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Question Paper Code: 31203

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2017

Third Semester

Electronics and Communication Engineering

01UCS323 - DATA STRUCTURES AND ALGORITHM ANALYSIS

(Regulation 2013)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions.

PART A - (10 x 2 = 20 Marks)

1. Define destructor.
2. Define operator overloading.
3. State the use of pointer.
4. What do you mean by stack unwinding?
5. Define Linked List. List the types of Linked List.
6. Write brief note on properties of binary heap.
7. Prove that the maximum number of nodes in a binary tree of height h is $2^h - 1$.
8. Define Topological sort.
9. Write the steps involved in bucket sorting.
10. Define Divide and Conquer technique. Give an example.

PART - B (5 x 16 = 80 Marks)

11. (a) Design a matrix and vector classes with necessary properties. Write a C++ program to multiply vector and matrix class objects using Friend function. (16)

Or

- (b) (i) Define constructor. Explain copy constructor with example. (8)
(ii) Elaborate overloading binary operators with example program. (8)

12. (a) Illustrate the types of inheritance with suitable examples. (16)

Or

- (b) Write a C++ program to design a template for generic queue with their necessary operations. (16)

13. (a) Write a procedure to insert and delete an element in a single linked list. (16)

Or

- (b) Given input {5179, 2345, 5425, 6173, 4199, 4344, 8796, 2411} and a hash function $h(X) = X \text{ mod } 10$, show the resulting

- (i) Separate chaining hash table
(ii) Open addressing hash table using linear probing
(iii) Open addressing hash table using quadratic probing
(iv) Open addressing hash table with second hash function $h_2(x) = 7 - (x \text{ mod } 7)$. (16)

14. (a) Briefly explain single rotation and double rotation of AVL tree with examples. (16)

Or

- (b) Write a routine to insert and delete an element in binary search tree. (16)

15. (a) (i) Write a routine for merge sort and explain with an example. (10)

- (ii) Sort the following using shell sort.
18, 32, 12, 5, 38, 33, 16, 2 (6)

Or

- (b) Write the routine for the quick sort and estimate its worst, average and best case time complexities. Also, sort the following key values using quick sort. 65, 70, 75, 80, 85, 60, 55, 50, 45. (16)