



# How the Ancient Greeks Invented Programming

Matt Butcher

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Strange Loop

# Matt Butcher

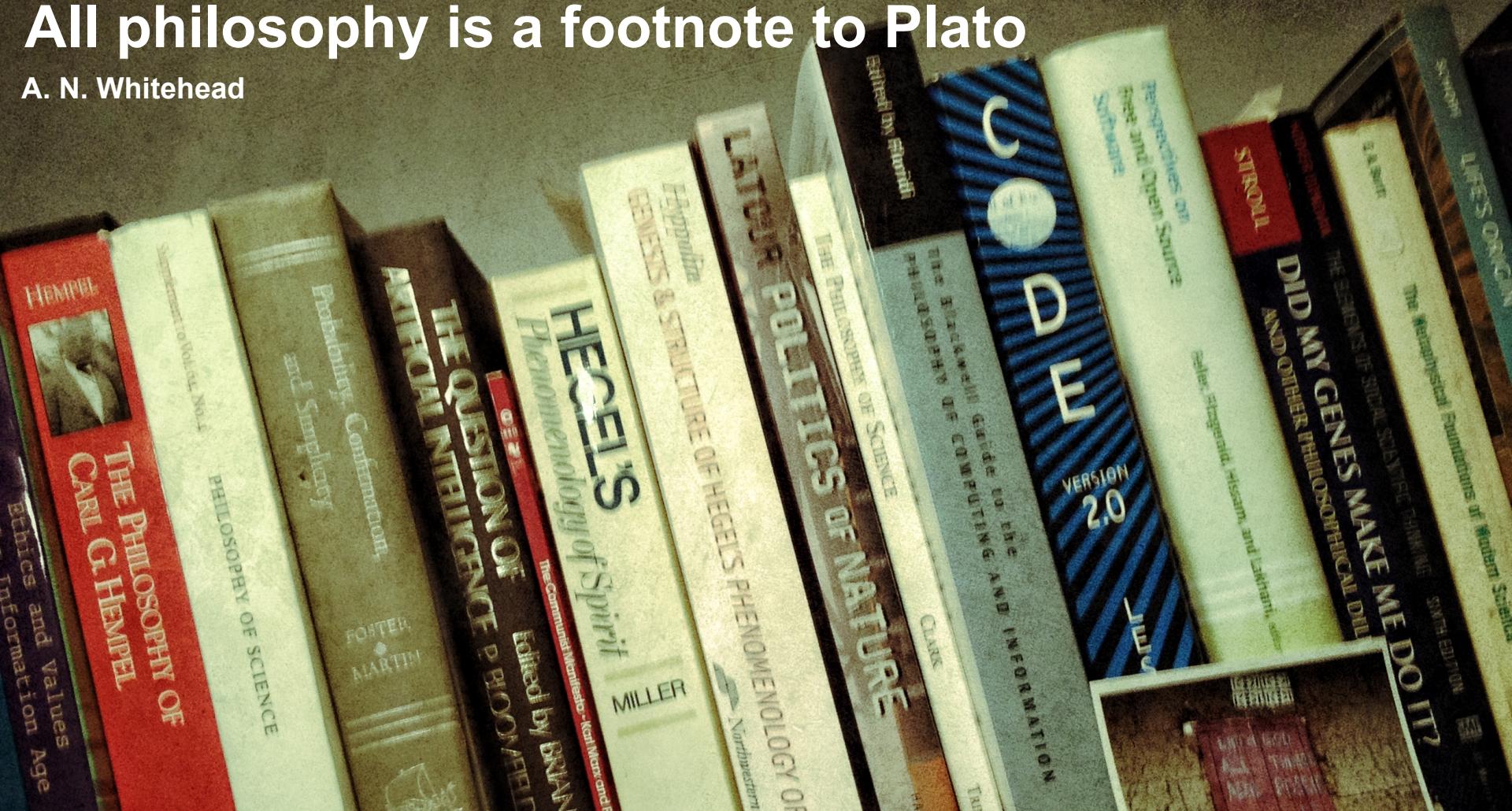
**Developer Experience Engineer  
Tech Author  
Philosopher**

