OPEN SOURCE CONFERENCE 2021
DRIVE INTO SPACE

-

Space trip powered by Ordina

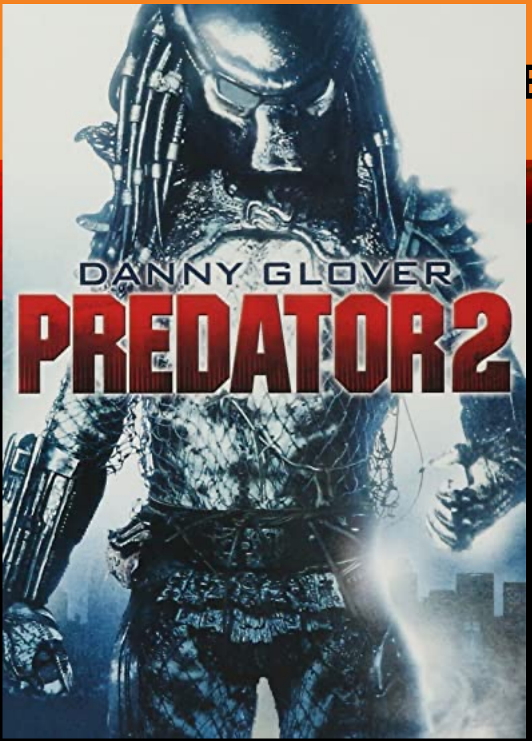
@ivonet

September 28st, 2021

DRIVE INTO SPACE

Sounds a bit like a movie title doesn’t it?

EREN


DANNY GLOVER
PREDATOR 2

SCHWARZENEGGER
TOTAL RECALL
4K RESTORATION
2020 MONSTER FEST

STEVEN SPIELBERG PRESENTS
BACK TO THE FUTURE PART III
A ROBERT ZEMECKIS FILM

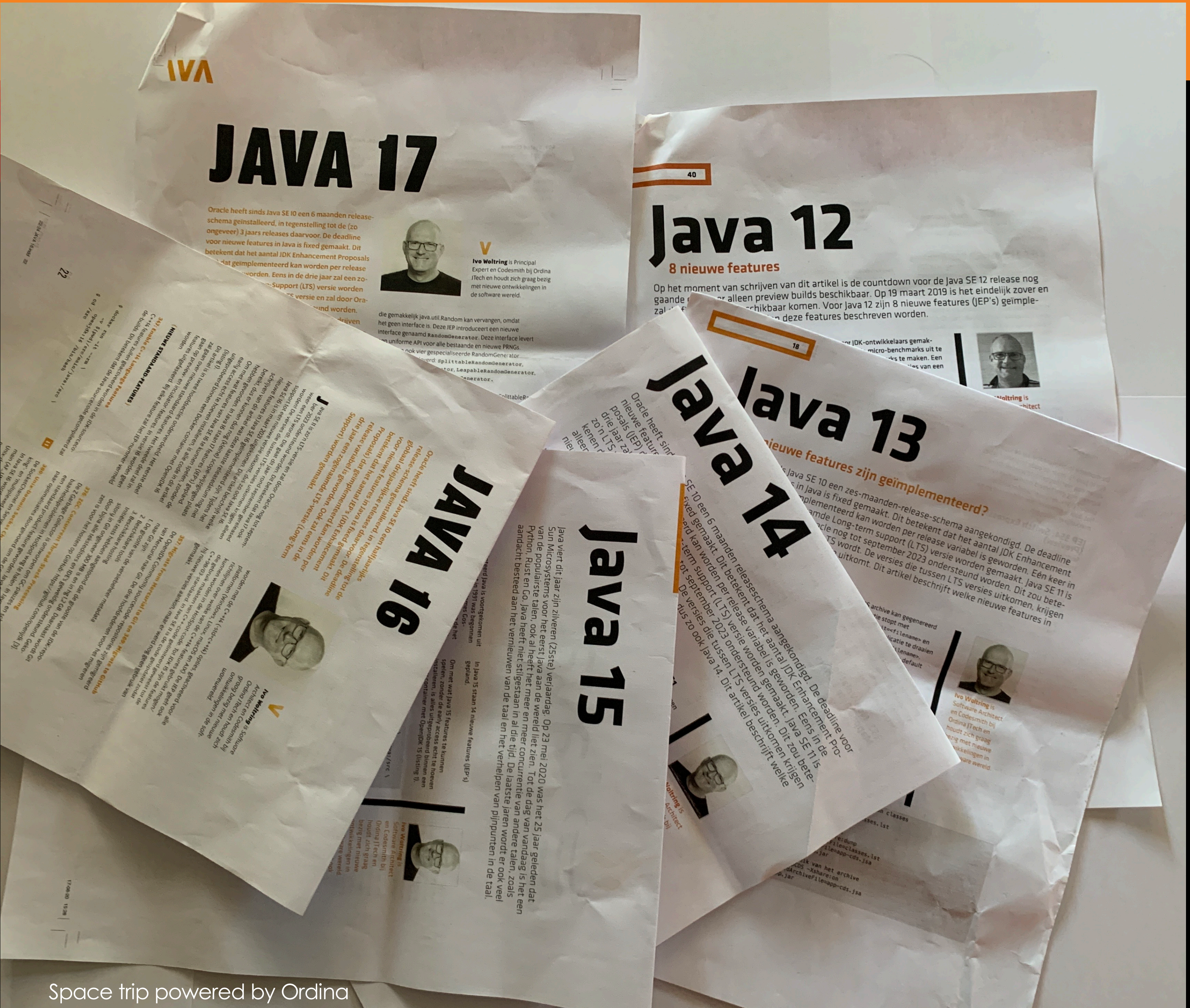
SPACE INVADERS
FOREVER

1990

IVO WOLTRING

- Principal Expert @ Ordina
- Codesmith
- Editor Java Magazine (NLJUG)
- Blogger (www.ivonet.nl)

- @ivonet



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JAVA JAVA
JAVA JAVA
JING JING JING

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September 28st, 2021

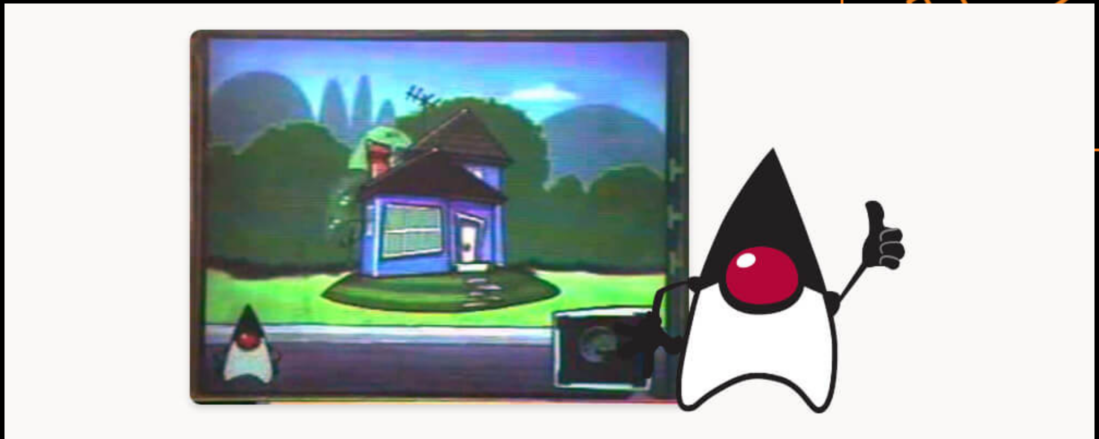
1991

STAR TREK VI
THE UNDISCOVERED COUNTRY
COMPOSED AND CONDUCTED BY CLIFF EIDELM

GREEN TEAM

http://obsoletetellyemuseum.blogspot.com/ ©2010 Frank Sharp.

TV'S IN 1991



STAR 7

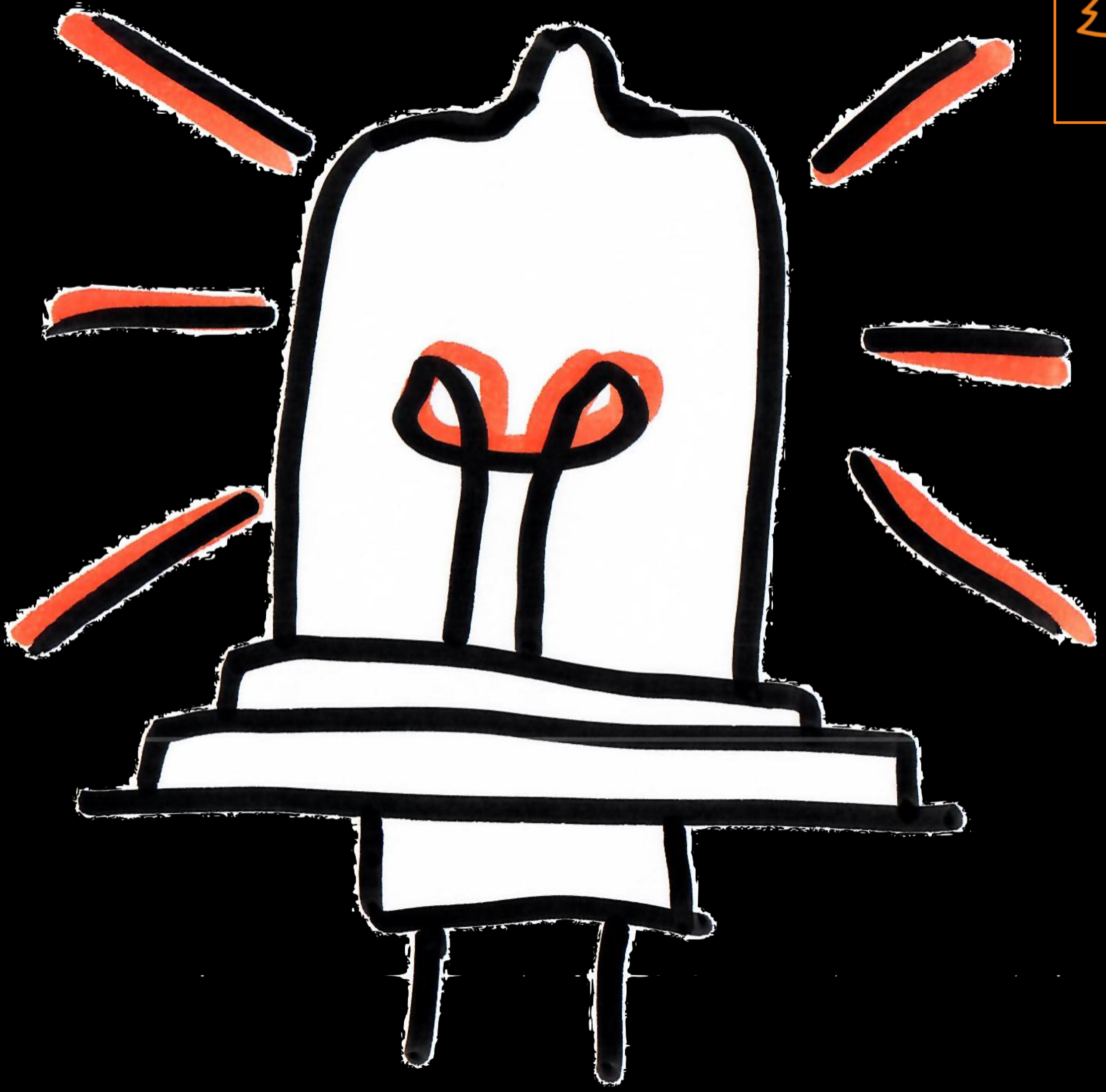
THE JOURNEY REALLY BEGINS

JAVA™
Java™
1996 - 2003
2003 - NOW

GENTLE REMINDER: SELFIE!

