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Question Paper Code: 33223

B.E. / B.Tech. DEGREE EXAMINATION, APRIL 2019

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. List out the operators that cannot be overloaded.
3. What is the runtime polymorphism? How it is achieved?
4. What do you mean by stack unwinding?
5. Write the various applications of Stack.
6. Assume the hash function is $h(x) = (p + q) \% 5$ where $x = pq$ and key values are $x = \{35, 43, 59, 19\}$. Build the hash table with the size is 5.
7. Prove that the maximum number of nodes in a binary tree of height h is $2^h - 1$.
8. Define NP-Complete problem.
9. Define shell sort.
10. State why quick sort is more efficient than merge sort?

PART - B (5 x 16 = 80 Marks)

11. (a) (i) Analyze the various loop structures with examples. (10)
(ii) Elucidate static member functions. (6)

Or

- (b) (i) Discuss the various types of constructors with example. (8)
(ii) Design the time class with their properties seconds, minutes & hours. Write a C++ program to overload the operators +, - with time objects. (8)
12. (a) Write a C++ code to construct classes of a person with name and age as public properties, account details as private properties and percentage of mark as protected property. Construct a class with sports details of person. Construct a class to rank person based on the equal weight age to academic and sports details. Use inheritance concept. (16)

Or

- (b) Write a C++ program to design a template for generic queue with their necessary operations. (16)
13. (a) (i) Compare best, worst and average case analysis. (6)
(ii) State and explain the methods for implementing a stack. (10)

Or

- (b) Explain with an example the formation of heap data structure and the properties to be found in a heap. (16)
14. (a) (i) Write a routine to insert and delete an element in binary search tree. (10)
(ii) Construct the AVL tree for inserting the elements 2, 1, 4, 5, 9, 3, 6, 7 into empty AVL tree. (6)

Or

- (b) (i) Explain prim's algorithm with appropriate example. (12)
(ii) What do you mean by network flow problem? (4)

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) Give the strategy behind divide and conquer technique. How does divide and conquer help in merge sorting. Consider your own set of unsorted ' n ' elements and apply the merge sorting to sort the elements you took. (16)
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