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National Institute of Technology Goa

B.Tech-IV Semester - End Semester Examination

Course Name: Object Oriented Programming

Date: May 17, 2022.

Duration: 3 Hours

Course Code: CS252

Time: 9 30 A M

Max. Marks: 100

Instructions:

1. Write legibly. Unnecessary details attracts penalty.
2. You must complement your explanation with the short fragments of code where appropriate.
3. Your programs should compile on any standard C++/Java compiler and be executed.
4. You should assume that appropriate headers and namespace std are included in each program.

Question 1: You have to provide justification for your answer.

| | |
|--|--|
| <p>A. What is the output of the following program? (3)</p> <pre>#include <iostream> using namespace std; struct a { int count; }; /*the rest of the code is on right side*/ struct b { int* value; };</pre> | <pre>/*Continuation of A. */ struct c : public a, public b { }; int main() { c* p = new c; p->value = 0; cout << "Inherited"; return 0; }</pre> |
| <p>B. What is the output of the program? (3)</p> <pre>void func(int a, double b) { cout << "First func function \n"; } void func (char a, double b) { cout << "Second func function \n"; } /*rest of the code is on right side*/</pre> | <pre>/* Continuation of B.*/ int main() { char X = 'b'; int Y = 6; func(X, Y); return 0; }</pre> |

C. What is the result of compiling and running this program? (3)

```
#include <iostream>
using namespace std;
int A = 10;
float functionB( int A, char B, float C=5 ) {
    return ::A + B + C;
}
int main() {
    int A = 2;
    float X = 11.1;
    cout << functionB( A, X );
    return 0;
}
```

D. Give the output of the following program. (2)

```
class some
{
    public:
    ~some()
    {
        cout<<"some's destructor"<<endl;
    }
};
int main()
{
    some s;
    s.~some();
    return 0;
}
```

E. What is the output of the program? (3)
Note: sizeof(int)=4;

```
class base {
    int arr[10];
};
class b1: public base { };
class b2: public base { };
class derived: public b1, public b2 { };

int main(void)
{
    cout << sizeof(derived);
    return 0;
}
```

F. What is the output of the following program? (2)

```
class base
{
    public :void out() { cout<<"base "; }
};
class deri
{
    public : void out() { cout<<"deri "; }
};
int main() {
    deri dp[3];
    base *bp = (base*)dp;
    for (int i=0; i<5;i++)
        (bp++)->out();
    return 0;
}
```

G. Which of the following declares a pointer to a function g, which takes two ints and returns nothing? (2)

- a) (*g)(int,int);
- b) void (*g)(int,int);
- c) (*g)(int,int) = void;
- d) *(void g(int,int));

H. In C++, which system-provided function is called when no handler is provided to deal with an exception? (1)

- a) terminate()
- b) unexpected()
- c) abort()
- d) kill()

I. What is the output of the program? (4)

```
#include <iostream>
using namespace std;
class Top {
    public:
    Top() { cout << "Start Top\n";}
    ~Top() { cout << "End Top\n";}
};
class Bottom : public Top {
    public:
    Bottom() { cout << "Start Bottom\n";}
    ~Bottom() { cout << "End Bottom\n";}
};
/*rest of the code is at the right hand side*/
```

/*Continuation of I*/

```
class Test {
    public: Bottom deal;
    Test() { cout << "Start Test\n";}
};
int main()
{
    Test me;
    Bottom b;
    return 0;
}
```

4

2.

- a. In C++, list out the impact on public, protected and private data members of the base class, when the base class is derived by public, protected and private access specifiers. You can explain with a simple example program. In particular, explain what is the use of protected access specifier? (5)
- b. How to achieve run-time polymorphism in C++? With an example program explain run-time polymorphism. (5)
- c. What are the advantages of overloading operators through friend functions? Write a program to overload post increment and pre-increment operators. (5)

obj++
++obj
3.

- a. Explain the concept of exception handling supported by C++ with the help of a program. Under which circumstances the terminate () and unexpected () functions will be invoked and what are their default actions? How to setup different handlers for these functions? (8)
- b. With an example program, explain how derived class exceptions are handled in C++? (4)
- c. How to catch all exceptions in C++? How to check whether an exception thrown is caught or uncaught? (2)
- d. How to prevent a function from throwing few types of exceptions? Explain with an example program. How to prevent a function from throwing any exceptions? (5)

4.

- a. How Java achieves platform-neutrality? Explain the process of creating and executing a "Hello World" Java Program. (5)
- b. Discuss the visibility of a member of a class to other classes with respect to different access modifiers such as public protected, friendly (default), private, private protected. Also consider the classes and subclasses within the same package and also the classes and subclasses in the other packages. You can use the table. (8)
- c. What are the uses of Vector? What are its advantages over arrays? Why wrapper classes are required? (5)

5.

- a. In how many ways you can create threads in Java? Explain with an example program. (5)
- b. Explain in detail the life cycle of a thread. Explain in detail each state. (10)
- c. How multiple inheritance is supported in Java? How to pass arguments to the base class constructor from derived class? (5)
- d. How to create a package in Java? Explain the process with an example. Also explain how to add a class to an existing package? (5)

*****All the Best*****