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: super() 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()