

## UNIT – 1

### INTRODUCTION

1. Some Representative Problems
  - A First Problem: Stable Matching:
    - The Problem
    - Designing the Algorithm
    - Analyzing the Algorithm
    - Extensions
2. Five Representative Problems:
  - Interval Scheduling
  - Weighted Interval Scheduling
  - Bipartite Matching
  - Independent Set
  - Competitive Facility Location
3. Computational Tractability:
  - Some Initial Attempts at Defining Efficiency
  - Worst-Case Running Times and Brute-Force Search
  - Polynomial Time as a Definition of Efficiency
4. Asymptotic Order of Growth:
  - Properties of Asymptotic Growth Rates
  - Asymptotic Bounds for Some Common Functions
5. Implementing the Stable Matching Algorithm
  - Using Lists and Arrays: Arrays and Lists,
  - Implementing the Stable Matching Algorithm
6. A Survey of Common Running Times:
  - Linear Time
  - $O(n \log n)$  Time
  - Quadratic Time
  - Cubic Time
  - $O(nk)$  Time
  - Beyond Polynomial Time
  - Sub linear Time.