**@technosohos  
matthew.butcher@hp.com  
<http://technosophos.com>**



# All philosophy is a footnote to Plato

A. N. Whitehead

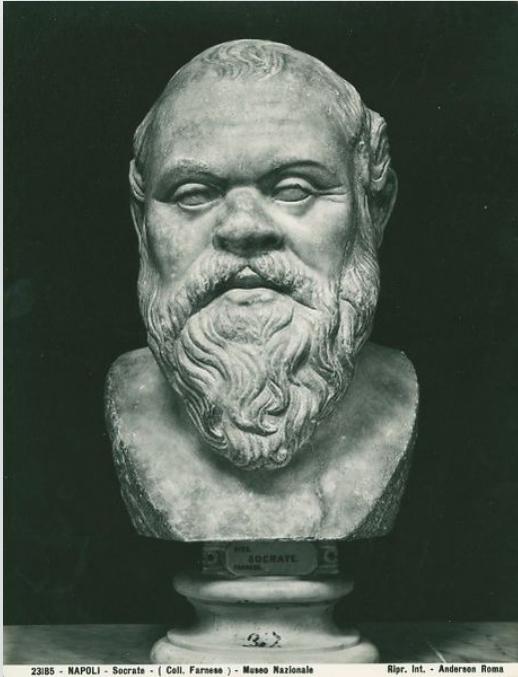


# So is all of computer science



# Socrates

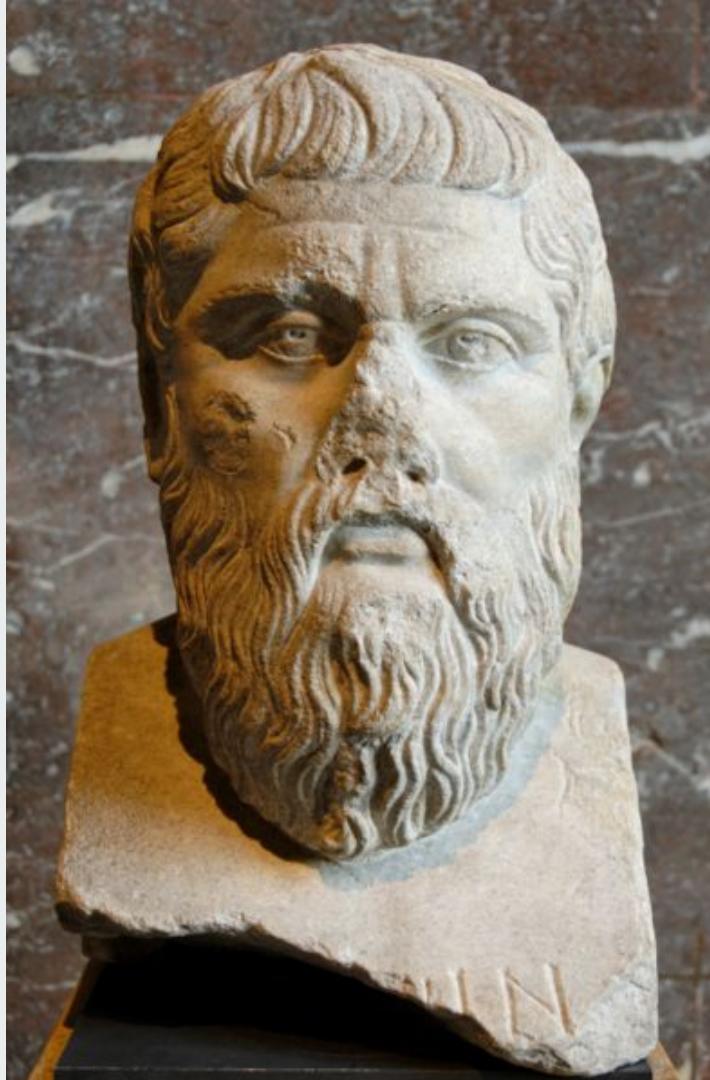
5<sup>th</sup> Century BCE



- Controversial teacher
- “The Socratic Method”
- A character in the dialogs of his most famous student
- Sentenced to death for “corrupting the youth”
- The Oracle of Delphi
- The father of western philosophy

# Plato

- Student of Socrates
- Mid-20's when Socrates died
- Like Socrates, an Athenian
- Traveled widely
- Numerous written works, mostly in dialog form
- *The Academy*

