DAA ALM - CO4

Q1: How to find CDP Problem is NP-Hard Problem? If the problem is NP-Hard then convert the exponential time complexity to the polynomial time complexity. Also compare the deterministic and non-deterministic algorithms with polynomial time execution.

- **NP-Hard Proof**: Show polynomial-time reduction from an NP-Hard problem (e.g., 3-SAT, Knapsack).
- **Convert Exponential to Polynomial**: Use approximation algorithms, heuristics, or dynamic programming.
- **Deterministic vs. Non-Deterministic**:
  - **Deterministic (P)**: Solves step by step in polynomial time.
  - **Non-Deterministic (NP)**: Guesses solutions and verifies in polynomial time.

Q2: How to find NCDP Problem is NP-Hard Problem? If the problem is NP-Hard, then convert the exponential time complexity to the polynomial time complexity. Also compare the deterministic and non-deterministic algorithms with polynomial time execution

- **NP-Hard Proof**: Reduce from an existing NP-Hard problem.
- **Convert Exponential to Polynomial**: Use greedy algorithms, heuristics, or parameterized complexity.
- **Deterministic vs. Non-Deterministic**:
  - **Deterministic**: Sequential execution.
  - **Non-Deterministic**: Tries multiple paths simultaneously.