

C.U.SHAH UNIVERSITY

Summer Examination-2018

Subject Name : Design and Analysis of Algorithms

Subject Code : 4TE05DAA1

Branch: B.Tech (CE,IT)

Semester : 5

Date : 27/03/2018

Time : 10:30 To 01:30

Marks : 70

Instructions:

- (1) Use of Programmable calculator & any other electronic instrument is prohibited.
 - (2) Instructions written on main answer book are strictly to be obeyed.
 - (3) Draw neat diagrams and figures (if necessary) at right places.
 - (4) Assume suitable data if needed.
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Q-1

Attempt the following questions:

- a) What is the difference between recursion and iteration? (01)
- b) What is principle of optimality? (01)
- c) What is empirical analysis of algorithm? (01)
- d) What is valid hit? (01)
- e) What is optimization problem? (01)
- f) What is optimal substructure? (01)
- g) Prepare the list of suffix for given string S="abcd". (01)
- h) What do you mean by spanning tree? (01)
- i) What is longest common subsequence? (01)
- j) What do you mean by time complexity of algorithm? (01)
- k) Which condition needs to be fulfilled for binary search? (01)
- l) What do you mean by average case complexity of algorithm? (01)
- m) Define the term potential function. (01)
- n) Write the complexity of insertion sort and binary search. (01)

Attempt any four questions from Q-2 to Q-8

Q-2

Attempt all questions

- (a) Answer the following questions (07)
 - (1) What is algorithm? Explain its properties.
 - (2) What is Asymptotic notation? Explain upper bound notation, lower bound notation and tight bound notation.
- (b) Solve following recurrences. (07)
 - (1) $T(n) = 2 T(n/2) + n$
 - (2) $T(n) = 3 T(n/3) + n^2$

Q-3

Attempt all questions

- (a) Which algorithm designing strategy is more suitable for solving fractional knapsack problem? Justify it with suitable example. (07)
- (b) Write the algorithm of linear search. Apply linear search algorithm on given data set $A=\{6,25,24,92,63,56,99\}$ to search a key = 63. (07)



- Q-4** **Attempt all questions**
- (a) Answer the following questions (06)
 (1) Compare Dynamic programming strategy and Divide and Conquer strategy.
 (2) Derive Binomial coefficient for given situation $C(5,4)$ using Dynamic programming strategy
- (b) Analyze Activity Selection Problem. Find the optimal set of activity for given set of data (08)
- | Activity [I] | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|--------------|---|----|---|----|---|----|---|----|---|----|----|
| Start time | 5 | 6 | 3 | 8 | 5 | 8 | 0 | 2 | 3 | 12 | 1 |
| End time | 9 | 10 | 8 | 11 | 7 | 12 | 6 | 13 | 5 | 14 | 4 |
- Q-5** **Attempt all questions**
- (a) Find Longest Common Subsequence of given two strings using Dynamic programming strategy. $S_1 = zxcvcvbev$ $S_2 = zxcxvbn$ (07)
- (b) Explain P type and NP type of problems. (07)
- Q-6** **Attempt all questions**
- (a) Explain Prim's Algorithm with suitable example. (07)
- (b) What is relation? Explain types of relation with example. (07)
- Q-7** **Attempt all questions**
- (a) Solve Matrix Chain multiplication problem for given set of data and obtained optimal sequence of multiplication of matrices. Here $A_1 (5 \times 4)$, $A_2 (4 \times 6)$, $A_3 (6 \times 2)$, and $A_4 (2 \times 7)$. (08)
- (b) Explain Naive String matching algorithm. Find pattern string from text string using Naive String matching Algorithm. Here Text string (T) = abcaabccabca, and Pattern string (P) = abc (06)
- Q-8** **Attempt all questions**
- (a) Explain Backtracking. Solve 5-queen problem using backtracking. (07)
- (b) Analyze Merge sort. Write its algorithm and derive its complexity. (07)

