

Adopting Java SE 17



Sander Mak

Java Champion

@Sander_Mak

When and Why to Adopt Java?

When and Why to Adopt Java?

Philosophy

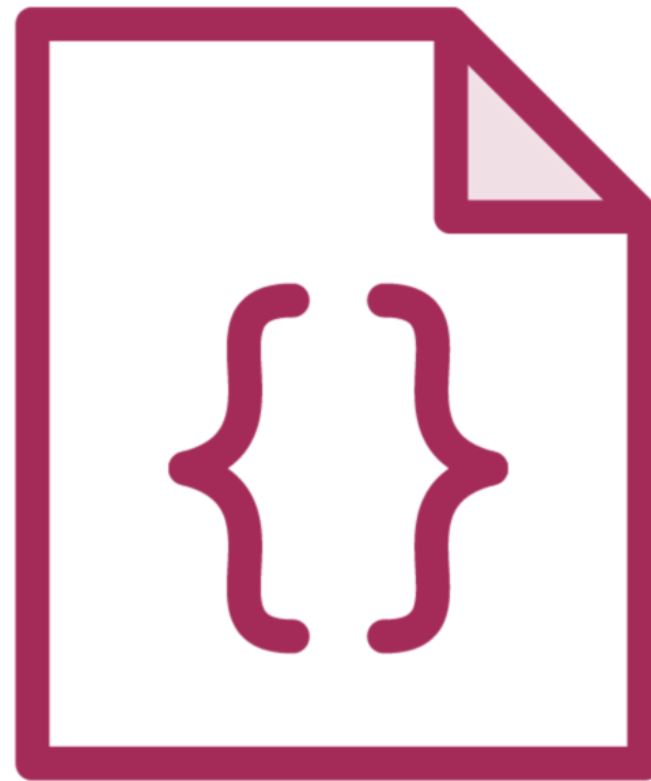


When and Why to Adopt Java?

Philosophy



Java's characteristics

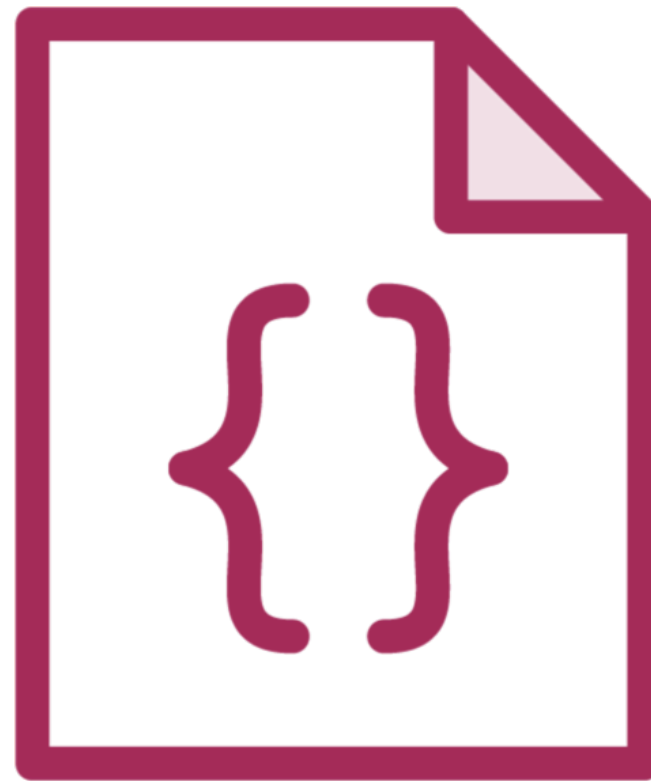


When and Why to Adopt Java?

Philosophy



Java's characteristics



Comparison



The Philosophy of Java: Readability

The Philosophy of Java: Readability

More than **10 million** Java developers

The Philosophy of Java: Readability

More than **10 million** Java developers



The Philosophy of Java: Readability

More than **10 million** Java developers

Reading code is more important
than **writing** code



The Philosophy of Java: Readability

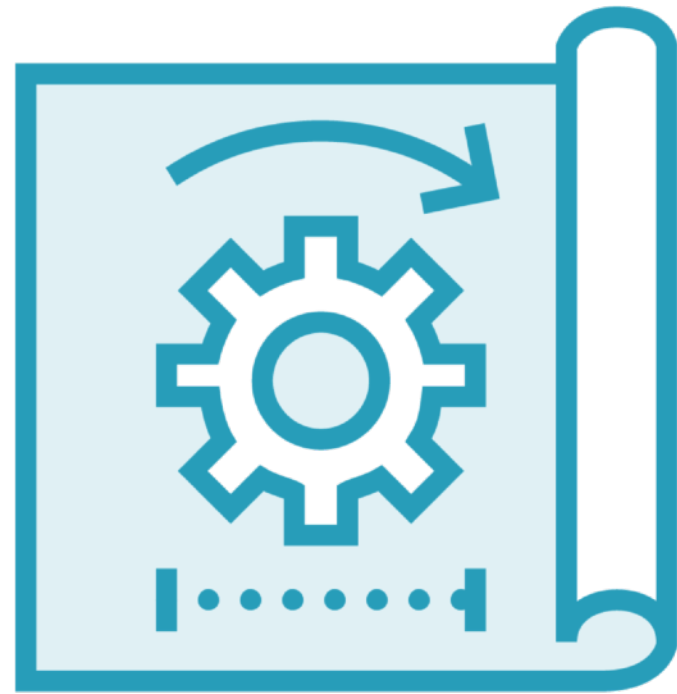
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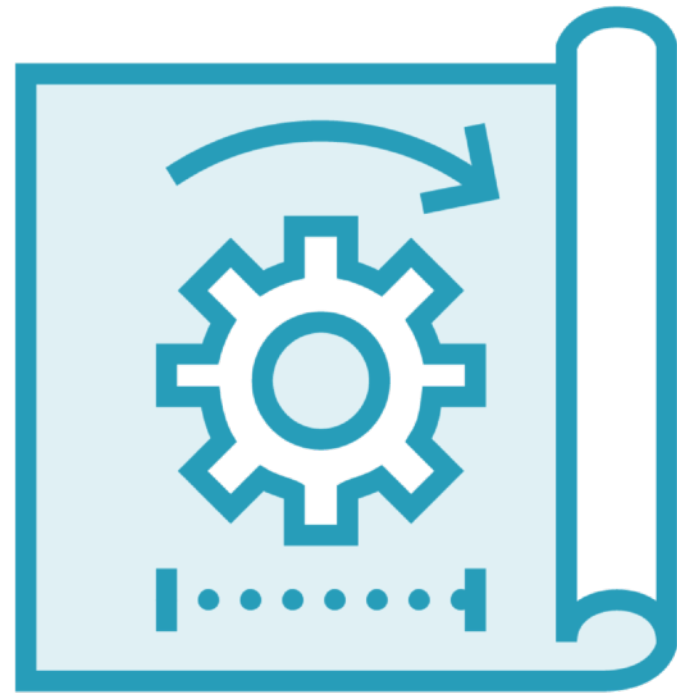
Understandable code over **short** and
clever code



The Philosophy of Java: Stability

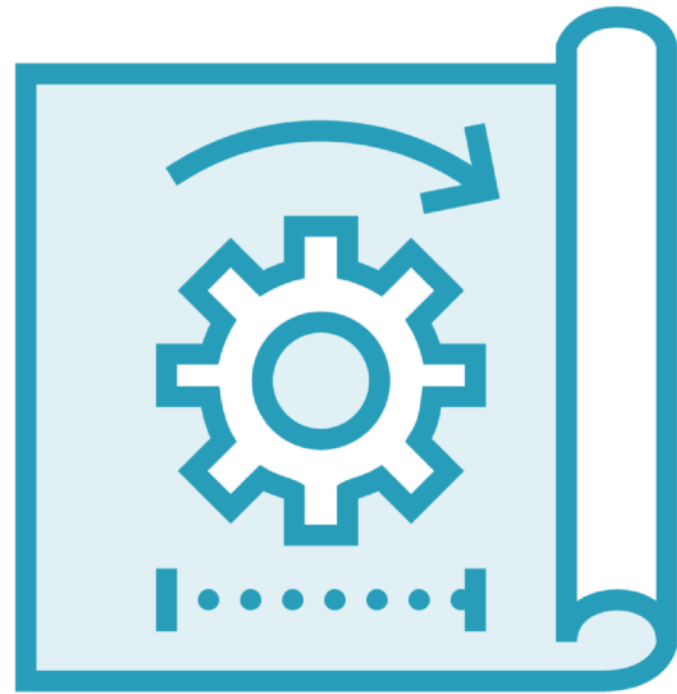


The Philosophy of Java: Stability



Conservative in adding new features

The Philosophy of Java: Stability



Conservative in adding new features

Java 1.0

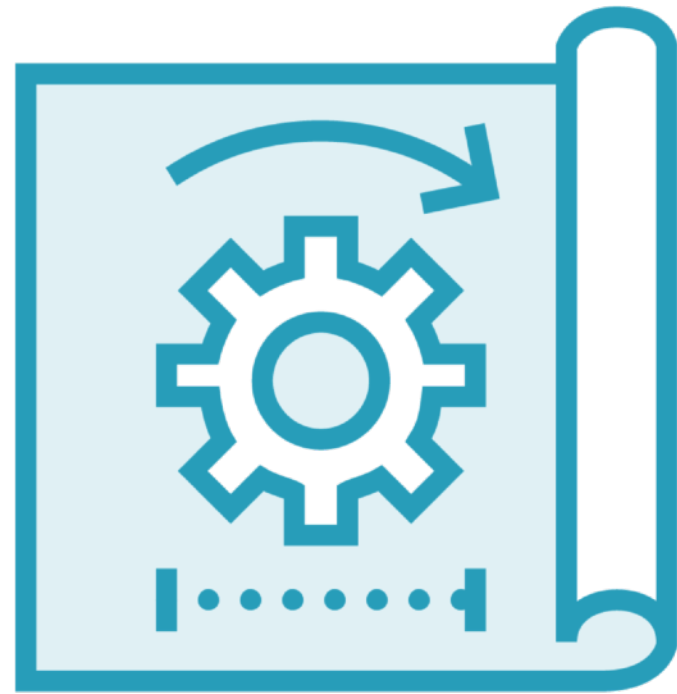
1996

Java 17

2021

2040?

