

What is a Technical Essay?

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Abstract: Many students have to write technical essays as part of their coursework. Here we describe what a technical essay is, and cover the process involved in writing one. As well as issues of layout, style, content and referencing we also provide some pointers on how to go about researching the topic of your essay. While there are several ways in which you can write a technical essay, following the guidelines here should provide you with a solid foundation for producing a good essay.

1 Introduction

In the School of Computer Science you will often be asked to write a technical essay as part of your coursework. For many students this is the first time they will have been asked to write such a document. Here we explain what a technical essay is, and offer some guidance on how to go about constructing one.

A technical essay is a bit like a short academic journal article. Usually you will be asked to write somewhere between 1500 and 2000 words, excluding references. Often the essay topic will be in the form of a question that you have to answer, or a statement that you are asked to discuss. In both cases, the process for writing the essay is basically the same.

Normally the essay should be written in a serif font (e.g., Times New Roman), and you should use a font size of 11 or 12 points. The text should also be formatted with a straight left margin, and a jagged right margin. All pages should be numbered at the bottom.

This article is written in the style of a technical essay. In the rest of this essay we first talk about the layout of the essay. We then consider issues of style, before discussing the essay content, which is usually the most important aspect. After describing how to use citations and references we recap and summarise what we have said in the concluding section.

2 Essay Layout

All good stories have a beginning, a middle and an end. A technical essay is no different in this respect. Your essay should therefore be divided up into coherent sections, each of which is numbered. You will sometimes hear people say that the structure of an academic paper should be “Tell them what you’re going to tell them; Tell them; Tell them what you told them”. This also applies to technical essays. So you start by introducing the topic and providing an overview of what you will say. Then you say the things that you want to say in the main part of the essay. Finally you draw some conclusions and provide a recap on the main points of what you have already said.

Before the body of the essay, you should include a short abstract (usually 100-150 words), which summarises what the essay is about. You may find it easier to write the abstract (and possibly even the introduction) first, and then go back and rewrite them after you have written the rest of the essay.

The introduction provides some background on the topic of the essay. This section will usually contain a short literature review which illustrates how the topic of the essay relates to other research that has been carried out.

One way of working out what the layout should be is to draw up an essay plan. This should help you to identify the headings for the different sections of your essay. At first the plan will be quite coarse, but as you start to read about the topic of the essay, you should refine the plan to reflect the things that you want to talk about in more detail, perhaps as a set of sub-headings or bullet points. It is important to make sure that the sections fit together, which is an issue that is addressed by the style of your essay.

Try to use an appropriate number of sections in your essay. This will be dependent on the given topic and required length, but as a rough guide, an essay of about 2000 words would normally have an introduction at the beginning, 2-3 sections covering the main content and a conclusions section at the end, making a total of 4-5 sections in all.

3 Essay Style

Essays should be written in clear, formal (but not stilted) English and should usually be written using an impersonal style (i.e., generally avoiding the use of "I"). You may find it helpful when reading journal articles, to consider (and learn from) the style in which they are written, as well as their content.

The essay should be written such that it flows within individual sections, and across sections to tell a coherent story. One way of maintaining the flow across sections is to include a sentence at the end of each section that provides an explicit link to the next one. In journal articles you will often see a linking paragraph that provides a transition between adjacent sections of the paper.

For those who need help, there are some useful textbooks on writing that may be worth consulting. *Elements of style* (Strunk and White, 1999) is often recommended, as is *A handbook for scholars* (van Leunen, 1992). While these books will not write the essay for you, they provide useful rules and guidelines on writing clear, correct English for those who need them. You should also make sure that you check the spelling and grammar of your essay.

Having considered the layout and style of the essay, the next thing is to consider the content. This is generally the part of the essay that is worth the most marks.

4 Essay Content

The content will normally account for most of the marks for an essay. This is where you get to show the reader how much you know and understand about the topic of the essay. The key point here is the *understanding*. In other words, it is important that you provide some sort of analysis or evaluation of the issues involved, rather than just list them, and use this to generate your own opinions and draw conclusions.

In some cases there may be a lot of background literature that is potentially relevant to your essay, but cannot all be included because they would make your essay longer than 1500 (or 2000) words. You should therefore decide to focus on what you think are the most important points and discuss and analyse these in most detail. Any other points should just be briefly mentioned in passing.

