 

# CS302 Inheritance

*The goal of this exercise is to practice tracing code that uses inheritance.*

```
class ClassA {
    public static final int A1 = 111;
    protected           int A2;
    private             int A3;
    public    ClassA  () { A2 = 122; A3 = 133; }
    public    void method1 () { /*...*/ }
    protected void method2 () { /*...*/ }
    private   void method3 () { /*...*/ }
}

class ClassB extends ClassA {
    protected           int B1;
    private             int B2;
    public    ClassB  () { super(); B1 = 211; B2 = 222; }
    public    void method1 (int x) { /*...*/ }
    protected void method4 () { /*...*/ }
    private   void method5 () { /*...*/ }
}

class ClassC extends ClassA {
    public static final int C1 = 111;
    protected           int C2;
    private             int C3;
    public    ClassC  () { super(); C2 = 322; C3 = 333; }
    public    void method1 () { /*...*/ }
    public    void method4 () { /*...*/ }
    protected void method5 () { /*...*/ }
    private   void method6 () { /*...*/ }
}

class ClassD extends ClassC {
    protected           int A2;
    protected           int C2;
    public              int D1;
    public    ClassD  () { super(); D1 = 411; }
    public    void method1 () { /*...*/ }
    protected void method5 () { /*...*/ }
    private   void method6 () { /*...*/ }
}
```

**1.)** For each class above, name all the data members that are visible internally (i.e. to methods in that class) without using the super reference.

ClassA from ClassA: A1 A2 A3
ClassB from ClassB: B1 B2
inherited from ClassA: A1 A2
ClassC from ClassC: C1 C2 C3
inherited from ClassA: A1 A2
ClassD from ClassD: D1
inherited from ClassC: C1 C2
inherited from ClassA: A1 A2

**2.)** Which of these data members are NOT visible externally (i.e.to methods in another class)?

ClassA A2 A3
ClassB B1 B2 A2
ClassC C2 C3 A2
ClassD C2 A2

 

**3.)** For each class above, name all the methods that are visible internally (i.e. to methods in that class) without using the super reference and not including the Object class.

ClassA from ClassA: ClassA() method1() method2() method3()
ClassB from ClassB: ClassB() method1(int) method4() method5()
inherited from ClassA: method1() method2()
ClassC from ClassC: ClassC() method1() method4() method5() method6()
inherited from ClassA: method2()
ClassD from ClassD: ClassD() method1() method5() method6()
inherited from ClassC: method4()
inherited from ClassA: method2()

**4.)** Which of these methods are NOT visible externally (i.e. to methods in another class)?

ClassA method2() method3()
ClassB method4() method5() method2()
ClassC method5() method6() method2()
ClassD method5() method6() method2()

**5.)** For each class above, name all the data members that are ONLY visible internally (i.e. to methods in that class) using super.

ClassA none since root class (ignoring Object)
ClassB none no re-declarations
ClassC none no re-declarations
ClassD super.C2 super.A2

**6.)** For each class above, name all the methods that are ONLY visible internally (i.e. to methods in that class) using super.

ClassA none since root class (ignoring Object)
ClassB super()
ClassC super() super.method1()
ClassD uper() super.method1() super.method5()

**7.)** For each class above, which methods are considered overridden methods?

ClassA none
ClassB none
ClassC super.method1()
ClassD super.method1() super.method5()