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ROBOT OOP

Learning the basics of
Object Oriented Programming
using robots from popular culture

GOOD SOFTWARE

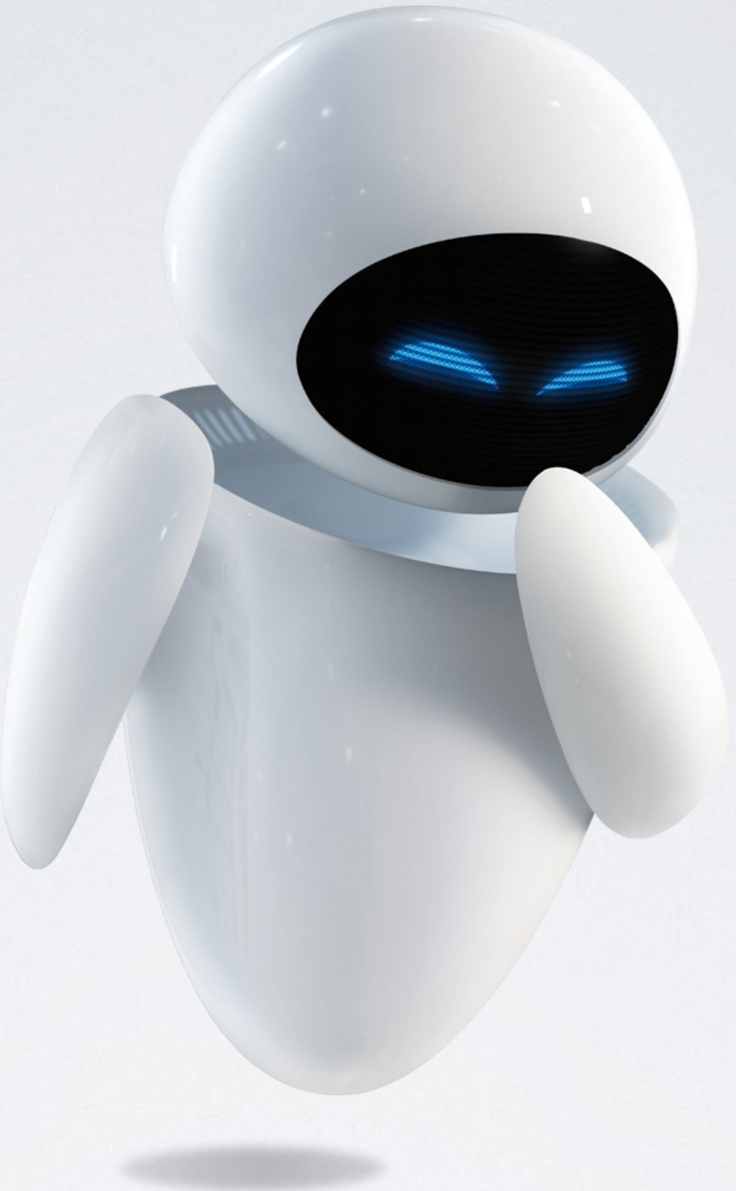
- Highly cohesive
- Loosely coupled

IN THE BEGINNING

- Before OOP there was Procedural
- A procedure is series of steps - like a recipe
- We use functions to organize our code
- functions are used by many languages

WHY OOP

- It’s a major part of modern programming
- Not knowing it will hurt your career
- Every CMS And Framework uses it
- It enables you to write better code