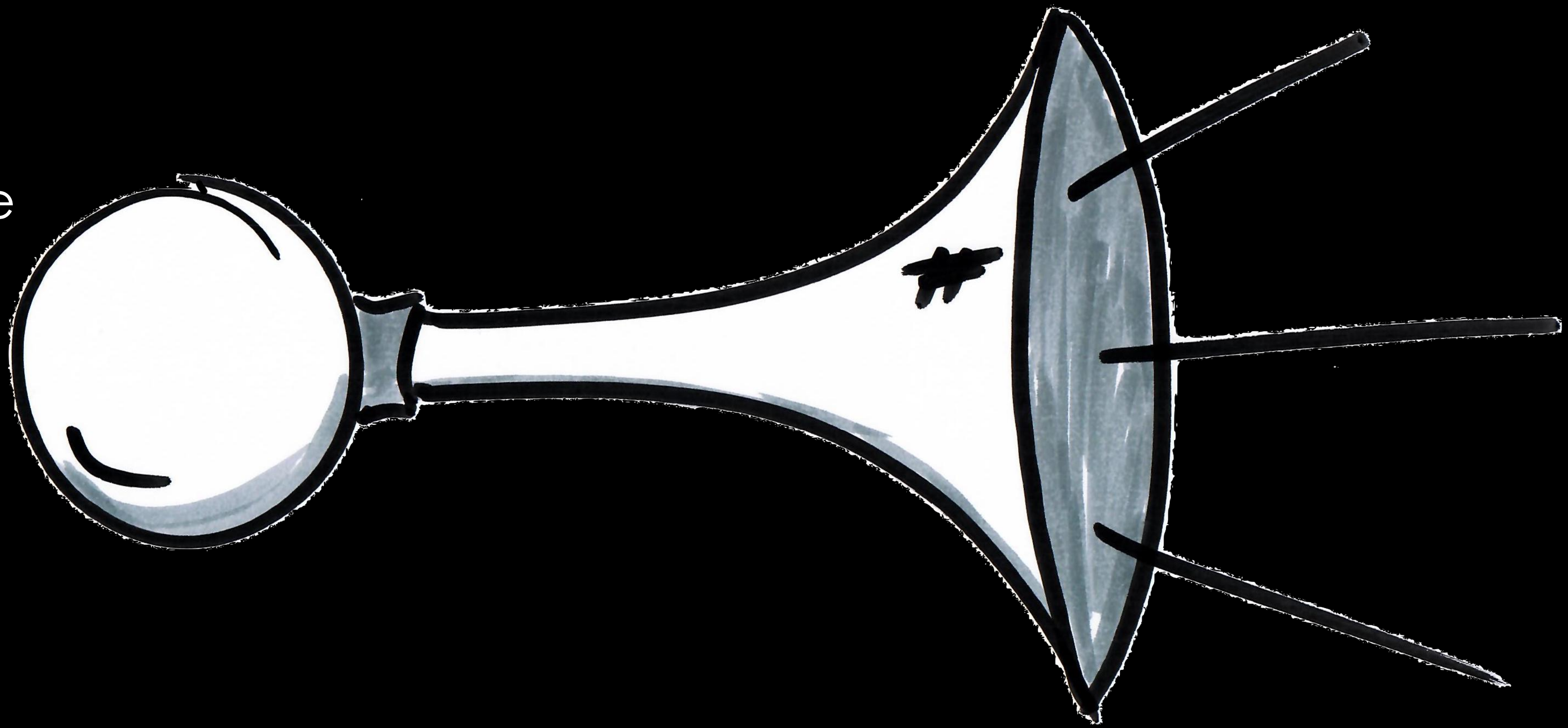
LIGHT

Let there be light!



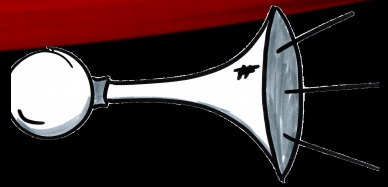
SOUND

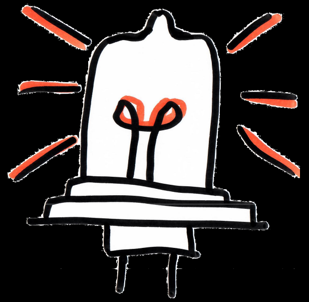
- Let us make some noise!



QUESTION

What was the first name of the language later called Java?





Greentalk

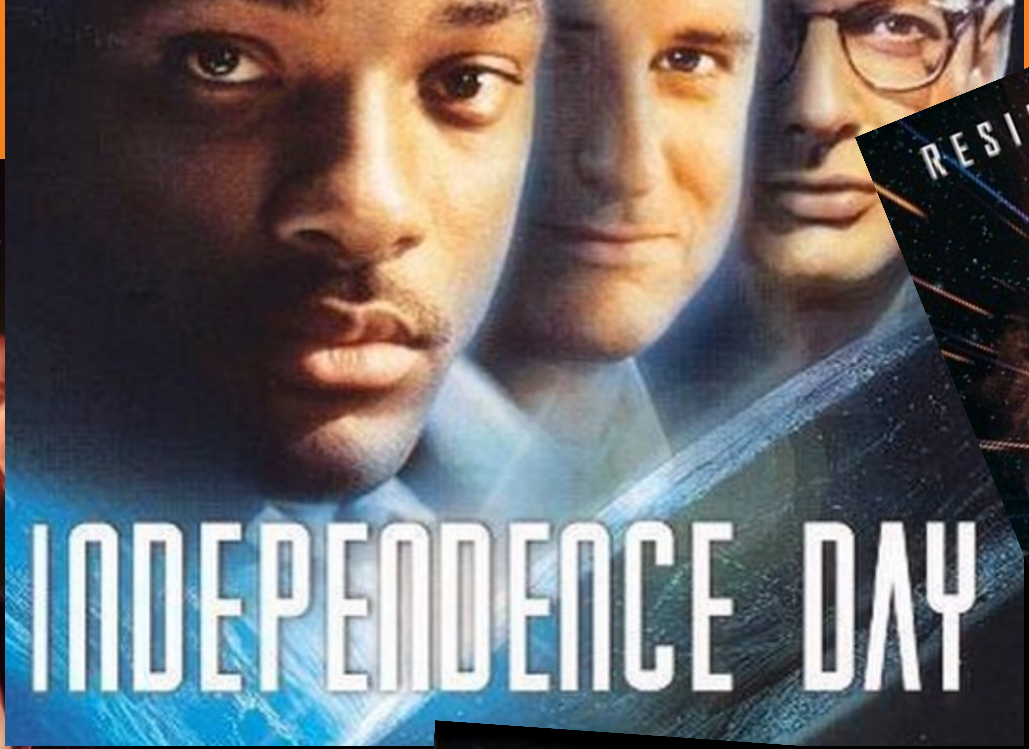
Oak

ANSWER

Greentalk

*.gt

OPEN SOURCE CONFERENCE 2021



1996

1996

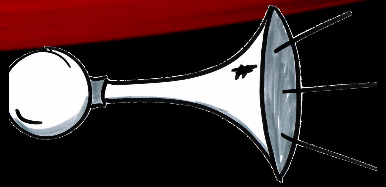
Sun's Worldwide Java Developer Conference

May 29–31, 1996 • Moscone Convention Center • San Francisco, CA

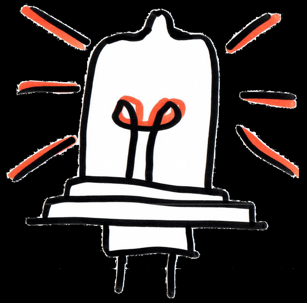
Java Development Kit 1.0 is released.

QUESTION

In which version was "Generics" introduced?



