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B.E / B.Tech (Full Time) DEGREE END SEMESTER EXAMINATIONS, APRIL / MAY 2014

ELECTRONICS AND COMMUNICATION ENGINEERING

II Semester

CS8251 & Data Structures and Object Oriented Programming in C++

(Regulation ...2012.....)

Time: 3 Hours

Answer ALL Questions

Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. When will you make a function inline? Why?
2. What are the differences between Class and Structure in C++?
3. What are Abstract class and Concrete class?
4. Give the public, protected and private member of Class D

Class B

```
{ Private: int x;  
  protected : int y;  
  public: int z;  
}
```

Class D: **private** B

```
{  
  public: int d;  
}
```

5. What is Doubly linked list? Give its advantage.
6. Evaluate the following postfix expression using stack. $8\ 6\ 2\ +\ *4\ 3\ 1\ -\ /\ -$
7. What is Complete and Full binary tree?
8. What is topological sort? Give example.
9. Show the result of sorting the following numbers using insertion sort (step by step o/p)
8,3,5,2,9,7,1
10. What are Big-O, Theta and Omega Notations? Give the notations for the following time complexity function $f(n)=8n^2+7n+6$

Part – B (5 x 16 = 80 marks)

11. i) Create a Class **String**(Data members- string and length). Use copy constructor and Dynamic constructor to initialize the string object. (6)
- ii) Define a class **Date** (Data members- years, months and days). Write a code to overload the following operators using Friend function. (C1,C2 &C3 are Date objects) (10)

- A. C2++
- B. C1=C2+C3
- C. Find the age of a person. AGE=C1-C2. (C1- current date C2- Dateofbirth, Age is no of years)

12. a) i) What is Multiple inheritance and Hybrid inheritance? What are the problems will occur in these inheritances? How do you solve it? Give example code and explain. (10)

ii) Define a class **Student** (Data member- Name, Reg.no, age. Member function - Display). Create array of students and a pointer pointing to array of students. Write a function Display to display the details of all the students using the pointer. (6)

OR

b) i) How do you achieve runtime polymorphism? Give an example and explain. (8)

ii) Define a class **Time** (Data members- hr, min &sec). Write a code to perform the following type conversions (8)

A. `int no_of_seconds=800`
`time t= no_of_seconds . // Basic to class (int to time)`

B. `int no_of_seconds= t // class to basic (time to int)`

13. a) i) Write a code to implement a Stack using array. Also write a routine to check whether a given string is Palindrome or not by using stack. (10)

ii) Write a procedure to add the two Polynomial linked list. (6)

OR

b) i) Write the functions to perform the following operations in a Linked list (12)

A. insert at the end (3)

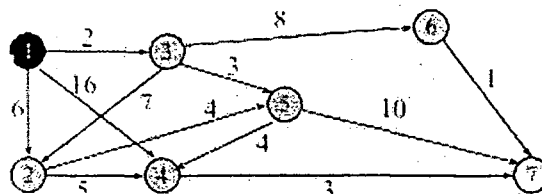
B. Insert at specified location (3)

C. Find and delete a node (3)

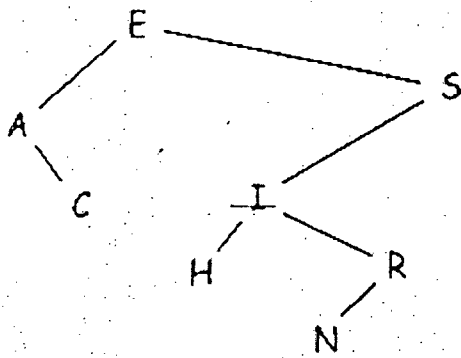
D. Display (3)

ii) Write a routine for insertion in a circular queue using array. Clearly specify the queue full condition. (4)

14. a) i) Write the Pseudo code for Dijkstra's shortest path algorithm. Trace the algorithm for the following graph. (8)



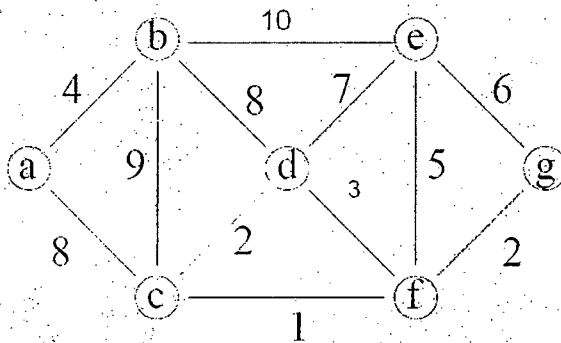
ii) Give the preorder, postorder and inorder traversals for the following tree. (6)



OR

b) i) Write the function to perform insertion and deletion in a binary search tree. Show the result of inserting 5, 3, 8, 4, 9, 1, 7, 10, 2 into an empty binary search tree. (11)

ii) Give the adjacency list and adjacency matrix representation of the following graph. (5)



15. a) i) Write a routine for Quick Sort and explain with example. (8)

ii) Sort the following numbers using Heap sort. 60,100,90,45,120,20,30,10,150,88,75,58,130. (Show step wise o/p) (8)

OR

b) i) Write a function to perform Merge sort. Give example. (8)

ii) Discuss the Best case, worse case and average case analysis of linear search and binary search algorithm. (8)