COSC 91/191, Spring 2019
Lecture 2
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1   Logistics

The course website has several new changes. You can access the class website with a shorter URL, https: //www.cs.dartmouth.edu/~cs191/. Also, Tom has updated the rules of writing, mainly to loosen up on the use of *they* for the singular.

Newly posted is a page with instructions on writing the final paper for the course, which is due the last day of class. The draft is due 16 days before then, and Tom will grade them so that students will put in a real effort on it.

Tom has posted a simple template for scribe notes along with the final version of scribe notes for the last class. Tom will review any writing using red ink. When typing up the notes, remember to make all the changes suggested. Check off each change after completion by highlighting in a different color that is not red or black to ensure you have made all the changes.

2   Writing in the large

This class will focus on four questions of theory surrounding technical writing.

2.1   What are you writing?

There is a broad range of answers, including but not limited to the following:

- theses

- papers

- documentation

- grant proposals

- blog posts

- reviews

- text books

- code comments

- patents

- interest articles

- surveys

- magazine articles

- reports

- press release

2.2 Why do you write?

Now that there is something to write, let's look at why you are writing it:

- To replicate work and duplicate results

- For a third party to review and verify

- To communicate your work to other people

- To smooth the transition when you have to leave a company and other people will takeover from where you left off

- To explain a technical concept to a general audience of lay readers

- To communicate with peers, whether in your exact field or a related one

- To get money

- To satisfy your advisor

- To fulfill some external request

- To identify weak ideas that may not be as obviously problematic in theory

- To close out a unit of research

- To educate

- To get a paper into a conference set in an exotic location

2.3 Who are you writing for?

Even with the medium and purpose of a piece of writing locked down, its content is still heavily influenced by its exact audience(s):

- Students of different levels, ranging from elementary-school students to post-graduates

- Peers who are researchers in the same specific area of study

- Peers who are unfamiliar with the specific area of study, but have the background to understand

- Lay readers who do not have a significant amount of context or underlying knowledge

2.4   What can you assume about your readers?

When writing, you will make certain assumptions of your readers. For example, Tom will usually assume that his readers are familiar with big-O and big-Θ notation. It is essential to know your audience. For example, consider the faculty candidate with a background in security spoke about return-oriented programming without defining it. Not everyone in the audience knew the term.

Use a language that the audience expects. Tom usually writes about vertices and edges. If his audience is a group of electrical engineers, however, it would make more sense for him to use nodes and links.

3   The paper

3.1   What do you want to say?

When you write you must have a clear answer to this question at all times. Avoid writing, and rethink the paper if the answer is not clear. The temptation is that you will write whatever comes to mind, but what ends up happening is that the work is a disorganized mess with poorly structured paragraphs. Inertia would prevent you from fixing this mess. It is, hence, more effective to think through a thorough storyline for the paper and then write about it.

Keep the storyline for the paper simple. As you think through the story, pay enough attention to the contributions the paper makes as well. Preferably, think of more than one way your work contributes to the sum of human knowledge. Rank these contributions in the order of importance. The weight given to these contributions would help you shape the story around these priorities.

3.2   Title

The first thing a reader sees in a paper is the title. Tom cited someone who speculated that the ratio of the number of people who read only the title to the number of people who read the entire paper is 500:1. A title must grab the attention of a reader and make them want to read a paper. Hence, it should include significant words from the paper and convey succinctly what the paper wants to take about.

Table 1 summarizes some discussions on the titles. Some additional good and imaginative titles are as follows:

- Nineteen dubious ways to compute the exponential of a matrix

- Can you count on your calculator?

- Performing armchair roundoff analyses of statistical algorithms

- Tricks or treats with the Hilbert matrix

- Can one hear the shape of a drum?

3.3   Authors

In most subfields of computer science, authors need to decide how to order their names on the paper. In subfields such as theoretical computer science, authors usually list their names alphabetically. In systems and graphics, the more significant contributor goes first and/or the leader of the lab that produced the paper goes

Title	Comments
On notions of information transfer in VLSI circuits	The word *On* serves a purpose here. The authors say they are not going to talk about everything in an area, but some facets.
Computing the eigenvalues and eigenvectors of symmetric arrowhead matrices	This title uses an action word, a verb in the beginning.
How and how not to check Gaussian quadrature formulae	There are mixed views on whether this is a good title. To some, this looks more like a blog post title. Whereas to some, it is catchy since no one says how to not do something.
Gaussian elimination is not optimal	This title is a sentence, and is stimulating and interesting as it summarizes the paper well. On the other hand, the paper made a profound innovation and did not convey that in the title. The paper showed how to multiply $n \times n$ matrices in $O(n^{\lg 7})$ time.
How near is a stable matrix to an unstable matrix?	The title is a rhetorical question. This is the question that will be answered in the paper.
Regression diagnostics: Identifying influential data and sources of collinearity	This is the template followed in most humanities papers these days. There is a short catchy phrase, followed by a boring title.
Fingers or fists? (The choice of decimal or binary representation)	Title has an alliteration. This paper could have followed the form of having a catchphrase followed by a colon and a longer title.
The perfidious polynomial	Use words in the title that would make sense to everyone.

Table 1: Paper titles and some comments on them.

last. In any case, typically you should be consistent with how you publish your name. Tom uses *Thomas H. Cormen* on all published material. Following one standard name helps aggregators build citations for your work seamlessly.

In drafts that are submitted for review by an advisor or a publisher, it is a good idea to include the date to tag the version. Spell out the month in the date to avoid confusion between the different date styles.

3.4 The Abstract

In short, an abstract describes what is in the paper. A reader should be able to tell what the paper is about, as well as what it is not about. Avoid math as much as possible in an abstract. Paper aggregators may not be able to handle special characters such as summations, integrals, subscripts, or superscripts.

If your paper improves on someone else's work, you should say you improve on X's work in the abstract, but not cite it there. The actual reference number needs to be in the paper, not the abstract. Some journals disallow the use of the word *we*. You could use the passive voice, *the author*, or *this paper*. Another option is to avoid submitting to such journals altogether.

An abstract should contain the most prominent results of the paper. Clearly say what is new and how this paper improves upon previous papers in the area. Don't let a referee say that there is nothing new in your paper.

Don't start an abstract with *In this paper* or *This paper*. Write the abstract after you have written the paper. The abstract does not set the tone of the paper, and you don't really know what the focus of the paper is going to be until you have written the rest of the paper.

4   Reading for next class

Read the abstract and introduction of the paper "Stupid Columnsort Tricks," authored by Geeta Chaudhry and Thomas H. Cormen. It is on the course website.