

Level: Bachelor
Programme: BE
Course: Object Oriented Programming in C++
Semester: Fall

Year : 2015
Full Marks: 100
Pass Marks: 45
Time : 3hrs.

*Candidates are required to give their answers in their own words as far as practicable.
The figures in the margin indicate full marks.
Attempt all the questions.*

How does making use of abstractions help in designing of an Object Oriented System? Explain with an example. 7

What is the role of behaviour in OOP? Along with a figure and an example of a CRC card, explain its significance in Object Oriented Design. 8

What is an inline function? Explain its importance with the help of an example program. 7

How do we make use of a Virtual Destructor when we need to make sure that the different destructors in an inheritance chain are called in order? Explain with an example in C++. 7

Create classes called class1 and class2 with each of having one private member. Add member function to set a value (say setvalue) on each class. Add one more function max () that is friendly to both classes. max () function should compare two private member of two classes and show maximum among them. Create one-one object of each class then set a value on them. Display the maximum number among them. 8

Explain how Inheritance supports Reusability? Describe the syntax of multiple and multilevel inheritance? 7

Compare and contrast composition and inheritance. 5

Differentiate between is-a and has-a rule with suitable example. 5

Write a program to enter the information of n students and then display it using the concept of multilevel inheritance. 8

What is the benefit of overloading an operator? Design a Soccer Player class that includes three integer fields: a player's jersey number, number of goals, number of assists and necessary

- constructors to initialize the data members. Overload the `>` operator (greater than). One player is considered greater than another if the sum of goals plus assists is greater than that of the others. Create an array of 11 soccer players, then use the overloaded `>` operator to find the player who has the greatest total of goals plus assists.
- b) How can you achieve run time polymorphism in C++? Discuss with a suitable example. 7
6. a) Define a class called stack and implement generic methods to push and pop the elements from the stack. 8
- b) **Path-follower Robot:**
A Path-follower Robot senses the path it needs to follow thru its sensors. Based on the data received thru its sensors, the Robot makes use of its actuators (Robotic Wheels) to steer itself forward. For the above mentioned system, identify as many components (collaborating objects) as you can, draw CRC card for at least three of them and show the interaction between these components thru an interaction diagram.
7. Write short notes on: (Any two)
 a) Responsibility Driven Design.
 b) Stack versus Heap Based Allocation.
 c) Virtual functions. 2x5

POKHARA UNIVERSITY

Level: Bachelor

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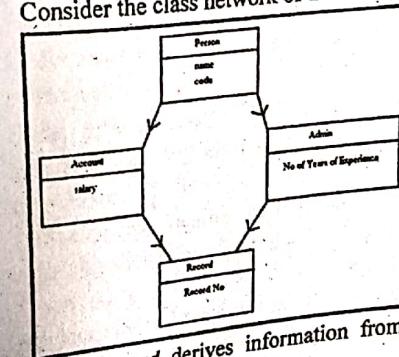
Time : 3 hrs.

Candidates are required to give their answers in their own words as far as practicable.

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Attempt all the questions.

1. a) Describe Object Oriented Programming as a new paradigm in computer programming field. Explain computation as simulation. 7
- b) "Friend function breaches the encapsulation", justify. Also mention the uses of friend function. 8
2. a) What are the common types of functions available in C++? Define the 3 common types of functions in C++ with a program. 8
- b) Can we have more than one destructor in a class? Write a program to add two complex numbers using the concept of constructor 7
3. a) Explain and contrast the following:
 - i. Interface and implementation
 - ii. Programming in small and programming in large
 b) "Ambiguity is essential evil", explain by example how it can effectively solve in complex programming. 7
4. a) Consider the class network of the following figure. 8