1.2



1.5

ANSWER

1.5

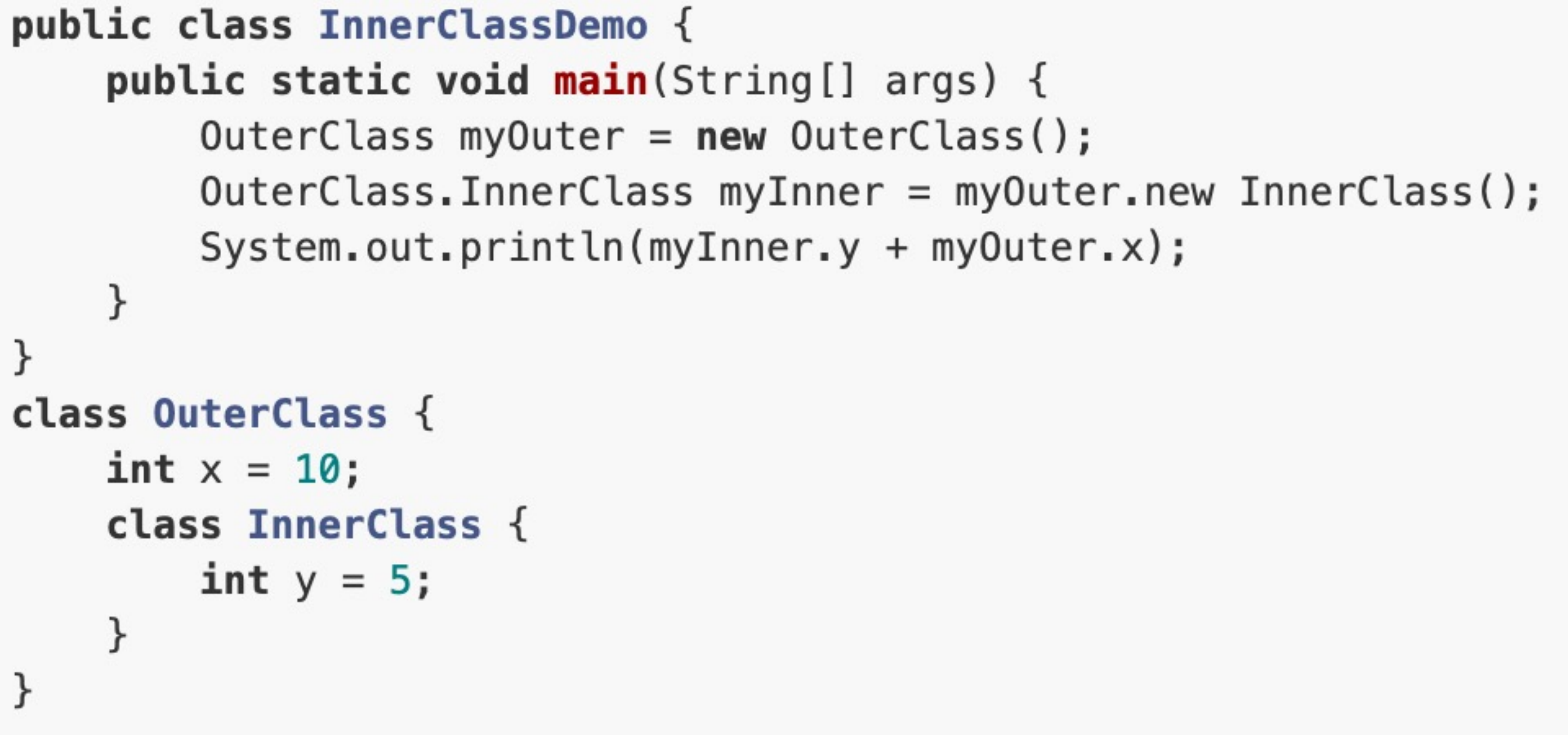
Also called Java 5.0

1996 - 2004

1.1 – 1.4

Java 1.1

INNER CLASSES

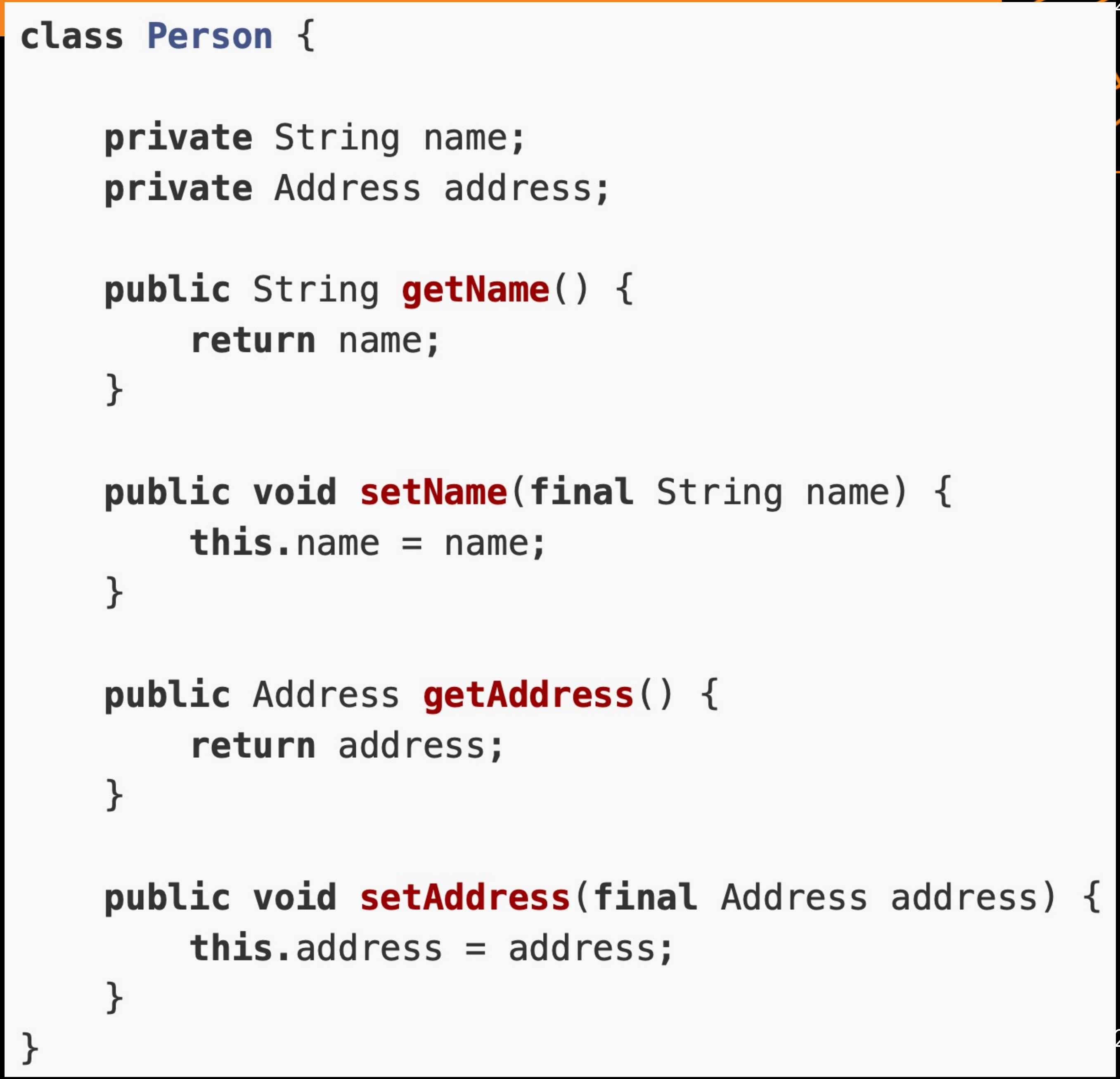


```
public class InnerClassDemo {
    public static void main(String[] args) {
        OuterClass myOuter = new OuterClass();
        OuterClass.InnerClass myInner = myOuter.new InnerClass();
        System.out.println(myInner.y + myOuter.x);
    }
}
class OuterClass {
    int x = 10;
    class InnerClass {
        int y = 5;
    }
}
```

1.1 – 1.4

Java 1.1

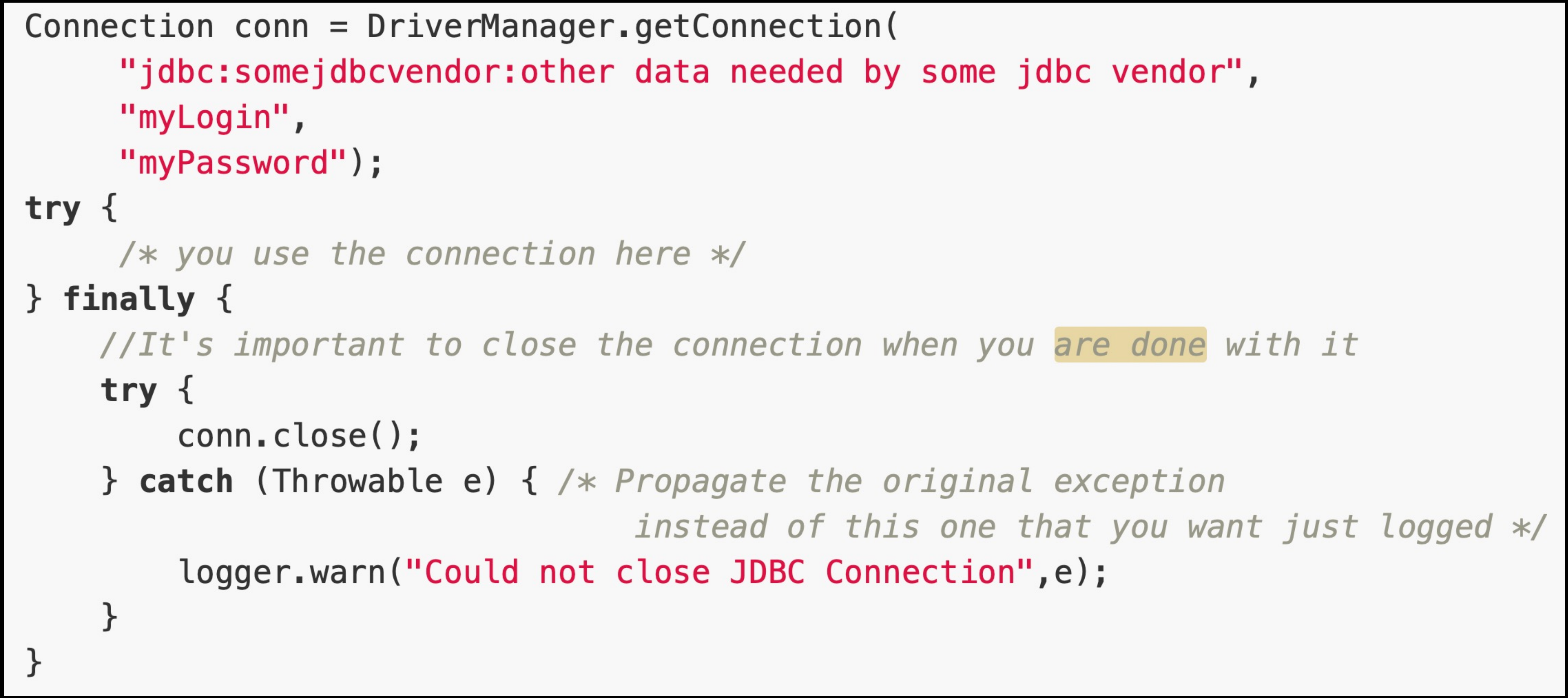
JAVABEANS



```
class Person {

    private String name;
    private Address address;

    public String getName() {
        return name;
    }

    public void setName(final String name) {
        this.name = name;
    }

    public Address getAddress() {
        return address;
    }

    public void setAddress(final Address address) {
        this.address = address;
    }
}
```

