Digest 1

(A compilation of emailed homework questions, answered around Tuesday.)

Question. I read the write-up for the final project but still found a little bewildered. On the website, it says we mainly could go from two directions, either reproduce a proof or give my own methodology to a problem without a satisfactory solution. However, my questions are below.

(1) If I were to reproduce a proof, aren't there plenty of resources online that we could simply "copy-paste"? So my question is, how to avoid simpling paraphrase the content from the internet? Do I need to find a way to make it unique?
(2) If I were to give a solution to a problem without a satisfactory answer, isn't it over our ability? I mean, if no one could give a solution as of now, how could I develop one as an undergrad.
(3) You've indicated many times about setting a probability model. What exactly does that mean?
(4) I've never written something like this before, so this question might be naive. Whenever I think of a mathematical situation or problem, it's either too hard for me to solve, or I can explain and solve it in a relatively short workflow. What does a good example of a 5-8 solely math-related paper look like, from an undergrad perspective?
(5) If trying to explain a theorem, does that only include proving it and giving some applicable scenarios?

Answer.

(1) If I were to reproduce a proof ... – In this case, you should not just copy-paste a proof, you should write it in your own words. Paraphrasing implies cutting a lot of content, which I would recommend not doing. You do not need to make the argument unique. You will still learn something even if you are copying large pieces of the argument. By analogy, even though a musician "is just copying the musical notes and playing them back," they still learn how to play the instrument. But in our case the instrument is your brain and the music is the proof.
(2) If I were to give a solution to a problem without a satisfactory answer – I don't expect anyone to provide a solution of a major open problem such as the Riemann hypothesis. Also you don't necessarily have to start your investigation with a significant open problem. I was just trying to suggest that an open problem could be a starting point of your project, but it does not have to be. Just as in a writing class where a chosen thesis can be the main driving point of an essay, here a significant open problem (e.g. how to apply neural networks to recognize handwriting) can be the main driving point of your project. In this case, that problem was "solved" 20-30 years ago, but it could still be the focus of your project (I think someone did suggest this as a project.)

(3) You've indicated many times about setting a probability model. What exactly does that mean? – I mean deciding what is the sample space Ω and what is the probability law $\mathbf{P}$. For example, if you are modelling the rolling of three fair eight-sided dice, then $\Omega = \{1, 2, 3, 4, 5, 6, 7, 8\}^3$ and $\mathbf{P}$ is uniform on Ω. If you are modelling something else, then you need to decide what your Ω and $\mathbf{P}$ are.
(4) What does a good example of a 5-8 page solely math-related paper look like, from an undergrad perspective? – There are a number of undergraduate math journals written by and for undergrads, such as this one. You don't necessarily have to write your article in the same way or on a similar topic, but this might be nice since you requested examples like this.
(5) If trying to explain a theorem, does that only include proving it and giving some applicable scenarios? – It's really up to you. You can certainly do this and the project might "only" consist of this.

Question. I'm considering doing this project with my friend. Can you explain in a little bit about how your expectations and requirements differ when considering individual works and group projects.

My main concerns are about what's an okay way to cut in, how deep it should be, and what kind of things should be included.

Answer. I think I said that the standards for a two-person project are twice as high as those for a one-person project. That means you should roughly double all requirements. So e.g. a two-person final report should be 10-16 pages in length, a two-person progress report should be about 4 pages in length, etc. And I would roughly expect that a two-person final project would "accomplish" twice as much as a one-person final project.

I think once the project gets going you should just follow your interests and then it should become clearer in how much detail you want to go with various sub-topics.

Question. When we turn in the project proposal, do we turn it in as the actual LaTeX file? I've never used LaTeX before so I wasn't sure about the protocol around it!

Answer. For all project-related documents that you turn in, ideally you would use LaTeX, but you are not required to use LaTeX.

Question. When exactly is the proposal due and how do i turn it in?

Answer. It is due Thursday October 8 at 2PM PST. You should submit it in blackboard, under the assignments tab.