The class `Record` derives information from both `Account` and `Admin`

- classes and in turn derive information from the class **Person**. Define all the four classes with at least one parameterized constructor and ‘void display()’ method in each class. In main () function, create the object of the class ‘**Record**’ and initialize all the data members and display them.
- b) Define the role of this pointer and pure abstract class in object oriented programming to create multiple object with suitable program.
5. a) How does a polymorphism play constructive role in application development? Which type of polymorphism is essential for the computation of distance among two cities from the specific location. The unit of measurements are feet and inch. (Also use standard unit if essential).
- b) What do you mean by generic programming? Illustrate it with an example of function template.
6. a) “A constructor is a special member function that automatically initializes the objects of its class”, support this statement with a program of all types of constructors. Also enlist the characters of constructors.
- b) How can you define pure virtual functions in C++? The pure virtual functions do nothing but it is defined in base class, why?
7. Write short notes on: (Any two)
- a) Non-linear behavior of complexity
 - b) Is-a rule and has –a rule
 - c) Memory recovery

POKHARA UNIVERSITY

Level: Bachelor

Programme: BE

Course: Object Oriented Programming in C++

Semester: Fall

Year : 2016

Full Marks: 100

Pass Marks: 45

Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

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Attempt all the questions.

a) Why Object-oriented programming is a superior than Procedural-oriented Programming. Explain. 8

b) Differentiate between structure and class. Why is class preferred over structure? Support your answer with suitable example. 7

a) What is information hiding? What are access modes available in C++ to implement different levels of visibility? Explain with example. 8

b) What do you mean by dynamic constructor? Explain its application by a program to compute the complex numbers. 7

2×5 a) Create classes called class1 and class2 with each having one private member. Add member function to set a value (say setvalue) on each class. Add one more function max () that is friendly to both classes. max() function should compare two private member of two classes and show maximum among them. Create one-one object of each class then set a value on them. Display the maximum number among them. 8

b) Under what condition virtual base class is created? Explain it with suitable examples. 7

a) State principle of substitutability. Explain sub classing for specialization, generalization. List out the disadvantages of Inheritance. 8

b) Define type conversion. Explain with example conversion from one class type to another class type. 7

5. a) When do you use virtual function? How it provides run time polymorphism. Explain it with suitable example. 8

b) What are the advantages of Generic programming ? Write a function template to calculate the average and multiplication of numbers. 7

6. a) What is software component? Explain about implementation and integration of component with real world example.
 b) Do you find any advantages of adopting Responsibility Driven Design? Explain with the help of suitable example. 8
7. Write short notes on: (Any two) 7
 a) The is-a and has-a rule
 b) Operator overloading
 c) CRC card. 2×5

POKHARA UNIVERSITY

Level: Bachelor

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Semester: Spring

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Full Marks: 100

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Time : 3hrs.

Candidates are required to give their answers in their own words as far as practicable.

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Attempt all the questions.

- a) What are different aspects of software components? 7
 b) Explain Message Passing Formalism with syntax in C++. What is stack versus heap memory allocation? 8
- a) Is it mandatory to create constructor in derived class if base class contains constructor? "Constructor is called in derived class but it can't be inherited". Support your answer with suitable example. 7
 b) Create a class called Mountain with data members name, height, location, a constructor that initializes the members to the values passed to it as parameters, a function called CmpHeight() to compare two objects and DisplayInfo() to display the information of Mountain. In main, create two objects of the class mountain and print the information of the mountain which is greatest height. 8
3. a) Differentiate between various access specifiers used in a class. 7
 b) Explain it with reference of an example. 8
4. a) What is inheritance? What are the different forms of inheritance? 8
 b) Describe overriding. How do you differentiate function overloading from method overriding. Explain with suitable example. 7
- b) Differentiate between
 i. Subclass and Subtype
 ii. The is-a rule and has-a rule. 7
5. a) Define operator overloading. Write a simple program to overload unary ++ operator. 8
 b) What are advantages of dynamic memory allocation? Explain with suitable example. 7
6. a) What is exception? Write the syntax for exception handling in C++. 7