The Philosophy of Java: Stability



Conservative in adding new features

First, do no harm

Java 1.0

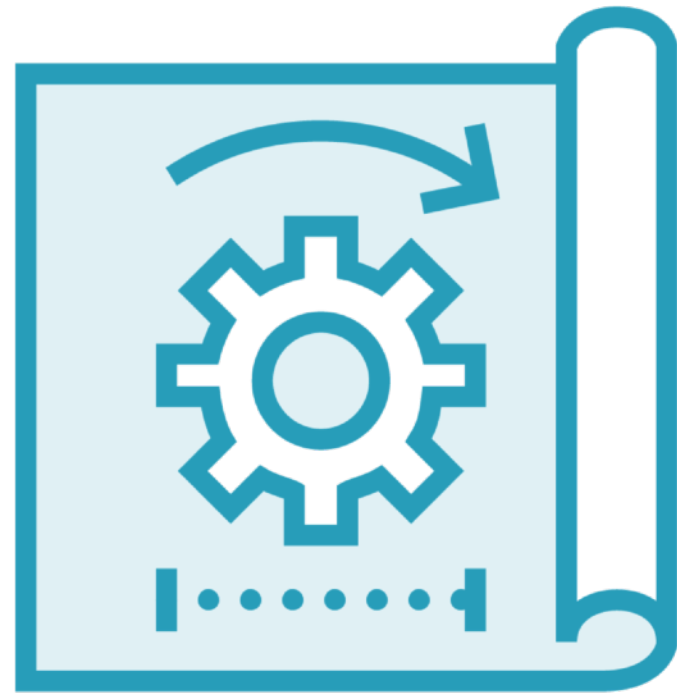
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Productivity

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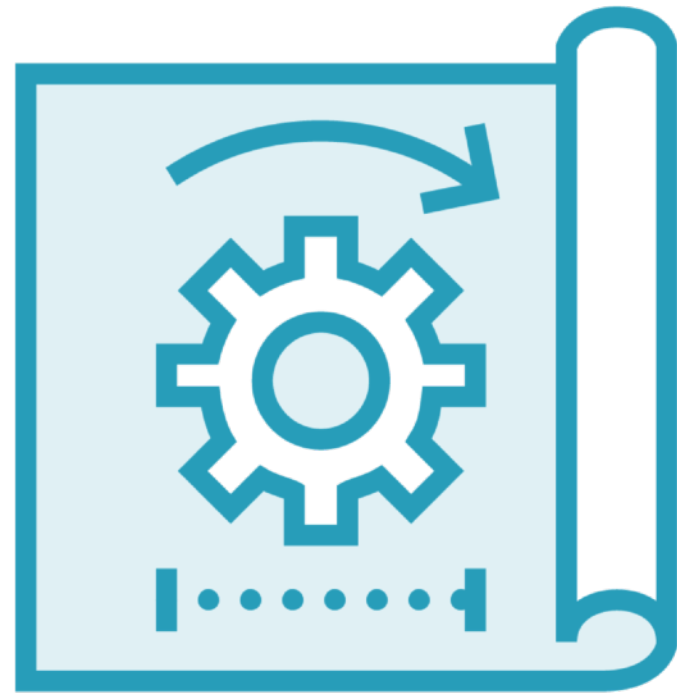
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Java 17

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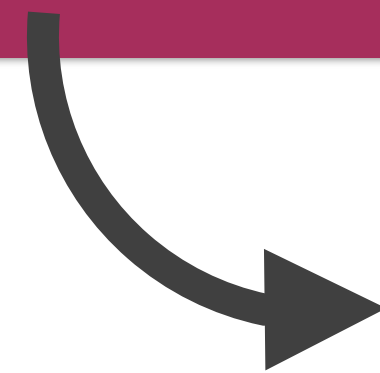
First, do no harm

Productivity

Java 1.0

1996

Java 12



Preview
Features

Java 17

2021

2040?

Backward Compatibility

Backward Compatibility



Backward Compatibility



Backward Compatibility

Java 8

Java 17

Backward Compatibility

Java 8

Java 17



Source code

Backward Compatibility

Java 8

Java 17



Source code



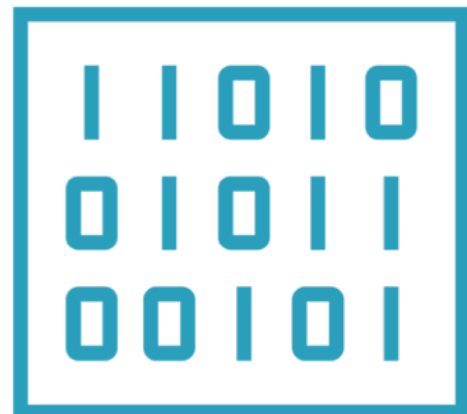
Backward Compatibility

Java 8

Java 17



Source code



Byte code

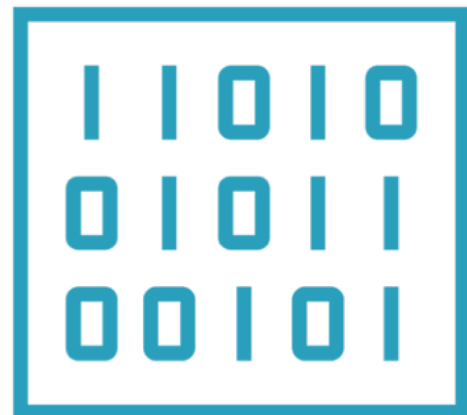
Backward Compatibility

Java 8

Java 17



Source code



Byte code



Backward Compatibility

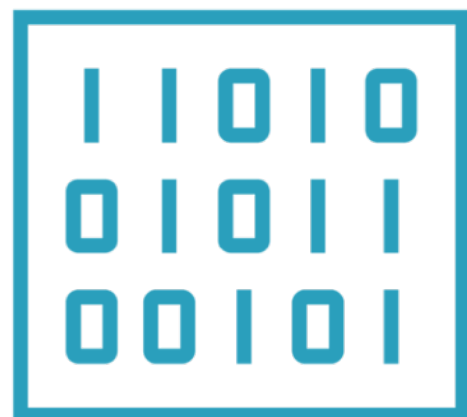
Java 8

Java 17

Java N



Source code



Byte code



Backward Compatibility

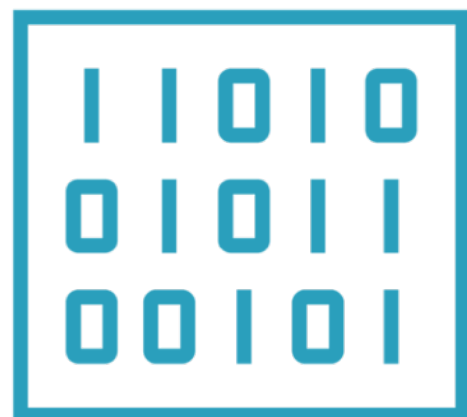
Java 8

Java 17

Java N



Source code



Byte code



Philosophy of Java: Openness & Community

Philosophy of Java: Openness & Community

Rigorous specification

Philosophy of Java: Openness & Community

Rigorous specification

The Java® Virtual
Machine Specification
Java SE 17 Edition

Tim Lindholm
Frank Yellin
Gilad Bracha
Alex Buckley
Daniel Smith

2021-08-09

Philosophy of Java: Openness & Community

Rigorous specification

The Java® Virtual
Machine Specification
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Rigorous specification



<https://jcp.org>

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Multiple vendors & community leaders

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IBM, Red Hat, Azul, Microsoft, Amazon, ...

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OpenJDK

OpenJDK




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
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 .github/workflows 8279379: GHA: Print tests that are in error last month

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OpenJDK

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Caciocavallo

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Common VM Interface


Compiler Grammar

Detroit


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Device I/O


OpenJDK



What is this? The place to collaborate on an open-source implementation of the [Java Platform, Standard Edition](#), and related projects. ([Learn more.](#))

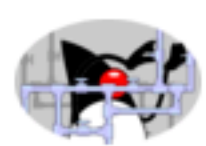


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Learn about the key active Projects in the Community including [Amber](#) (high-productivity language features), [Loom](#) (lightweight concurrency), [Panama](#) (foreign functions and foreign data), [Valhalla](#) (primitive types and specialized generics), and, of course, the [next version of Java and the JDK](#).

If you want to learn how to contribute to the JDK available today, head over to [jdk.java.net/contributing](#).



Hack on the JDK itself, right here in the OpenJDK Community: [Browse the code repository](#) to make a local copy to fix a bug, enhance an existing feature, or add a new feature.

openjdk.net

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About

JDK main-line development

[openjdk.java.net/projects/jdk/](#)

java jvm openjdk

OpenJDK

Java enhancement proposals (JEPs)

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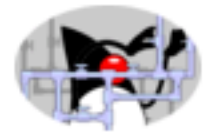


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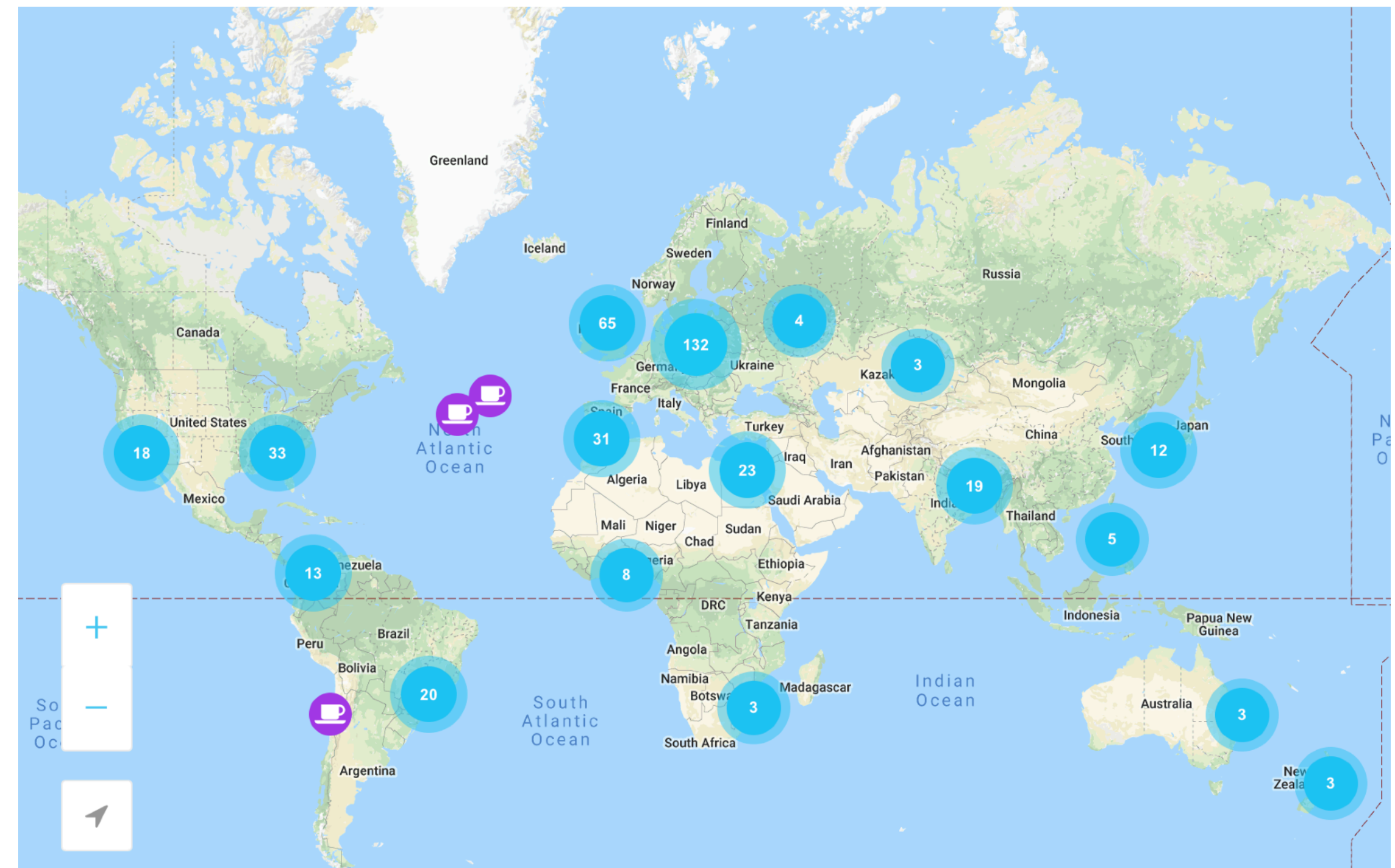
[openjdk.java.net/projects/jdk/](#)

java jvm openjdk

Java Community



Java Community



Java User Groups, meetups, conferences

The Java Language

The Java Language

Familiar syntax



The Java Language

Familiar syntax



```
public class MyClass {  
    public void aMethod(boolean choice) {  
  
  
    }  
  
    private void anotherMethod() {  
  
  
    }  
}
```