1.1 – 1.4 JDBC

Java 1.1

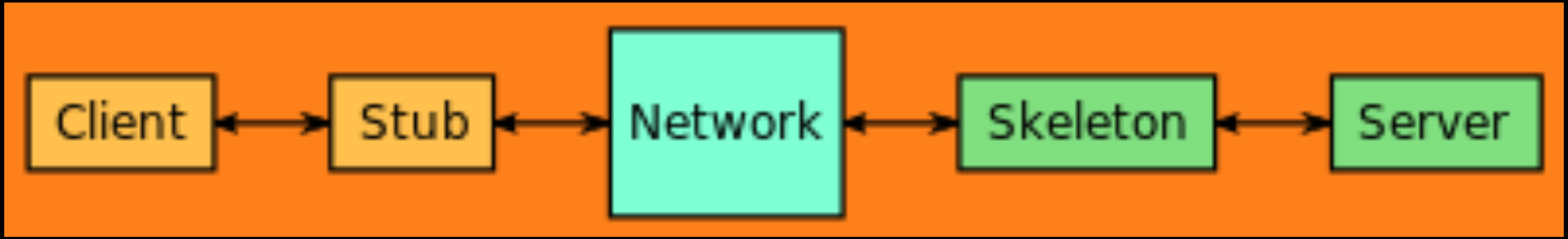


```
Connection conn = DriverManager.getConnection(
     "jdbc:somejdbcvendor:other data needed by some jdbc vendor",
     "myLogin",
     "myPassword");
try {
     /* you use the connection here */
} finally {
    //It's important to close the connection when you are done with it
    try {
        conn.close();
    } catch (Throwable e) { /* Propagate the original exception
                                instead of this one that you want just logged */
        logger.warn("Could not close JDBC Connection",e);
    }
}
```