OVERVIEW

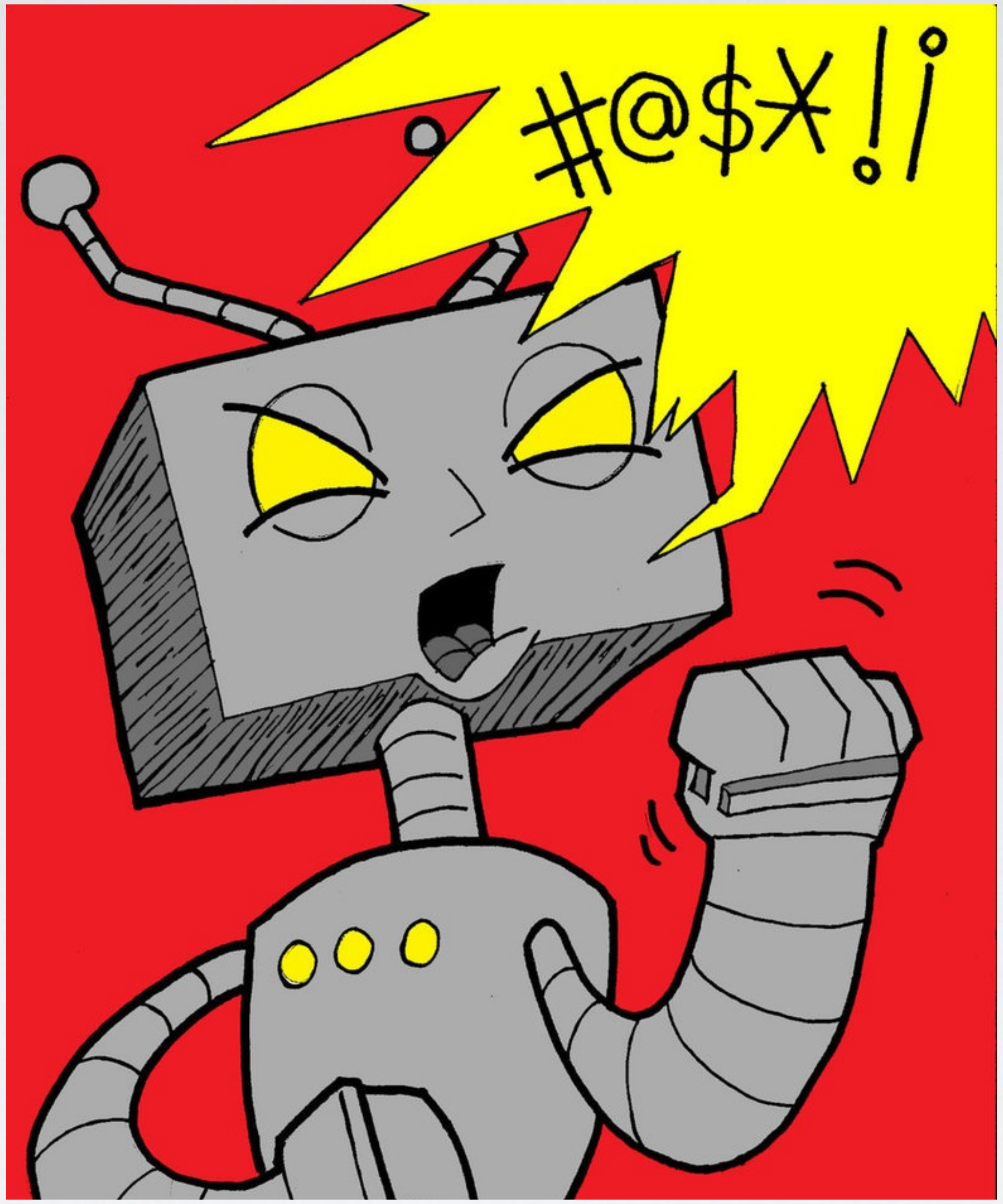
The Basics of Objects

WHAT IS AN OBJECT

- an **object** is an instance of a class
- an **instance** is a single occurrence of something

WHAT IS A CLASS

- A **class** specifies the object’s internal data and representation and defines the operations the object can perform

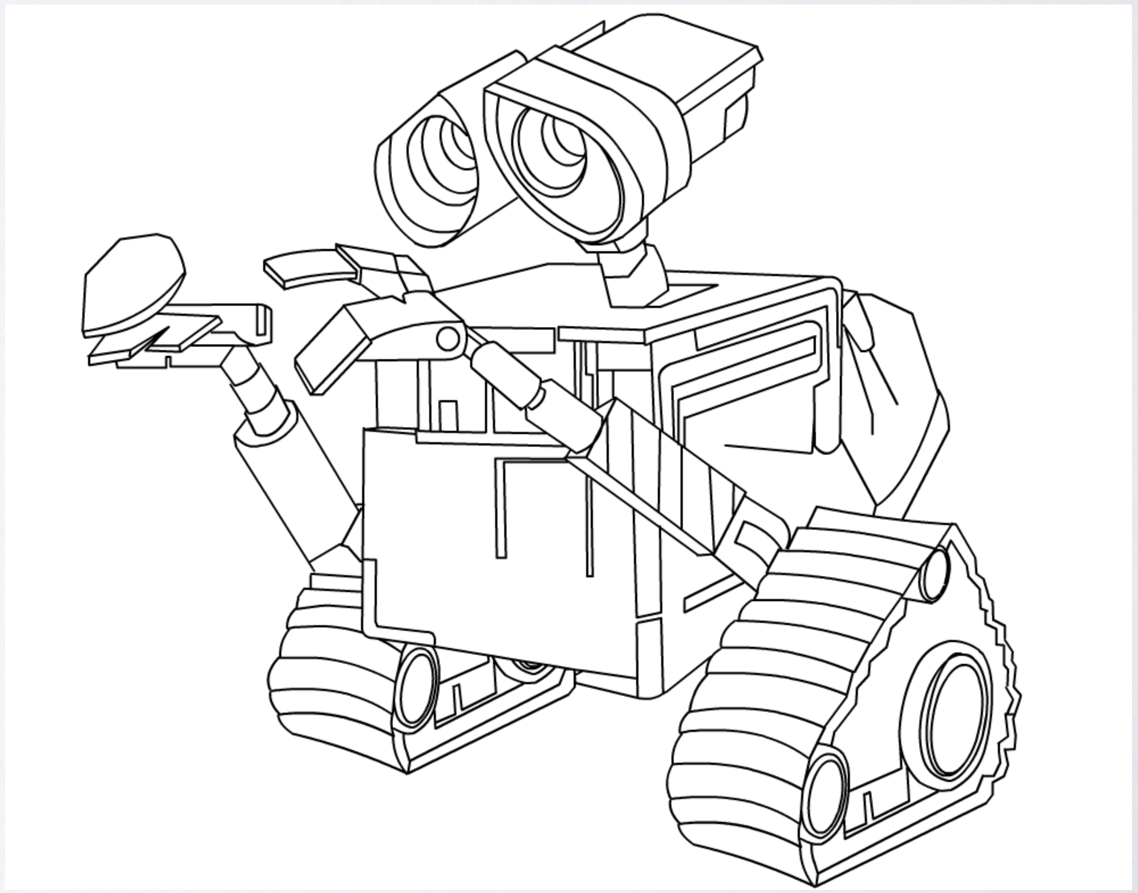


WTF

While those definitions are technically correct, they're not very helpful

An Object is a class made real.
It’s a bundle data and behavior

A Class is a blueprint.
It defines what the
object is and what it can do



INSTANTIATION

- The act of creating an instance of an class

```
<?php

include “class.robot.php”;

$first = new Robot();
$second = new Robot();
```