The Java Language

Familiar syntax



```
public class MyClass {  
    public void aMethod(boolean choice) {  
        if(choice) {  
            //..  
        } else {  
            // ..  
        }  
    }  
  
    private void anotherMethod() {  
        for(int i = 1; i < 10; i++) {  
            // ..  
        }  
    }  
}
```

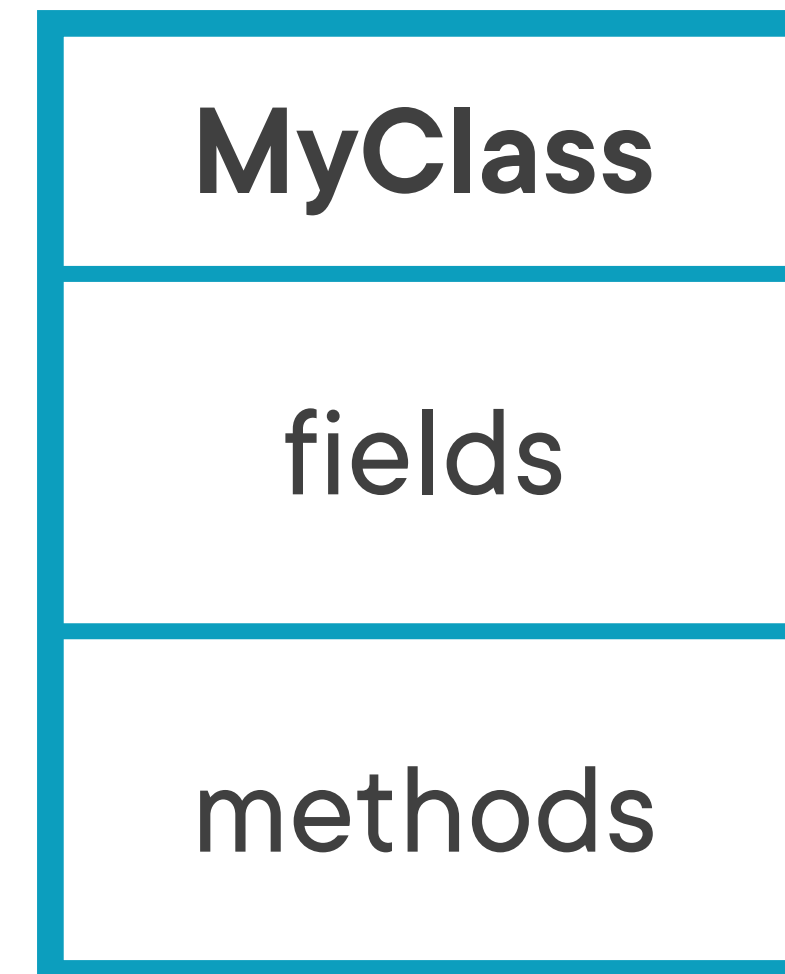
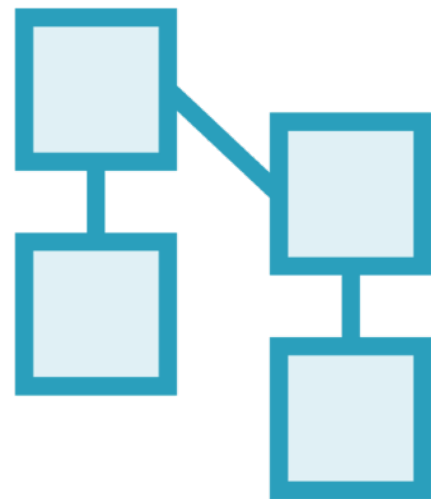
The Java Language

Object Oriented



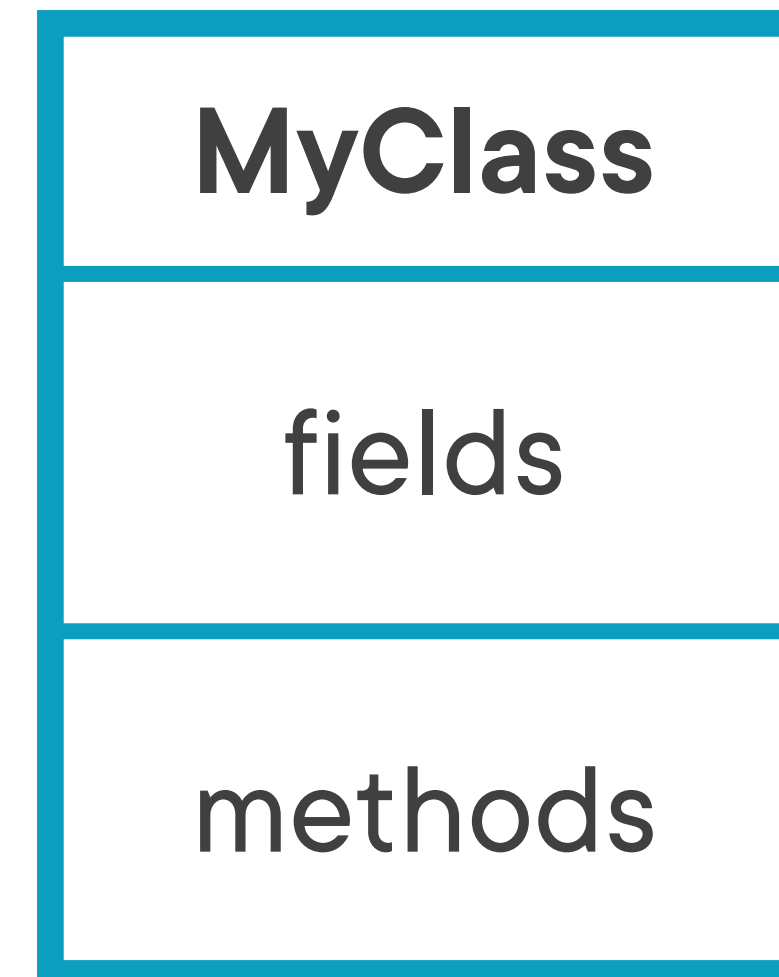
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Object Oriented

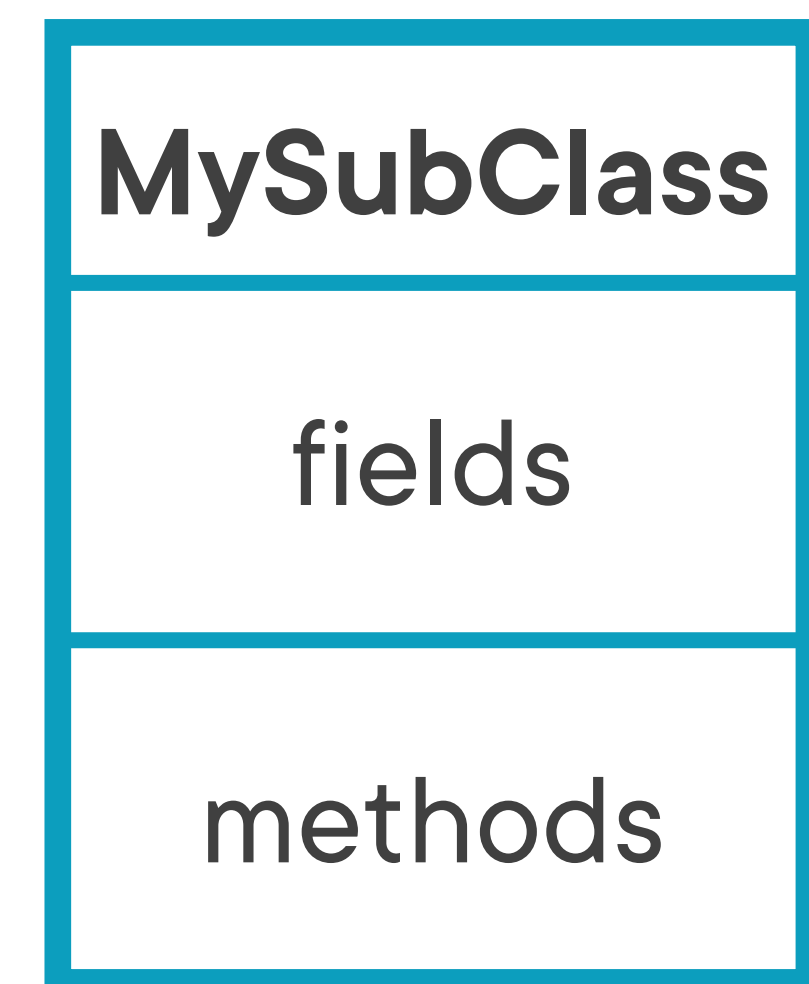
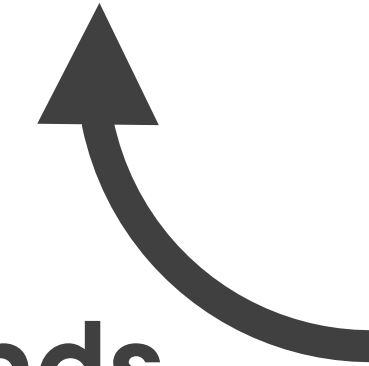


