University of Dhaka
Dept. of Computer Science and Engineering

CSE-2112: Object Oriented Programming Lab (Spring, 2022)
Lab Teachers: Dr. Muhammad Ibrahim and Mr. Md. Ashraful Islam

Lab 4: Inheritance, access control with inheritance, method overloading and overriding with inheritance, using keyword "super", order of execution of constructors of superclass and subclass.
Date : February 10, 2022
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Solve all of the following three problems and submit the (1) source files **in a zipped folder** and (2) screenshots of outputs of each program.
Submission time ends at 4.15 PM. Late submissions will be accepted up to 5.00 PM but with a gradual penalty.

A. Create two packages named P1 and P2.

   In the P1 package, create three classes: A, B and D where B extends A.

   Create four integers in A as follows: `int d_a`, `private int prv_a`, `protected int prt_a`, and `public int pbl_a`; Initialize all of them with arbitrary values.

   In the P2 package, create two classes: P2A and P2B where P2B extends A.

   Now using `System.out.println()` method, fill up the following table.

	Subclass in package		Non-subclass in package		Subclass in non-package		Non-subclass in non-package	
	Without Object	With Object	Without Object	With Object	Without Object	With Object	Without Object	With Object
Private								
Default								
Protected								
Public								

   See the sample code below that will be part of each of the classes B, D, P2A and P2B:

```
    void access_mode(){
            A ob = new A();
            //System.out.println(prv_a); NOT possible
            //System.out.println(ob.prv_a); NOT possible

            System.out.println(prt_a);
            System.out.println(ob.prt_a);

            System.out.println(d_a);
            System.out.println(ob.d_a);

            System.out.println(pbl_a);
            System.out.println(ob.pbl_a);
        }
```

Note: In the P2 package, to create objects of type A, you need to include the following statement above the class:

```
import <package-name>.*;
```

B. Anything wrong with the following program? If yes, mention which class(es) have the problem and why. Also, without touching Demo class, solve the problem by writing appropriate code. You must show at least two ways of coding to solve the problem(s).

If you think there is no problem at all in the first place, mention that and show us the output.

```
public class A {
    int A1 = 100;
    String Astr = "String of A";
    A(int a, String str){
        A1 = a;
        Astr = str;
        System.out.println("Inside A(int, String) constructor.");
    }
}
public class B extends A{


}
public class C extends A{


}
public class E extends C {
```

```
}
public class Demo {
    public static void main(String args[]){
        A aob = new A(4, "something");
    }
}
```

C. Use the class hierarchy mentioned in the previous problem.

Create methods named `m_A()`, `m_B()`, `m_C()`, `m_E()` in A, B, C and E respectively. Put a console output in each of these methods for debugging purpose indicating which class this method belongs to.

Execute all the available methods inside the main method of Demo class using an object of type E. If any of these four methods do(es) not execute, write that too in a comment.

Overload `m_C()` method inside E class and execute both overloaded methods.

Override method `m_A()` in C class and execute it in E class. Which version of `m_A()` is invoked inside E?