POPULAR WORDPRESS CLASSES

- WP_Query
- WP_Rewrite
- WP_Error
- WP_Widget

4 PRINCIPLES OF OOP

- Abstraction
- Encapsulation
- Inheritance
- Polymorphism

ABSTRACTION

separation from details

INTERFACES

- Details aren’t important to the User
- Desktop is an interface
- USB is an interface

FUNCTIONS

- name
- parameters
- return values
- provide scope for variables

CLASS

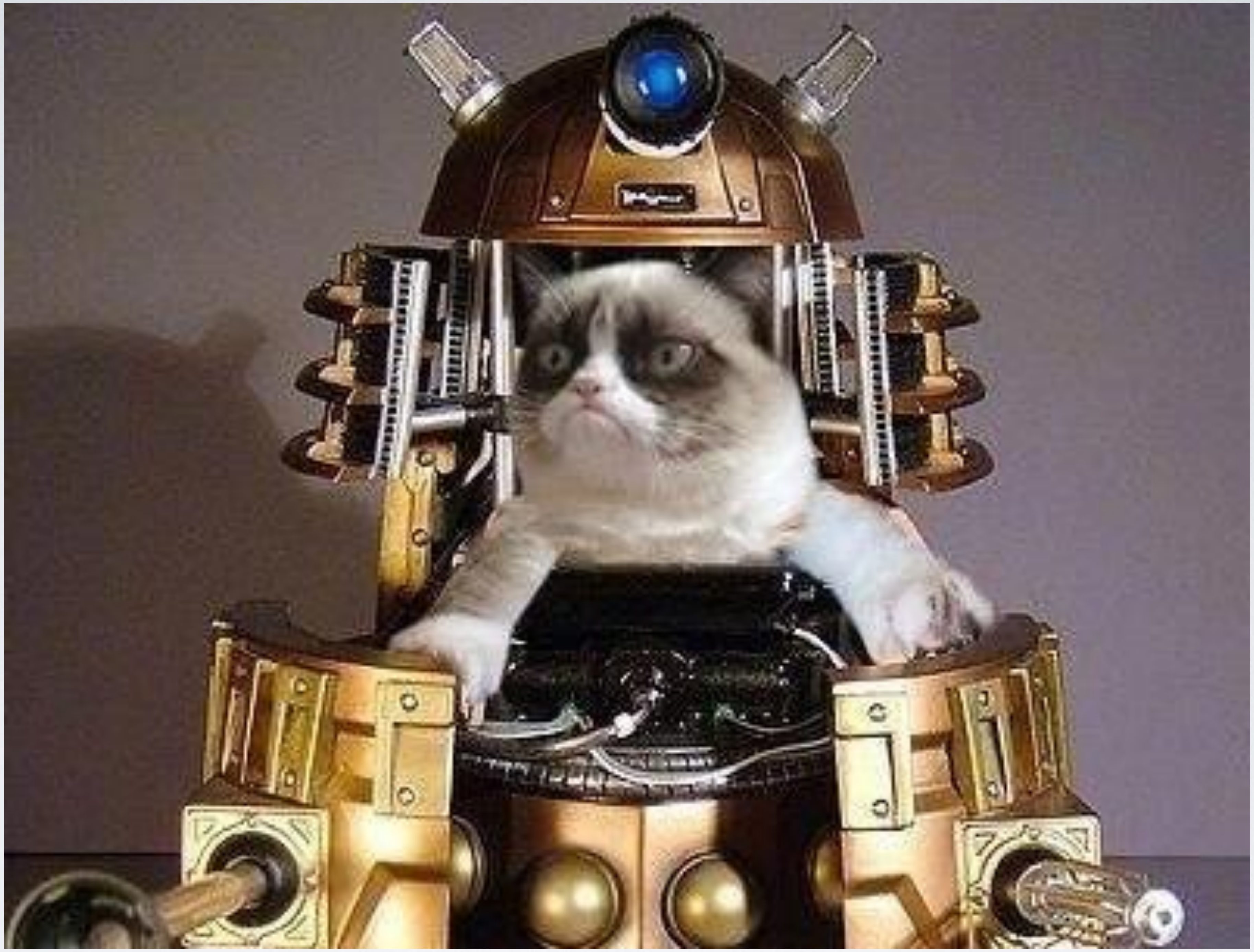
- It’s the basis for OOP in PHP
- Scope for data members and methods
- Abstraction from main program
- Can be used between programs and projects

INSIDE THE CLASS

- member variables (data members)
    - instance variables
    - class (static) variables
- methods
    - instance methods
    - static methods

SNEAK PREVIEW

- Encapsulation
- Inheritance
- Polymorphism
- Composition
- Type Hinting
- Interfaces



