Code : 326103

MCA 1st Semester Exam., 2024

OBJECT-ORIENTED PROGRAMMING, ANALYSIS AND DESIGN

Time : 3 hours *Full Marks* : 70

Instructions :

(i) The marks are indicated in the right-hand margin.

*(ii) There are **SEVEN** questions in this paper.*

*(iii) Attempt **FIVE** questions in all.*

*(iv) Question Nos. **1** and **2** are compulsory.*

SECTION—A

1. Choose the correct answer of the following : 2×10=20

(a) If two classes derive one base class and redefine a function of the base class, also overload some operators inside the body of the class. Among these two things of function and operator overloading, the polymorphism is used where?

(i) Function overloading only

(ii) Operator overloading only

(iii) Either function overloading or operator overloading because polymorphism can be applied only once in a program

(iv) Both are using polymorphism

(b) Objects type

(i) can be changed in runtime

(ii) cannot be changed in runtime

(iii) can be changed in compile time

(iv) may or may not get changed

(c) When a subclass is created using inheritance, the resulting class

(i) may have only attributes of parent class

(ii) may have only operations of parent class

(iii) may have new operations only in addition to those in parent class

(iv) may have new attributes and new operations in addition to those of the parent class

(d) Which is the condition that must be followed if the array of objects is declared without initialization, only with size of array?

(i) The class should have separate constructor for each object

(ii) The class must have no constructors

(iii) The class should not have any member function

(iv) The class must have default or zero argument constructor

(e) If a base class is inherited in protected access mode, then which among the following is true?

(i) Public and protected members of base class becomes protected members of derived class

(ii) Only protected members become protected members of derived class

(iii) Private, protected and public all members of base, become private of derived class

(iv) Only private members of base, become private of derived class

(f) What is operator overloading?

(i) Defining additional tasks to operators without changing their actual meaning

(ii) Defining additional tasks to operators by changing their actual meaning

(iii) To discourage the operator to work according to its actual meaning

(iv) None of the above

(g) Global functions can be Friend functions for which of the following classes?

(i) Base class

(ii) Derived class

(iii) Any classes

(iv) None of the above

(h) What is the purpose of the 'interface' in OOP?

(i) To represent a specific type of object

(ii) To declare a set of methods without implementation

(iii) To implement a set of methods with default behaviour

(iv) To specify the visibility of class members

(i) Choose the option below which is not a member of the class.

(i) Friend function

(ii) Static function

(iii) Virtual function

(iv) Const function

(j) Encapsulation in object-oriented modelling is useful as

(i) it allows improving methods of an object independent of other parts of system

(ii) it hides implementation details of methods

(iii) it allows easy designing

(iv) it encapsulates attributes and operations of object

SECTION—B

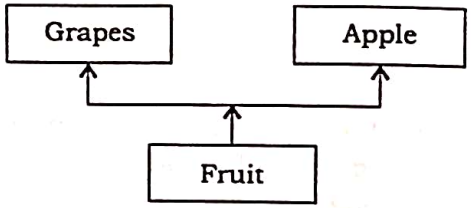
2. Answer any *four* questions : 5×4=20

(a) Differentiate between Object-Oriented Programming and Procedural Programming. Write a program in C++ by creating a class of integers and write a function that prints all the prime numbers from the class.

(b) What is constructor? How is it different from the member function?

(c) Explain the difference between function overriding and function overloading with suitable examples.

(d) Write a program to implement the following hierarchy of inheritance :



(e) Discuss the use of public, private and protected access specifiers, and their visibility in the class.

SECTION—C

Answer any *three* questions : 10×3=30

3. Define a class named 'Train' representing following members :

Data members :

1. Train number
2. Train name
3. Source

(Continued)

4. Destination
5. Journey date

Member functions :

1. Initialize members
2. Input train data
3. Display data

Write a C++ program to test the train class.

4. Define UML. Draw a UML for the automation of training and placement office of any college. Make suitable assumptions if required and explain them clearly.

5. Explain how base class member functions can be invoked in a derived class if the derived class also has a member function with the same name.

6. Write a C++ program to perform multiplication between an integer and complex number object using friend operator function.

7. Create class called shopping list. The shopping list includes details such as the item code number and price of item. Provide operations such as adding an item to the list deleting an item from the list printing the total value.

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