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- Write a program that catches multiple exceptions.
- b) What is generic and templates? Create a template to find the sum of two integers and floats. 8
7. Write short notes on: (Any two) 2×5
- a) Virtual Function Vs. Pure Virtual Function
 - b) STL
 - c) RDD

सुनाम स्टेनरी सञ्चारसंग एन्ड फोटोफोटो सर्विस
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NCIT College

*Candidates are required to give their answers in their own words as far as practicable.
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Attempt all the questions.*

1. a) Describe how object oriented programming models the real world problem with reference of agents, method, behavior and responsibilities? 7
- b) What do you mean by static data member of a class? Explain the characteristics of a static data member. 8
2. a) Does a friend function violate the data hiding? Explain briefly. Write a program to swap variables of two classes using friend function. 8
- b) What is constructor? Can constructor be overloaded? If yes, explain how that is possible with reference of an example. 7
3. a) Differentiate methods of arguments passing in constructor and destructor. 7
- b) Inheritance supports the reusability characteristics of OOP. Justify your answer. Explain ambiguity that occurs in multiple inheritances. 8
4. a) Write base class that ask the user to enter Time (hour minute and second) and derived class adds the Time of its own with the base. Finally make third class that is friend of derived and calculate the difference of base class time and its own time. 7
- b) When base class and derived class have same function name what happens when derived class object calls the function? Differentiate overloading with overriding. 8
5. a) What is polymorphism? How operator overloading is used to support polymorphism? Explain it by overloading '+' operator to concatenate two strings. 7
- b) What is the advantage of using template functions? Write a program to illustrate a template function with two arguments. 8

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6. a) Reusability implies non-interference. Explain with example.
- b) Explain in brief about interface and implementation. How different components of Software design can be represented and integrated? Discuss in brief.
7. Write short notes on: (Any two)
 - a) CRC card
 - b) Virtual function
 - c) Features of object-oriented programming

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7

2x5

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Attempt all the questions.

- a) What are shortcomings of procedural oriented programming? Explain the notion of "everything is an object" in object oriented programming.
- b) Differentiate between the concept of computation as simulation and responsibility implies non-interference.
3. a) What is responsibility driven design? Draw a CRC Card of student.
- b) What is encapsulation? How can encapsulation be enforced in C++? Explain with suitable code.
- a) What is constructor? Write an example of copy constructor and explain each line of code.
- b) Create a class time a constructor having hour, minute and second as arguments is used to take two time data from user. The add function that takes two class objects as arguments adds them respectively then display aggregate result? (Apply 60 second=1 minutes and 60 minutes= 1 hour).
4. a) Why is destructor function required in class? Can a destructor accept arguments?
- b) What is inheritance? Explain different forms of inheritance.
5. a) How does visibility mode control the access of members in the derived class? Explain with an example.

7

8

7

8

8

7

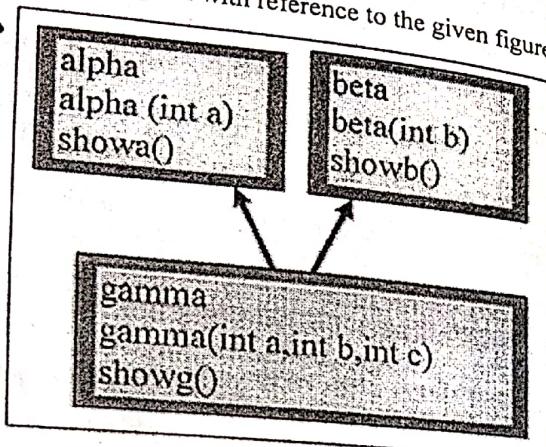
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7

8

7

b) Write a complete program with reference to the given figure.



6. a) What are generic and templates? Create a template to find the sum of two integers and floats.
b) Write a complete program to convert the polar co-ordinates into rectangular coordinates.
(hint: polar co-ordinates (radius, angle) and rectangular co-ordinates (x,y) where $x = r \cdot \cos(\text{angle})$ and $y = r \cdot \sin(\text{angle})$).
7. Write short notes on: (Any two)
a) Friend function
b) Pure polymorphism
c) Expectation mechanism

POKHARA UNIVERSITY

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8

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Attempt all the questions.

