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TCS–307

B. TECH. (CSE) (THIRD SEMESTER)

END SEMESTER

EXAMINATION, Jan., 2023

OBJECT ORIENTED PROGRAMMING WITH C++

Time : Three Hours

Maximum Marks : 100

Note : (i) All questions are compulsory.

(ii) Answer any *two* sub-questions among (a), (b) and (c) in each main question.

(iii) Total marks in each main question are **twenty**.

(iv) Each sub-question carries 10 marks.

1. (a) A college has a large number of students. You must keep their roll numbers in a

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suitable data structure. The roll numbers are all positive integers. Create a function that separates even and odd roll numbers. This function places all even roll numbers first, followed by all odd roll numbers. (CO1)

Example :

Students strength = 10

Input = {1, 2, 3, 4, 5, 6, 7, 8, 9, 10}

Output = {2, 4, 6, 8, 10, 1, 3, 5, 7, 9}

(b) Discuss the importance of namespaces with suitable examples. (CO1)

(c) Define strings. Write a program that will take ten strings and sort them in dictionary order. (CO1)

2. (a) Create a class 'Student' with three data members which are name, age and address. The constructor of the class assigns default values to name as

"unknown", age as '0' and address as "not available". It has two functions with the same name 'setInfo'. First function has two parameters for name and age and assigns the same whereas the second function takes has three parameters which are assigned to name, age and address respectively. Print the name, age and address of 10 students. Create appropriate destructor as well.

Hint-Use array of objects (CO2)

(b) Write a C+ program to overload binary operator * for multiplying two objects using friend function. (CO2)

(c) (i) What is 'this' pointer ? Explain with an example.

(ii) What are dynamic objects ? How can you create them ? (CO2)

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3. (a) What do you understand by Inheritance ? What are the different types of inheritance ? Explain all kinds of inheritance with a proper example. (CO3)

   (b) Write a C++ program to design a base class Person (address, phone_no). Derive a class Employee (eno, ename) from Person. Derive a class Manager (designation, department name, basic-salary) from Employee. Write a program to : (CO3)

   (i) Accept all details of 'n' managers.

   (ii) Display manager having highest salary.

   (c) What is Diamond problem ? What is the solution for this problem ? Explain your solution with the proper coding example. (CO3)

4. (a) What is Polymorphism hierarchy in Object Oriented Programming ? Explain all the types of Polymorphism with suitable

examples. Also explain how Ad-hoc Polymorphism works in Polymorphism with suitable code. (CO4)

(b) Explain what is Virtual Base Class and the use of Virtual Base Class in Polymorphism with suitable code. What type of problems may occur if we never use Virtual Base Class in our program ?

Along with that explain the need of choosing to use virtual destructor instead of the normal destructors in polymorphism. (CO4)

(c) Explain the difference between compile time and run time binding with proper code and example. Assume a base class "Base containing information of an employee like employee name, employee id and contact number. There is a child class "Child" containing further information of the employee like

employee address, department. "Child" class is extending "Base" class and the derived class is also overriding one of the get (String, int, int) method in child class make sure this redefinition will always be called irrespective of the reference pointer of the child class object. (CO4)

5. (a) What is STL ? Explain what is list, vector and map and explain 3 different functions in each of them. Create a vector, accept 5 numbers from user, insert them one by one into the vector, remove last element from the vector and then print the elements of the vector in reverse order. (CO5)

(b) What is an exception and what's the need of exception handling ? Also explain how exception handling is better compared to if-else statements ? Write a program to demonstrate re-throwing of an exception. (CO5)

(c) Explain fstream, ifstream, ofstream classes w.r.t file handling, and also explain any *three* different modes of opening a file. Write a program to read a file, count the number of words in it, create a new file and write the total words counted in it.

(CO5)