The Java Language

Object Oriented



extends



Scalable Development

Scalable Development

Hierarchical & structured codebases

Scalable Development

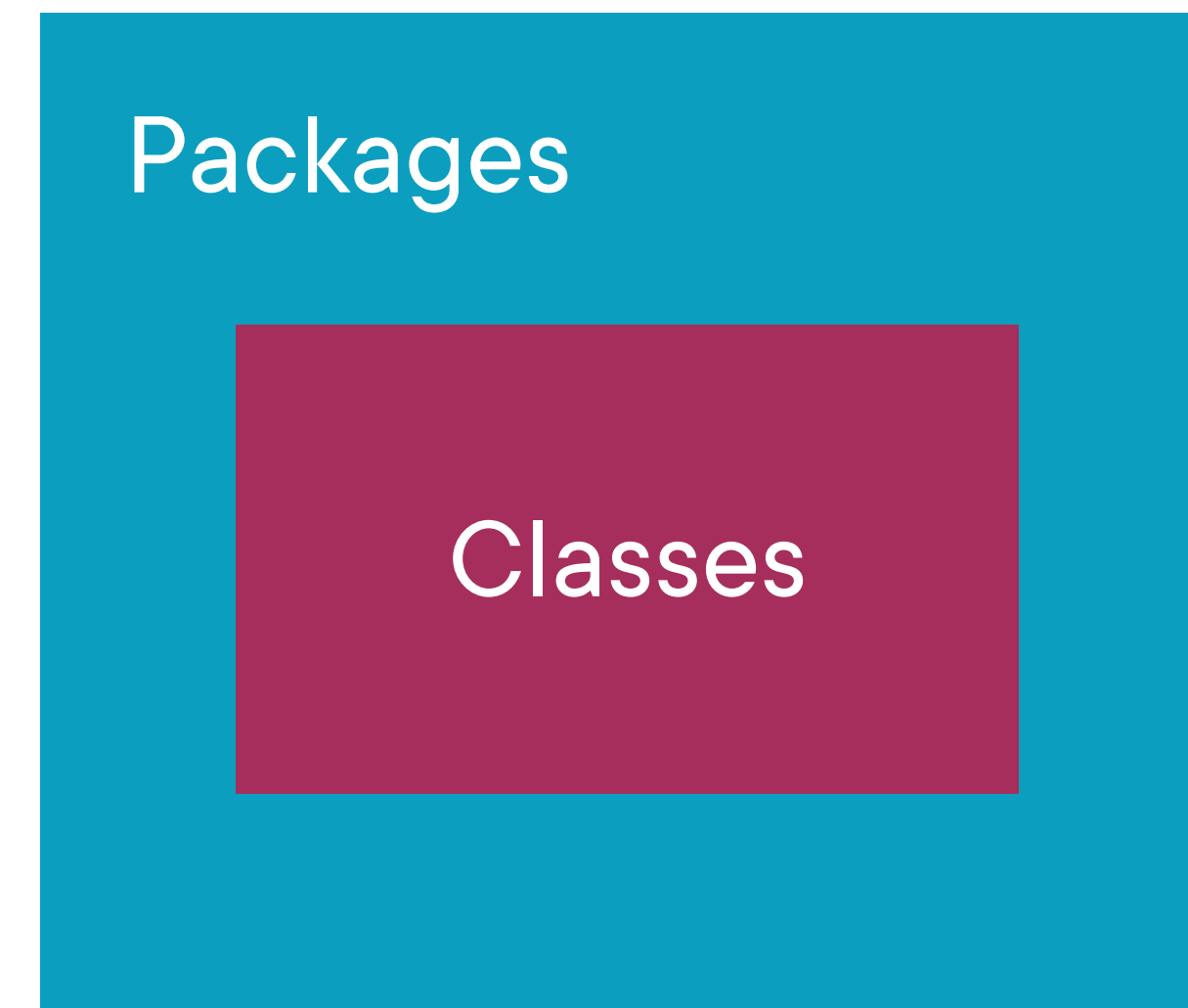
Hierarchical & structured codebases



Classes

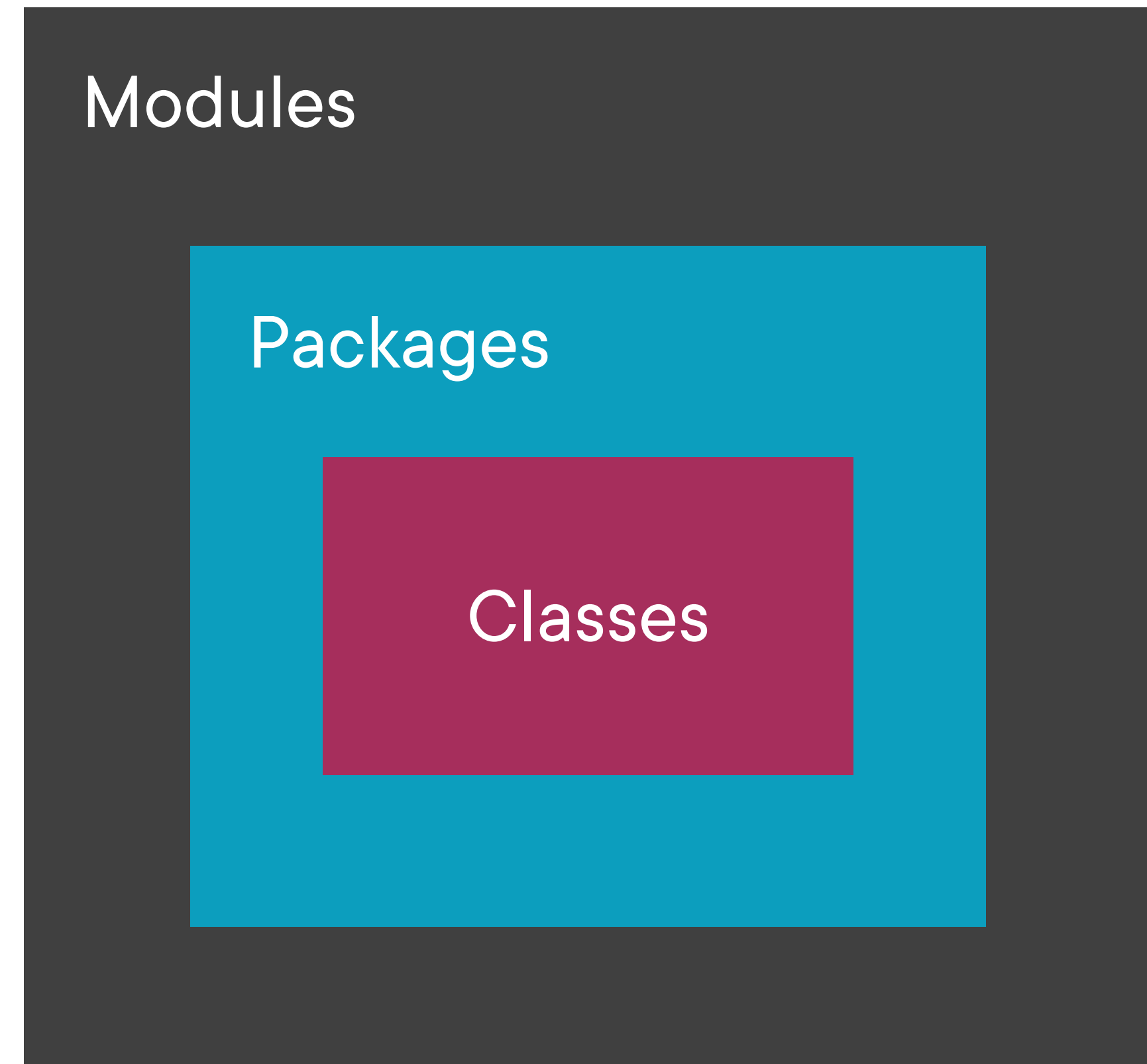
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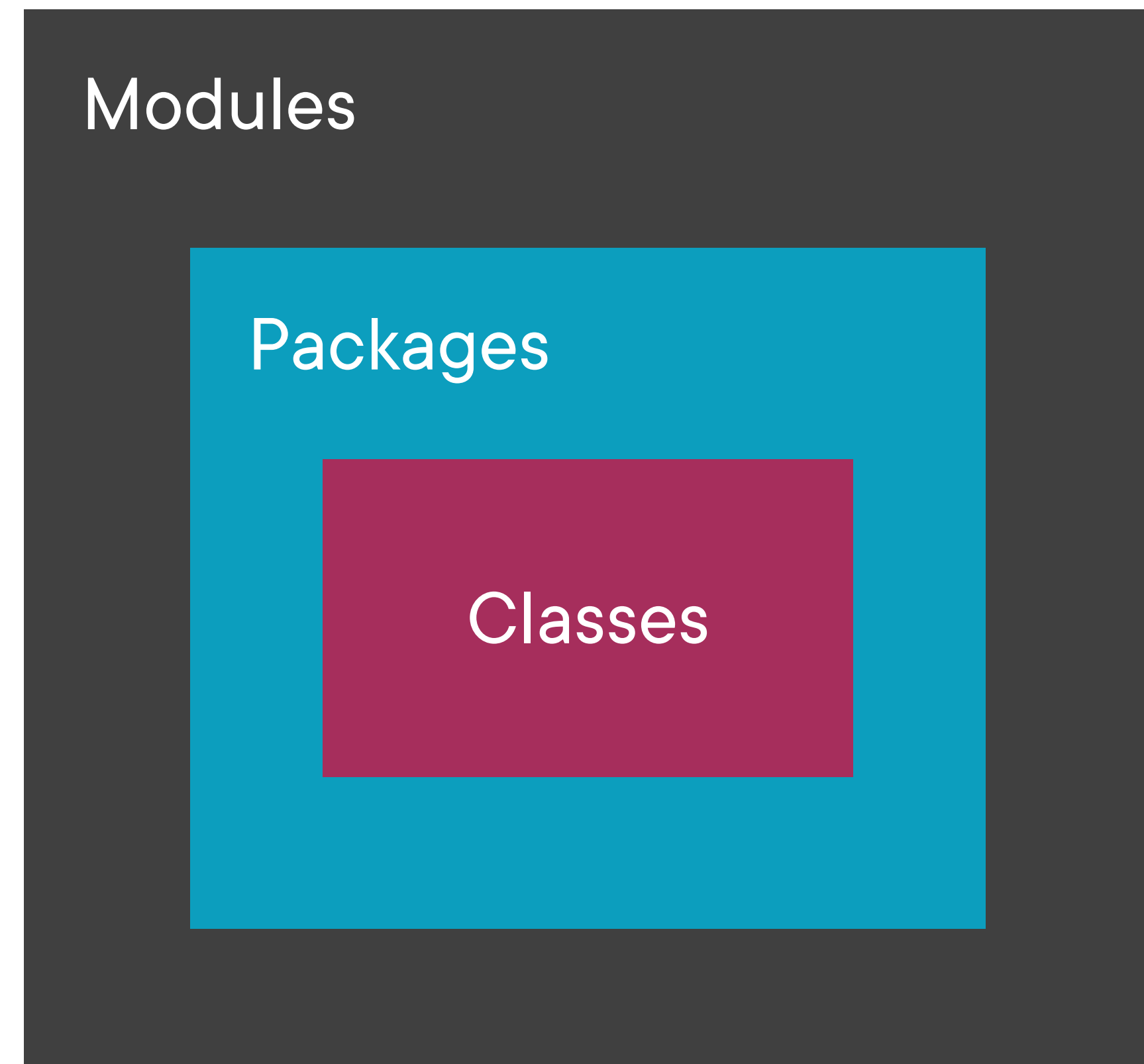


Scalable Development

Hierarchical & structured codebases



Working with the Java
Module System



Productivity: Type System

Productivity: Type System

Catch bugs early



Productivity: Type System

Catch bugs early



```
public class Hello {  
    public static void main(String[] args) {  
        int message = "Hello Pluralsight!";  
        System.out.println(message);  
    }  
}
```

