

OOPs Again

1. Reading

- a. Plan on having read chapters 1-3 by Monday
- b. (They go with the lab)

2. Previously on CS136...

- a. Abstract interface
- b. Concrete implementation
- c. A child (subclass) **inherits** or **extends** a parent (base/superclass), e.g.,

```
java.lang.Object
  java.awt.Component
    java.awt.Container
      javax.swing.JComponent
        javax.swing.AbstractButton
          javax.swing.JButton
```

3. Designing a class and hierarchy, e.g.,

```
Vehicle
  XJ220
  HondaCivic
    OldHondaCivic
```

- 4. **super** lets you call methods on your super class, e.g., `super.getDriver()`
- 5. Everything extends class `java.lang.Object`, which has special methods, including
 - a. `toString`
 - b. `equals`
- 6. **Casts** move between base and super classes, e.g., `String s = (Object)x;`
- 7. A design revisited... the abstract base class `Car`
 - a. (hey, check out the switch statement!)

8. Factory methods

- a. `public static Vehicle createRandomCar ()`
- b. Using `java.util.Random`

Bonus Material (not discussed in class):

9. More detail on structure5 assertions

- a. Assert.pre – use at the start of a method
- b. Assert.post – use at the end of a method
- c. Assert.invariant – detect internal state inconsistency
- d. Assert.fail – when you shouldn't have gotten to this line of code
- e. Assert.condition – any other kind of test

10. ...or, you can use Java's built-in assert:

- a. Use in your code:
 - i. `assert expression ;`
 - ii. `assert expression : message ;`
- b. and run your program with “`java -ea classname`”

A Word from our Sponsor (Williams College)

“Focus the Nation” is an event held tomorrow at Paresky, around campus, and on campuses throughout the country to discuss issues of sustainability and global warming. Here are two metaphors as arguments of why you should care about these issues.

1) “Let’s sell all of our office equipment to make money,” is not a sustainable business plan, since we’d just be eating up our capital for a short-term gain, with no plan for how to run things in the future. That’s the problem with non-sustainable resources like oil, coal, and corn ethanol, and with over-consumption of potentially renewable resources. After 100 more years of today’s practices there will likely be no usable oil or gas, no fish in the ocean, and no arable land in the Midwest.

2) Your entire family, and the only other members rest of humanity, are trapped on a space ship with no place to get off and a failing life support system. That ship is called “Earth.” Many cities already have toxic air several days a year, much of the “fresh” water is not safe to drink, and many of our food sources are fragile and disease-prone due to monoculture.