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Idea and Motivation

My plan for the AAD project is to take a Breadth-First-Approach with regards to algorithms not only covered during the lectures but also some of the well known NP-Hard and NP-Complete problems. I am very much interested in CP (Competitive Programming) despite not being good at it and that is my motivation for this project. I know CP is not synonymous to Algorithms but the concept of algorithm analysis and design do play a huge role in it. I wanted to do something which not only lets me explore the new algorithms but helps me in CP at the same time. So I finally decided to make a CP Notebook (killing 2 birds with one stone (:) which programmers often use during contests. I am quite intrigued by AI/ML/DL as well and I wanted to explore that too. So, if time permits, I had some ideas to give a try at it too.

End Product

I plan to make a CP Notebook which will contain various algorithmic practices used in CP along with a short preview of what the algorithm is about and possibly the best time and space efficient predefined code snippets attached to it. I am planning to attach a link to different pdfs as well in which I'll try explaining the algorithms mentioned in CP Notebook in detail in the way I understood them. I will also try explaining the concept with the help of one or more good test cases so that the reader can easily grasp the intent of the given algo. Since Graph Theory is one of the topics which I find interesting but tough, I will try to focus more on that part of the Algorithms course. I am planning to explain a detailed analysis of algorithms with which I would be comfortable with. I am familiar with C and C++ majorly, and Python (a little) so I will try implementing the algos in the CP Notebook in these languages. If time permits, I might even go ahead and dive into the world of AI and ML algos such as or implementing few fun games in python or C++ for a change which uses few of the alorithms taught in class. It is highly possible that I might not be able to do all of this in the given timeframe but I plan to continue this "AAD" Project beyond just this semester and continue adding to it whatever I learn in my free time.

Timeline

Assuming the Project Submissions to be at the end of November, hereby is my timline for the proposed project:

By **October 30:** Number-Theory related Algorithms

By **November 10:** Graphs related Algorithms

By **November 20:** Combinatorial, Fourier Transform, Strings, Geometry related algorithms

By **November 25**: Famous DP problems as well as Good CP Problems

By **November 30:** AI/ML Algorithms Introduction