Productivity: Type System

Catch bugs early



```
public class Hello {  
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        System.out.println(message);  
    }  
}
```

```
Hello.java:4: error: incompatible types:  
String cannot be converted to int  
    int message = "Hello Pluralsight!";  
                  ^  
1 error
```


Java's Runtime

Java's Runtime



Portability

Java's Runtime



Portability



Managed
Runtime

Java's Runtime



Portability

Managed
Runtime

Performance

Java's Runtime: Portability

Java's Runtime: Portability

Write
Once
Run
Anywhere

Java's Runtime: Portability

Write
Once
Run
Anywhere



Application
Bytecode

Java SE APIs

Java's Runtime: Portability

**Write
Once
Run
Anywhere**

Application
Bytecode

Java SE APIs

Java Virtual Machine (Linux)

Linux

arm64

Java's Runtime: Portability

**Write
Once
Run
Anywhere**

Application
Bytecode

Java SE APIs

Java Virtual Machine (Windows)

JVM for each OS/architecture

Windows

x86

Java's Runtime: Portability

**Write
Once
Run
Anywhere**

Application
Bytecode

Java SE APIs

Java Virtual Machine (Windows)

JVM for each OS/architecture

Platform-agnostic APIs

Windows

x86

Managed Runtime

Managed Runtime

Automatic Memory Management

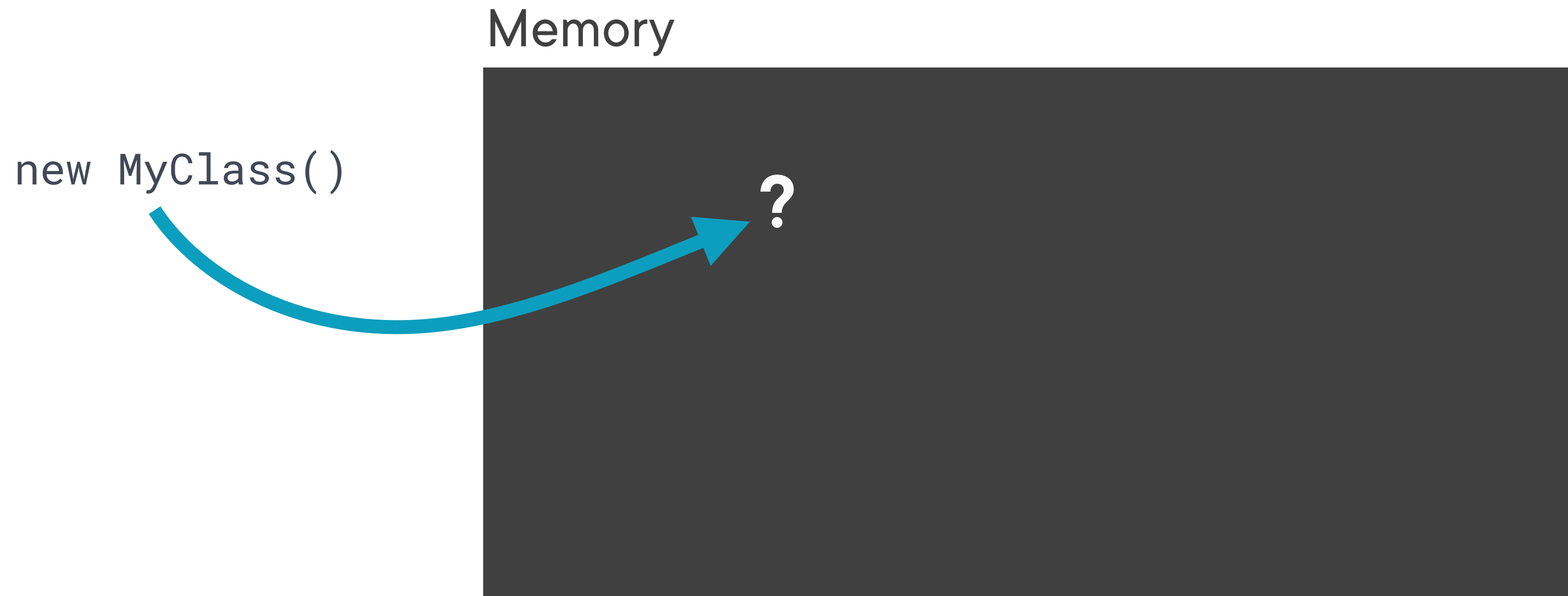
Managed Runtime

Memory



Automatic Memory Management

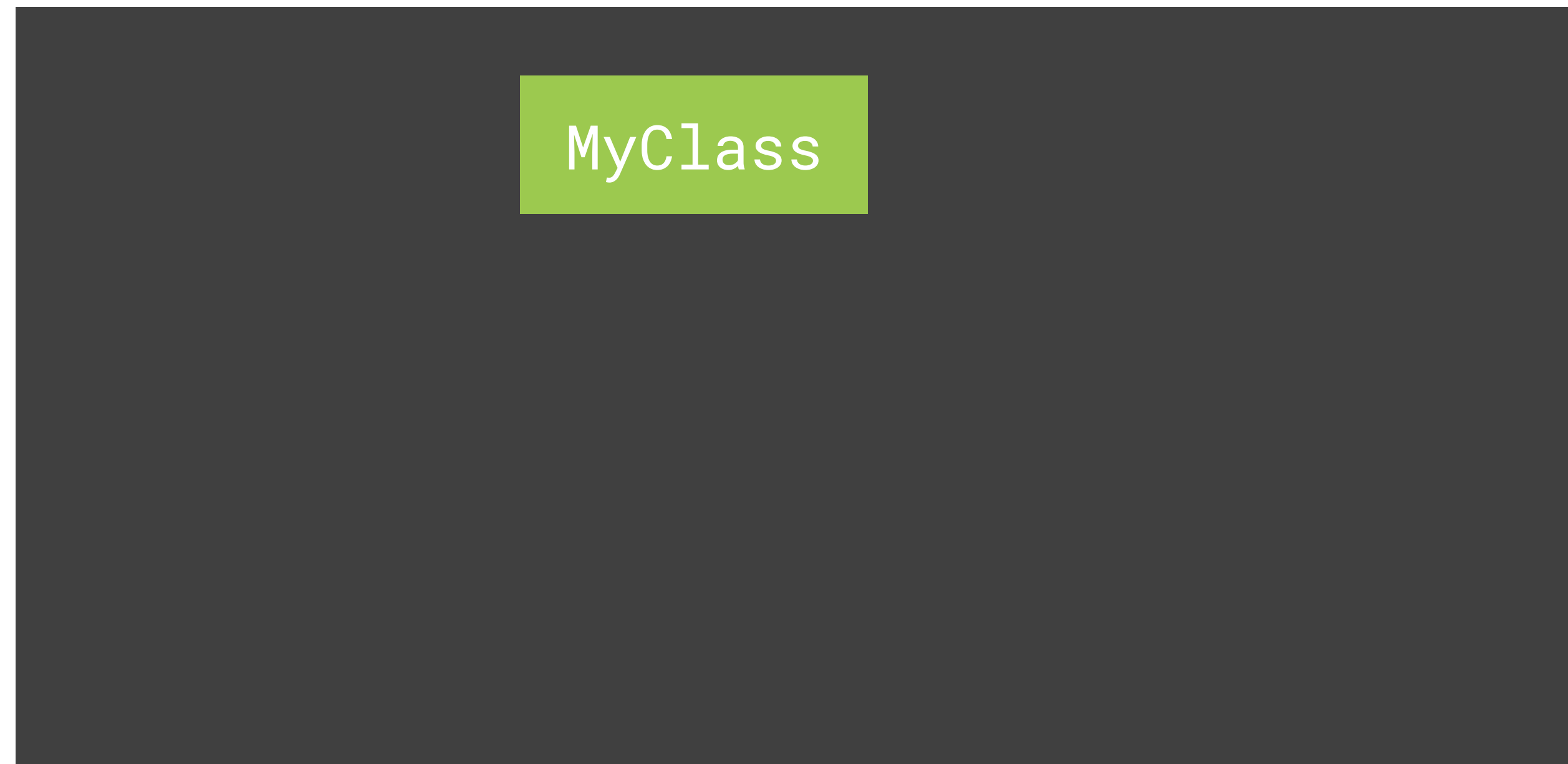
Managed Runtime



Automatic Memory Management

Managed Runtime

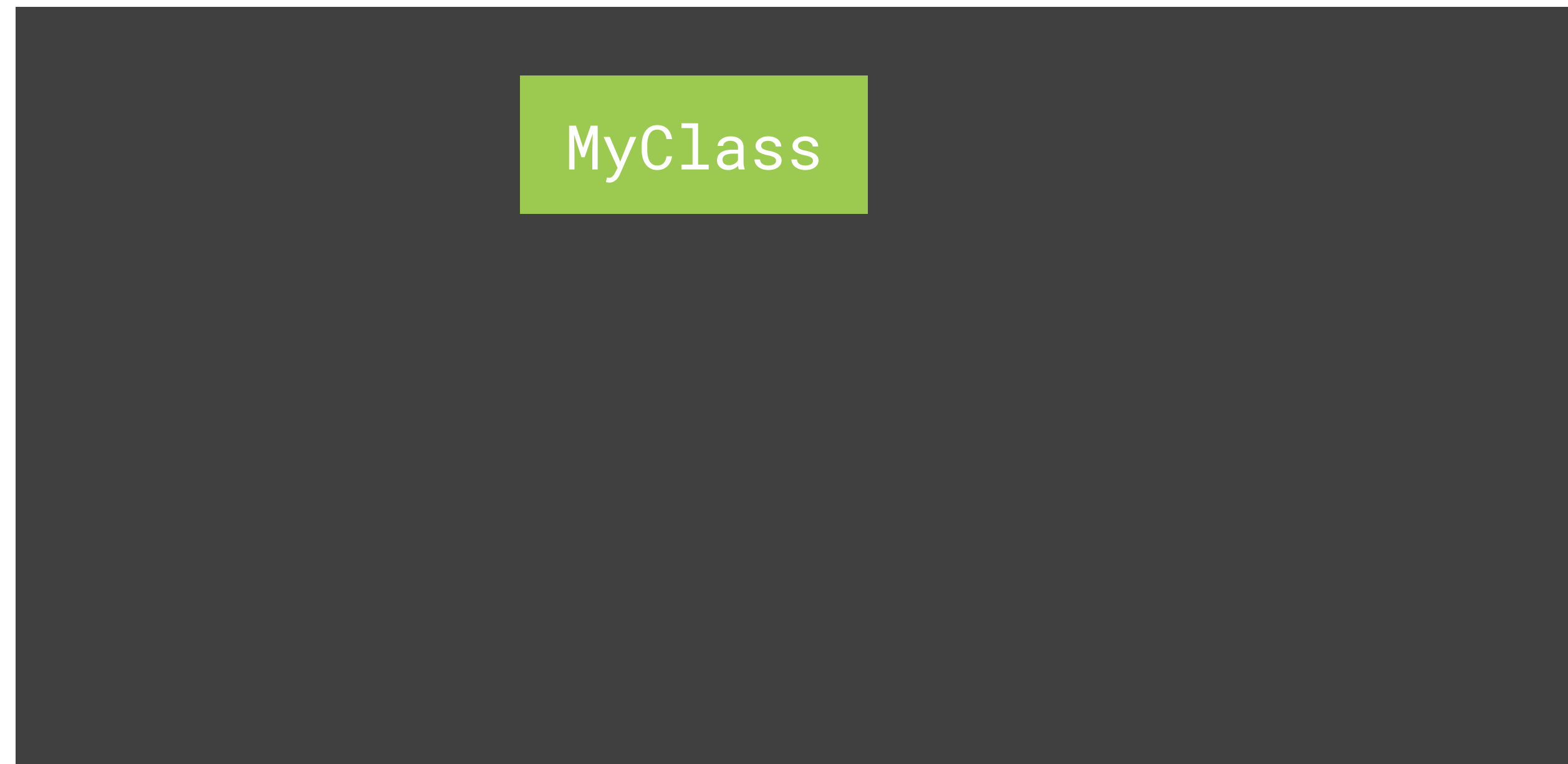
Memory



Automatic Memory Management

Managed Runtime

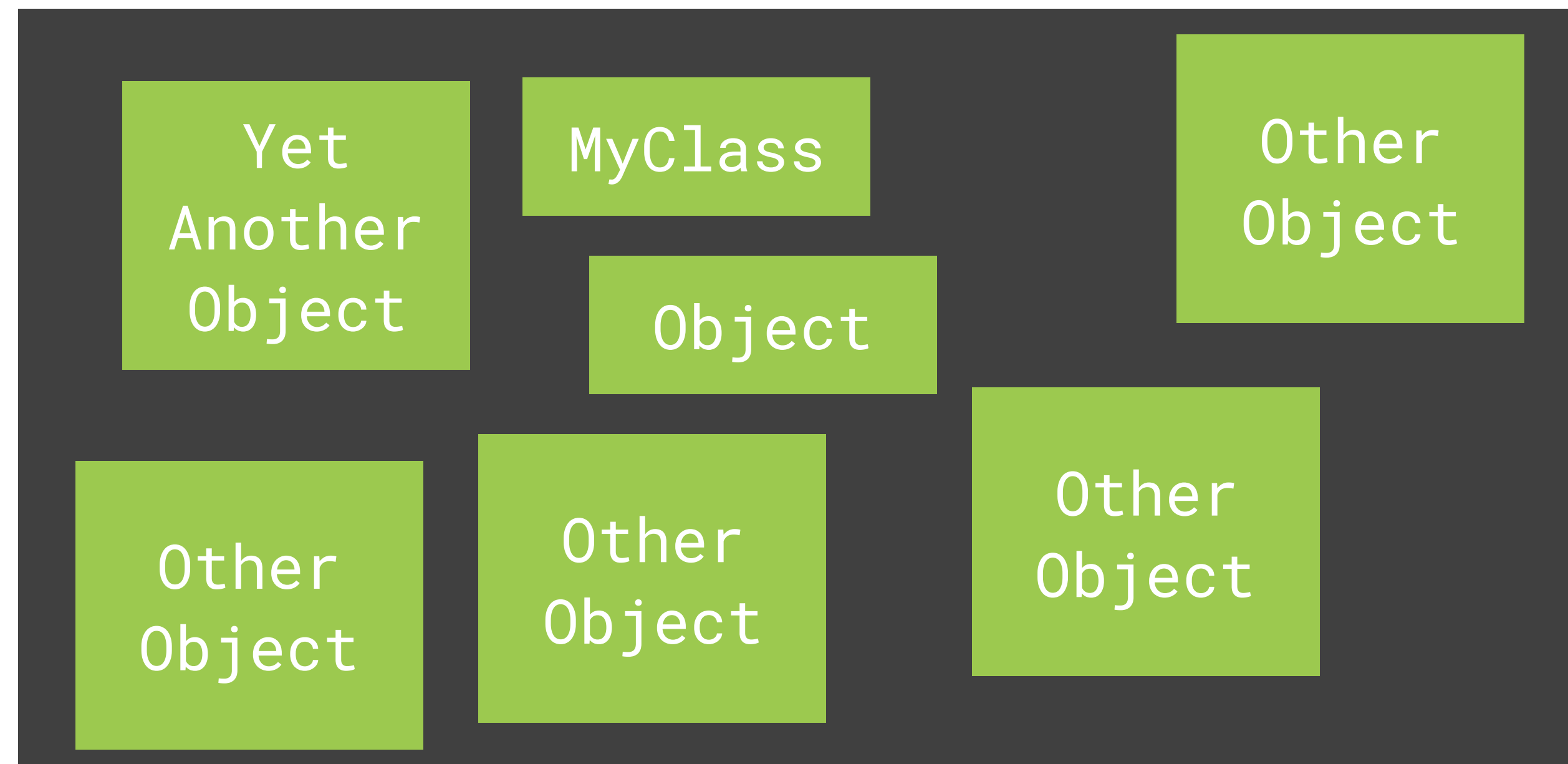
Memory



Automatic Memory Management
Garbage collection