- 7
a) With the help of object oriented programming explain how can object oriented programming cope in solving the complex program. Explain computation as simulation.

- 8
b) Private data and function of a class cannot be accessed from outside function. Explain how it is possible to access then with reference of an example.

- 7
a) What is constructor? Can constructor be overloaded? If yes how?

- b) Create a class called Employee with data member Code, Name, Address, Salary. Create a constructor to initialize the member of the class. Also create another constructor so that we can create an object from another object. Define member function display() to display the information of the class.

- 7
a) Explain how does composition provide re-usability? Differentiate between Is-A rule and Has-A rule.

- b) What is a hybrid inheritance? Does ambiguity occur in hybrid inheritance? If Yes? How can you remove this? Explain with example.

- 7
a) What are the advantages and disadvantages of using friend function?

- b) Explain with example program.

- 8
b) What is type casting? Write a program to read a height of a person in Feet and Inches and convert it into Meter using user defined to class type conversion method. 1 meter=3.28084 feet, 1 feet=12 inch.

- 7
a) What is function template? Create a template function to swap two values.

- 8
b) Create a class Person with data members Name, Age and Address. Create another class Teacher with data members Qualification and Department. Also create another class Student with data member Program and Semester. Both class are inherited from the class Person.

1

Every class has at least one constructor which uses base class constructor. Create member function Show Data() in each to display the information of the class member.

6. a) What is compile time and run time polymorphism? How can you achieve runtime polymorphism in C++? Explain deferred method.
b) What are the use of new and delete operator in a program? Explain with an suitable example.
7. Write short notes on: (Any two)
a) Overriding
b) Exception Handling
c) Standard Template Library

POKHARA UNIVERSITY

Level: Bachelor

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Semester: Spring

Year : 2018

Full Marks: 100

Pass Marks: 45

Time : 3 hrs.

7

8

2x5

Candidates are required to give their answers in their own words as far as practicable.

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Attempt all the questions.

- a) Define computation as simulation. Why the behaviour of complexity is regarded as non-linear? 7
- b) What are the advantages of oriented programming over structural programming? Explain with suitable examples. 8
- a) Illustrate the role of friend function in object oriented programming with its pros and cons. Also write a suitable program. 8
- b) Can a class have more than one constructor? If yes, justify your answer with help of a program that reads firstName and secondName then concatenates into Name. (use suitable type of constructor). 7
- a) Can you have more than one constructor in a program? Write a program to find area of a triangle (when its sides are given) using the concept of overloaded constructor. 8
- b) Define Reusability? What are the advantages of software Reusability in OOP design? 8
- a) What are the different types of inheritance? Describe multiple inheritance with an example. 7
- b) The following figure shows minimum information required for each class. Write a program by realize the necessary member functions to read and display information of individual object. Every class should contain at least one constructor and should be inherited to other classes as well. 7

POKHARA UNIVERSITY

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Semester: Fall

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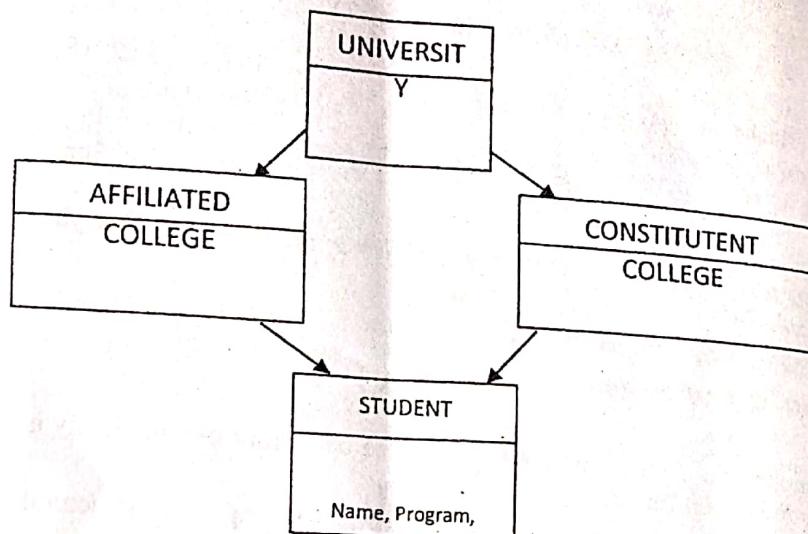
Pass Marks: 45