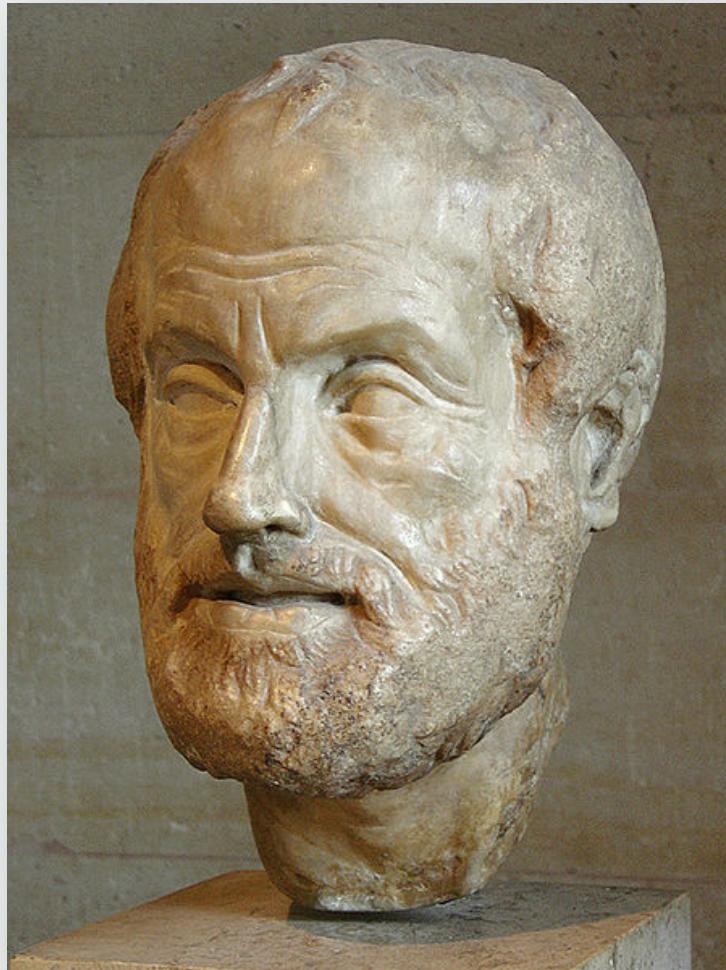


[http://commons.wikimedia.org/wiki/File:Plato\\_Silanio\\_Louvre\\_Ma3654.jpg](http://commons.wikimedia.org/wiki/File:Plato_Silanio_Louvre_Ma3654.jpg)

# Aristotle

- Student of Plato
- Teacher of Alexander the Great
- Instrumental in the development of...
  - Philosophy
  - Rhetoric
  - Political Science
  - Biology

[http://commons.wikimedia.org/wiki/File:Aristoteles\\_Louvre.jpg](http://commons.wikimedia.org/wiki/File:Aristoteles_Louvre.jpg)



# Metaphysics

**The thing that comes before physics.**

(Philosophers get paid for saying stuff like that!)



