan out the structure of the document.

In an academic setting, a report is normally written to allow the reader — who may well be marking it — to assess your ability, so you need to demonstrate your technical competence, show

your organisational skills, and demonstrate that you can write clearly and concisely to produce a good report. The actual content of the report depends on what you were asked to do — build a mathematical model, design a controller, compare design techniques, write some software, or something quite different.

Having established the aims of the report you can begin collecting and organizing material. A good way of doing this is to separate it into three categories:

1. Obviously important information which must go into the report.
2. Borderline information which might be of use to some readers, or which might amplify or substantiate other more important material.
3. Information that you find interesting (or cannot bear to throw away) but which is not relevant to the report.

Material in the first category will probably go in the main body of the report, with that in category 2 in an appendix. Material in category 3 you will probably eventually throw away — though don't be in too much of a hurry to do that in case you find it contains a piece of vital information which you had overlooked.

## 4 Plagiarism

One thing that you must avoid at all costs is plagiarism, representing others' work as your own, either deliberately or by oversight. If you source material from books, the web, or anywhere else, you must either re-write it in your own words or enclose the copied text in quotation marks and refer to the source (see below on how to reference). This also applies to diagrams: if you use a diagram that you have not yourself drawn, be sure to refer to its origin. If you have re-drawn a diagram, it is polite to acknowledge the source too.

Plagiarism is a serious academic offence and is treated severely. Allowing others to use your work is also an offence so be careful to avoid doing that too. You will be aware by now that academics have access to tools that are excellent at detecting and reporting plagiarism, and they are routinely applied to submitted work. For further information, [please consult the University's online resources](#).

## 5 Organizing the report

Although written in a formal way, a good report tells a kind of story. It first sets the scene and explains why the work was done. In doing this, it will often describe the developments that led up to the topic of the report, and this is conventionally done in a literature survey.

Having given the reader enough understanding of the subject to appreciate why the work described in the report was done, the next thing is to describe it, giving enough detail for the reader to be able to reproduce the work themselves. This often, but not always, involves describing the theoretical principles underlying the work and then the experimental implementation of it. Following that, any results obtained during the work should be reported (often involving tables and graphs) and interpreted.

The last part of the report should draw conclusions from the work. If there are clear further steps that can be made as a result of your work, these should be outlined.

Following the conclusions, any appendices that support the main body of the work should be presented, and the very last thing in the report should be a list of references or a bibliography.

Although one could in principle write a report just as a series of paragraphs, it is conventional to break the text up into sections or, for longer documents such as a thesis, into chapters. Each section or chapter should have a title that conveys to the reader an idea of what it contains. These should also be numbered, principally because it gives an easy way to refer to other parts of the document

(“as was discussed in section 4”). There should be a table of contents following the title material, as demonstrated in this document. Practically every published book also follows this convention.

The reader is probably a busy person so say what you want to say accurately and succinctly. If you have little to say, padding it out will not conceal the fact but will irritate the reader. Do not use phrases such as “at this present moment in time” when you mean “now”, or “it should be noted that” when you could use “note.” Avoid using words such as “rather,” “quite,” “fairly,” “very,” which have little meaning in a technical context.

Sentences may be long or short. Short sentences produce a clear, easily-read style for factual material. Longer sentences are appropriate when you want the reader to consider two or three ideas together or to compare and contrast information. Sentences should be written in the third person passive, as in “the components of the system were connected as shown in figure 2”, not in the first person (“I connected the components of the system as shown in figure 2”). The use of the right tense makes a big impression on the reader and is one of the yardsticks that people use when deciding whether or not a report qualifies as “good.”

Paragraphs should have a unity of content. This may be one idea or may be several that share some common theme. Paragraphs also have a psychological affect on the reader: a paragraph that is longer than a page discourages the reader, while many short paragraphs, each consisting of one or two sentences, gives an impression that the writer has not organised the material in a coherent way.