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Attempt all the questions.



5. a) Why does 'this' pointer is widely used than object pointer? Write a programme to implement pure polymorphism.
b) Write a program showing '+ +' and '- -' operator overloading.
6. a) Differentiate between template function and template class. How can we compute the roots of quadratic equation by using function template? Explain by examples.

OR

What is application of exception handling? Illustrate the process of exception handling with necessary programming modules.

- b) Differentiate between:
 - i. Programming in Large and Programming in Small
 - ii. CRC Card and sequence diagram
7. Write short notes on (Any Two):
 - a) Message passing formalism
 - b) Software Components
 - c) Abstraction mechanism

- 2×5
1. a) What is the use of abstraction mechanism in C++? Explain with example.
b) What are the different types of access specifiers? Using a class write a program that receives inputs principle amount, time and rate. Keeping rate 8% as the default argument, calculate the simple interest for three customers.
 - 7 2. a) What is data hiding? How do you achieve data hiding in C++?
b) Explain with a suitable program.
 - 8 3. a) What are the advantage of inheritance? Explain multi-level inheritance with example.
b) How can you overload constructors? Explain with suitable example.
 - 7 4. a) What is dynamic memory allocation? How do you allocate memory dynamically in C++? Explain with an example.
b) The following figure shows minimum information required for each class. Write a program by realizing the necessary member functions to read and display information of individual object. Every class should contain at least one constructor and should be inherited to other classes as well.

POKHARA UNIVERSITY

Level: Bachelor

Programme: BE

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Semester: Spring

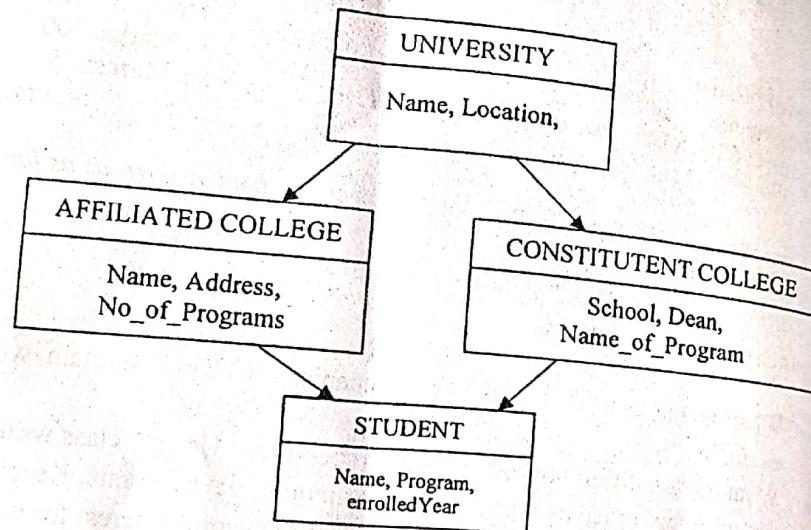
Year : 2019

Full Marks: 100

Pass Marks: 45

Time : 3hrs.