ENCAPSULATION

Hiding the details

BASICS

- Sometimes called **Information Hiding**
- Scope
- Visibility in classes

METHODS

- They’re just functions
- clear names
- function scope provides protection
- limited activity

VISIBILITY

- You set visibility to prevent *unauthorized* changes
  - **Public** - everyone can access
  - **Protected** - you and your relatives
  - **Private** - Just for you

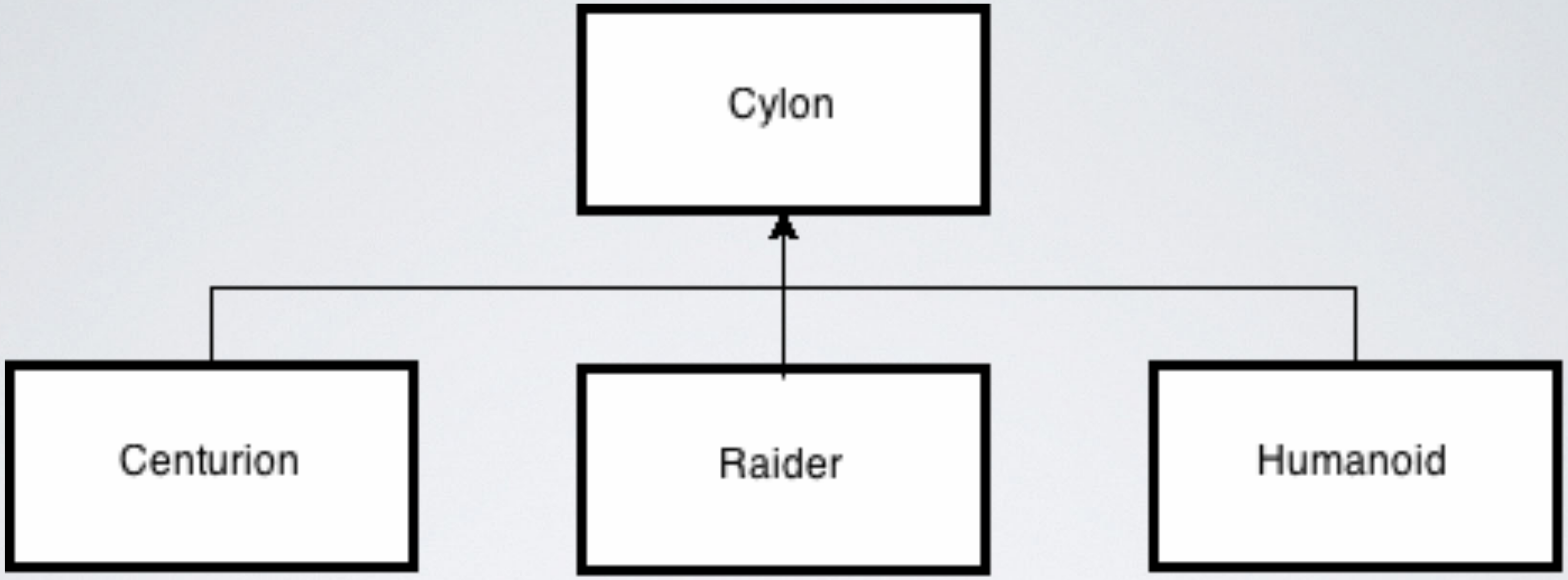
SHOW US THE CODE

```
class Person {
    private $firstname = null;

    public function get_name(){
        return $this->firstname;
    }

    // ... Lots of other stuff would go here

}
```



