Segment-4

Greedy Algorithms and String-Matching Algorithms

1. What do you mean by optimizing problems? Example?
2. Write down the application of greedy method?
3. Difference Between dynamic programming and greedy algorithm?
4. Why do some problems which are solvable by dynamic programming are also solvable by greedy algorithm and why are some not?
5. Find an optimal solution to the knapsack instance n=4, m=16, (p1,p2,p3,p4) = (45, 10, 30, 45) and (w1,w2,w3,w4)=(3,5,9,5)
   [Hint: use greedy method for the fractional knapsack]
6. Find an optimal solution to the knapsack instance n=5, m=100, (p1,p2,p3,p4,p5) = (20, 30, 65, 48, 50) and (w1,w2,w3,w4, w5)=(10, 20, 30, 40, 50)
   [Hint: use greedy method for the fractional knapsack]
7. Show that you can make a greedy choice when solving fractional knapsack problem but cannot do that when solving 0/1 knapsack problem.
8. What is the running time of Huffman's Algorithm on a set of n characters?
9. You have been asked to encode a paragraph with Huffman coding scheme. This paragraph contains the following symbols along with their associate frequency in the paragraph.

A	B	C	D	E	F	G	H	I	J
3	3	26	5	3	8	13	2	16	9

Draw the corresponding Huffman tree and utilizing that tree tell the binary encoding for each 16 letter.

10. What is an optimal Huffman code for the following set of frequencies?
    a:5 b:8 c:45 d:25 e:17 f:30
11. Generate a Huffman tree and determine an optimal Huffman code for the following text: "to be or not to be it is true"

12. Find all possible optimal set for the following data set using activity selection problem

i	1	2	3	4	5	6	7
Si	1	3	5	7	6	13	18
Fi	4	5	6	11	12	18	22

[N.B. Si is start time and Fi is finish time, i is number of activity]

13. Find all possible optimal set for the following data set using activity selection problem

Si	1	2	3	4	5	6	7	8	9	10	11
i	1	3	0	5	3	5	6	8	8	2	12
Fi	4	5	6	7	8	9	10	11	12	13	14

[N.B. Si is start time and Fi is finish time, i is number of activities]

14. Prove that in activity selection problem, the activity that finishes first is always part of some optimal solution.