

Homework 4

1. Create a class called **Root** that contains an instance of each of the classes (that you also create) named **Component1**, **Component2**, and **Component3**. Derive a class **Stem** from **Root**. All classes just have no-arg constructors that print a message about that class. (1 point)
2. Create a **Cycle** class, with subclasses **Unicycle**, **Bicycle**, and **Tricycle**. There is a **wheels()** method in **Cycle**, which returns the number of wheels. Override the **wheels()** method in each subclass. Write a **ride()** method in the **Cycle** class, which takes a **Cycle** and calls **wheels()**. In the **main()** method, create instances of each type and try **ride()** method. (1 point)
3. Create an inheritance hierarchy of **Rodent**: **Mouse**, **Gerbil**, **Hamster**. In the base class, provide an abstract method named **eat()**. Create an array of **Rodent**, fill it with different specific types of **Rodents**, and call your base class **eat()** method. (1 point)
4. Create a base class **Base** with an abstract **print()** method that is overridden in a derived class **Derived**. The overridden version of the method prints the value of an **int** variable defined in the derived class. At the point of definition of this variable, give it a nonzero value, say, 11. In the base class constructor, call this method. In **main()**, create an object of the derived type, and then call its **print()** method. Explain the results. (1 point)
5. Create three interfaces (you choose their names), each with two methods (you choose their return types and signatures). Inherit a new interface that combines the three, adding a new method. Create a class by implementing the new interface and also inheriting from a concrete class. Now write four methods, each of which takes one of the four interfaces as an argument. In **main()**, create an object of your class and pass it to each of the methods. (1 point)