Managed Runtime

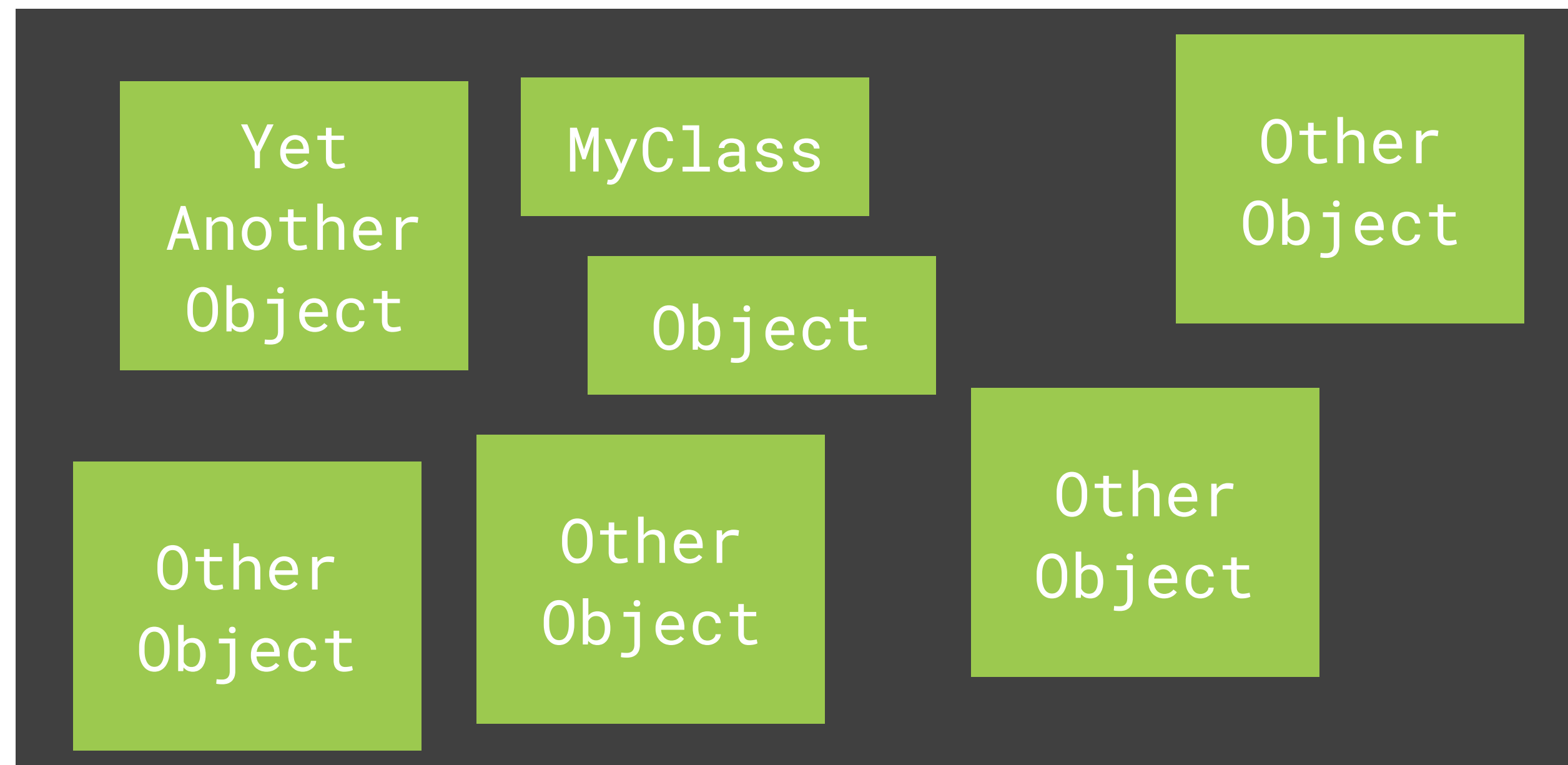
Memory



Automatic Memory Management
Garbage collection

Managed Runtime

Memory

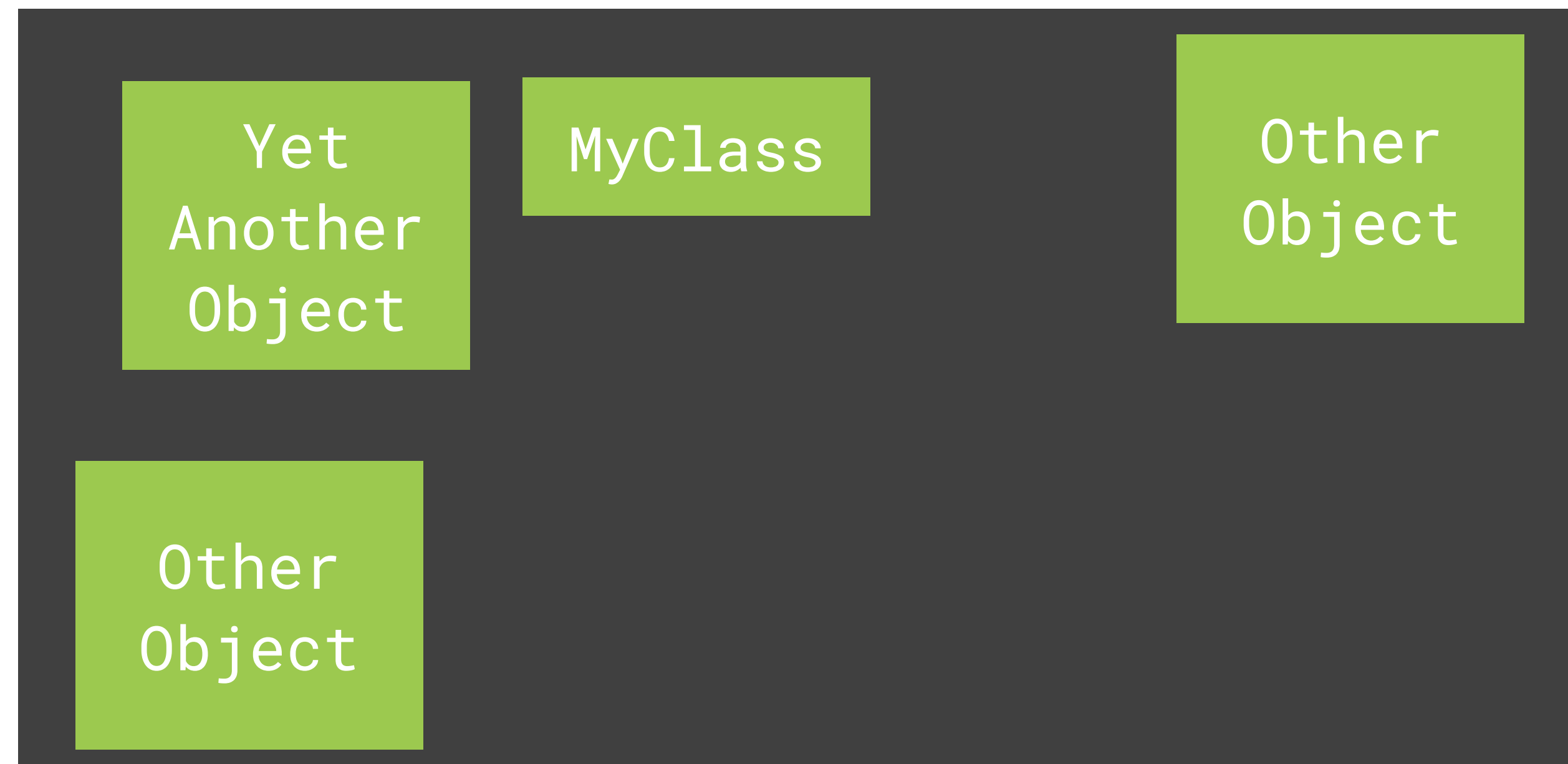


**Garbage
Collector**

Automatic Memory Management
Garbage collection

Managed Runtime

Memory

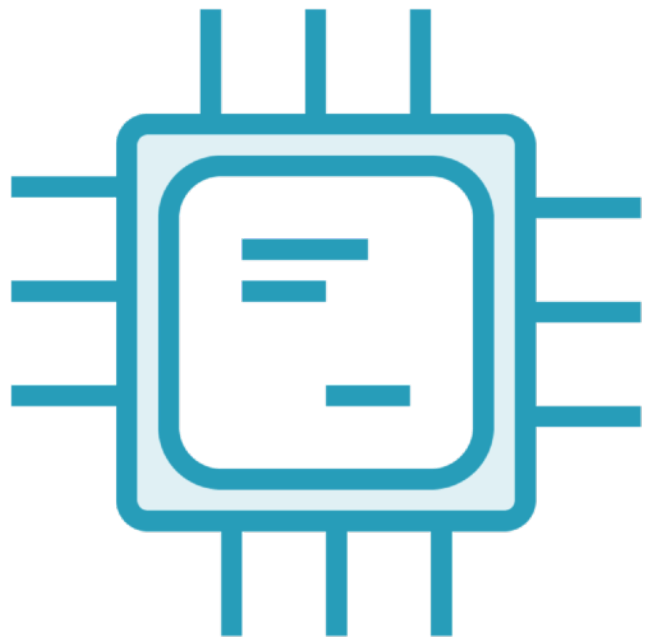


**Garbage
Collector**

Automatic Memory Management
Garbage collection

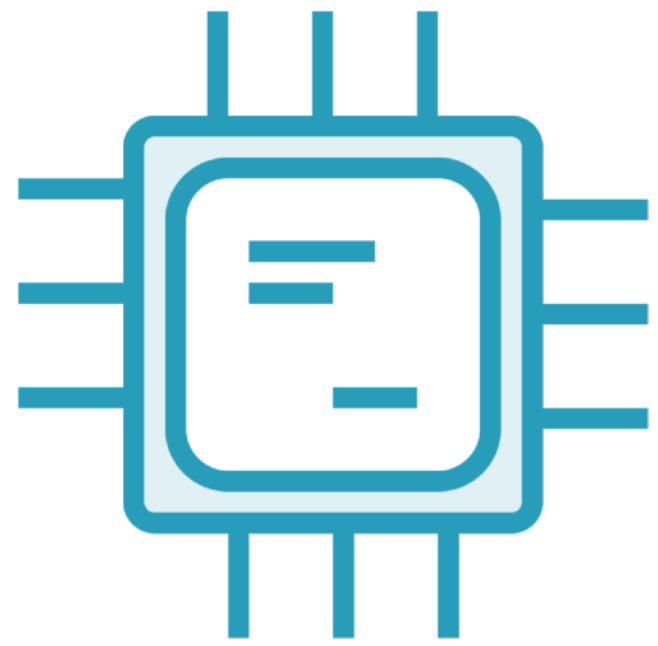
Managed Runtime: Multi-threading

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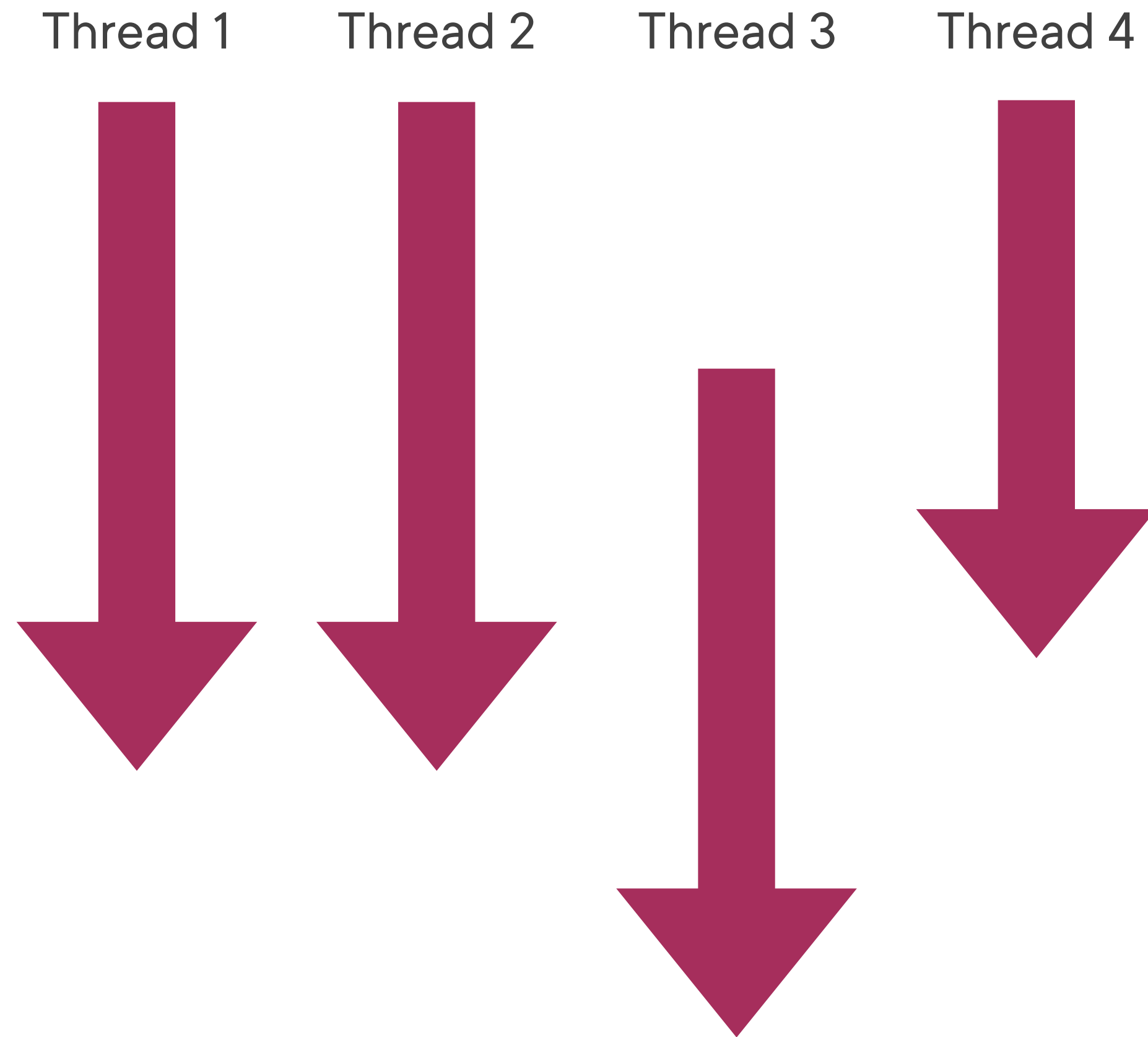


Multi-core
processors

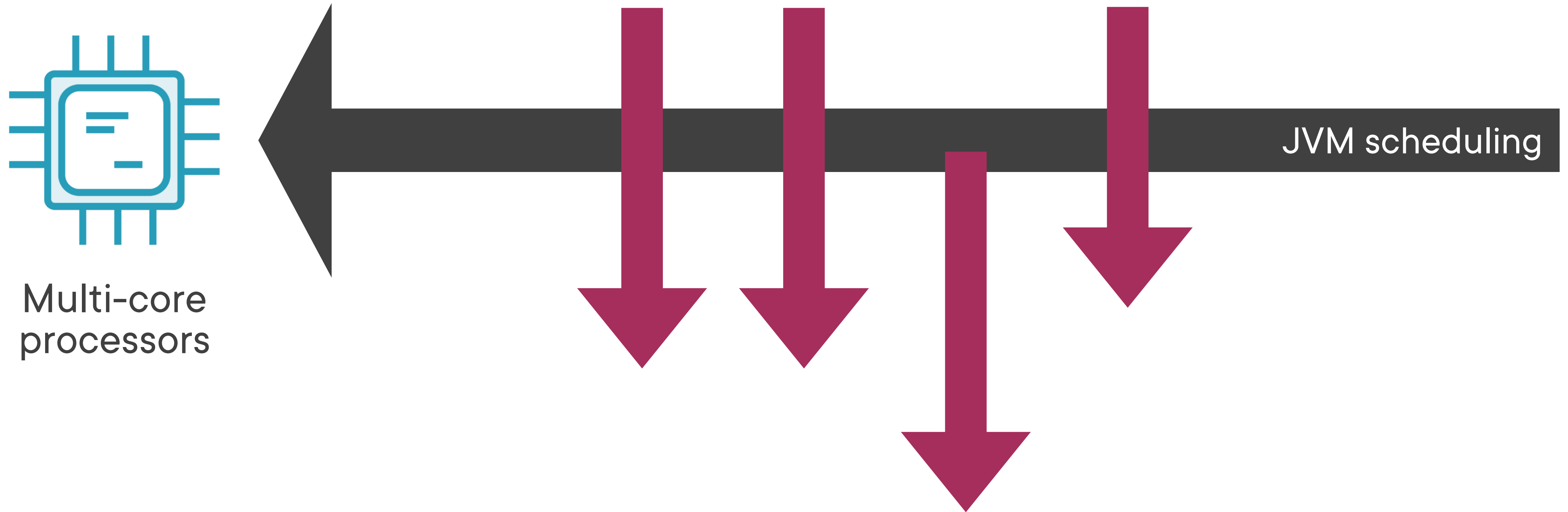
Managed Runtime: Multi-threading



Multi-core
processors



Managed Runtime: Multi-threading



Managed Runtime: Performance



Managed Runtime: Performance



Java Virtual Machine (Windows)



