NAME: _____

CS232 Lab7
sp2015
streller

PROBLEM STATEMENT:

The three types of class derivation/inheritance are: private, protected, and public. These three terms are also the names of the three different types of class member access. The attached page provides a table summarizing the three different types of class derivation/inheritance and how the three member access types are inherited via each of the three derivation types. Since public derivation/inheritance is the predominant type of derivation, this lab exercise focuses on this type of derivation.

CODE:

enter the following small program:

```
class A
{           private:
            int  number;
};

            class B : public A
{           public:
            void f()
            {    cout << "From derived class, number is: " << number << endl; }
};


int  main()
{           B x;       // variable x is declared to be an instance of class A.
            int k;
            k = x.number;     // try to access the data member of object x.
            cout << endl  << endl  <<  "Lab Demo Program" << endl;
            cout <<   "The number is: "  <<  k << endl;
            x.f();      //  call public function f
            return;0;
}
```

Can you successfully compile the program? _____

What message(s) do you get, if any?
_____

Print out your program to be turned in with this assignment.

Private data members of a class can only be accessed by certain member functions of the same class.

This program should demonstrate that a private data member is not accessible to the member functions of a publicly derived class. Does it? _____

Which statement violates this rule? _____

The private data members of a class are not accessible to functions outside of derived classes either. Which statement violates this rule? _____

According to the table on the attached page, are private data members of a base class accessible to member functions of the derived class when the derivation type is private? _____ When it is protected? _____

Change the access specification on the data member 'number' to 'protected' in class A.

Compile the program. Do any statements now cause error messages? _____

If so, which one(s)? _____

According to the table on the attached page, are protected data members of a base class accessible to the member functions of a publicly derived class? _____

What statement in the program demonstrates this? _____

Are protected data members accessible to functions that are not members of the same class or a class derived via public or protected inheritance? _____

Which statement violates this latter rule? _____

Get a printout of the new version of the program to be turned in

After we changed the access category of member 'number' to protected in class A, what is the access category of 'number' when it is inherited by class B? _____

If we modified the program to add a third class C that is publicly derived from class B, would the data member 'number' of class A be inherited by class C? _____

If so, what would be the access category of 'number' in class C? _____

In general, should the data members of a class be specified as private, protected, or public access? _____

In general, when data members are specified as private or protected, this is called:
_____

Fix the program so that it runs correctly. Make a printout of the program and the output

Rewrite class A so that it will handle int, long, float or double information.
The type of information will be determined when an object of the class or derived class is declared. Make a printout of the program and the output.

Turn in this completed lab exercise sheet (with your answers filled in) along with the printouts that you made of the different versions of the program. Label each version of the program for ease of identification.

DELIVERABLES:

hard :

this lab with requested printouts stapled

Due Date : 8:00am Tuesday 17 March 2015

| | PUBLIC INHERITANCE | PROTECTED INHERITANCE | PRIVATE INHERITANCE |
|---|---|---|---|
| PUBLIC BASE CLASS MEMBERSPECIFIER | Public in derived class. Can be accessed directly by any non-static member functions, friend functions and non-member functions. | Protected in derived class. Can be accessed directly by all non-static member functions and friend functions. | Private in derived class. Can be accessed directly by all non-static member functions and friend functions. |
| PROTECTED BASE CLASS MEMBERSPECIFIER | Protected in derived class. Can be accessed directly by all non-static member functions and friend functions. | Protected in derived class. Can be accessed directly by all non-static member functions and friend functions. | Private in derived class. Can be accessed directly by all non-static member functions and friend functions. |
| PRIVATE BASE CLASS MEMBERSPECIFIER | Hidden in derived class. Can be accessed by non-static member functions and friend functions through public or protected member functions of the base class. | Hidden in derived class. Can be accessed by non-static member functions and friend functions through public or protected member functions of the base class. | Hidden in derived class. Can be accessed by non-static member functions and friend functions through public or protected member functions of the base class. |