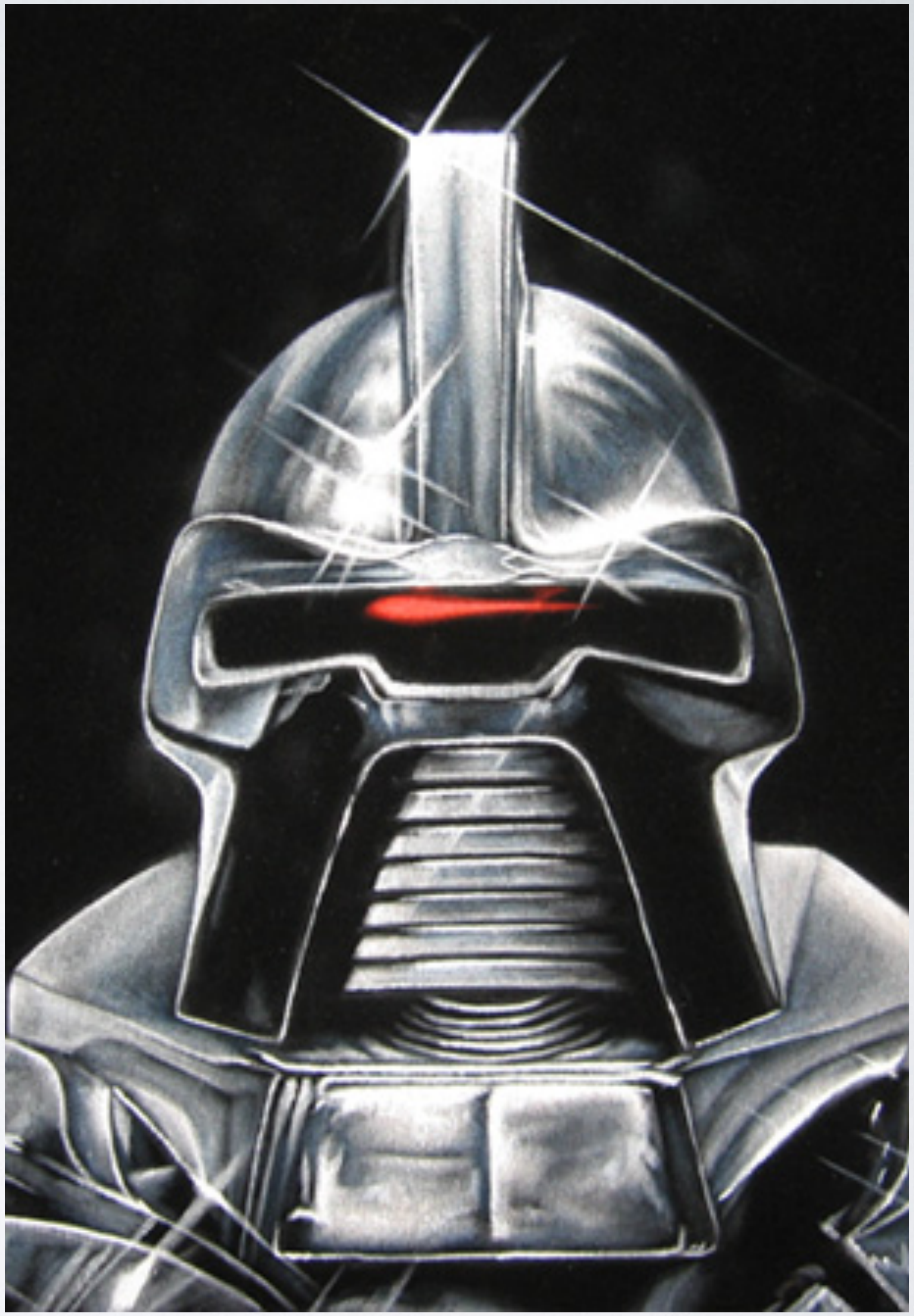
INHERITANCE

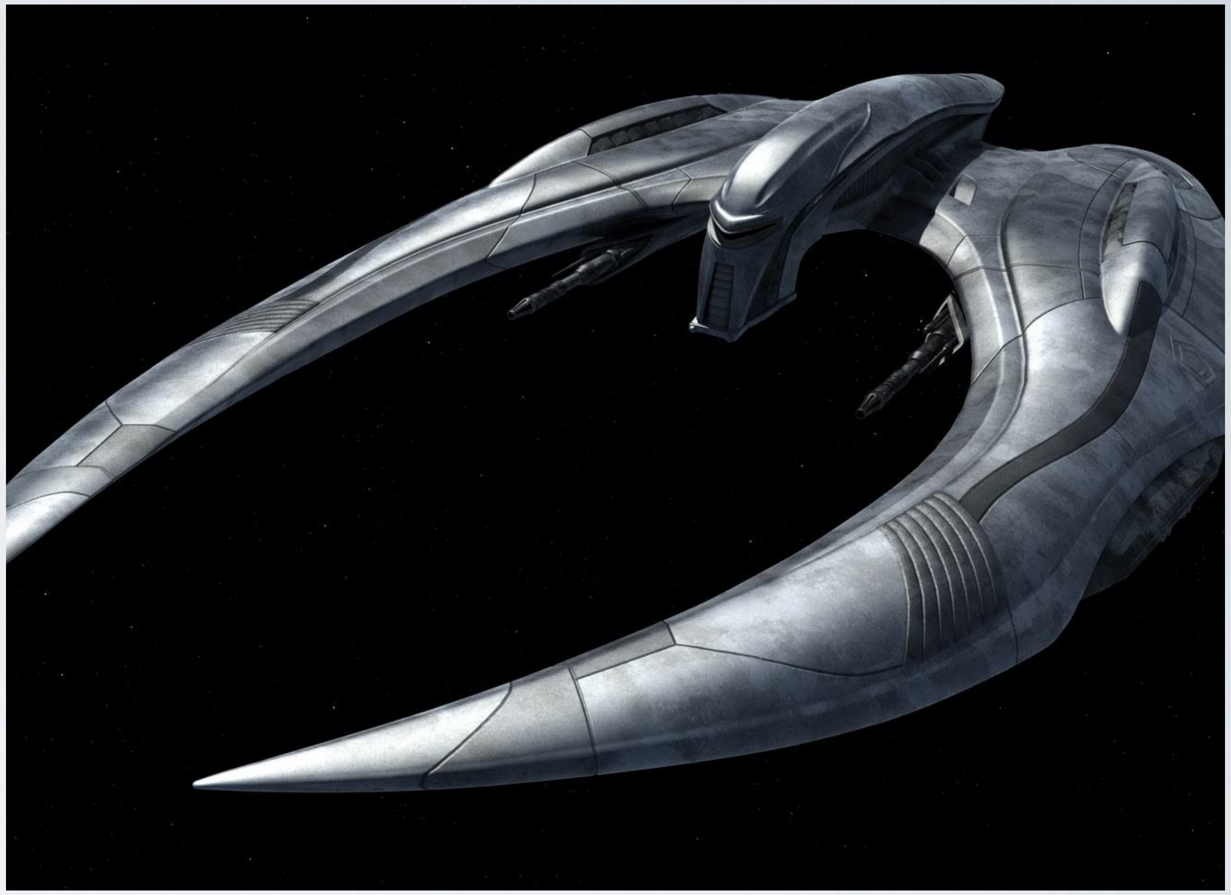