Windows

x86

Managed Runtime: Performance

Just-in-time compilation



Java Virtual Machine (Windows)

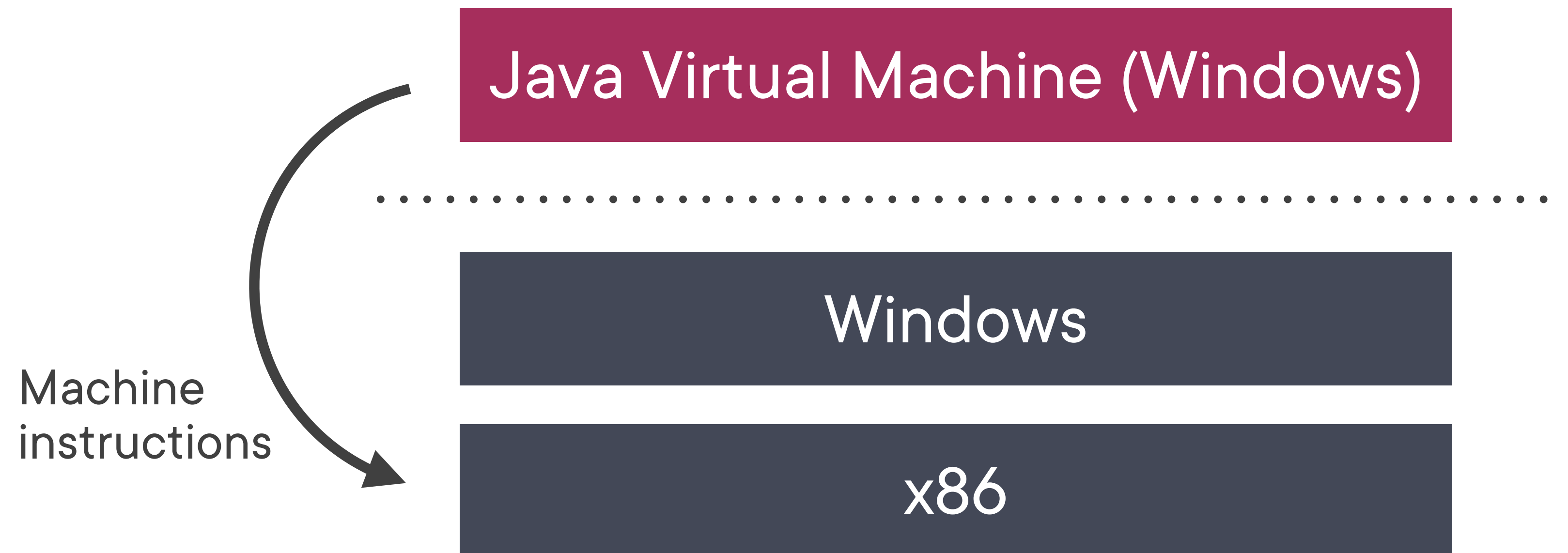


Windows

x86

Managed Runtime: Performance

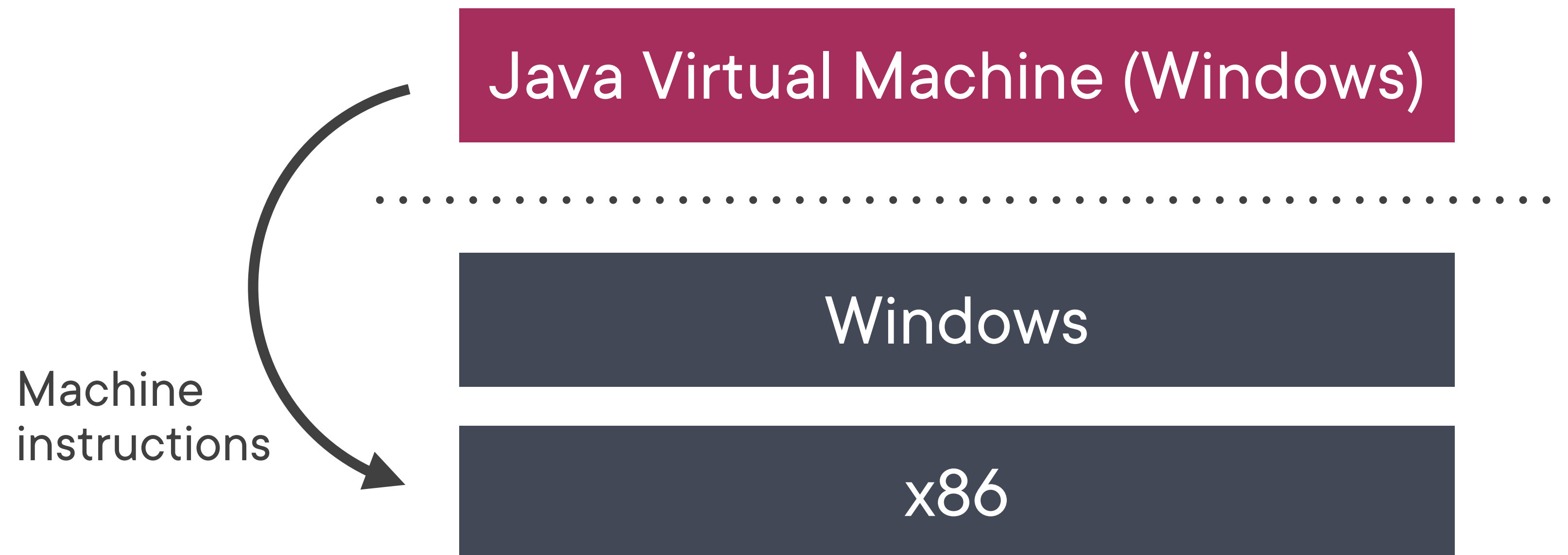
Just-in-time compilation



Managed Runtime: Performance

Just-in-time compilation

Specialized to executing processor

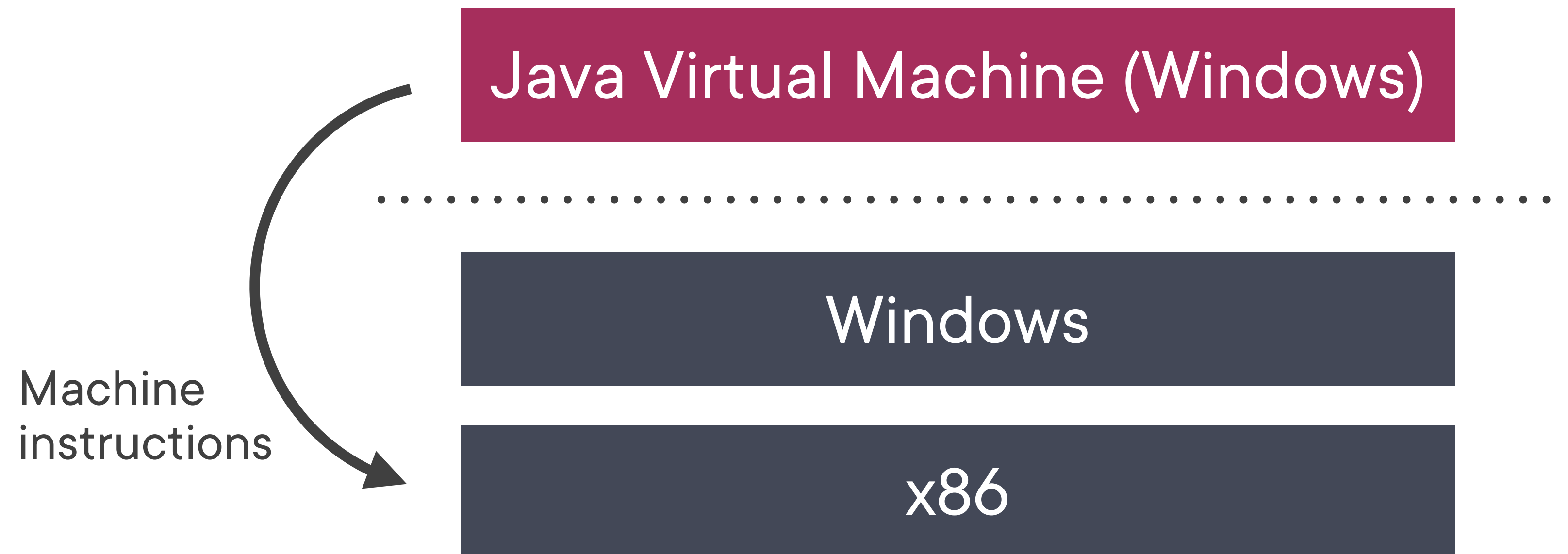


Managed Runtime: Performance

Just-in-time compilation

Specialized to executing processor

Based on actual execution of code



“When web companies grow up,
they turn into Java shops.”

James Governor, RedMonk analyst & co-founder

Comparing Java to Other Languages



Comparing Java to Other Languages

C# / .Net



Comparing Java to Other Languages

C# / .Net

C / C++



Comparing Java to Other Languages

C# / .Net

C / C++

JavaScript



C# / .Net



C# / .Net



Common Language Runtime (CLR): a managed runtime

C# / .Net



Common Language Runtime (CLR): a managed runtime

Intermediate Language (IL): like Java bytecode

C# / .Net



Common Language Runtime (CLR): a managed runtime

Intermediate Language (IL): like Java bytecode



C# / .Net



Common Language Runtime (CLR): a managed runtime

Intermediate Language (IL): like Java bytecode



Wider range of language features

C# / .Net



Common Language Runtime (CLR): a managed runtime

Intermediate Language (IL): like Java bytecode



Wider range of language features

More liberal in breaking backward compatibility

C# / .Net



Common Language Runtime (CLR): a managed runtime

Intermediate Language (IL): like Java bytecode



Wider range of language features

More liberal in breaking backward compatibility

Not originally cross-platform

C / C++



C / C++



Similar syntax

C / C++



Similar syntax



Unmanaged languages

C / C++



Similar syntax



Unmanaged languages

Low-level: more freedom, also more error prone

C / C++



Similar syntax



Unmanaged languages

Low-level: more freedom, also more error prone

Separately compile for each target platform

JavaScript



JavaScript



JavaScript with Node.js: managed runtime

JavaScript



JavaScript with Node.js: managed runtime

High-level code

JavaScript



JavaScript with Node.js: managed runtime

High-level code



JavaScript



JavaScript with Node.js: managed runtime

High-level code



Interpreted language: no compilation

JavaScript



JavaScript with Node.js: managed runtime

High-level code



Interpreted language: no compilation

No static type system

JavaScript



JavaScript with Node.js: managed runtime

High-level code



Interpreted language: no compilation

No static type system (TypeScript!)

JavaScript



JavaScript with Node.js: managed runtime

High-level code



Interpreted language: no compilation

No static type system (TypeScript!)

Single-threaded

Summary

Summary

Summary

Readability & stability

Summary

Readability & stability

Open community, open-source

Summary

Readability & stability

Open community, open-source

Object-oriented on managed runtime