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Attempt all the questions.*



- b) What do you mean by virtual base class? At which condition it has to be implemented? Explain with suitable example.
5. a) What is operator overloading? Write a program to find the sum and difference of any two complex numbers by overloading '+' and '-' operator.
- b) Why is 'this' pointer widely used than object pointer? Write a programme to implement pure polymorphism.
6. a) What is exception? Explain in brief about the exception handling mechanism in C++.
- b) Explain CRC card and sequence diagram with suitable example.
7. Write short notes on: (Any two)
 - a) Software reusability
 - b) Template functions
 - c) Software component

1. a) Software development process is not linear. Justify. Explain abstraction mechanism technique in C++ with examples. 7
- b) Differentiate between structure and class in C++? What are the various access specifiers used in class? 8
2. a) Illustrate the role of friend function in object oriented programming with its pros and cons. Also write a suitable program. 8
- b) What is dynamic memory allocation? How is memory allocated and de-allocated in C++? Explain with examples 7
3. a) Explain subtype, principle of substitutability, object pointer, this pointer, virtual function with examples. 7
- b) Write a program to input two vector coordinates from a base class named "Base". Class "Derived" inherits all the properties of class Base. Class "Derived" must contain a function named add_vector() that add the two vectors input from the base class and finally display the result from a function display() that is friend with the base class. 7
4. a) Create a class called Person with suitable data members to represent their name and age. Use member functions to initialize and display these information. Derive Student and Employee from the Person class with their unique features. Initialize objects of these classes using constructor and display the information. 8
- b) How can you achieve compile time and runtime polymorphism. Explain with examples. 8
5. a) What do you mean by type casting? Write a program to convert an object of Polar class into the object of Rectangle class by using type conversion routine. 8

- b) Write a program to add two complex numbers. Your program should have three objects. Each object contains two attributes (i.e real and imaginary part). Now add each attribute and save them into third object separately. Use the concept of '+' operator overloading.
6. a) Explain the purpose of template programming with examples. Describe the technique of exception handling in C++ with examples.
b) Explain CRC cards and sequence diagram with examples.
7. Write short notes on: (Any two)
a) Message Passing in C++
b) Inline function
c) Abstraction mechanism

POKHARA UNIVERSITY

Level: Bachelor Semester: Fall Year : 2020
Programme: BE Full Marks: 100
Course: Object Oriented Programming in C++ Pass Marks: 45
Time : 3 hrs.

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Attempt all the questions.

1. a) What are the key features of Object Oriented Programming? Explain with example. 7
b) Friend function is not the member function of a class. Justify the statement with suitable program. 8
2. a) Why do you use inline function? Explain with a suitable example. 7
b) What are default and parameterized constructors? Write a program to illustrate parameterized constructor. 8
3. a) What is copy constructor in C++? Is it possible to pass object as argument in copy constructor? Explain with suitable program. 7
b) How inheritance supports reusability? What are the different forms of inheritance? Explain with example. 8
4. a) Why is protected access specifier used in C++? Explain with example
different types of inheritance with examples. 7
b) Write a program to overload multiplication operator (*) showing the multiplication of two objects. 8
5. a) What is virtual function? When do we make a function virtual? Explain with appropriate example. 7
b) Create a template function swap() and use it to swap two integers, two floating point data and two characters. 8
6. a) Differentiate between i) interface and implementation and ii) coupling and cohesion. 7
b) What is CRC card? Why is it necessary in programming? Prepare a CRC card for library management system. 8

7. Write short notes on: (Any two)

- a) Dynamic memory allocation
- b) This pointer
- c) Template class.

POKHARA UNIVERSITY

Semester – Spring

Year: 2020

Full Marks: 70

Pass Marks: 31.5

Time: 2 hrs.

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Attempt all the questions.

