

6.033 Spring 2015
DP Report Assignment
Due 5/8 at 5:00pm

Having now had two rounds of feedback on your design, it's time to write your final report. Unlike the proposal document, the report should contain enough detail that it could feasibly be turned over to the IHTFP task force for implementation. It should also contain an analysis and evaluation of your design.

Outline of the Report

Your team's report should be approximately 5000 words¹ and follow the basic outline below:

- **Title page:** Give your report a title that reflects the subject and scope of your project. Include your names, email address, recitation instructor, section time(s), and the date on the title page.
- **Introduction:** Summarize the problem to be solved and what your design is intended to achieve. Outline your design and briefly outline why your design meets the requirements.
- **Design:** Explain your design. Identify your design's main components and protocols. You should subdivide the design, with corresponding subsections in the text, so that the reader can focus on and understand one piece at a time. Explain why your design makes sense as well as explaining how it works. Use diagrams, pseudo-code, and worked examples as appropriate.

It should be clear from this section that your design meets the specifications of the assignment (e.g., that it does not exceed the storage or CPU specs of the sensor, nor the storage assumptions about FCS, etc.). Leave any major calculations to the evaluation section, though it's fine to reference those calculations beforehand (e.g., "Our design results in a battery life of 5 years; see Section 3.1 for an analysis.").

- **Analysis:** Analyze and evaluate your design. There are more details about this section below.
- **Conclusion:** Briefly summarize your design and provide recommendations for further actions and a list of any problems that must be resolved before the design can be implemented.
- **Acknowledgments and references:** Give credit to individuals whom you consulted in developing your design. Provide a list of references if appropriate.

¹ As always, use this word count as a guideline. If you are writing significantly more than 5000 words, you're giving us too much detail. If you are writing significantly fewer than 5000 words, you are giving us too little. We care much more about the content of your paper than the exact word count.

Analysis

A good analysis will do more than just calculate metrics relevant to your system; it will also use calculations to justify design decisions. For example, “Our clever algorithm for delivering data results in a battery life of 10 years, compared to a design without this clever algorithm, which results in a battery life of 2 years.” Depending on how you organize your writing, it may be appropriate to put these brief statements in the design section of your report instead of the analysis. That’s fine, but leave long justifications and calculations to the analysis section itself.

At a minimum, your analysis section should answer the following questions:

- **What is the expected battery life of a sensor in the system?**
- **What fraction of collected data do you expect your system to deliver to FCS within a day? A week?**

Delivering 100% of collected data is not a strict requirement, but that your system should reduce the amount of missing data. What fraction do you expect to arrive? If you can’t calculate this value precisely, give a reasonable range based on your estimates.

- **On average, how quickly do you expect an anomaly to be reported in your system?**

In answering those questions, you should provide the appropriate numbers as well as some context for them. How do the values that you calculated affect users or other entities in the system? If your system reports an anomaly within X days of it being detected, is that good or bad? Etc.

We also recommend addressing issues of scale and fault tolerance:

- **What parts of your system limits scale, and what are those limits?**

Could your system handle facilities adding another 100K sensors to the system? Could it handle an influx of users? For example, Kresge Auditorium seats 1226 people; in your system, how will a sensor in Kresge behave when the room is full?

- **How tolerant is your system to network faults?**

For example, suppose the 802.11 wireless — not BLE — stops working in the Infinite Corridor for a few minutes. How will your system behave?

Because every system design is different, you may need to discuss additional metrics specific to your system in the evaluation. You may also discuss how your system will evolve as facilities upgrades their hardware. What would an increase in FCS or sensor storage mean for your system? Or an upgrade to a future version of BLE?

Finally, some design decisions may not correspond to calculable metrics; the most common case is preferring a simple, modular design over a complex one. Your design report should note when you made choices in the name of simplicity or other design principles. Depending on your report organization, it may be more appropriate to include this information in the design section than in the analysis.

Cover Memo

In addition to the report, **each student** should provide a cover memo of approximately 250 words. The format should be the same as the memo you wrote for the [DP proposal](#).

The memo should briefly summarize the contribution of each team member and reflect on the writer's own contribution. Please answer the following questions:

- What is the biggest change your team has made to your design since the proposal?
- Which model(s) of collaboration did your team use to develop your design and write this report?
- Was your model of collaboration effective for your team? Describe any changes you made to your collaboration process between the proposal and the report.