

B.E. DEGREE EXAMINATIONS: APRIL/MAY 2009

Third Semester

COMPUTER SCIENCE AND ENGINEERING

U07CS301 Design and Analysis of Algorithms

Time: Three Hours

Maximum Marks: 100

Answer ALL the Questions:-

PART A (20 x 1= 20 Marks)

1. gcd (60,24) is
A. 12 B. 10 C. 18 D. 20
2. Algorithm means
A. Branch of Computer Science
B. Core of Computer Science
C. Unit of computer Science
D. Computer science
3. For the given Input size n , if the algorithm runs the longest among all possible inputs of that size is called
A. Best-case efficiency B. Average- case efficiency
C. Worst - case efficiency D. Amortized efficiency
4. Amortized Efficiency applies to
A. Single run of an algorithm
B. Sequence of operations performed on same data structures
C. Sequence of operations performed on Different data structures
D. Sequence of operations performed on inputs
5. Recurrence equations of the form
A. $M(n)=M$
B. $M(n)= M(n-1)+1$
C. $M(n)= \alpha$
D. $M(n)= M(n)$
6. The convenient way to compare the order of growth of two functions is
A. Value –based approach
B. Limit –based approach
C. Order –based approach
D. Asymptotic notations
7. The divide – and- conquer algorithms fall in to this category
A. n^2 B. $n \log n$ C. n^3 D. n

8. For the big oh notation the equivalent equation is
 A. $t(n) \leq c g(n)$ B. $t(n) = c g(n)$ C. $t(n) \geq c g(n)$ D. $t(n) \neq c g(n)$
9. Brute force approach is termed as
 A. Complex approach B. Straight forward approach
 C. Linear approach D. Spiral approach
10. In selection sort, the number of key swaps is only
 A. $n-1$ B. n C. n^2 D. $n-2$
11. The equation of general divide and conquer recurrence is
 A. $T(n) = aT(n/b) + f(n)$ B. $T(n) = bT(n/b) + f(n)$
 C. $T(n) = aT(n/b)$ D. $T(n) = aT(n/b) + f(a)$
12. The average case efficiency of Binary search is
 A. $\log(n)$ B. n C. $\log_2(n)$ D. $\log_2(n-1)$
13. The extension of Insertion sort is named as
 A. Merge sort B. Selection sort C. Heap sort D. Shell sort
14. In AVL Tree the height of the empty tree is defined as
 A. 1 B. -1 C. 0 D. ∞
15. In heap the total number of key comparisons in the worst case will be
 A. $2n$ B. $2n \log n$ C. $2(n - \log_2(n-1))$ D. $2(n - \log_2(n+1))$
16. The time efficiency of Floyd algorithm is
 A. n^3 B. 2^n C. $n!$ D. n
17. Kruskal algorithm falls under the technique called
 A. Divide – conquer Technique
 B. Greedy Technique
 C. Sequential Technique
 D. Brute – force Technique
18. Back tracking is based on the construction of
 A. Un directed graph B. Directed graph C. Trees D. Arrays
19. In subset of Items whose total weight does not exceed the knapsack's capacity is falls under
 A. No solution B. Feasible solution C. Complete solution D. Partial solution

20. The Hamilton circuit is a cycle that passes through all the vertices of the graph

- A. exactly once B. twice C. many times D. thrice

PART B (5 x 16 = 80 Marks)

21.(a) Discuss the basic efficiency classes and important problem types with examples

(OR)

21.(b) Describe the fundamental concepts of the analysis frame work.

22.(a). Discuss about

(i). Analyze the Fibonacci numbers mathematically

(ii). Algorithm visualization

(OR)

22.(b). Explain in detail about the Empirical analysis of algorithms with its applications.

23.(a). Explain the algorithm of Quick sort and its performance analysis with an example

(OR)

23.(b). Explain in detail about Breath – first and Depth – first algorithms.

24.(a). Explain Warshall's and Floyd's algorithm with an example.

(OR)

24.(b). Discuss about Optimal binary search tree.

25.(a). Discuss about Traveling sales man problem for the following graph defined by its weight matrix

$$G = \begin{matrix} 0 & 20 & 30 & 10 & 11 \\ 15 & \infty & 16 & 4 & 2 \\ 3 & 5 & \infty & 2 & 4 \\ 19 & 6 & 18 & \infty & 3 \\ 16 & 4 & 7 & 16 & \infty \end{matrix}$$

(OR)

25.(b). Briefly explain

(i) . Assignment Problem

(ii) Hamilton circuit Problem