A programming language has an two audiences

# Being and Becoming





# The Most Important Slide



This  
Says  
It  
All

# Plato

## Forms, perfection, and reality

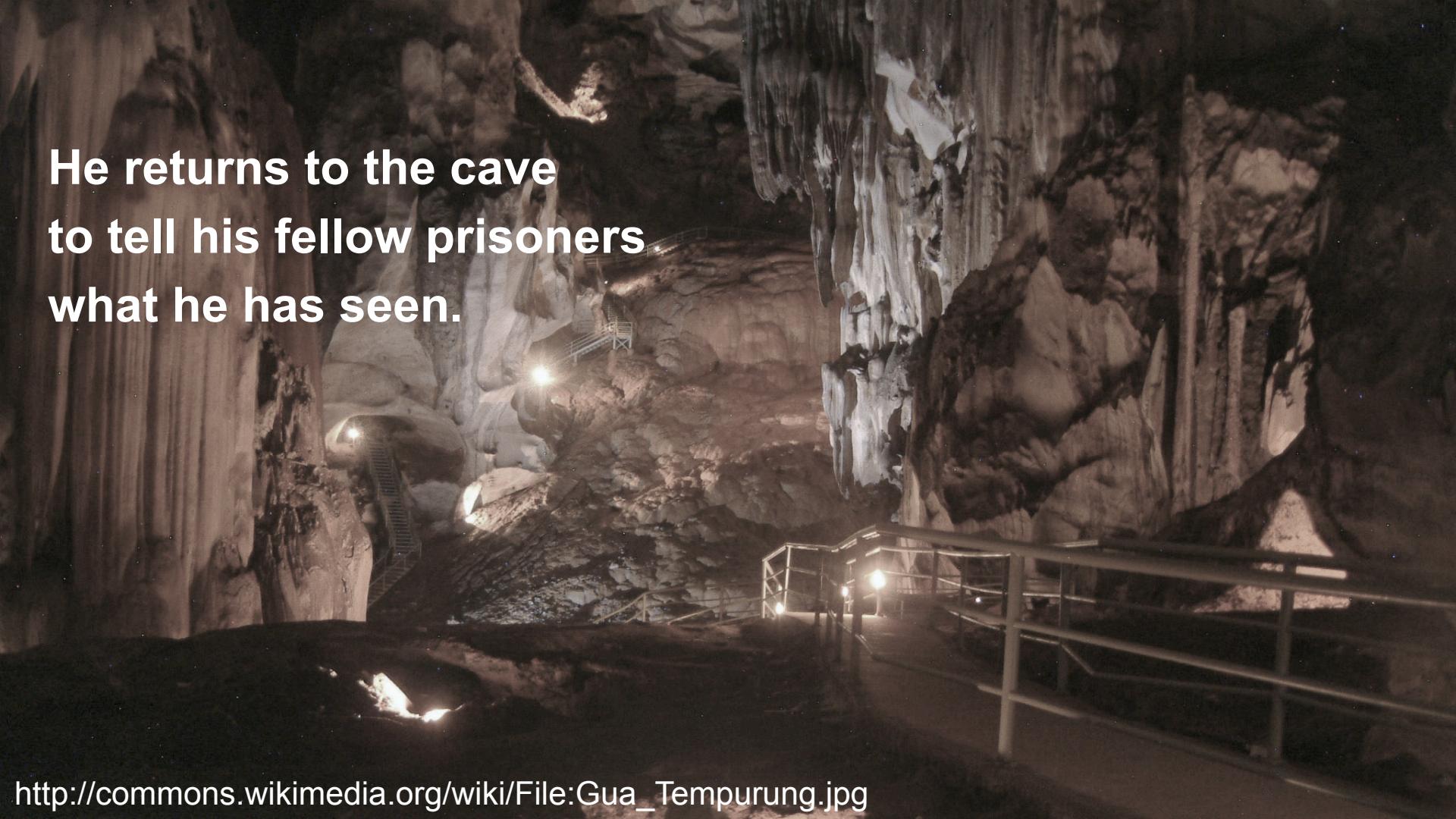
# Ideal

**Having to do with an idea or a mental object.**

This does *not* entail perfection.

**(So what's an ideal girlfriend/boyfriend)**



A photograph of a large, dark cave interior. The walls are covered in massive, light-colored stalactites and stalagmites. A metal walkway with railings runs through the center of the frame, illuminated by several bright lights. The overall atmosphere is mysterious and vast.

**He returns to the cave  
to tell his fellow prisoners.  
what he has seen.**

# What is the most real?



# Eidos: The Forms

## The Forms

- “Real”
- Perfect
- Unchanging

## The Physical World

- “Instances”
- Imitations
- Becoming



# The LSD Chair

Esinem Design



# Intellect and Art

The Forms

The Physical World

Copy of a copy



# Object Oriented Programming

## Classes

- “Real”
- Describes all an object can be
- An ideal state

## Objects (Runtime instances)

- “Instances”
- Runtime is the source of all evil
- Runtime is the more “concrete” state

If Plato is the architect...

Aristotle is the biologist

# Aristotle

## Metaphysics, Change, & *Hylomorphism*

**Aristotle is all about becoming,  
change,  
dynamism**

# Aristotle in Three Words

1. Stuff (*Hyle*)
2. Potentiality
3. Actuality



Building your vocabulary one pretentious term at a time...

