OOP in Java – Paolo Perrotta

Approaching OOP

A diagram of a diagram

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We say child is a subclass of parent

A screenshot of a computer

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-We can pass in any subclass of Alarm

Functional Programming vs OOP

A black screen with white text

Description automatically generatedA screenshot of a black screen

Description automatically generated

-Primitives initialize by literal value

A black and white picture of objects

Description automatically generated

-Java still allocates memory when you create an object in Heap (reverse to objects)

-Returns a reference to object

-We prepare variable of the same type as the object, and assign the reference

Heap

-area memory where objects live

-like a big lake

A number and numbers on a white background

Description automatically generated with medium confidence

-Value is a Unicode sequence

A blue sign with white text

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A computer screen with white text and green text

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-Double =, comparing values (good for primitive) but Strings are objects (so need to compare reference) BUT IT MAY RETURN TRUE IN NEWER JAVA to spare memory

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Strings

-only objects without using new

-optimization to avoid creating too many strings

A screenshot of a cellphone

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Final Object Variable

A black background with white text and orange and green text

Description automatically generatedA black background with white text and orange and green text

Description automatically generated

-Only reference is final not object is not

A screenshot of a computer

Description automatically generated

-Strings are immutable, getting a new String BTS

AutoboxingA black background with white and orange text

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-Integer is the wrapper class because you can wrap it around an int

-But Java does it automatically (Autoboxing) so you don’t have to do conversion

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-Looks like this behind the scene

A black background with white text and orange arrow

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-Can even do this

Defining your own Classes

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Unreachable Objects

-JVM can track references for us and if no object has no reference it will delete it for us (Garbage Collection)

-GC is unpredictable

-Java is not ideal for strict runtime computations

-No destructors in Java because of GC

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-Like opening a file or network socket

Hiding Information

A screen shot of a computer code

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-If you don’t declare a member public/private , that means the message is only visible to the same package

-Same thing applies to classes, must make it public to make it visible outside the package

A close-up of a chart

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A screenshot of a computer screen

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Designing with Abstraction and Encapsulation

A diagram of a computer code

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-Design is translating the domain of the problem to the domain of the solution

A white and orange text on a white background

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A white background with black text

Description automatically generatedInheriting from Another Class



A diagram of a computer

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-use super.METHOD to use super methods

A diagram of a system

Description automatically generated

-If a class doesn’t explicit says extends, then they have implicit default superclass (Object from java.lang.package)

-All Java classes have ONE direct superclass

-toString() method comes from Object

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-final method can’t be overridden in a subclass

-final Class means you can’t inherit

Sealed Class

-it can decide exactly which other classes inherit from it

-Use cases are advanced



-Means only these classes can inherit it

-Subclasses must be sealed, non-sealed (Regular class) or final to remove errors

Understanding Polymorphism

Class Inheritance

-described as is-a relationship

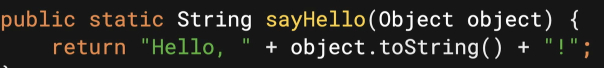
-Instance of a subclass IS A instance of superclass



-Subclass cannot make code less visible

A screenshot of a computer

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-Can pass literally any Java Object because every Java Object is also an instance of Object

A screen shot of a computer

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-Can only use Alarm methods

-Like breaking your TV remove and using a generic one

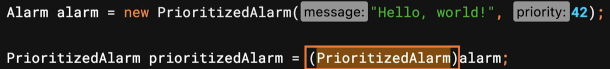
-So why when you lose some stuff?

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-It called the one from subclass, even though you cant access subclass, its still a subclass Object and will call subclass if overridden

Downcasting



Avoiding ClassCast expection

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Talking to Interfaces

Designing with Interitance and Polymorphism

Using the static Keyword

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Static Initializers aka Static block

-gets executed before calling constructor

A screen shot of a computer program

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-don’t have to use MATH.PI



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Wrapping up

Enums, Records, Generic

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