BCSE 2nd Year 1st Semester Supplementary Examination, 2023

Programming Fundamentals and Object Oriented Concepts

Full marks: 100   **Time: 3 hours**

Attempt any five questions

1) a) What is a self referential structure in C?   2

   b) Compare array and linked list.   3

   c) In C, implement a two dimensional array of integers using an array of pointers. Accept the value for the elements and print those.   8

   d) Discuss parameter passing in C.   4

   e) Describe fwrite() and fread() in C.   3

2) a) Explain the following concepts.

   Class and object, encapsulation, inheritance and polymorphism   8

   b) Design and implement (code required) one dimensional array of integer class using c++ with the following features.

   Space allocation for the array will be dynamic. When object is declared its length will be specified (by default 0). An object may be initialized with another. Assignment is also allowed. In both the cases the destination object will have its separate copy of the content. Two objects s1 and s2 can be checked for equality using ==. They are equal if size and all the array elements (in case of non zero size) are same.   12

3) a) What is the difference between private, public and protected members?   4

   b) What is the utility of static data members and static member function?   5

   c) In C++, what is a friend function?   3

   d) For each student unique roll number, name and score are to be stored. There is a list of students. One can search whether a roll number is present or not. If present then it will be displayed. One can find the student with highest score, can display all the student data, can modify the score for a particular student. Design the classes. 8

4) For each student roll, name and marks are to be stored in a file. Design and implement (code required) the class(es) in C++ to support the following.

One can put the record in the file, given a roll, details of the student can be displayed, name of the candidate with highest marks can be shown, and given a roll his marks can be changed. 20

Or

Write the code using C language (class design not required) 20

5) a) How will you achieve runtime polymorphism in C++? 4

b) What is an abstract class? Mention its utility. How will you define an abstract class in C++? 6

c) There exists a class ELECTRIC_BILL which has a member function to compute the basic charge based on the units of call made following certain rules. Design the class(es) to deal with commercial consumers where additional charge (say, x% of basic chage) is claimed and subsidized consumers where a discount (say, y% of basic charge) is provided. Accordingly new billed amount has to be computed. Show the skeleton of the ELECTRIC_BILL and write the code for the new classes. 10

6) a) What is the utility of namespace? 3

b) What are container, iterator, generic algorithm in STL of C++? Illustrate their use with a suitable example. 10

c) How will you specify the priority in priority queue? 3

d) What is hashmap? 4

7) Write short notes on the following.

a) Exception handling in C++ 5

b) Inline function in C++ 4

c) Virtual base class in C++ 5

d) Function template and class template in C++ 6