Design report requirements

The general mechanics of report writing are well covered in the document report guidelines available separately on the Learn page. Not all reports have an identical structure, and there are some differences between a laboratory report and a design report.

Fundamentally a good design report answers the following questions for its readers.

* Why? (Who?)
* What?
* How?

In addition, many reports also describe

* When?

But this is not required for your ENEL300 project.

# Why and Who?

The abstract (or executive summary) and the introduction of the report must address these fundamental questions. Furthermore, they must address it in a manner accessible to the widest possible audience. If your readers don’t understand why your design is important, and who it is intended for, then they will not support it being made.

You need to address these questions of why and who in the abstract and introduction. Avoid jargon and unnecessary technical details. If you don’t do this section well, the chances are your report will gather dust and your efforts will have been in vain.

It’s also important that you address questions of why throughout the report. For example, you chose to implement the program in Python on a Linux machine. Why did you choose this? It could because it will then be straightforward to transfer the program to another platform (such as Windows), or it could be because it will only work on Linux. This is where a design decision impacts on the usability of a product and limits where it can be sold. The information needs to be known outside the engineering group of a company.

It is important that you document why you made any significant decision in your report. Sometimes it may be as simple as you chose Java because it’s what you knew, or you used a LMC6482 because you had some available and any generic op-amp would have been sufficient.

# What?

When describing a design, it is important to differentiate between the requirements and the specifications. Engineering design is about solving real world problems, so the reader will expect that you will explain to them what problem you are solving. Both the requirements and the specifications are ways of describing what something is, but they do it in a different way and for different audiences. It is important to draw the distinction between them.

## Requirements

The requirements describe what the product design will achieve for the user. This belongs in the introduction. As an example of requirements consider a device that you can carry in your pocket that will enable you to talk to people throughout the world. It will need to be recharged on a daily/weekly basis. It will enable you to browse the internet etc, etc. These are the requirements of a smart phone, and the description is something everyone can relate to without needing an engineering degree.

Although requirements are written in general terms they need to be complete. If you don’t say it can be carried comfortably in a pocket, then there is no constraint on the size or weight for the specifications. The result may be something too large to be carried easily or too small to be kept track of.

## Specifications

This is where the technical language can start to flow more freely, because you can assume that the nontechnical readers have stopped reading by now. That said, don’t expect your readers to be as familiar with the technology as you are. The specifications describe how something can be built that will meet the requirements. For the user if the phone uses the 3G cellular network or communicates another way shouldn’t matter to them.

Every specification should be to ensure that the design meets a requirement. If the user doesn’t want or need something, then you don’t need a specification for it. If you find a mismatch between specifications and the requirements, then you need to either add or remove specifications and/or requirements.

**Requirements are why you need specifications.**

Specifications need to be detailed, because they describe how something will be built. It’s important to remember that there is not a one-to-one relation between requirements and specifications. For example, that a device fits in a pocket puts an expectation on the size and weight. It also puts an expectation that it will not overheat or have sharp edges, because these preclude it being carried in a pocket.

As an aside this is a common cause of conflict in product design. It’s your job to take the requirements and produce specifications with numbers. If you don’t have enough information to write the specifications, you need to find out more about why your user wants this device and what for.

As an example, a requirement would be that an application can be read at arms-length by an adolescent with normal eyesight. A specification would be that it requires a 12pt font.

# How?

The how is the description of how you will build the what. It is precise clear and should include justifications about how it will meet the specifications[[1]](#footnote-1). As mentioned earlier, there is usually more than one way to meet a specification so make sure you include why design choices were made. If the how is given to different people for construction the result should be very similar.

# When and who?

This is essentially a timeline for the creation of the design. The who in this case refers to the personal that are involved in building the design, not the end users. It is not required for this report.

# References

A final word about references. References are valued for their quality and not their quantity. They serve three purposes:

* To acknowledge work that is not yours.
* To provide background material, that while relevant is not directly required in the report
* To support your decisions. The reason why you made a decision may be supported by an authoritative reference.

1. And if the requirements and the specifications have been matched correctly, this should also ensure the user has what they wanted. [↑](#footnote-ref-1)