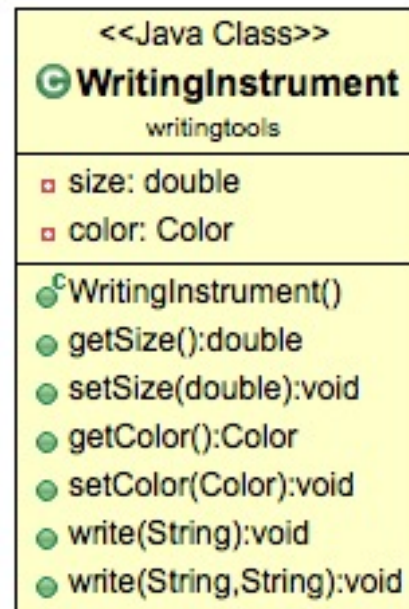
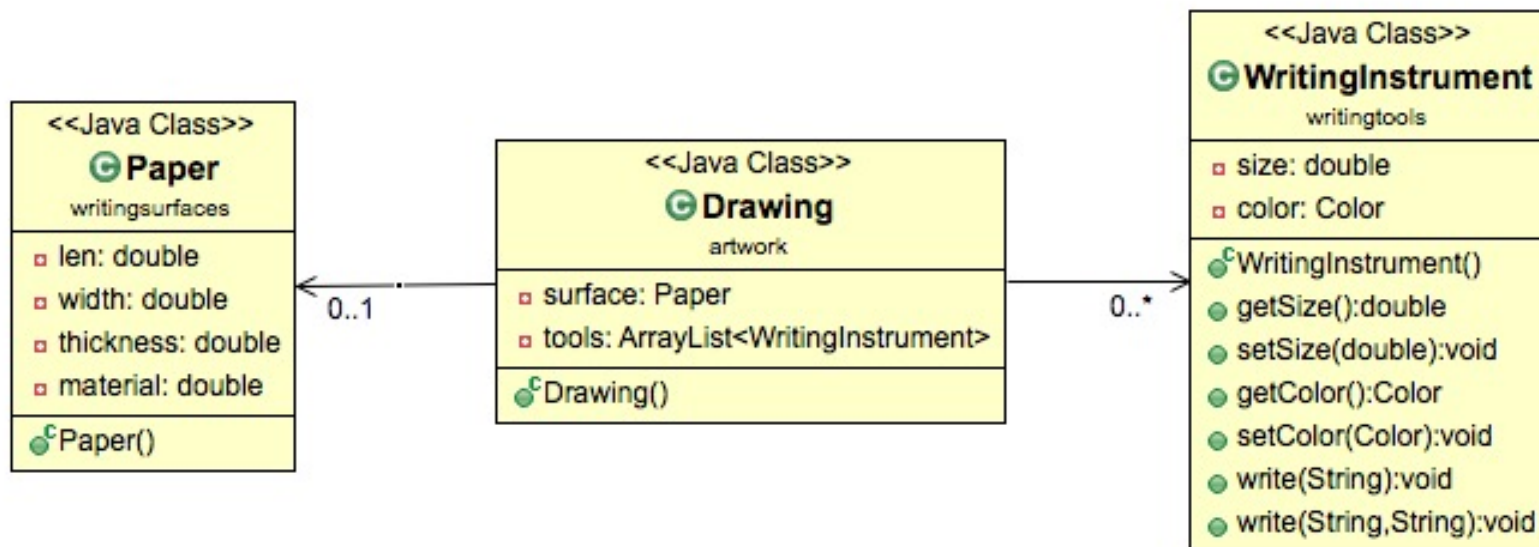


