B.M.S. College of Engineering, Bengaluru-560019

Autonomous Institute Affiliated to VTU

July 2024 Semester End Main Examinations

Programme: B.E. Semester: V

Branch: Electronics and Telecommunication Engineering Duration: 3 hrs.
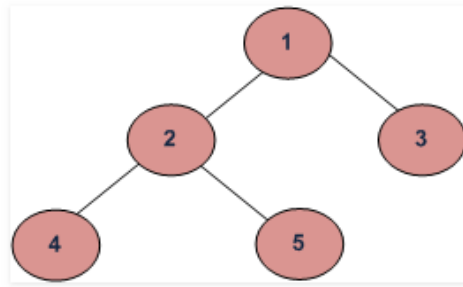
Course Code: 22ET5PE1DS Max Marks: 100

Course: C++ AND DATA STRUCTURES

Instructions: 1. Answer any FIVE full questions, choosing one full question from each unit.
2. Missing data, if any, may be suitably assumed.

			UNIT - I	CO	PO	Marks
1	a)		Explain data hiding concept in C++ with respect to public and private interface using a block diagram	CO1	-	5
	b)		Define a class called array and illustrate the following operations that can be performed on an array object i. input an array elements ii. print the array elements iii. mean of the array elements iv. find the largest value in an array v. sort the array elements in ascending order	CO2	PO1	12
	c)		Write the output of following code ```\n#include<iostream>\nusing namespace std;\nmain ()\n{\n int x = 5;\n int &y = x;\n cout << "x before modification=" << x << endl;\n cout << "y before modification=" << y << endl;\n x = x + 10;\n cout << "x after modification=" << x << endl;\n cout << "y after modification=" << y << endl;\n}\n```	CO4	PO4	3
			UNIT - II			
2	a)		Illustrate normal banking transactions such as deposit, withdrawal, balance and display. Use the constructor to construct initial value of an object acnt of class type account.	CO2	PO1	8
	b)		Write a cpp program to overload binary operator + to add 2 complex numbers. Use member function to overload. make use of the constructors.	CO2	PO1	8

		c)	List the IOS format functions and describe their role in C++	CO1	-	**4**

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UNIT - III

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				CO1	-	**5**
3	a)	Write the visibility of inherited members in the following table				

Base class visibility	Derived class visibility		
	Public derivation	Private derivation	Protected derivation
private	?	?	?
protected	?	?	?
public	?	?	?

				CO4	PO4	**7**
	b)	Write a C++ program using try and catch blocks to get the desired output as shown below.				

> **Expected output screen:**
>
> Testing multiple catches
> X= =1
> Caught an integer
> End of try-catch system
> X= =0
> Caught a character
> End of try-catch system
> X= = -1
> Caught a double
> End of try-catch system
> X= =2
> End of try block
> End of try-catch system

				CO2	PO1	**8**
	c)	Consider a class called BOOKS. Derive two classes from BOOKS namely ENG_BOOKS and MED_BOOKS. Derive another class from both ENG_BOOKS and MED_BOOKS namely CET_BOOKS. Add suitable data members and function members to all the classes. Include a main program. Write a complete C++ program to demonstrate the above scenario.				

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UNIT - IV

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				CO2	PO1	**10**
4	a)	Write a C++ program to implement a linked list and include the following operations i. insert node at the beginning ii. insert node at the end iii. reverse the linked list items				
	b)	Implement a stack using arrays and include following operations i. push an element ii. pop an element iii. display the current status of stack		CO2	PO1	**10**

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OR

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5	a)	Implement a queue using linked list and include the following operations i. insert ii.delete iii. display the status	CO2	PO1	**12**
	b)	Write the sequences using following traversal mechanism for the tree given. i. in order ii. preorder iii postorder 	CO4	PO4	**3**
	c)	Calculate the index before and after linear probing for the following data in a hash table of size 20.	CO2	PO1	**5**

data	hash	index before probing	index after probing
1	?	?	?
2	?	?	?
42	?	?	?
4	?	?	?
12	?	?	?

UNIT - V

6	a)	Using heap sort method show the sorting of following array. Include creation of max heap and all intermediate operations. array={4,3,7,1,8,5}	CO2	PO1	**10**
	b)	Using stack show the post fix expression calculator for the following expression 63+2* =	CO4	PO4	**5**
	c)	Write the postfix expressions for the following infix notions (i) a+b (ii) a+b*c (iii) a*b+c (iv) (a+b)*c (v) (a-b)*(c+d)	CO4	PO4	**5**

OR

7	a)	Apply bin sort on the input array [0.78, 0.17, 0.39, 0.26, 0.72, 0.94, 0.21, 0.12, 0.23, 0.68]. Show all intermediate operations.	CO2	PO1	**10**
	b)	Write an algorithm to check for balanced bracket expression using stack. Illustrate using an example.	CO2	PO1	**10**

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