1.1 – 1.4

RMI

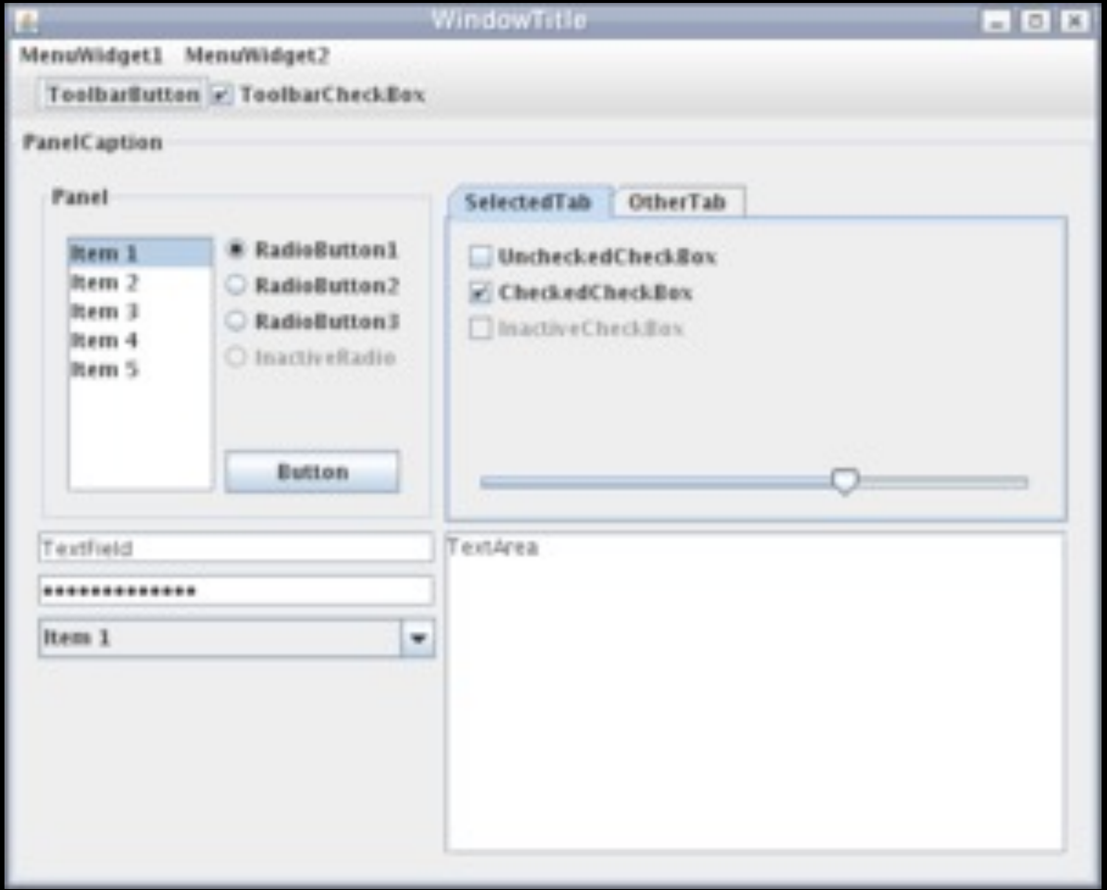
Java 1.1



1.1 – 1.4

Java 1.2

SWING



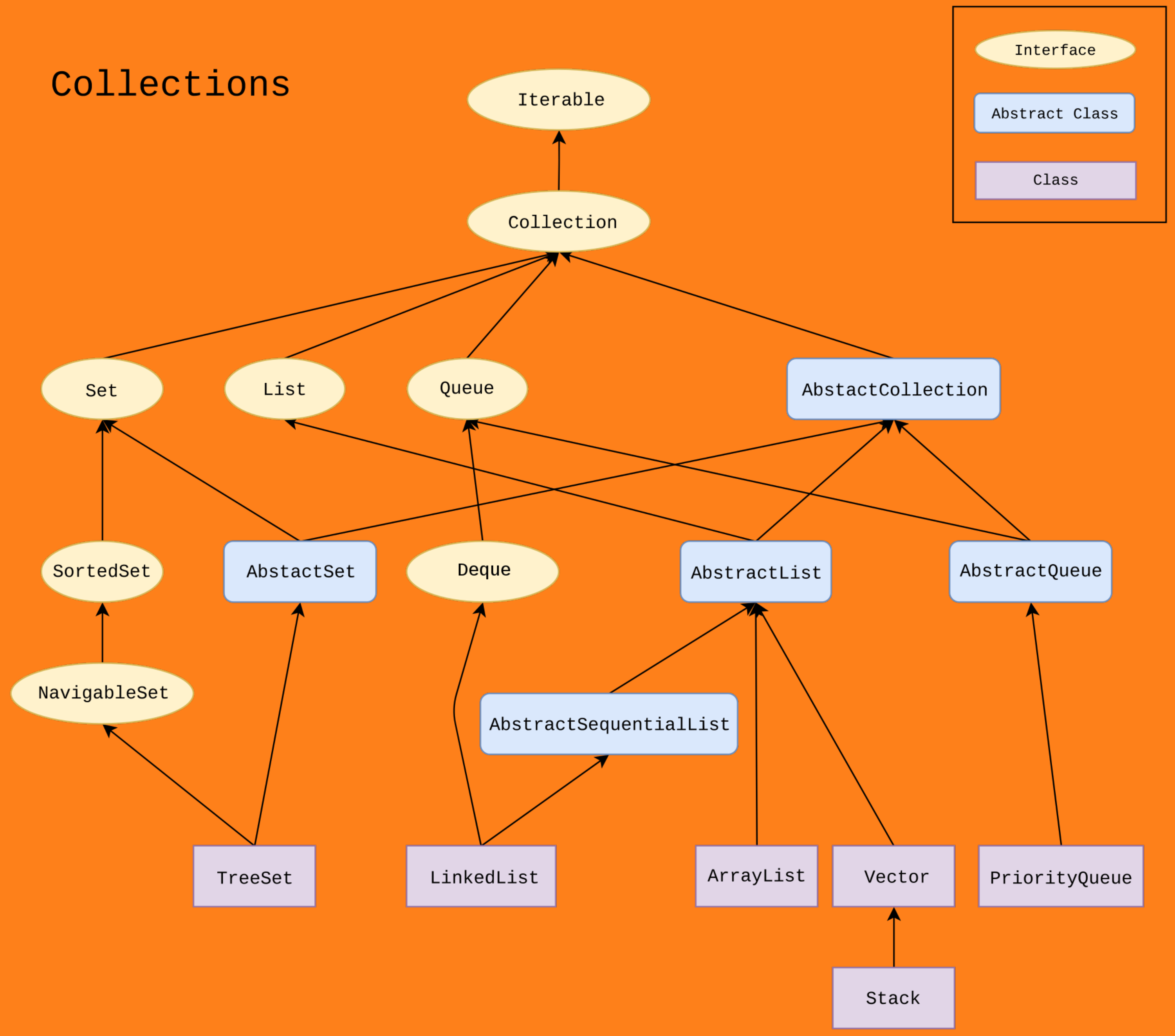
1.1 – 1.4

Java 1.2

COLLECTIONS FRAMEWORK

Joshua bloch

Collections



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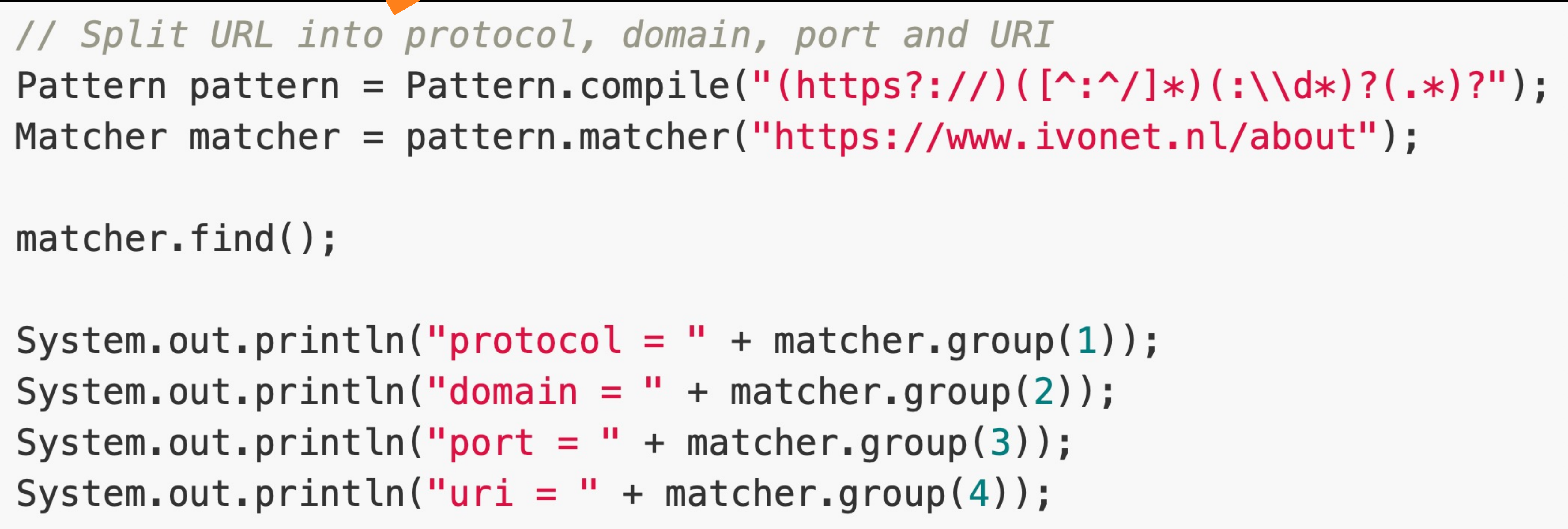
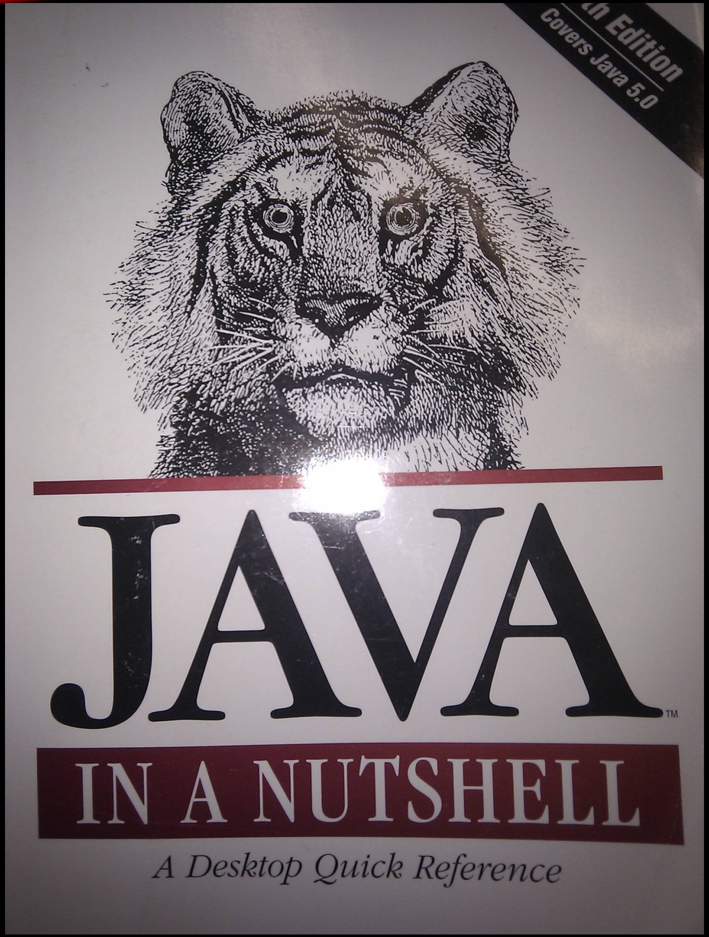
1.1 – 1.4 REGEX LIKE PERL

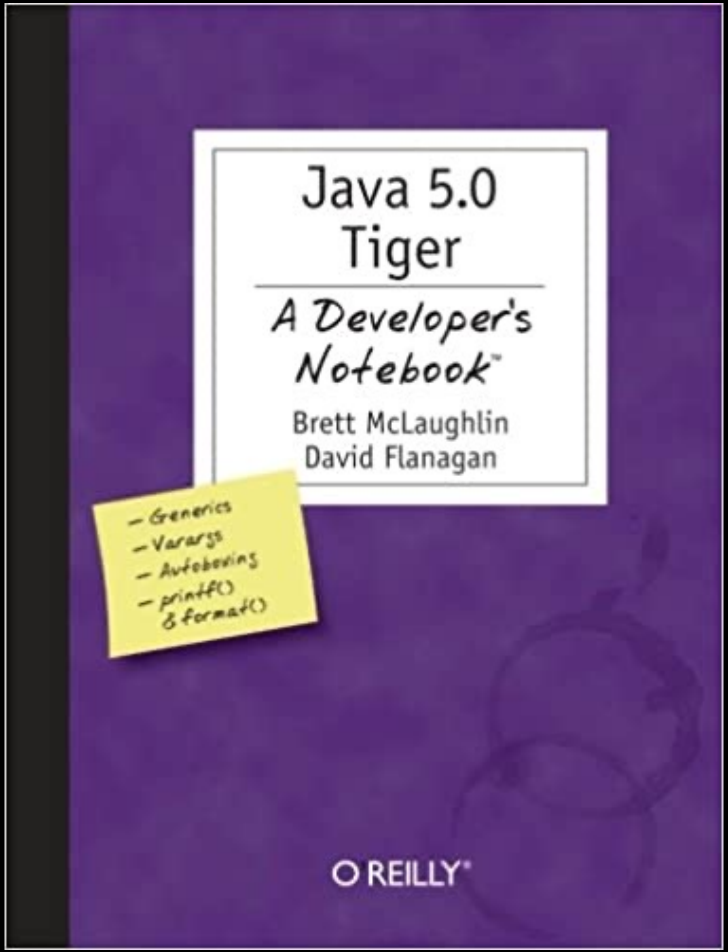
Java 1.4



```
// Split URL into protocol, domain, port and URI
Pattern pattern = Pattern.compile("(https?://)([^:^/]*)(:\\d*)?(.*)?");
Matcher matcher = pattern.matcher("https://www.ivonet.nl/about");

matcher.find();

System.out.println("protocol = " + matcher.group(1));
System.out.println("domain = " + matcher.group(2));
System.out.println("port = " + matcher.group(3));
System.out.println("uri = " + matcher.group(4));
```

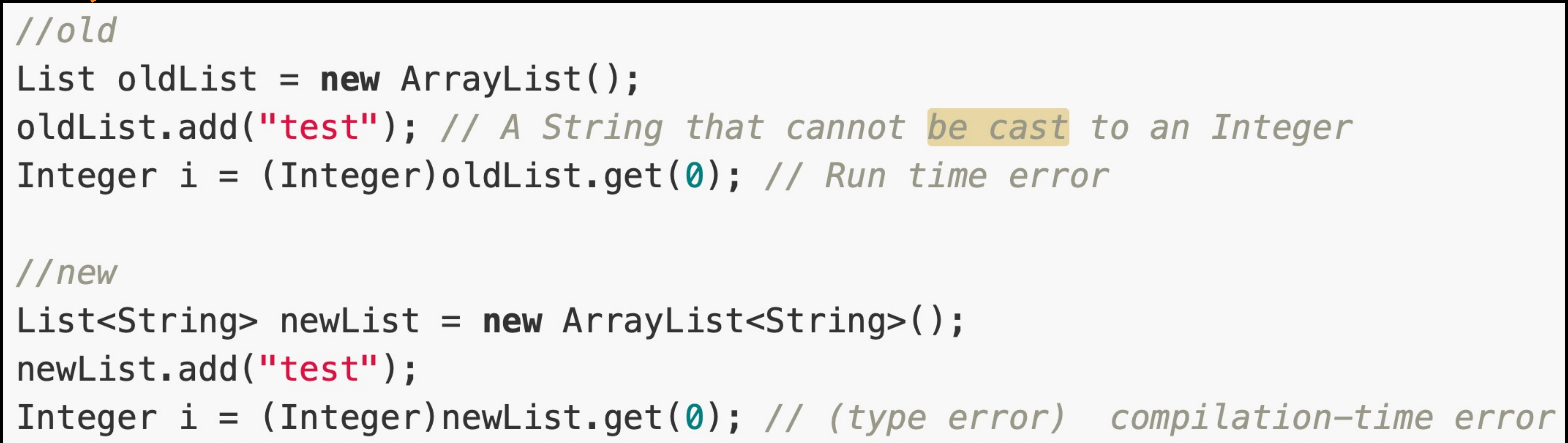
2004


h Edition
Covers Java 5.0
JAVA
IN A NUTSHELL
A Desktop Quick Reference


Java 5.0
Tiger
A Developer's Notebook
Brett McLaughlin
David Flanagan
- Generics
- Varargs
- Autoboxing
- printf()
& format()
O'REILLY

