

*Functional Specification*

**First Revision Worst-Case Due Date:** September 21 (IN-PERSON REVIEW)

**Final Revision Worst-Case Due Date:** September 28 (ELECTRONIC)

It is often said that the answer to the question is easy, as long as you take the time to construct a good question.

The secondary purpose behind a functional specification is to communicate to others what it is you plan to implement. The *primary* purpose behind this document is to clarify in your own mind what it is you're doing (i.e., constructing a good question). Starting from a good functional specification, a good design flows naturally.

Once the functional specification is approved, you must stay very close to it. You will be allowed to modify the specification as your design evolves, but only with good reason. Thus, doing it right the first time is well worthwhile. This is as it is in industry as well. A functional specification is a form of contract between you, the designer, and all interested groups within a company. They will probably not care much *how* you do what you do (as long as you stay within the budget), but they will certainly care *what* it is you accomplish. Others depend on your success, and there can be severe repercussions if you deviate from this "contract".

The goals of the functional specification are:

- to explain what it is you plan to design
- to convince me and your client that you understand the product requirements
- to provide enough information so that *any designer* (not just yourself) can implement your design
- to give anyone using your design (software programmers, for example) enough information to do their jobs

That last two bullet points above deserve careful re-reading. You know you're done with the functional specification when you can hand it to any reasonably knowledgeable designer and have them completely implement a system that does what you say it should do (and without bugging you every 5 minutes with questions!) There are entire groups of engineers within companies whose sole purpose is to create functional specification documents (under various names like "system requirements analysis"). It is important that you develop the skill of being to specify the requirements/behavior of a system at an appropriate level of abstraction, but with sufficient detail.

In addition, the functional specification from one department is often the "user's manual" for another. For example, the functional specification of a hardware device is used to develop the software for the device (assuming different engineers for hardware and software). When the software engineer needs to know how the device will respond to a particular command sequence, the answer can (should) be found in the functional specification. The software engineer does not care about how the hardware was designed, only how it behaves.

It is important that your functional specification be a good document, as it will be read by many people. The actual detailed designed document, where you present how you implemented your design, will most likely only be read by a few technical people, those who can judge the nitty-gritty details. The functional specification, however, will probably be read by many more people, including managers. Do a good job.

When it is time to find a full-time job and employers ask for samples of your work, this functional specification should be something you would be proud to show.

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**NOTE:** The Functional Specification is a major milestone for your project. This means that you *will not be allowed to proceed on your project* until your client and I are completely satisfied with its contents.

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## NOTES:

- This is an iterative process. Make an appointment with me to review a draft copy *as soon as possible*. Make changes as soon as possible.
- Functional specification reviews will only be done in person – bring a printout of the latest version of your document.
- If you have a functionality choice to make, use your intelligence to come up with what you think is the best choice, be able to justify it, then run it by me and your sponsor. If you are not confident, come up with 3 alternatives and be prepared to discuss the tradeoffs inherent in each.
- Strive for a document that is as *complete* and *thorough* as possible. Time invested at this point of the project pays off many times over by the end of the project.
- The background section of your document should reflect a *major investment* in researching the underlying technologies, protocols, etc. of your project. Students, in general, grossly under-perform in constructing the background section of the document. Work with me to fully understand what needs to go into this section.
- You may be required to do some hands-on investigations to figure out some of the background material. Don't wait to be told....do it!
- The crafting of the functional specification is (in my opinion) the hardest part of the project. Once you know what you're building, the rest is just implementation details. But without having a clear direction, you are nailing Jell-o to the wall/driving a stake in water/insert favorite metaphor here. **IT IS UP TO YOU** to write this document and to “find your path”, with the help of myself and your client. This is a big difference from previous projects/assignments where you have been told what to do.
- No two documents will be exactly the same because no two projects are the same. Your 0<sup>th</sup> task is to come up with a proposed structure for the document. Discuss this with me before beginning the bulk of the work.