1 Administrivia

- Pset 2 Code Review until Wednesday noon
- Pset 2 Final due on Sunday at 11:59 PM

2 Purpose of Visitor Pattern

It’s important to know exactly what problem the visitor pattern allows us to solve: *Visitor lets you define a new operation without changing the classes of the elements on which it operates.* Also, other languages have features like first-class functions (lambdas) and function objects; we can approximate these with visitors. Finally, the visitor pattern allows us to implement double-dispatch in languages (like Java) that don’t have it natively: more on that later, if we have time.

3 Example

- Look at the Car example, located in the recitation code in the examples.car package.
- Our data type is the Car, specified by interface CarElement. The specific elements are Wheel, Engine, Body, and Car.
- We have an interface CarElementVisitor that defines a visitor.
- We also have two visitors, CarElementPrintVisitor and CarElementDoVisitor.
- Point out the details of this code, and then walk through one of the operations in the debugger.
- Note: this code is taken from an example on Wikipedia, but I’ve tweaked it so that the Visitor is responsible for iterating over any subelements of an element (e.g., Car has a list of elements inside of it). The code originally had the CarElement object responsible for iterating over sub-elements (see the code on Wikipedia). It’s probably a good idea to go over both ways of doing it.

4 Double Dispatch (cover if time)

Question: Why can’t we just do something like

```java
CarElementPrintVisitor v = new CarElementPrintVisitor();
v.visit(car);
```

The problem is that which function in the visitor to invoke is chosen at compile time. Java doesn’t have double dispatch built in, so we get it by using the visitor pattern. Furthermore, we might only have a variable of type CarElement with a reference to some part of the car, and the visitor doesn’t have a visit(CarElement) method.

At this point, demonstrate the problem using the Spaceship code (taken from the Wikipedia article on double dispatch), located in examples.spaceships.