Department of Computer Science and Engineering

PES UNIVERSITY

UE19CS251: Design and Analysis of Algorithms (4-0-0-4-4)

Unit 2: Questions and Answers

Q.1 What are the advantages and disadvantages of BruteForce approach?

Q.2 Design an efficient brute-force algorithm for computing the value of a polynomial $p(x) = a_n x^n + a_{n-1} x^{n-1} + \cdots + a_1 x + a_0$ at a given point x_0 and determine its worst-case efficiency class.

Q.3 Sort the list E, X, A, M, P, L, E in alphabetical order by bubble sort

Q.4 Find the number of character comparisons that will be made by 'straight forward string matching' for the pattern ABABC in the following text: BAABABABCCA

Q.5 Write a brute-force algorithm for counting the number of vowels in a given Text.

Q.6 Give an example of a text of length n and a pattern of length m that constitutes a worst-case input for the brute-force string-matching algorithm. Exactly how many character comparisons will be made for such input?

Q.7 Find the optimal solution for the assignment problem given below

	Job 1	Job 2	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

Q.8 Write pseudocode for divide-and-conquer algorithm for the exponentiation problem of computing an where a > 0 and n is a positive integer
Q.9 Find the order of growth for solutions of the following recurrences.
Q.10 Apply mergesort to sort the list E, X, A, M, P, L, E in alphabetical order

Q.11 Write a pseudocode for a divide-and-conquer algorithm for finding values of both the largest and smallest elements in an array of n numbers.

Q.12 Apply quicksort to sort the list M, E, R, G, E, S, O, R, T in alphabetical order. Find the element whose position is unchanged in the sorted list.

Q.13 Design a divide-and-conquer algorithm for computing the number of levels in a binary tree. (In particular, the algorithm must return 0 and 1 for the empty and single-node trees, respectively.) What is the efficiency class of your algorithm?

Q.14 Compute 2101 $*$ 1130 by applying the divide-and-conquer algorithm outlined in the text

Q.15 Write an algorithm for Mergesort. Mention its time complexity for Best, Worst and Average case