SIX

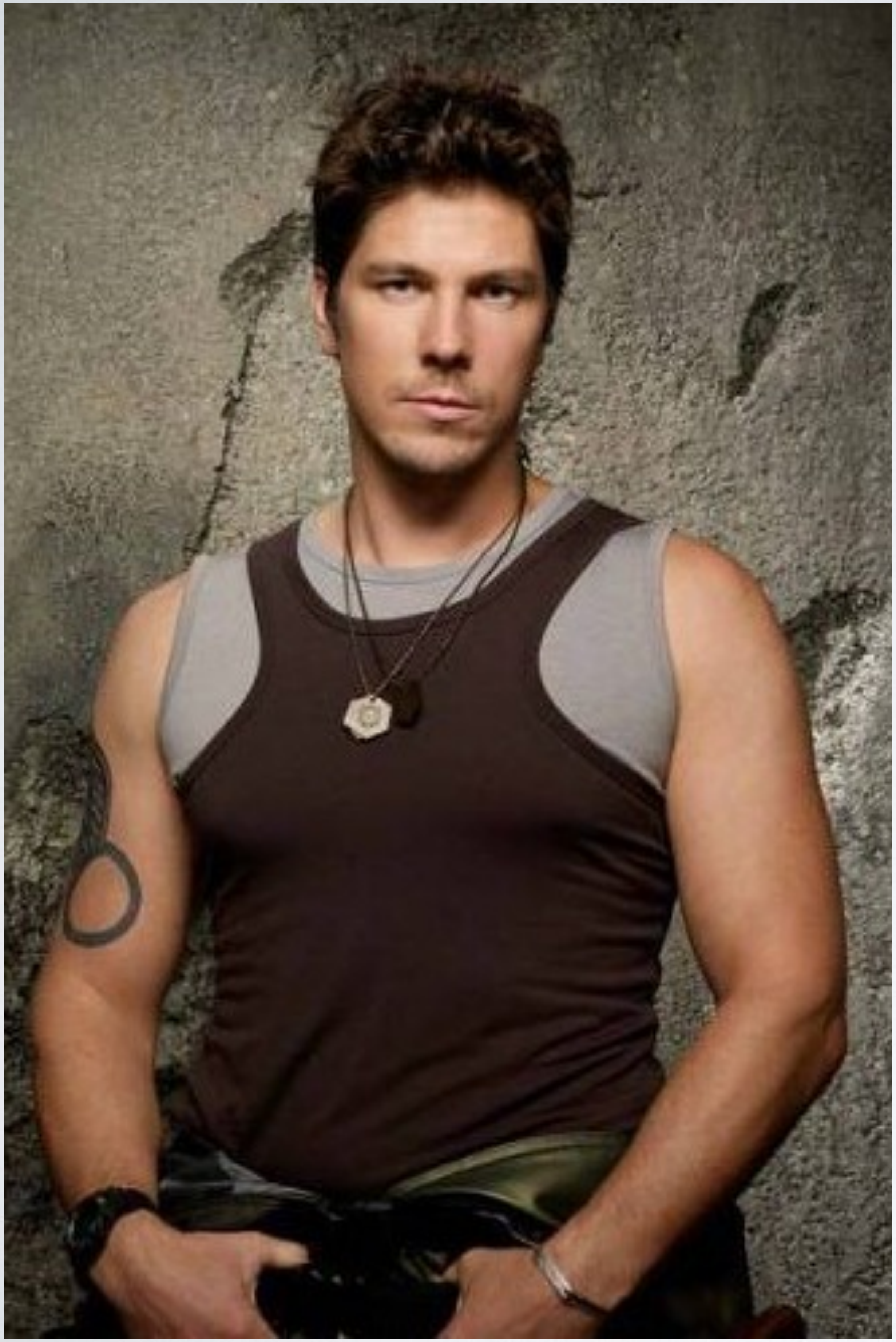
Intelligent, Cunning, and Alluring … also a Cylon

