

1 Due Date

Official Due Date: Your project writeup for the class is due on Dec 2 at the start of class.

Extended Due Date: You should aim for the official due date, but if you run out of time and need an extension, you can turn in your project on Dec 5, at 1 p.m. in Mor's office.

The Dec 5th date is a Hard Deadline, because we need time to grade the projects!

2 General guidelines for project writeup

- The big emphasis is on clarity and ease of understanding.
- Please type
- Figures are very welcome. They can be hand-drawn and you can take a picture with your phone and insert them. You will definitely want figures for all the queues.
- We recommend LaTeX for the queueing formulas. If you don't know LaTeX, you can use whatever package you like, and you can even hand-write the formulas if needed. Just be clear.
- Page length is not important. Keep things as short as you can while explaining everything clearly.
- Please make use of office hours to discuss your research further. We're happy to add extended office hours. Email us suggestions for times that are best for you.

3 Problem

The first section of your project writeup should describe your research problem. As in the presentations, you need to find a way to do this that doesn't require acronyms, unless you are willing to define them in full. Also, as in the class presentations, you should include pictures to help illustrate your problem. Make sure to be clear about the performance metric that you're trying to optimize.

4 Queueing Model

There should be a section explaining your queueing model. Some things to think about:

- What is a job in your model?

- Is a job a single unit, or does it consist of multiple tasks?
- Does a job go through a single queue or multiple queues?
- How do you define the response time of a job?
- What is the job size distribution?
- Are there dependencies between job sizes?
- Is your system open or closed? If it's closed and interactive, what is the distribution of think time? Who are the users?
- How is “load” defined in your model? What is the bottleneck device?
- What simplifications are you making in your model?

This is not meant to be an inclusive list – there may be more things that need to be explained.

5 Queueing Question

The point of this section is to clearly explain the queueing question(s) that are being asked: Here are some ideas to get you going. As before, this is not an inclusive list:

- What is the performance metric that you're trying to optimize in your queueing model?
- What are knobs that can be changed in your queueing model to produce potential improvements?
 - a different routing policy?
 - a different load balancing or load unbalancing policy?
 - a different scheduling policy at a queue
 - faster servers?
 - more servers?
- What are constraints that can't be changed?

6 Before and After

In class we often tell a story where we start with a system (the “before”) and then make an improvement (the “after”) which results in better performance. There should be a section of your document showing at least one example of a before and after. If you have several before and after ideas, that's even better.

If possible, you should use the queueing analysis you learned to derive the performance improvement (i.e., derive both the before and after performance). In places where you can't do

that, or where the queueing formula is just an approximation, you should use simulation to illustrate the improvement.

Make sure that your performance graphs are clear. You might need a log scale on one or both axes to show things clearly. You might need to adjust the scale on the axes to make things clear. Look at the solutions to homeworks that we pass out and the way that graphs are drawn there.

7 What have you done post class presentation?

The final section should describe what improvements you were able to make that were not discussed during the class presentation. We're asking you to take a step on your own, outside of what you discussed with Shashank and me, to make some further improvement.

If you can't come up with anything, you can leave this section blank. But try!