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Reg. No. : | | | | | | | | | | |

Question Paper Code: 53826

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2022

Third Semester

Electronics and Communication Engineering

15UIT326-DATA STRUCTURES AND ALGORITHM ANALYSIS

(Regulation 2015)

Duration: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (5 x 1 = 5 Marks)

1. When one object reference variable is assigned to another object reference variable then CO1- R

   (a) a copy of the object is created.
   (b) a copy of the reference is created.
   (c) a copy of the reference is not created.
   (d) it is illegal to assign one object reference variable to another object reference variable

2. Which of the following is not correct for virtual function in C++? CO2- R

   (a) Must be declared in public section of class
   (b) Virtual function can be static
   (c) Virtual function should be accessed using pointers
   (d) Virtual function is defined in base class

3. The result evaluating the postfix expression 10 5 + 60 6 / * 8 – is CO3- App

   (a) 284 (b)213 (c) 142 (d) 71

4. The height of a binary tree is the maximum number of edges in any root to leaf path. The maximum number of nodes in a binary tree of height h is: CO4- U

   (a) 2^h -1 (b) 2^(h-1) – 1 (c) 2^(h+1) -1 (d) 2*(h+1)

5. If the array is already sorted, then the running time for merge sort is: CO5- R

(a) O(1) (b) O(n*log n) (c) O(n) (d) O(n^2)

PART – B (5 x 3= 15 Marks)

6. Illustrate the various control structures used in C++. CO1- R

7. Explain about how to declare pointer and perform arithmetic with an example. CO2-U

8. Write a routine to implement stack operations using array. CO3-App

9. Explain double rotation in AVL tree with an example. CO4-U

10. Write the algorithm for insertion sort. CO5-U

PART – C (5 x 16= 80 Marks)

11. (a) Specify a class called complex to represent complex numbers. Overload +, - ,*and / operators when working on the objects of this class. CO1- U (16)

Or

(b) Write a C++ program to apply the basic concepts of OOPs with diagrammatic illustration. CO1- U (16)

12. (a) Write a C++ program to define a class called patient(name, age, sex).Derive two classes from patient namely in-patient(ipno, date-of-admin, date-of-discharge) and out-patient (opno, doctor-id and consultation-fee).Define two classes namely general-ward(rent/day) and special-ward(roomno, rent/day, eb-bill).For out-patient print the bill with consultation fee. For in-patients, print bill according to their accommodation either in general-ward or special-ward. CO2- Ana (16)

Or

(b) (i) Write a program to maintain employee details using files. Arrange the file in descending order of their salary. CO2- Ana (10)

(ii) Explain the concept of multiple catch statements in exception handling. CO2- Ana (6)

13. (a) Given two sorted lists, L1 and L2, write procedure to compute L1 U L2 and L1 using only the basic list operations. CO3- Ana (16)

Or

(b) Given the input (5, 29, 20, 0, 27, 18) and a hash function "h(k)=k%9" CO3- Ana (16)

show the result of

(i) Separate Chaining hash table

(ii) Open addressing hash table using linear probing

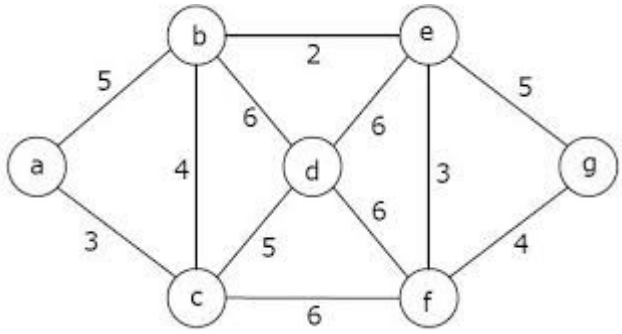
(iii) Open addressing hash table using quadratic Probing

(iv) Open addressing hash table with second hash function $h_2(k)$

14. (a) Write an insertion and deletion algorithm for binary search tree. Insert 17,21,13,15,10,16,4,24,27,23,11,25,26 into a initially empty binary search tree. Delete 4, 10, 27 and 13 from the tree. CO4- App (16)

Or

(b) Explain Prim's algorithm. Construct the minimum spanning tree for the following graph CO4- App (16)



15. (a) Write an algorithm to sort a set of 'N' numbers using Quick sort .Trace the algorithm for the following numbers : 2, 13, 45, 56, 27, 18, 24, 30, 87 and 9 CO5- App (16)

Or

(b) Explain how all pairs shortest path algorithm is solved using dynamic programming? CO5- App (16)