

**JAYA ENGINEERING COLLEGE-THIRUNINRAVUR**  
**DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING**  
**CS6402- DESIGN AND ANALYSIS OF ALGORITHMS**

**UNIT-1**

1. Discuss in detail about fundamentals of algorithmic problem solving?
2. Explain the necessary steps for analyzing the efficiency of recursive algorithms
3. Explain the general framework for analyzing the efficiency of algorithm.
4. Write the asymptotic notations used for best case ,average case and worst case analysis of algorithms and Write an algorithm for finding maximum element of an array perform best , worst and average case complexity with appropriate order notations
5. Explain the method of solving recurrence equations with suitable example.
6. Explain the method of solving Non recursive equations with suitable examples
- 7.Explain the types of asymptotic notations with example.

**UNIT-2**

1. Explain selection sort and bubble sort algorithm using brute force method and analyze with examples
2. Describe Sequential search and brute force string matching using brute force method
- 3 Explain in detail quick sorting method. Provide a complete analysis of quick sort with example.
- 4 Explain in detail merge sort. Illustrate the algorithm with a numeric example. Provide complete analysis of the same.
- 5 Describe binary search in detail. Provide the complete analysis with example
- 6.Find the optimal solution for assignment problem given below.

	Job1	Job2	Job 3	Job 4
Person 1	4	3	8	6
Person 2	5	7	2	4
Person 3	16	9	3	1
Person 4	2	5	3	7

**UNIT-3**

1. Write an algorithm for binomial coefficient computation and analyze the efficiency of algorithm
2. Describe the Warshall's algorithm with example and analyze its efficiency
3. Explain Floyd's Algorithm for all pair shortest path algorithm with example and analyze its efficiency
4. Explain optimal binary search tree algorithm with example and analyze its efficiency
5. Describe Knapsack problem and Memory functions with example
6. Apply the bottom up dynamic programming algorithm to the following instance of Knapsack Problem

Item Weight Value

1	7	\$42
2	3	\$12
3	4	\$40
4	5	\$25

Capacity W=10

7. Explain in detail about prims algorithm with example and analyze its efficiency

8. Describe in detail about Kruskals Algorithm with example and analyze its efficiency
9. Explain Dijkstra's Algorithm in detail with example and analyze its efficiency
10. Write the Huffman's Algorithm. Construct the Huffman's tree for the following data and obtain its Huffman's Code

Character	A	B	C	D	E	-
probability	0.5	0.35	0.5	0.1	0.4	0.2

#### UNIT-4

1. Describe in detail about outline of simplex method
2. Explain geometric interpretation of Linear programming with example
3. Write the algorithm for maximum matching in Bipartite Graphs and prove the theorem with example
4. Explain the maximum matching problem in bipartite graph.
5. Explain the following.
  - a) Blocking pair
  - b) Stable marriage problem
  - c) Man-optimal and d) Woman-optimal
6. Explain the stable marriage problem with example
7. Explain the Ford –Fulkerson method with example.

#### UNIT-5

1. Explain decision tree with an example.
2. Explain the concept of P, NP, NP hard and NP complete.
3. What is backtracking? Write the template of general backtracking algorithm and explain in detail with suitable example.
4. Explain the n-queens problem with example.
5. Explain the sum of subset problem with example.
6. Explain the assignment problem using branch and bound method.
7. Explain the TSP with example.