Group - A: (5×10=50)

Q. N. 1

In your opinion, how does the Object Oriented thinking solve the software crisis? List the basic characters of object oriented programming and explain any two characteristics that are directly applicable for the software maintenance. 2+5+3

Q. N. 2

When should you prefer the use of inline function over not inline function? Explain friend function and the situation in which you should use this concept? Explain with example program. 3+5+2

OR

Differentiate between static data member with not static data member with example. Explain the types of constructor with example. 4+6

Q. N. 3

“Constructor cannot be inherited through derived class can call the base class constructor.” Justify the above example with example. 10

Q. N. 4

Both child class and its parent class have same function signature. Which version of function will be called by the object pointer of parent class that is pointing to the child class's object? Explain the reason. When do we need to use virtual function? Explain with example program. 10

Q. N. 5

Suppose you are a programmer, you are assigned a task to develop a software with all the requirements but the requirements doesn't include the data types of data structures to be used in classes and functions. As a programmer, you are not sure about the data types, how do you solve this issue and create a generalized classes and functions. Write an example program to support your answer. 10

Group - B: (1×20=20)

Q. N. 6

a) You are given a task to develop a system for a bank that keeps records of customers and its employees.

i. Identify possible components

ii. Draw CRC card for all the components you listed

iii. Draw sequence diagram of process “withdraw money from ATM”

b) “A task that would take one programmer two months to perform could not be completed by two programmers working for one month”. Justify this statement. 5

5x3

POKHARA UNIVERSITY

Level: Bachelor
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Semester: Fall

Year : 2021

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Pass Marks: 45

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Attempt all the questions.

What features of Object Oriented Programming have made it more special than Procedural Oriented Programming? Explain. 7

Explain the advantages of making any argument as default argument in function definition. 8

Does friend function breach encapsulation? Justify with examples. 7

Explain CRC cards and sequence diagram with examples. 8

Can you make same name to define more than one constructors? Explain with example. 8

i) Why do you need a destructor in a program? Can you pass arguments in a destructor? Explain with an example program. 7

ii) How can you solve the ambiguity that arises in multiple inheritance? Explain with program example. 7

iii) List out the types of inheritance that are supported in C++. Explain any three of them with program code. 8

iv) Explain subtype, principle of substitutability, object pointer, this pointer, virtual function with examples. 8

v) How can you achieve compile time and runtime polymorphism? Explain with example. 7

a) Why operators are overloaded? We have a class name Complex which have a data member real and imaginary. Default and parameterized constructor are there to initialize the data member. WAP overloading unary operator ‘++’ where real and imaginary data member will be incremented and ‘+’ operator to add two complex number. 8

b) Explain the purpose of template programming with examples. Describe the technique of exception handling in C++ with examples. 7

7. Write short notes on: (Any two)
- Memory leak
 - Software Components
 - Computation as simulation

2×5

POKHARA UNIVERSITY

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Full Marks: 100

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Candidates are required to give their answers in their own words as far as practicable.

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Attempt all the questions.

- a) How is data abstraction achieved in Object Oriented Programming?
Explain the features of Object Oriented Programming. 8
- b) What do you mean by static data member? Explain with examples. 7
1. a) Create classes called class1 and class2 with each of having one private member. Add member function to set a value (say set_value) on each class. Add one more function max() that is friendly to both classes. The max() function should compare two private member of the two classes and show maximum among them. Create one object for each class then set a value to each object. Display the maximum number among them. 8
- b) What do you understand by memory allocation? Describe memory allocation and deallocation methods in C++. 7
3. a) Explain default and parameterized constructors with examples. 8
- b) How can you solve the problem due to the same function name that occurs in both base and derived classes? Explain with example. 7
4. a) How does inheritance support reusability? List out different forms of inheritance and explain any two of them. 8
- b) What do you mean by virtual base class? In which condition do you implement it? Explain with suitable example. 7
5. a) Explain operator overloading in brief. Write a program to overload unary minus (-) operator. 8
- b) Explain function overriding with a suitable program. 7
6. a) Do you find any advantages of generic programming? Write a function template to find the product of two numbers. 8
- b) What are exceptions? How are they handled in C++? 8

7. Write short notes on: (Any two)

- a) CRC cards
- b) Sequence diagram
- c) Inline function