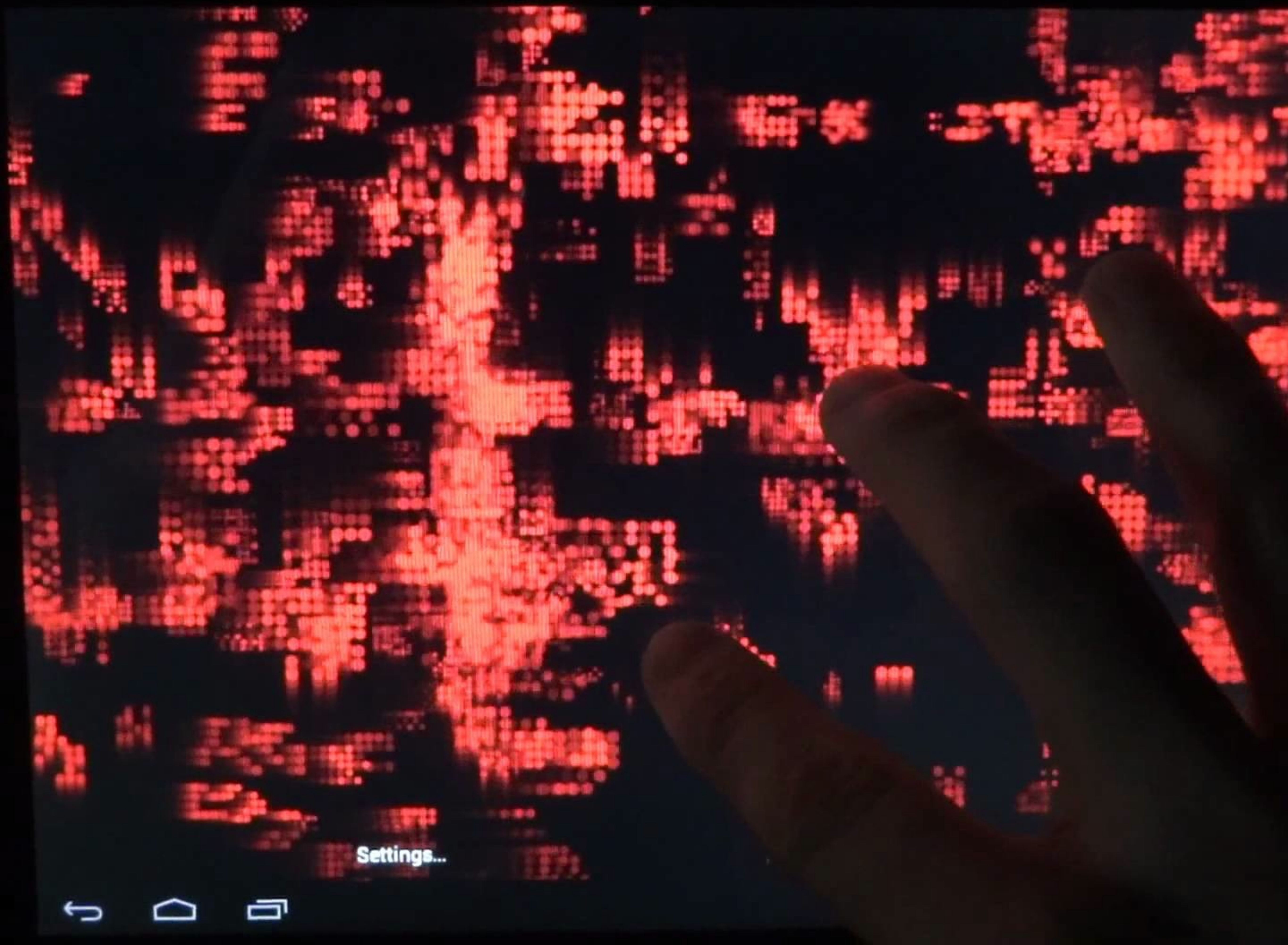
WHAT IS A CYLON?

Cybernetic Lifeform Node








Settings...

```
class Cylon
{
    public function __construct()
    {
        $this->created = new DateTime();
   }

    public function __destruct()
    {
        error_log( 'Died at ' . new DateTime() );
         $this->download();
    }

    /** @todo Add some cool artificial intelligence */
}
```

EXTENDING CLASSES

- uses the extends keyword
- gets everything from it’s parent
- then adds it’s own data members and methods

```
class Six extends Cylon {

    // add methods here

}
```

WHY INHERITANCE

- It allows you to easily re-use code
- It’s a way to organize related classes
- Write less code

TYPE HINTING

- Used when defining functions or methods
- Specify what class a parameter must be
- public function get_name(Cylon $cylon)