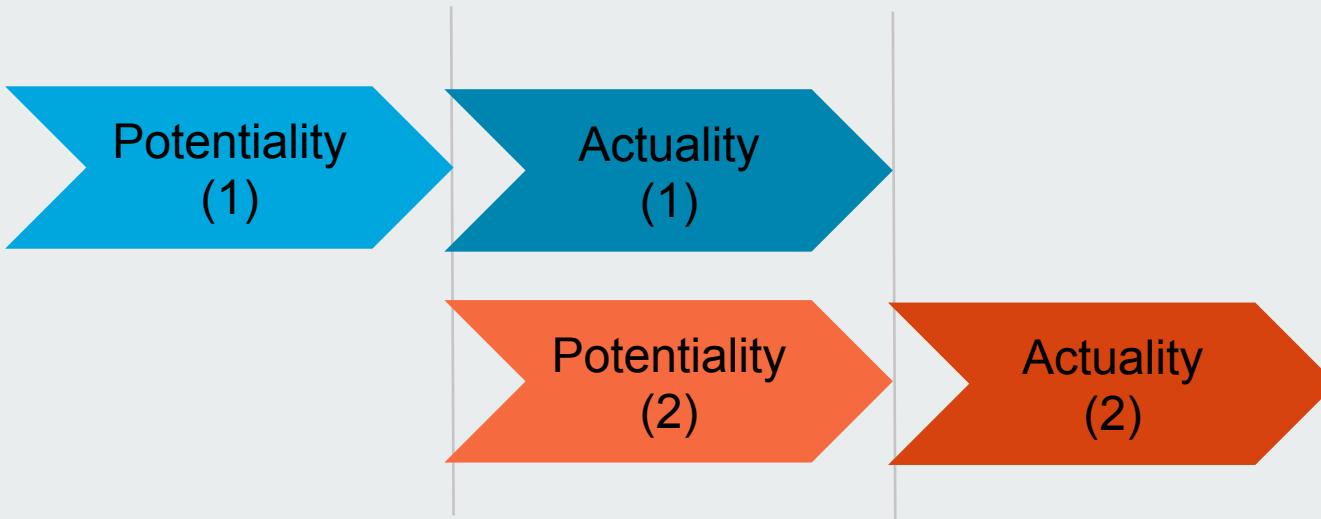
# Hylomorphism

Turning stuff into things.

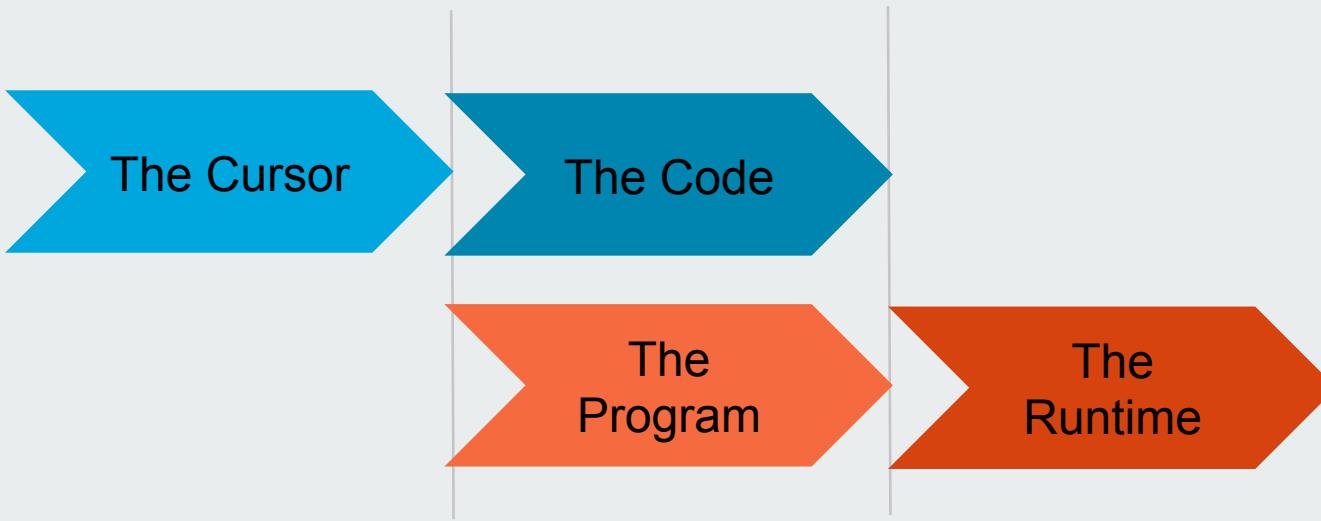
I am not kidding. Philosophers get PAID for this.



# Aristotle's Famous Model



# If Aristotle had written code...



# Functional vs. Object-Oriented

## Functional

- Focus on transitions (becoming)
- What transformation is occurring?
- Primacy of functions
  - Dynamicity of the runtime
  - Process

## Object-Oriented

- Focus on BEING
- What is the current state?
- Primacy of classes
  - Encapsulation
  - Structures

# Looping

Functional:

Head and tail

The current change

Procedural:

The index

Items in a collection

# Functional Programming

Pay attention to the *process* of the code, what it is becoming, not what things it is made of.

**Aristotle would worry about  
placing too much emphasis  
on description**

**Focus on the movement – the *physis*.**

# Quo Vadis?

That's Latin for "Oh crap, what are we gonna do now?"

**The Good News:**  
**Plato and Aristotle died**  
**thousands of years ago...**

# **But philosophy did not.**

# Metaphysics has changed

Spinoza

Duns Scotis

Thomism

Process philosophy

Leibniz

Phenomenology

Existentialism

Scholasticism

Augustine

Kant

Logical Positivism

Reid

Scientific Realism

Descartes

Pragmatism

# So will programming.

# Lessons

- **Consensus is neither likely nor necessary.**
- **We are on the front-side of the bubble.**
- **We have the most exciting job in the history of philosophy.**

# Thank you

Twitter: @technosophos

Blog: <http://technosophos.com>