GENERICS

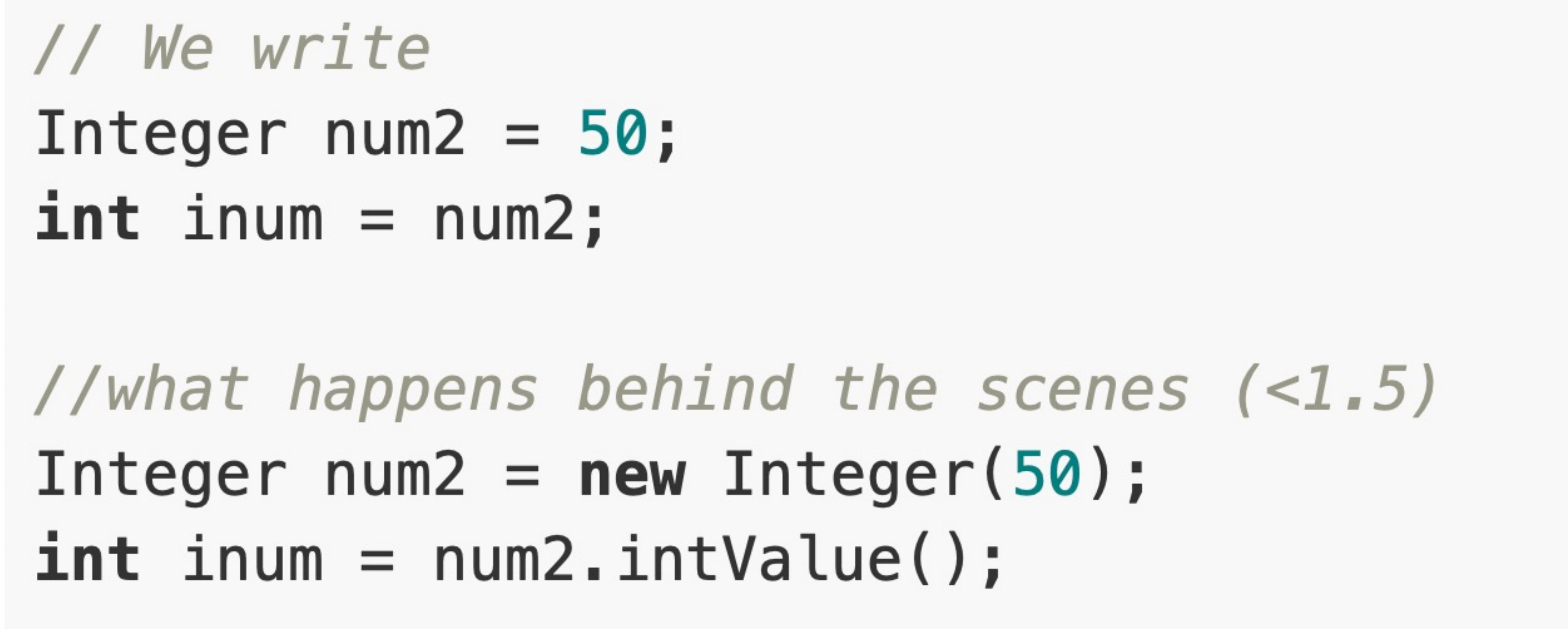
Java 5.0



```
//old
List oldList = new ArrayList();
oldList.add("test"); // A String that cannot be cast to an Integer
Integer i = (Integer)oldList.get(0); // Run time error

//new
List<String> newList = new ArrayList<String>();
newList.add("test");
Integer i = (Integer)newList.get(0); // (type error)  compilation-time error
```

AUTOBOXING

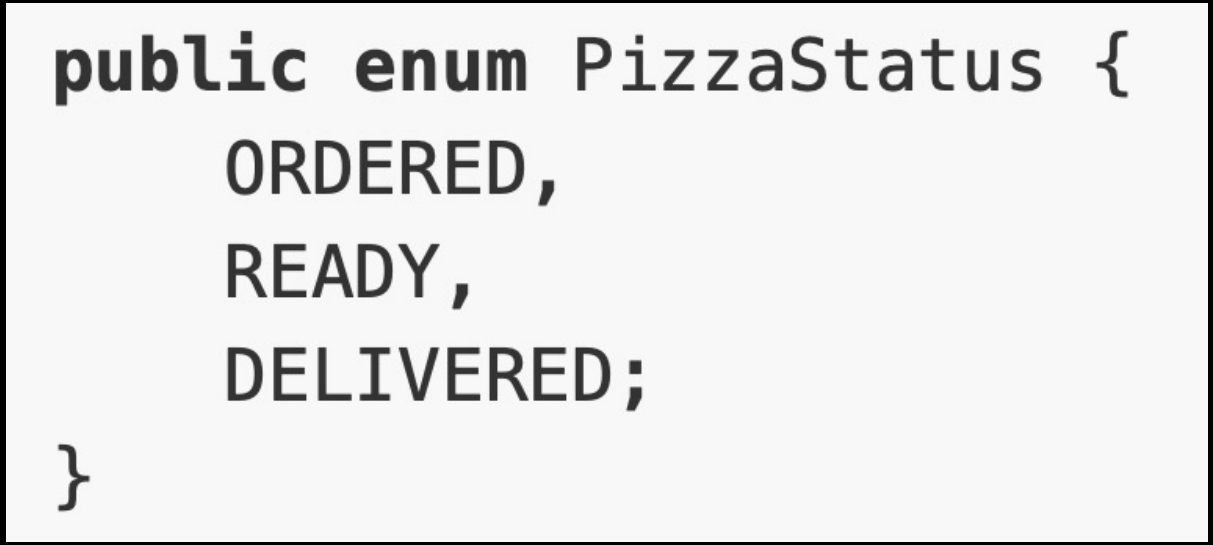
Java 5.0



```
// We write
Integer num2 = 50;
int inum = num2;

//what happens behind the scenes (<1.5)
Integer num2 = new Integer(50);
int inum = num2.intValue();
```

ENUMS

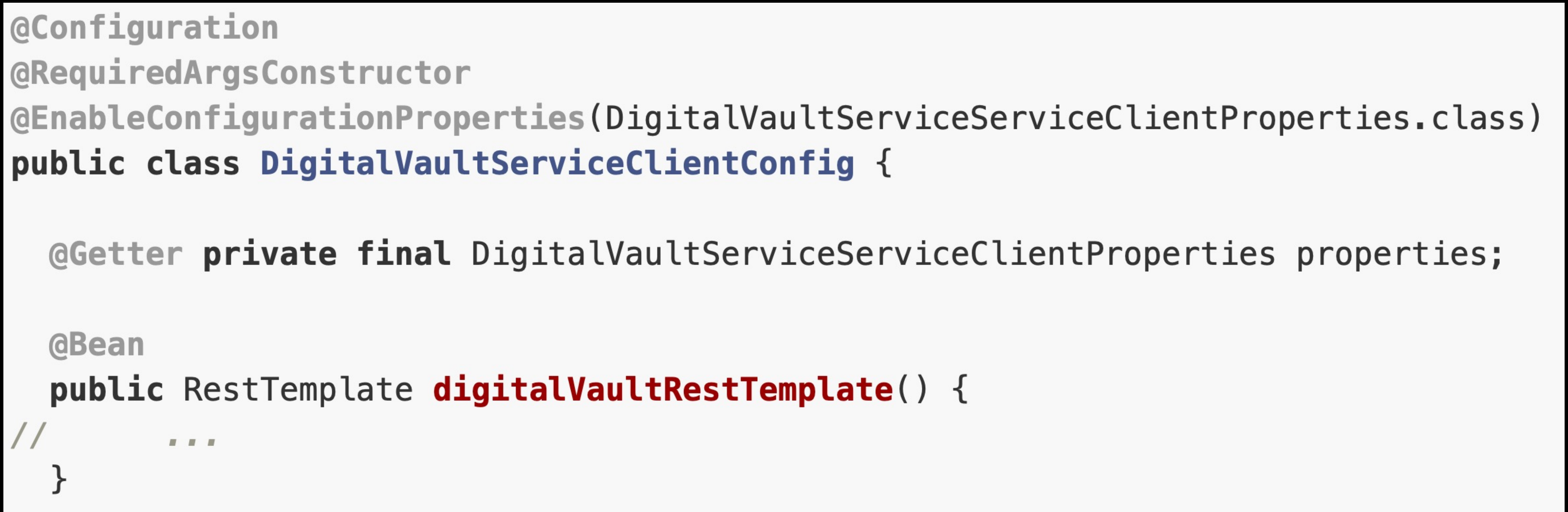
Java 5.0



```
public enum PizzaStatus {
    ORDERED,
    READY,
    DELIVERED;
}
```

ANNOTATIONS (METADATA)

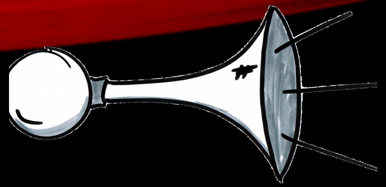
Java 5.0

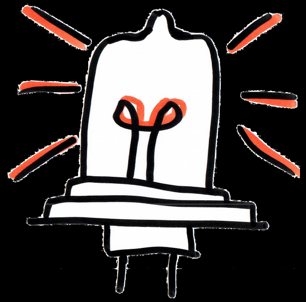


```
@Configuration
@RequiredArgsConstructor
@EnableConfigurationProperties(DigitalVaultServiceServiceClientProperties.class)
public class DigitalVaultServiceClientConfig {

  @Getter private final DigitalVaultServiceServiceClientProperties properties;

  @Bean
  public RestTemplate digitalVaultRestTemplate() {
//      ...
  }
```