When consulting the background literature, make sure that you use references that you can justifiably trust. In other words, you should rely mostly on conference papers, academic journal papers, and books which have been peer reviewed. Pages from Wikipedia should normally be avoided, because they can be written by almost anyone, and may simply reflect the opinions (and biases) of the authors.

The University library should be your first point of call when looking for references. In addition to the library in the Physics building, and the main library, the University library's web site provides access to electronic copies of many journals and to portals such as the ACM Digital library¹, which provides access to articles published by the ACM. You may also find Google Scholar useful, and many authors provide preprints of their own articles on their web pages.

It is legitimate (and good practice) to include illustrative diagrams or tables where appropriate². Sources must be given where diagrams are not novel. It is permissible, and sometimes useful, to include short quotations from articles you have read in order to illustrate a particular point. If you do so, you must make sure that you include an appropriate citation to the work where the quotation appears. In general, however, you should try to summarise the ideas from the literature in your own words, and providing citations to the appropriate references.

There should usually be a take home message to your essay, and this should be emphasised in the conclusions section. You should be able to sum up the main point(s) of your essay in one or two sentences that you could use if you were having a general conversation about the topic of your essay. Your conclusions should be based on the arguments that you have presented in the essay. It is also vitally important to make sure that your conclusions relate to the topic of the essay!

5 Citations and Referencing

All good essays should normally cite references to the existing literature that relates to the topic of the essay. There are two basic styles of citing references that are used within the School of Computer Science: Harvard, and Vancouver. This document has been written using the Harvard style³, in which citations are based around the author's names, and the year that the article or book was published, and all the references are listed alphabetically. In contrast, the Vancouver style uses numeric citations, and all the references are listed numerically, as shown in Figure 1. There are lots of other different styles, but most use either an author name, or a numbering based scheme.

For those who need help, there are some useful textbooks that may be worth consulting, such as *Elements of Style* [1].

References

1. Strunk, W., White, E.B. *Elements of style*. Harlow (UK): Longman, 1999.

Figure 1. An example of a Vancouver style citation and the corresponding entry in the references section of an essay.

References that are cited in the main body of the essay should be included in a references section at the end. For each reference that you have cited, there should be a corresponding entry in the references section. Each of these references should provide enough detail so that the reader could go

¹ <http://portal.acm.org/dl.cfm>

² Examples appear in later sections of this essay

³ Two examples of Harvard style citations were used in the third paragraph in Section 3 of this essay

off and find the original document it they wanted to check it for themselves. Using a reference manager such as EndNote will help to make the management of citations and references easier.

6 Conclusions

A technical essay is like a shortened version of an academic paper. Writing a technical essay is not an easy task, and takes time and effort. The background research will take time, then you need to organise it, and then write the essay. Once you have done the background work, you should probably expect to take at least about a day to write each page of the essay and get it into the final format that can be submitted.

You may find it helpful to generate a simple list based on that shown in Table 1 to ensure you have addressed all of the relevant points. As you check each item in the list, you simply tick it off.

Item	Yes/No
Does the essay have an abstract?	
Does the essay have an introduction?	
Does the essay have a valid set of conclusions?	
Does the essay address the question that was asked?	
Is there an entry in the reference list for every article that is cited in the essay?	
Have I spellchecked the essay?	

Table 1. Sample list of points to check before submitting a technical essay for marking.

This article, itself written in the style of a technical essay, has discussed the layout, style, content and use of citations and references appropriate for technical essays in Computer Science. Even though writing a technical essay is not an easy task, there are a number of steps you can follow, as described above. These should help to ensure that your writing:

- Is well laid out with numbered sections.
- Has a coherent style, such that the essay flows within and across section.
- Presents content that is relevant to the task, which you have analysed.
- Includes quality citations from peer-reviewed academic publications (journals, conference papers, and books) and well laid out references.

and hence should provide a sound basis for a good essay.

7 References

- STRUNK, W. & WHITE, E. B. (1999) *Elements of style*, Harlow, UK, Longman.
 VAN LEUNEN, M.-C. (1992) *A handbook for scholars*, Oxford, UK, Oxford University Press.