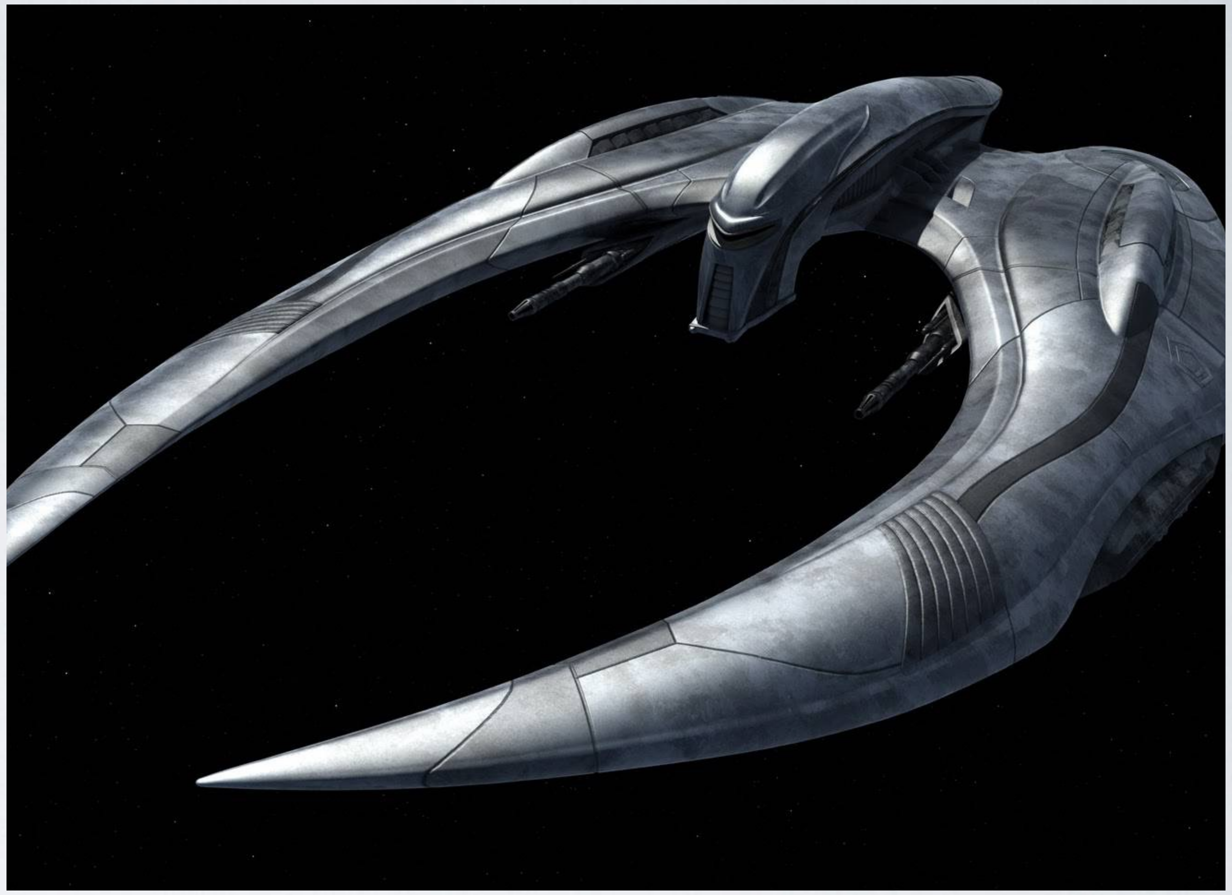
ABSTRACT CLASSES

- Still provides core functionality for child classes
- **Not directly instantiated**
- Allow your descendants chance to change

```
abstract class Cylon
{
    public function __construct()
    {
        $this->created = new DateTime();
   }

    public function __destruct()
    {
        echo 'Died at ' . new DateTime() . "\n" ;
         $this->download();
    }

    /** @todo Add some cool artificial intelligence */
}
```



CONTROL IT

- It creates a tight relationship between classes
- Not too deep - limit to 2 levels
- Can make it hard to move class to new project

COMPOSITION

Let’s form Voltron

COMPOSITION

- One object is a part of another
- Uses the public interface
- Preferred over inheritance
- Modular and loosely coupled

```
class Person {
    private $firstname = null;
    private $dateOfBirth = null;

    public function __construct(){
        $this->dateOfBirth = new DateTime();
    }

    public function getName(){
        return $this->firstname;
    }

    public function getDateOfBirth(){
        return $this->dateOfBirth->format(‘c’);
    }
}
```

```
class Lion {
    private $color = '';

    public function __construct($color) {
        $this->color = $color;
    }

    public function form() {
        printf("%s Lion!\n”, $this->color);
    }
}
```

```
class Voltron {

    public function __construct( $black_lion ) {
        $this->head_torso = $black_lion;
    }

    public function form(){
        $this->left_leg->form();
        $this->right_leg->form();

        $this->left_arm->form();
        $this->right_arm->form();

        $this->head_torso->form();
    }
}
```

POLYMORPHISM

from the Greek, meaning “many forms”

TYPE OF POLYMORPHISM

- Sub-Type polymorphism aka inheritance
- function overriding - redefined by subclass
- function overloading - not supported by PHP

FUNCTION OVERLOADING

- two methods w/same name but different signatures
- Java does this. Not supported by PHP.

```
class Person{

    public function setName( $first, $last ){
        $this->firstName = $first;
        $this->lastName = $last;
    }

    public function setName( $fullname ){
        list($first, $last) = explode(' ', $fullname);
        $this->firstName = $first;
        $this->lastName = $last;
    }

}
```

INTERFACES

- use **implements** not extends
- Have no functionality - just names and parameters
- Useful across unrelated classes.

```
interface iOpenClose
{
    public function open();
    public function close();
}

class File implements iOpenClose {

}

class Door implements iOpenClose {

}
```

```
interface iDestroyHumanity
{
   public function destroy();
}

class Cybermen implements iDestroyHumanity {

}

class Dalek implements iDestroyHumanity {

}
```

WRAPPING UP

4 PRINCIPLES OF OOP

- Abstraction
- Encapsulation
- Inheritance
- Polymorphism

FURTHER STUDY

- Design Patterns
- Principles of S.O.L.I.D.
- Collections
- Iterators
- Exceptions

S.O.L.I.D. PRINCIPLES

- **S**ingle Responsibility Principle
- **O**pen Closed Principle
- **L**isksov Substitution Principle
- **I**nterface Segregation Principle
- **D**ependency Inversion Principle

HOMEWORK

- Create a WordPress Widget for a sidebar
- Create a class to parse an RSS feed
- Create a WordPress Plugin using OOP

FUN STUFF

- Form Voltron https://www.youtube.com/watch?v=tZZv5Z2Iz_s
- Battlestar Galactica
- Doctor Who, S01 E06 - “Dalek”
- Doctor Who, S02 E05 - “Rise of the Cybermen”

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THANK YOU

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