Part - 3

Greedy Programming

Greedy programming is a type of algorithmic strategy that involves making the locally optimal choice at each stage of the algorithm with the hope of eventually reaching a globally optimal solution. It is often used in optimization problems, such as finding the shortest path through a graph or the minimum spanning tree of a network. However, it is important to note that greedy algorithms do not always produce the optimal solution and can sometimes get stuck in local maxima or minima.

So, note that choosing a Greedy Idea and Proving correctness that it would work is a very difficult task. However, It is easy to prove that a greedy idea works when you know the idea is correct. The important part in this part is to get a greedy idea that works.

Examples of Greedy Algorithms:

check out the book's chapter - 6. There are few good questions explained. Greedy Algorithms have a good use in solving tougher problems in CP contests. Also check out the examples in the CLRS and their proofs, to an idea of how to prove a greedy Idea.

The proof usually goes in 2 parts. The first part is to prove that there is an optimal solution which follows the greedy idea, and the second part is to use induction and prove it generally. (I know that This statement is not clear. But it becomes clear once you had seen at least one proof of correctness of a greedy algorithm).

Dynamic Programming

Dynamic Programming is actually very smart way of iterating over all the solutions for a problem. This smart way can actually reduce the complexity of the problem from exponential time to linear time. I can't brief anything more on this method other than you observe the way this technique is applied. Check out the chapter-7 in the book and also CLRS (not necessary).

The problems that can be solved by these techniques are usually of 2 types. One is to find the optimal solution and other is to count the number of solutions. DP is one easy go to way once you have understood how to do it.

This time in the assignment, there will be questions which have to solved based on either greedy or DP, but There might be many practice problems but dw.