CS214 – Lab8 (Week10):
On Dynamic Programming and Greedy Algorithms

Objective:

- To develop working knowledge of the concepts learned from Lectures
- To appreciate algorithm design with Dynamic Programming and Greedy Algorithms
- To develop algorithmic thinking in programming simple algorithms

Activities:

1. Choose appropriate algorithms to effectively construct an optimal binary prefix code for the letters in the following table. Show your steps.

Letter:	A	B	D	H	I	K	P
Frequency:	10	8	18	9	5	3	1

2. Given three jobs and their service time are as follows: t1=5, t2=10 and t3=4. List all possible schedules and their total times to complete all three jobs in sequence. What is the optimal schedule w.r.t. the total time to complete all the three jobs in sequence? What algorithm approach can be used to design an algorithm to give an optimal schedule? Illustrate by designing a job schedule algorithm.

3. Below is an adjacency matrix for a graph, where ∞ means "no edge".

	1	2	3	4
1	0	2	9	∞
2	1	0	6	4
3	∞	7	0	8
4	6	3	∞	0

   a. Use a dynamic programming approach to determine the optimal tour in the graph. Show steps.
   b. Give the recursive properties that give the Hamiltonian circuit of the result from Point a (above).
   c. Does the Principle of Optimality apply to your solution? Justify your answer.