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COMP 4 – 6 (RC)

S.E. (Comp.) (Semester – IV) (RC) Examination, May/June 2016
OBJECT ORIENTED PROGRAMMING AND DESIGN USING C++

Duration : 3 Hours | Total Marks : 100

Instructions : 1) *Answer* ***any five*** *questions by selecting at least* ***one*** *question from* ***each*** *Module.*
2) ***Assume*** *suitable data* ***if necessary***.

MODULE – 1

1. a) If B is a base class and D is a derived class and if both these classes contain a method display() declared under the visibility mode 'public', then which display() method will be used ? If an object d is created for the derived class and we invoke the display() method, how can we remove ambiguity by explicitly mentioning the class from which display() is to be used. **5**

b) Identify and correct if there are any errors in the following code : **5**

```
#include <iostream>
using namespace std;
class room
 {
float mwidth;
float mlength;
public:room() {}
room(float w,float h):mwidth(w),mlength(h) {}
operator float * ()
 {
   return (float) mwidth*mlength;
}
float getwidth()
{ }
float getlength()
{
```

```
    return mlength;
}
};
int main()
 {
room objroom1(2.5,2.5);
float ftotalarea;
ftotalarea=objroom1;
cout<<ftotalarea;
return 0;
}
```

c) For each of the following write C++ statements that perform the indicated task using console I/O functions. **5**

i) Output the characters 'O' and 'K' in one statement with ostream function 'put'.

ii) Print integer in decimal, octal and hexadecimal separated by tabs using a stream manipulator to change the base.

iii) Print 1.234 in a 9 digit field with preceding zeroes.

iv) Print following using ios member functions -**********1.230000.

v) Identify a statement to get the value of the next character to input into a variable without removing it from the istream.

d) Can we derive a class from a base class even if the base class source code is not available ? Justify your answer with help of an example. **5**

2. a) How is dynamic binding achieved in C++ ? Explain what will be the output of the following code **6**

```
#include<iostream>
using namespace std;
class nonvirtual
{ int x;
public:
void func();
```

```
};
class withvirtual
{
int x;
public:
virtual void func();
};
int main()
{
cout<<"sizeof(nonvirtual)="<<sizeof(nonvirtual)<<endl;
cout<<"sizeof(withvirtual)="<<sizeof(withvirtual)<<endl;
return 0;
}
```

4

b) Trace the output or correct if errors

```
#include<iostream>
#include<iomanip>
using namespace std;
int main()
{
float i;
for(i=0.25;i<=1;i=i+0.25)
{
cout.precision(5);
cout.width(7);
cout<<i;
cout.width(10);
cout<<i*i<<"\n";
}
cout<<setw(10)<<"Total="<<setw(7)<<setprecision(3)
   <<setiosflags(ios::showpoint|ios::fixed)<<1234.57;
    return 0;
}
```

c) What is the basic difference between manipulators and ios member functions in implementation. 4

d) Writ a C++ program to manipulate N student objects. Overload the subscript operator for bounds checking while accessing ith student object. 6

MODULE – 2

3. a) Write a class called directory. It contains Rollo, name, branch and email address of a student.Class should contain functions to accept data from the user and to display them. Make use of file streams.
Write a main program with the following options :

i) Enter data and add it to the random access file.

ii) Display the contents of entire file.

iii) Update the existing details based in the file based on roll no and branch as input.

iv) Search based on roll no and branch. If found then display the details else display appropriate message.

b) Consider the following code : 5

```
template<class X>void sum(X a ,X b)
{
cout<<a+b<<endl;
}
int main()
{
int i1, i2;
double d1,d2;
i1=10;
i2=12;
d1=12340;
d2=499090;
```

```
sum(i1,d2);
return 0;
}
```

In this program sum accepts two parameters with different data types. But at run time two parameters with same data type (int) have been passed. Will there be an error in this code ? Explain.

c) Write a program for the following : 4

i) A function to read two double type numbers from the keyboard.

ii) A function to calculate division of these two numbers.

iii) A try block to throw an exception if the condition divide by zero occurs.

iv) Appropriate catch block to throw the exceptions thrown.

d) Both ios::ate and ios::app place the file pointer at the end of the file (when it is opened) then what is the difference between them ? 3

4. a) Give the pointers associated with the file, write and explain the position of this pointer when the file is opened in 6

i) Read mode

ii) Write mode

iii) Append mode.

b) Explain under what circumstances the following statements would be used : 6

i) throw

ii) void functionx(float y) throw()

iii) catch(..)

c) Write two template functions one to find the smaller of two values and other to add two values. Tell for which type of variables/objects (integer, float, strings) it will work. 4

d) A file contains list of telephone numbers and names. Write an interactive menu driven C++ program that will access the file and determine the telephone number of the specified person. 4

MODULE – 3

5. a) What are pre-processor directives. Write a MACRO for finding the area of different geometric figures with the input from the keyboard. Also make use of symbolic constants. 5

b) What is the difference between C++ strings and C style char* strings ? Which function is used to convert string class objects to C style pointer based strings. Illustrate with example. 6

c) What will be the output of the following code : 4

```
#include<iostream>
#include<string.h>
using namespace std;
int main()
{
    string str1("ABCDEF");
    string str2("123");
    string str3;
    str1.insert(2,str2);
    str1.erase(2,2);
    cout<<str1<<end1;
    cout<<str1.c_ str();
    cout<<end1;
    return 0;
}
```

d) What is string stream processing ? Write a C++ program to illustrate the use of class ostringstream. 5

6. a) Explain the use of #pragma and #error directive with example. 5

b) How are iterators used with the string objects ? Write a C++ program to reverse a string and count the occurrence of one character in a string using iterators. 5

c) Create a student class that includes a student first name and his roll number.Create five objects of this class and store them in a list thus creating a phone list. Write a C++ program using the given container to display the student name if the roll number is given and vice versa. 6

d) Explain with respect to list container. 4

i) Splice ii) Unique.

MODULE – 4

7. a) Explain any three ways of using UML. 6

   b) Draw a use case diagram for an ATM system. 8

   c) List and explain visibility specifiers in class diagrams. 6

8. a) What is a package diagram. Give example. 4

   b) Draw a state diagram for ordering a product online and also the delivery of the product to the customer. 8

   c) Explain the following with reference to class diagram. 8

      i) Specialization

      ii) Generalization

      iii) Multiplicity

      iv) Relationships.