

## W3101 Programming Languages – C++ Midterm Feb 13, 2008

Name:

Student Id:

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1. Consider two classes, employee and executive such that executive class is derived from employee class,

```
class employee
{
    private:
        int salary;
    public:
        employee(int x) : salary(x)
        {
            cout << ``In employee constructor`` << endl;
        }
        ~employee()
        {
            cout << ``In employee destructor`` << endl;
        }
};

class executive : public employee
{
    // Write the constructor code here

    {

        cout << ``In executive constructor`` << endl;
    }

    ~employee()
    {
        cout << ``In executive destructor`` << endl;
    }
}
```

- (a) Write the constructor code for the executive class. It should take an integer value called “amount” as input and set it as the executive’s salary. ... (1 mark)

(b) What does the following code segment output? ... (3 marks)

```
... // all the include files, etc.
void main()
{
    executive x(1);
    executive *y = new executive(2);
}
```

(c) Define a function called “setSalary” that returns “void” (nothing) and takes an “int” as argument. Make it a friend function in the class employee. Write the body of the function, such that it sets the input parameter as the salary. ... (2 marks)

2. Consider the following code segment:

```
class baseClass
{
public:
    baseClass() { };
    virtual void f1()
        { cout << ``In base class f1`` << endl; }
    void f2() { cout << ``In base class f2`` << endl; }
};

class derivedClass
{
public:
```

```

        derivedClass(){ }
        void f1() { cout << ``In derived class f1`` << endl; }
        void f2() { cout << ``In derived class f2`` << endl; }
};

```

What is the output of the following program segment? Please write your answers next (or below) to the functions called in main. ... (4 marks).

```

main( )
{
    baseClass x;
    derivedClass y;
    baseClass *z = new derivedClass;

    x.f1();

    x.f2();

    y.f1();

    y.f2();

    z->f1();

    z->f2();

}

```

3.     class employee  
        {  
            private:  
                int salary;  
            public:  
                employee(..) { /\* code \*/ }  
        }

What are the different ways in which any external (not a member of this class) function or class access the private member of the class employee shown above? You are free to add member functions to the class, if you wish. Write one line code (to show

how it is done) for each way you list in your answer. ... (3 marks).

4. What is polymorphism? Is it really needed and if so, why? What are its advantages? How is it implemented in C++? If it makes your explanation easier, you can use an example. Be precise and brief, in your answers. ... (2 marks).