Group Assignment 4, Due: April 10, 5 pm. Late submission shall receive some penalty.

NOTE: For each of the question, present the logic and analysis as part of (i) theory assignment, email the typed doc/handwritten (ii) C++ code for practice, email the code on completion. Questions are relatively easy and can be answered if you have understood my scribe. Work in a group of size 4/5 for both theory and practice. For all these questions, solutions are available online in some form, pay attention while lifting the solution.

1. Coin-Change problem: Given denominations $d_1, d_2, \ldots, d_k$ (Ex: Re 100, 500, 2000) and an integer $x$, the objective is to return change for $x$ if exists using minimum number of currencies. Present (i) Greedy Algorithm (ii) Dynamic Programming
2. The above problem with the restriction that the number of $d_i$ is at most $l_i$.
3. Finding Maximum Independent Set in Trees - An independent set is a set of mutually non-adjancet verties and maximum independent set is a set of maximum size. Present (i) Greedy Algorithm (ii) Dynamic Programming
4. For Matrix-chain multiplication; present two greedy strategies and for each of them present a counter example to show that it does not give optimum always. As part of practice, implement the DP given in scribe.
5. All Pairs Shortest Path - Shortest path between any two given pair of vertices (i) Present a greedy strategy (ii) Present a DP
6. Implement the DP given in scribe for Knapsack problem.
7. Implement Bellman Ford Algorithm.