Ref. No. Ex/CSE/PC/B/T/214/2022

BCSE 2nd Year 1st Semester Examination, 2022

Programming Fundamentals and Object Oriented Concepts

Full marks: 70 **Time: 3 hours**

Instruction

Arrange the pages in sequence and form a single pdf. File name will be your Exam roll number. On the top of the first page write your complete Exam roll. Send the answer script at: sksjuexam@gmail.com In case of any query give me a call at 9433526300

Group I [CO1]: 10 Marks
Attempt any one

1) a) In C language, an array has to be implemented to store the name of the 50 students. Length of name may vary from student to student. Write a function to implement the array and store the names. Note, the names can also be made available to other functions. 4

b) Consider an array of 500 integers that stores marks in five subjects for 100 students. Data is ordered according to the roll numbers ranging from 1 to 100. Write a function in C language to find the total score of a student with roll number given by user at runtime. Pass the necessary parameters to the function. 4

c) Consider p is a pointer to an array of 10 integers. How will you allocate memory to implement a 2-D array of dimension 20x10? 2

2) a) Consider a structure student that contains roll, name and score of a student. Design and implement a function in C language to sort the array of structure. Design will be such that a user will be able to use the function to sort on the basis of desired fields like, roll/score and ascending or order descending order (do not consider fieldname/sorting order as arguments).

As user of the said function, write down the necessary code in C language to sort on i) ascending order of score and ii) descending order of score. 7

b) Consider p is a pointer to int. Write a function in C language that will allocate space for desired number of integers given as arguments. 3

Group II [CO2]: 10 Marks

3) a) Compare files with fixed length record and variable length record. 3

b) Assume a suitable file that stores employee code, name, designation, department name and salary of each employee in an organization. Write the code for the function in C language to increase the salary by 10% and change of department name (optional -- to be asked) for the employees with designation 'AAA'. 7

Group III [CO3]: 20 Marks

Attempt any two

Answer in the context of C++

4) a) Comment on the size of an object. 3

b) Specify the use of friend function. 2

c) Consider, class A has two virtual public member functions f1(void) and f2(void). B has been derived from A in public mode. In B, there are two public functions f1(int) and f2(void). Consider the following codes:

A *p; B b; p=&b;

Explain which functions will be called for the following:

i) p→f1() ii) p→f2() iii) p→f1(10) iv) b.f1() 5

5) a) Compare function overloading and function overriding. 3

b) Consider, x, y and z are objects of a class and i is an integer. Explain what minimal action you will take to support the following.

x=i; i=x; x=y+5; z=x+y; i=x+y; 3

c) Consider a class has a member function that receives an object reference as argument. What will be the prototype for the function so that it cannot modify the contents of the object(s) made available to it? 2

d) Discuss the role of throw verb? 2

6) a) What is the utility of abstract class? 2.5

b) As programmer, what will you do to achieve runtime polymorphism? How does the system support it? 5

c) Explain, what minimal support do you need to compare two objects? 2.5

Group IV[CO4]: 20 Marks
Attempt any one

7) a) Employee information (unique emp-id, name, basic pay, dept-id in which he/she works) are stored in emp.dat file. Department information (unique dept-id, dept name) are stored in dept.dat file. In emp.dat file records are appended and for a new employee, emp-id (integer data) is automatically assigned as last emp-id assigned +1. It is to be checked that dept-id is present in dept.dat file.

Design the necessary classes; assume the files of suitable type. Write the code to add employee record and code for necessary member functions in different classes are to be implemented. Consider C++ for coding. 14

b) In an institute, each student has unique class roll number. During every semester examination, unique examination roll number is assigned to each student. The mapping between the two roll numbers for every semester examination is maintained at the examination controller's office. Evaluator submits score sheet containing the semester number, examination roll number and score of all students. There must be support for the following: a) Given the examination roll number and semester number one can find the class roll number, b) given a class roll number and semester number, one can find the score. 6

8) a) For transaction in the library, member fills up a transaction form quoting the member-id (unique for each member) and book-code (unique for each physical book). To validate a transaction, member-id is to be verified against a member list and validity of book- code is to be checked with a booklist. If the transaction is of issue type then verify whether book can issued to the member or not (for any pending return no further issue is made). Valid issue is added in transaction list. If the transaction is of return type then it is to be verified whether the book was issued to the member or not. Valid return will update corresponding entry in transaction list to denote that the book has been returned. Assume, classes for book-list, member-list exists. Design the classes to handle the transactions.

No implementation detail is required. Provide a textual description regarding the prototype and functionality of the member functions. 14

b) An electric supply corporation maintains following information for every connection: consumer-id, consumer-name, consumer-address, meter-id, last reading and current reading. For every connection, a fixed meter rent (may vary time to time) is charged in every month. Per unit consumption rate is also fixed for all consumers and may vary time to time. In every moth, meter reading is to be updated. A bill is to be prepared (meter rent + charge for unit consumed) for the consumers in every month. Design the class(es). 6

Group V [CO5]: 10 Marks

Attempt any one

Answer in the context of C++

9) a) Assume that for a function template and the overloaded functions are present. How the call to the function is resolved? 2.5

b) How does the concept of namespace influence the design of a solution? 2.5

c) Student information (Student-id, Name, Score and Phone) are being stored into a container as and when made available. At any point of time those are retrieved in the descending order of score. Use suitable STL class and design and implement other classes you need. 5

10) a) What happens when an object is declared using a class template? 2.5

b) Consider a suitable container provided by STL and write down the code snippet to access all elements using an iterator. 2.5

c) Consider a suitable container provided by STL that stores roll, name and score of the students. Show the use of STL provided algorithm to find whether in the container anybody with score less than 40 exists or not. Write the code snippet. 5