2005

2006-2008





or

2009-2013

THE
HUNGER GAMES

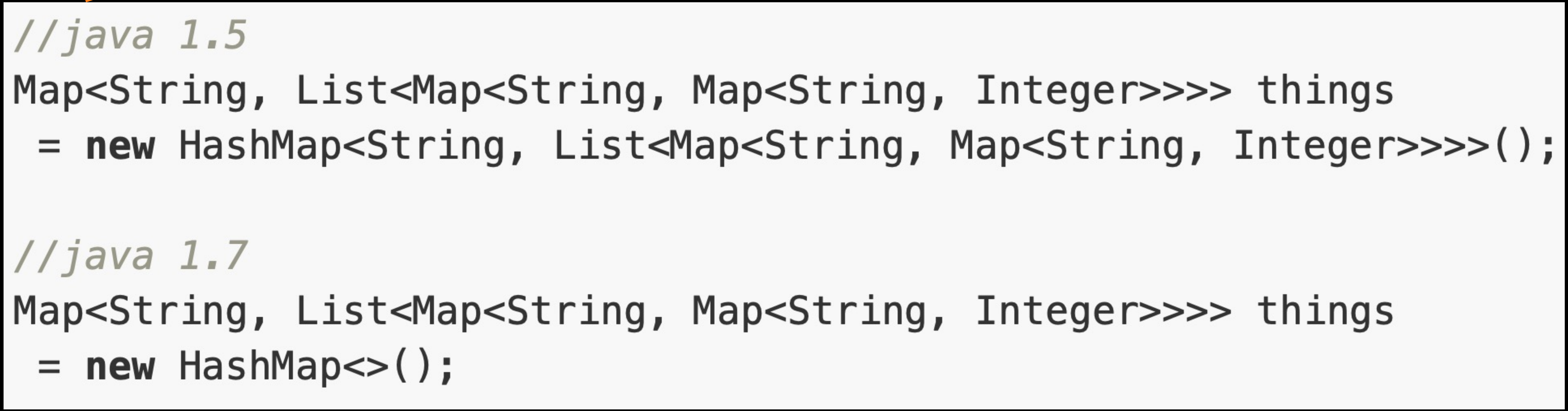
GREEN LANTERN

TRON
LEGAC

MINECRAFT
JAVA EDITION

GENERICS IMPROVED

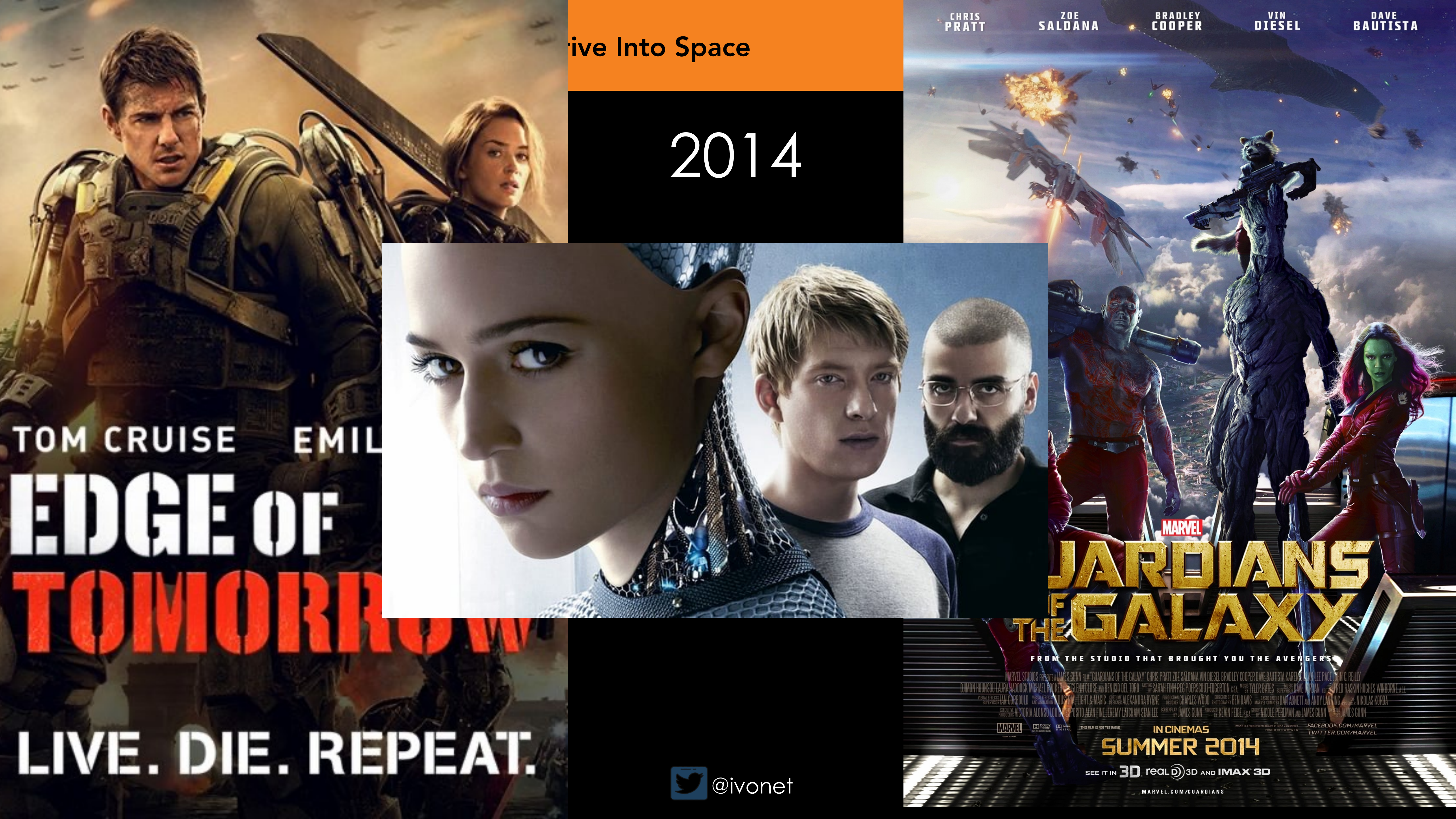
Java 1.7



```
//java 1.5
Map<String, List<Map<String, Map<String, Integer>>>> things
 = new HashMap<String, List<Map<String, Map<String, Integer>>>>();

//java 1.7
Map<String, List<Map<String, Map<String, Integer>>>> things
 = new HashMap<>();
```

ive Into Space

2014

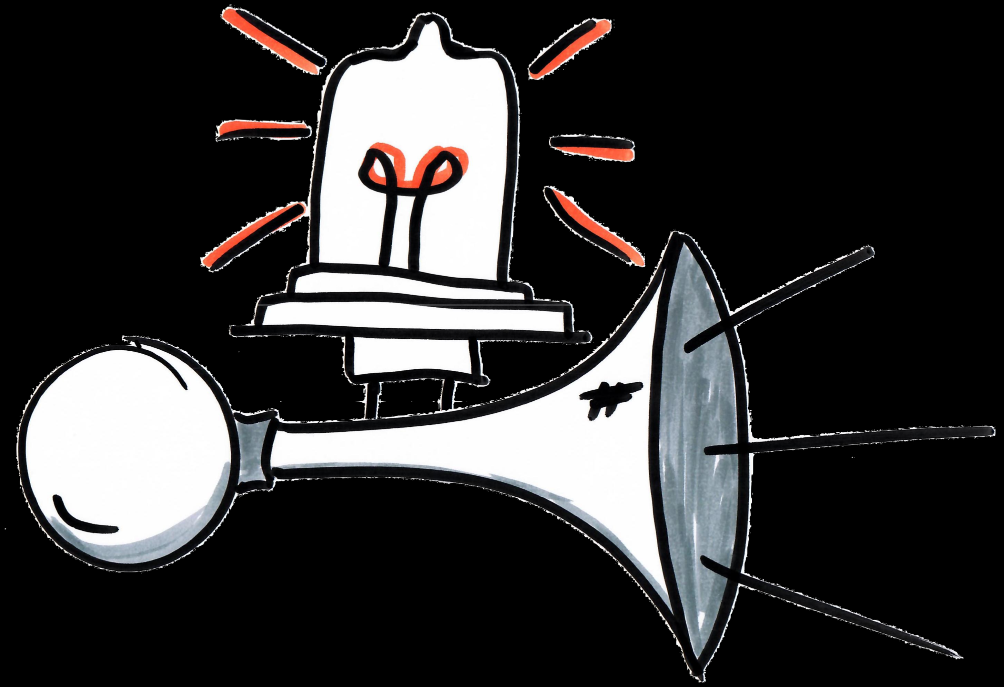


@ivonet

2014

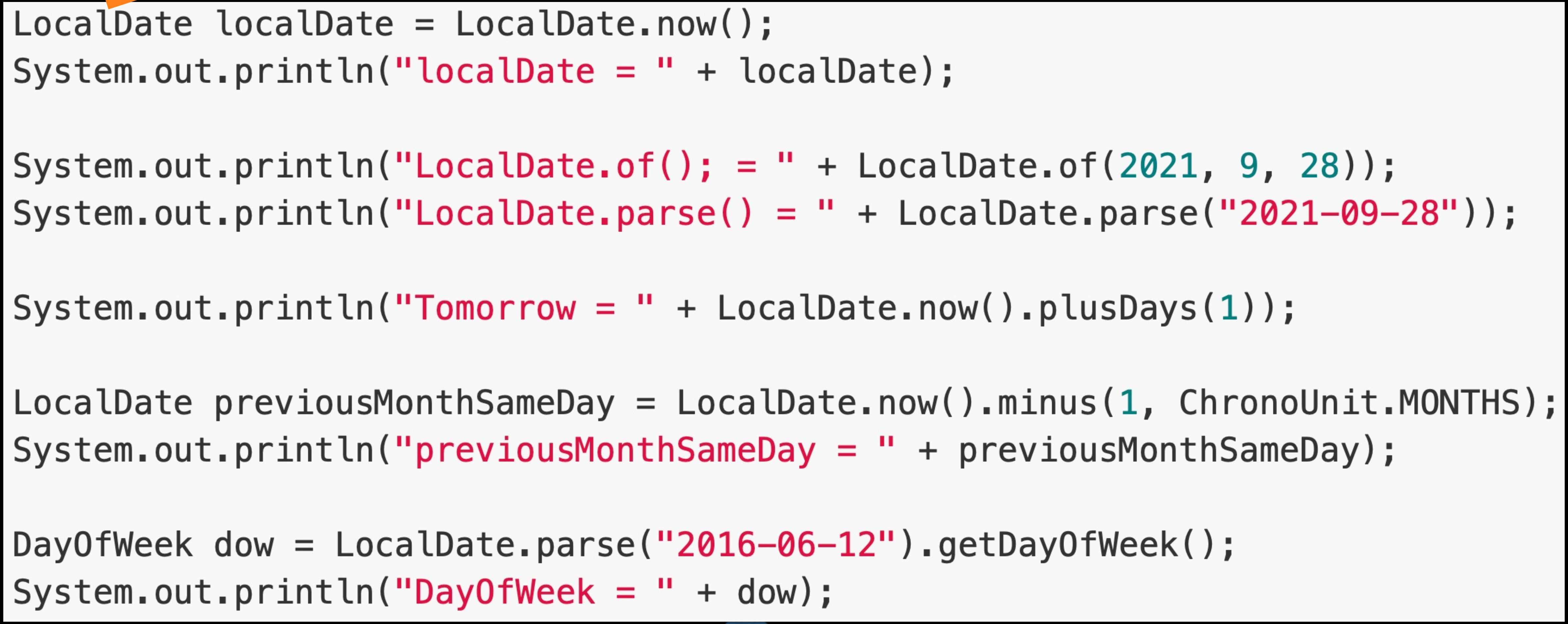
Neues in Java 8
Martin Piskernig
Lambdas
Streams
java.time
Java 8 New Features
Functional Java
Java SE 8 for the Really Impatient
Java 8 Die Neuerungen
Java 8
Beginning Java 8 Fundamentals
Java8
Java 8 Prático
Java 8 Streams
How to Kick Ass with Lambdas
Java 8 eSampler
Java 8 Lambdas
Pocket Java 8
Java 8 Streams
Beginning Java 8 APIs, Extensions and Libraries
Apress
Beginning Java 8 Language Features
Java 8 in Action
Java 8 Recipes
Java 8 -kirja
Java 8 Die Neuerungen
APOGEO

JAVA <8, 8, 11, ...?



