

BCSE 2nd Year 2nd Semester Examination, 2019

Object Oriented Programming

Full marks: 100

Time: 3 hours

Group A [CO1]: 40 Marks

Attempt any two

- 1) a) What are data abstraction and data encapsulation in object oriented programming? 3
- b) Compare normal function, macro and inline function in C++. 4
- c) Consider Sample is a class. What happens for the following code snippet in C++ and in Java: 3
Sample X; Sample Y; X=Y;
- d) Consider the following code snippet in Java and explain what will happen: 3
int x; short a, b, c; a=5; b=3;
x=a; c=a+b;
- e) Comment on the use of public data member and private member function in a Class. 3
- f) Why may we need to write our own copy constructor in C++ and Java? 4
- 2) a) What is function overloading? How does it differ in C++ and Java? 3
- b) As programmer what will you do to achieve runtime polymorphism in C++ and in Java? 5
- c) Why do we need a virtual destructor in C++? 4
- d) Why do we need a virtual base class in C++ and not in Java? 4
- e) What is the use of abstract class? How will you define it in C++ and in Java? 4
- 3) a) What is the use of function template in C++? 3
- b) What is a wrapper class in Java? Explain autoboxing and unboxing in Java? 4
- c) What minimal action will you take to support the following in C++: 3
X=5; Z=X+Y; Z=Y+10; Assume, X, Y and Z are objects of same class.

- d) What is the utility of package in Java? I want to create a package mypack. What are the steps to be followed? Also specify how one can use it? 6
- e) Write short notes on exception handling in C++ or Java. 4

Group B [CO2]: 40 Marks

Attempt any two

4) Employee information (unique emp-id, name, basic pay, dept-id in which he/she works) is stored in emp.dat file. Department information (unique dept-id, dept name) is stored in dept.dat file. All files are binary files. 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.

- a) Design the necessary classes.
- b) Write the code in C++ to support the following: i) Adding records in emp.dat along with auto assignment of emp-id and ensuring the validity of dept-id (i.e. must be in dept.dat file).
- c) Find sum of basic pay of all employees. 7+8+5

5) a) 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, meter rent is charged and that is same for all. But it may change time to time. For every connection a bill is periodically generated. Billed amount comprises of meter rent and consumption charge (i.e. per unit charge * difference between last and current reading. Per unit charge is different for commercial and domestic connection (these are only two possible types of connection). A fixed amount as caution deposit is also collected when connection is initially provided to a consumer and it is different for different types of connection.

Design the necessary classes. 10

b) Consider the student objects with roll, name and score. Design the class(es) and write the complete code in Java to store the objects in a file, to find out the student details against a roll number and to find out the highest score . 10

6) a) Design the necessary classes (mention the classes, their attributes, methods along with signature, a textual description for the methods) for the following system: Each faculty has faculty id (it is unique), name and phone number. Each subject has subject code (it is unique), subject name and type (denotes whether it is core subject or elective). A list of faculty is maintained where faculty information is to be stored and a subject list will be there. Given a faculty id, one can get the faculty details. Given a subject code one can find the subject details. A faculty may be specialized in multiple subjects and

number of faculty may be specialized in one subject. Specialization information is also be maintained. For a subject one should be able to find out details of the faculties who are specialized in that. Similarly given a faculty, one should be able to find out the details of the subjects in which he/she is specialized. One should be able to find out the list of all core/elective subjects, list of all faculties. Consider the lists as in-memory ones.

Write down the associated code in C++/java to find out details of the faculties who are specialized in a given subject (say, user provides subject code) and to find out the details of the subjects in which a given faculty (say, user provides faculty id) is .specialized.

12+8

Group C [CO3]: 10 Marks

Attempt any one

- 7) a) In C++, What is a namespace? 2
 b) What are container and iterator in STL? 3
 c) Using STL, write down the code snippet in C++ to traverse the elements from start to end of a linked list. 5
- 8) a) Each applicant has an id (unique) and score. Applicant information are to be maintained in an ArrayList . New applicants may be added and some may also withdraw. One may like to find number of applicants at a point of time and details of all existing applicants. Design the necessary classes and Write the code in Java. 7
 b) What is HashMap in Java? How will you define the hash function? 3

Group D [CO4]: 10 Marks

Attempt any one

- 9) a) Comment on the event handling mechanism in Java? 4
 b) Write down a GUI application/Applet to enable the user in choosing one elective subject from three different options. Once user clicks on OK button, selected subject is to be displayed. 6
- 10) a) Student objects have roll, name and score. There are threads to view the objects and threads to update the objects. Viewing is always allowed. But, for updating of an object one at a time is to be ensured. Design the classes and write the code in Java. 7
 b) How inter-thread communication can be achieved in Java? 3