Punctuation errors distract the reader; if you struggle with punctuating sentences correctly, stick with ones that are fairly short. Spelling mistakes are unforgivable in the 21<sup>st</sup> century when word processors are being used to prepare reports — and be sure to use British English spellings as you are studying in a UK university. Note that a spelling checker will not detect all your mistakes; in particular, it cannot detect words which are correctly spelt but wrongly used. This means that you still need to read through your text. For technical words and new words you should adopt what seems to be the most common usage and be consistent. For example, “non-linear” and “nonlinear” are both acceptable but you should choose one form and use it consistently.

All equations that are referred to in the text should be numbered. Place the number in parentheses “(·)” at the right hand margin alongside the equation. For documents that have only sections, number equations consecutively within the entire document; but for longer reports that involve chapters, number equations within each chapter, so that the fourth equation in chapter 5 will be numbered (5.4).

When referring to equations in the text use the form “(5.4)” or “equation 5.4”. All symbols used in equations should be either listed in a table of symbols at the beginning of the report or should be defined at the point of first use. If possible use a different type face to distinguish symbols that are based on the standard alphabet from normal text. A typical convention is to use an italic font for symbols.  $\LaTeX$  users will find this is done automatically for them as they switch into maths mode.

A clear, well drawn-diagram can convey quickly a large amount of information; but a muddled, badly presented diagram will distract and annoy the reader. Each diagram should have an informative title and each should be numbered in the order of appearance with a document or chapter. In the body of the text diagrams should be referred to as “Figure 3.6.” As far as possible, the diagram should be placed so that they are visible at the point in the text where it is first referred to. Tables should be numbered separately, but in a similar way, to figures.

## 6 References

References are important and are used for a number of reasons, the main ones being to acknowledge the source of material being used, to tell the reader where the confirmation of statements that you have made can be found, and to tell the reader where a more extensive or more detailed discussion of the subject (or related subject) can be found. Whatever the reason for giving the reference, it

must be accurate and complete: there is nothing more irritating than trying to follow up a reference and finding that too little information was given.

There are two commonly used forms of indicating a reference (citation) within the body of the text: numeric, and the so-called Harvard system. In the numeric system the citation is indicated by the use of a superscript number in the text or by placing a number in square brackets. In the Harvard system the citation is given in the text by the last name of the author(s) and the year of publication of the work. For example: “Several numerical algorithms have subsequently been proposed to unwrap the phase spectrum for a given signal [Tribolet, 1976; McGowan and Kuc, 1982; Moura and Bageroer, 1988]” and “Fundamental results in this area were obtained by Sandberg (1964) and Zames (1963, 1964)”. If there are several citations to the same author for publications in the same year then they are identified by adding the letters a, b or c etc., to the year, as in Sandberg 1964a and Sandberg 1964b. A reference with three or more authors would be cited in the list as Jones *et al* (1997) with the complete list of authors provided as part of the reference.  $\LaTeX$  users will find that its companion  $\text{BIB}\TeX$  and  $\text{Biber}$  programs adhere to these conventions.

A full list of references should be given at the end of the report. For the Harvard system they are arranged in alphabetical order of the first author’s family name.

- For journal articles the preferred style of the citation is author name(s), title, name of journal, volume number, page numbers, month, year.
- For papers in conferences use author names(s), title, conference title, pages, publisher, month, year.
- For books use author name(s), title, publisher, year.
- For web sources use author, title, URL, date accessed.

Note that web sources are much less reliable sources of information than the others listed here as they have not been subjected to peer review.

When you examine reference lists in books and journals you will find many different formats used: the exact format is a matter of house style and is not important. The three important things are consistency, completeness and correctness.

## 7 Finishing the report off

When the report as a whole has been completed, it is time to write the abstract, a short summary of the content of the document. Writing a good abstract is difficult, so do read through abstracts of papers and try to use a similar style.

When you have done all this, you still need to check the report. If possible, put it to one side for a couple of days and then read it through line by line, checking for consistency of notation, typographical errors, and so on. It is surprising how many errors this final read-through usually finds.

## References

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