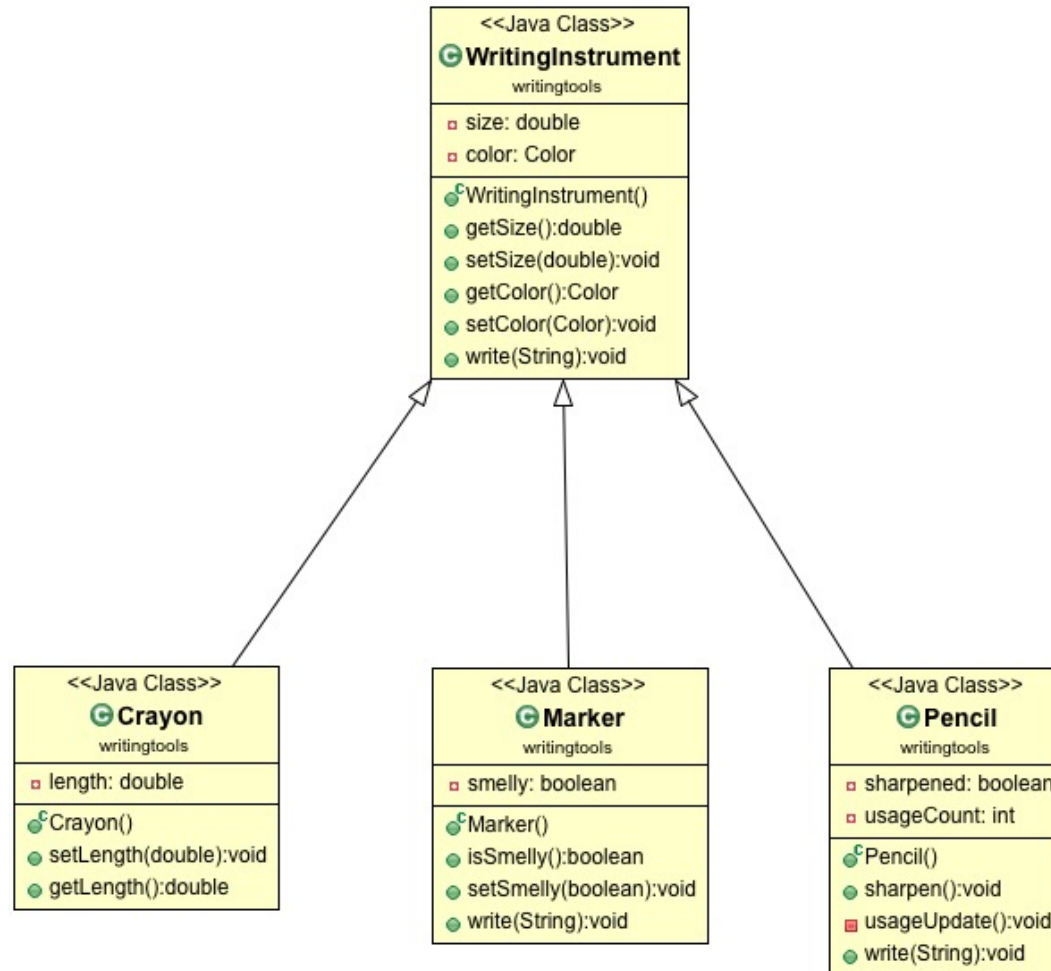
UML Class Diagrams (Unified Modeling Language)



Composition (has-a)



Inheritance (is-a)



UML Diagrams

- Refer to Course Resource Page
- Expected to read UML Diagrams
- Expected to create UML Diagrams, options for tools
 - LucidChart (lucidchart.com)
 - UMLet (<http://www.umlet.com>)
 - Gliffy (last semester free trial ran out on people)
 - Visio (possibly via CoE, may have discontinued)

Is-a versus Has-a Relationships

- In an **is-a** or inheritance relationship, one class is a subclass of the other class (or implements an interface)
Car is a Vehicle
- In a **has-a** or aggregation relationship, one class has the other class as an attribute
Often denotes parts, a car has tires
- Most of the time the difference between the two is obvious, other times it is harder to tell apart
Car is-a Vehicle
Car has tires, doors, engines, etc.