Announcements

- JavaBats March 23rd by 11:59pm
- Prog #6 due next Tuesday by 9:00pm
- Prog #7 due Tues. after spring break (but start early!)
Recap:

Composition ("has a")

Definition
An object whose state includes other objects exhibits composition.

Car

\[\text{Car has an engine.}
\]
\[\text{Car has tires.}\]
Inheritance ("is a")

Definition

Inheritance permits the creation of a new class that is given fields and some/all methods of an existing class.
```java
public class Engine {
    public class DieselEngine extends Engine {
        public class RotaryEngine extends Engine {
            public class InlineEngine {

                Engine d = new DieselEngine();
                Engine r = new RotaryEngine();
                Engine i = new InlineEngine();

                Engine[] engines = {d, r, i};

                Object a = new DieselEngine();
            }
        }
    }
}
```
More about inheritance in Java

"extends" means "inherits from"

Subclass constructor need not explicitly invoke superclass constructors, but often do. If they do, they must be the 1st statement of the subclass's constructor.

```java
public class Engine
{
    private int numberOfCylinders;
    public Engine(int cylinders)
    {
        numberOfCylinders = cylinders;
    }
}
```

```java
public class DieselEngine extends Engine
{
    public DieselEngine(int cyl)
    {
        super(cyl);
    }
}
```
Overriding

Occurs when the methods have the same name, return type, quantity, types and order of formal parameters.

In other words, Overridding occurs when the method signatures match.

The superclass method is hidden by the subclass method.

Overloading

Occurs when the method names and return types match, but the formal parameter lists differ.

public CalendarDate (int year, int month, int day)

public CalendarDate ()
Can't do "super. super" in Java

That is, you can "override an override"
but not "override an override an override"

Ex: TØ4nØ3.java
    //Demonstrates Objects
    //toString method()

TØ4nØ2 → Inheritance
TØ4,Ø1 → Composition