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PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 80

Max Time: 120 Mins

Weightage: 40 %

END TERM EXAMINATION

I Semester AY 2017-2018

Course: CSE 212 ANALYSIS OF ALGORITHMS

20TH Dec 2017

Instructions:

- i. Answer all questions
 - ii. Read the question and answer accordingly
 - iii. Part A, & Part B are closed book and Part C is Open Book. You are permitted to use only the Text Book .
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Part A

(6Q X 4 M = 24 Marks)

1. Write a brute force algorithm to compute a^n .
2. Give an example of liner, quadratic, exponential and factorial time complexity algorithm
3. List out the steps involved in back tracking paradigm
4. State knapsack problem and its mathematical model
5. Solve the recurrence equation $T(n) = 2 T\left(\frac{n}{2}\right) + 6n$, given that $T(1)=1$
6. State Master's Theorem in the context of Divide and Conquer Technique

Part B

(4Q x 9 M= 36 Marks)

7. Write the recursive algorithm and iterative algorithm for Fibonacci numbers and do the Program correctness for one of algorithms written by you
8. Write general algorithm(control Abstraction) Backtracking and explain the concept of basic object in Backtracking paradigm and explain the application of binary string of length n in solving knapsack problem
9. Explain Dynamic programming paradigm with the help of All pairs shortest path Problem(all the eight steps are required)
10. State n –queen problem and write an algorithm for n-queens problem using backtracking paradigm and solve 4 queens problem by state space tree method.

Part C (Open Book)

(30 Mins)

(20 Marks)

11. State Traveling Sales Person Problem and solve the TSP using as an application of Permutation.

(12 Marks)

12. The time complexity of a problem is exponential, how do you settle for Greedy paradigm or Dynamic Programming Paradigm

(8 Marks)



PRESIDENCY UNIVERSITY, BENGALURU
SCHOOL OF ENGINEERING

Max Marks: 40

Max Time: 60 Mins

Weightage: 20 %

TEST 1

I Semester 2017-2018

Course: **CSE212 Analysis of Algorithms**

20 SEPT 2017

Instructions:

- i. Write legibly
 - ii. Scientific and non-programmable calculators are permitted
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Part A

(4Q x 3M= 12 Marks)

1. State Masters Theorem and give an example of exponential algorithm.
2. Solve the recurrence equation by substitution method

$$T(n) = \begin{cases} c, & \text{if } n = 0 \\ 2T(n-1) + d, & n \geq 1 \end{cases}$$

3. In quick sort, for sorting n elements, the $\left(\frac{n}{4}\right)$ th element is selected as pivot using $O(n)$ time algorithm. Write the recurrence equation in this case?
4. What do you mean by Loop Invariant and its usage in analysing of algorithms?

Part B

(3Q x 6M= 18Marks)

5. State Towers of Hanoi problem and set up the recurrence equation from the problem and solve the obtained recurrence equation.
6. Devise an iterative algorithm to find the maximum among the n integers stored in an array and verify its correctness of proof.
7. Write bubble sort algorithm and study its worst case running time(express in asymptotic notation)

Part C

(1Q x 10M= 10 Marks)

8. Explain the various steps involved in deploying dynamic programming approach in the computing the binomial coefficient n_{C_r} .