15-851 Algorithms for Big Data — Spring 2024

Problem Set 4: Project Progress Report

Due: Sunday, April 7, end of day

Project Progress. For this homework, I would like you to write the following "Introduction" section to your final project. Think of this as the Introduction section in a research paper. I'd like you to write 3 pages, excluding references and a title page. The title page should have the title, authors, and a brief but informative abstract. The 3 pages should then contain the following information:

1. Formally define the problems you will study.

2. State motivation for these problems. An example motivation might be that the problem has practical real-world applications. Another motivation might be that it connects two different theoretical areas of research. Another motivation might be that it is mathematically intriguing or provides a new twist to a known problem. Or maybe it has a long line of previous work that has taught us interesting techniques. In any of these cases, it would be good to give sufficient explanation. Think of this as an exercise in trying to make people excited about your research.

3. Have a "previous and related work" section. Try to cite all the references you can find on the problems you study, and summarize what they say and what the state of the art is. If there is a sequence of improved bounds, have a table listing the history. Even if a certain previous related work does not directly address your problem, state the related problem they study and why it does not directly address your problem.

4. State any current progress or conjectures you have about the solutions to your problems. State what approaches and techniques you are thinking about applying. If you are writing a survey, it still makes sense to state what the conjectures in the area are, what recent approaches to these problems have been tried, etc.

The final project, which will be due a few weeks after this problem set, should be at least 5 pages if you are in a team of 1, at least 6 pages if you are in a team of 2, and at least 7 pages if you are in a team of 3. These page counts exclude the title page and references. I am also happy to allow for exceptions to these page lower bounds if for example, you solve a hard open problem in a few pages. There should be sufficient justification provided for having a project shorter than the above page guidelines though.

Your presentations will be given and spread out over the last two days of class. Each student in each team should present part of the project. The exact number of minutes is still being determined. The presentation can be done using slides or using the board.