DATETIME API

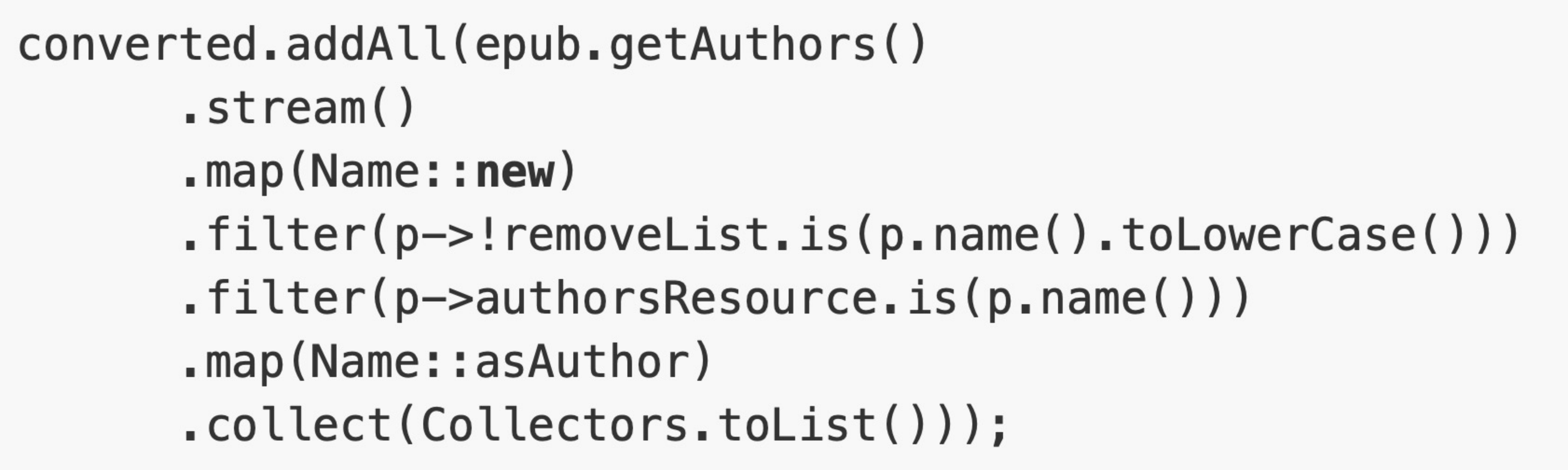
Java 8



```
LocalDate localDate = LocalDate.now();
System.out.println("localDate = " + localDate);

System.out.println("LocalDate.of(); = " + LocalDate.of(2021, 9, 28));
System.out.println("LocalDate.parse() = " + LocalDate.parse("2021-09-28"));

System.out.println("Tomorrow = " + LocalDate.now().plusDays(1));

LocalDate previousMonthSameDay = LocalDate.now().minus(1, ChronoUnit.MONTHS);
System.out.println("previousMonthSameDay = " + previousMonthSameDay);

DayOfWeek dow = LocalDate.parse("2016-06-12").getDayOfWeek();
System.out.println("DayOfWeek = " + dow);
```

STREAMS

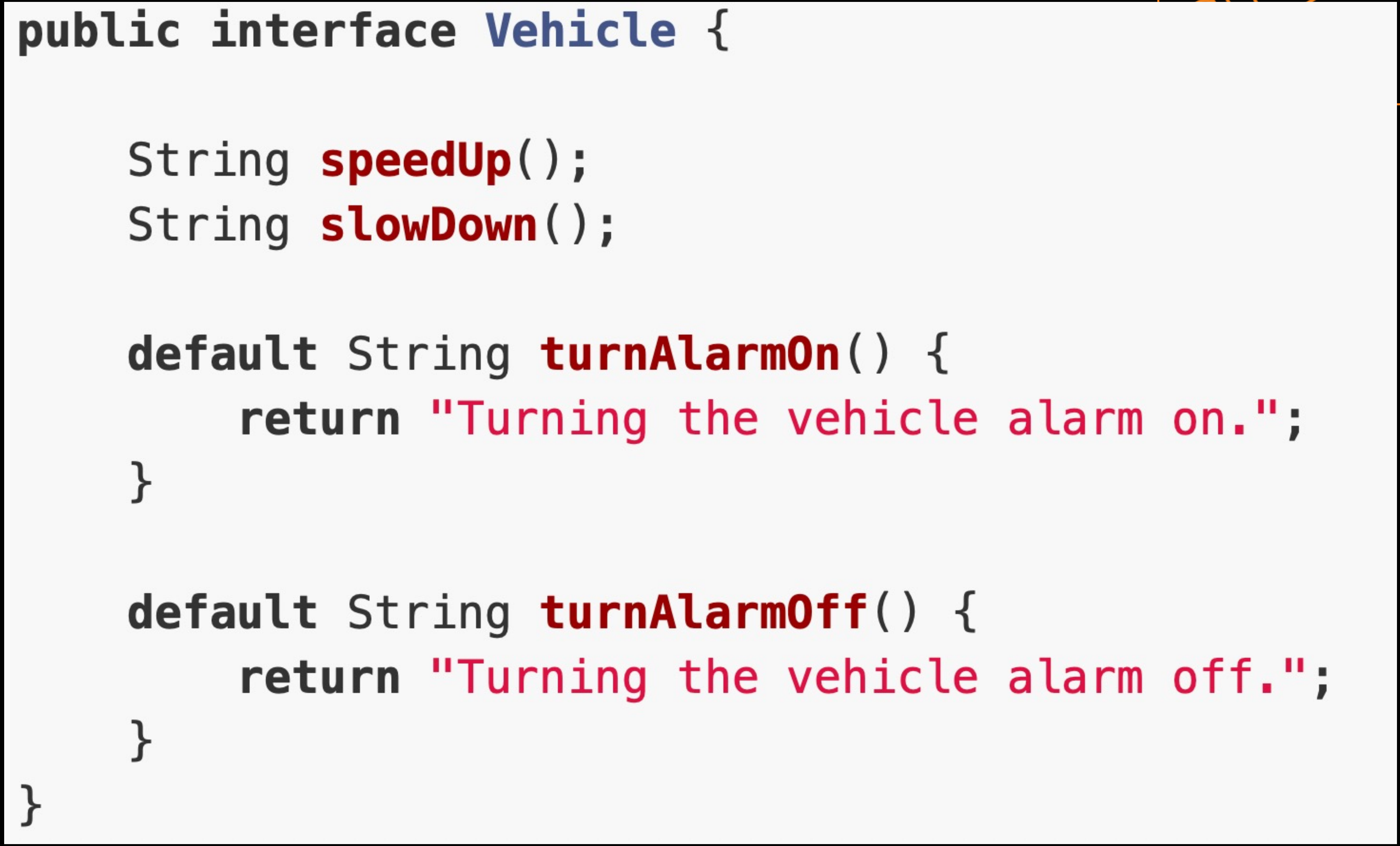
Java 8



```
converted.addAll(epub.getAuthors()
      .stream()
      .map(Name::new)
      .filter(p->!removeList.is(p.name().toLowerCase()))
      .filter(p->authorsResource.is(p.name()))
      .map(Name::asAuthor)
      .collect(Collectors.toList()));
```

Java 8

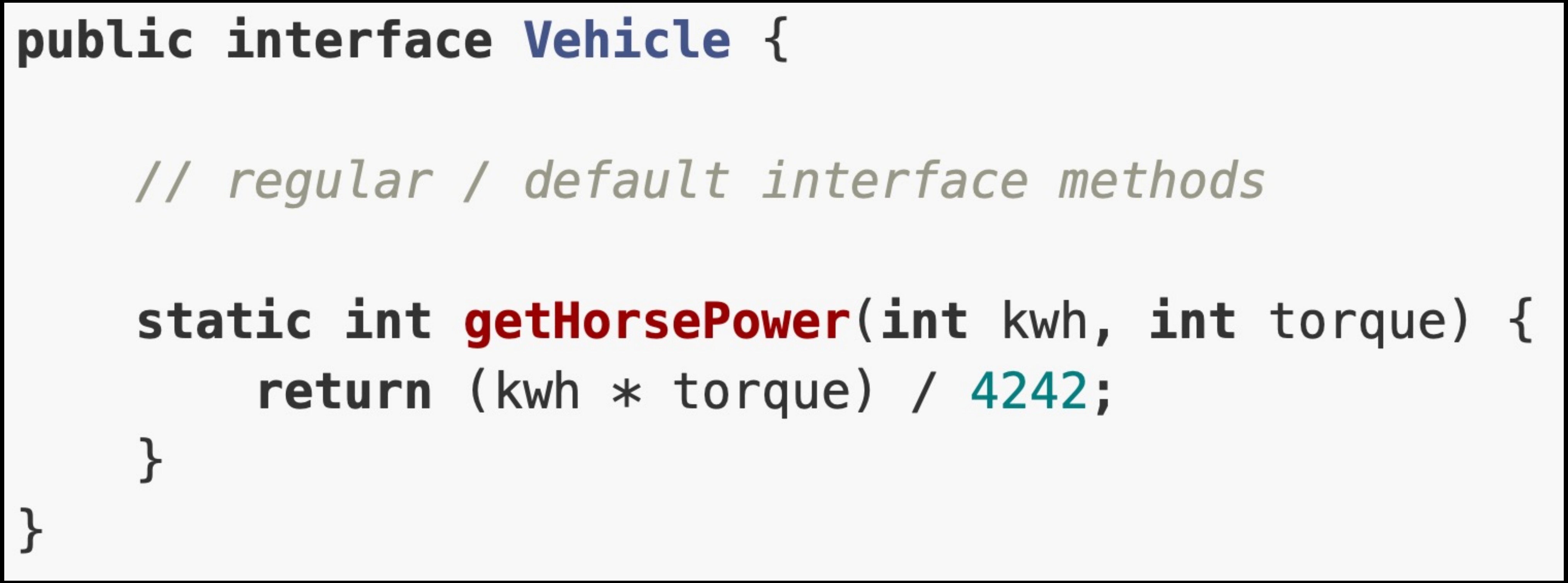
DEFAULT METHODS IN INTERFACES



```java
public interface Vehicle {

    String speedUp();
    String slowDown();

    default String turnAlarmOn() {
        return "Turning the vehicle alarm on.";
    }

    default String turnAlarmOff() {
        return "Turning the vehicle alarm off.";
    }
}
```

STATIC METHODS IN INTERFACES

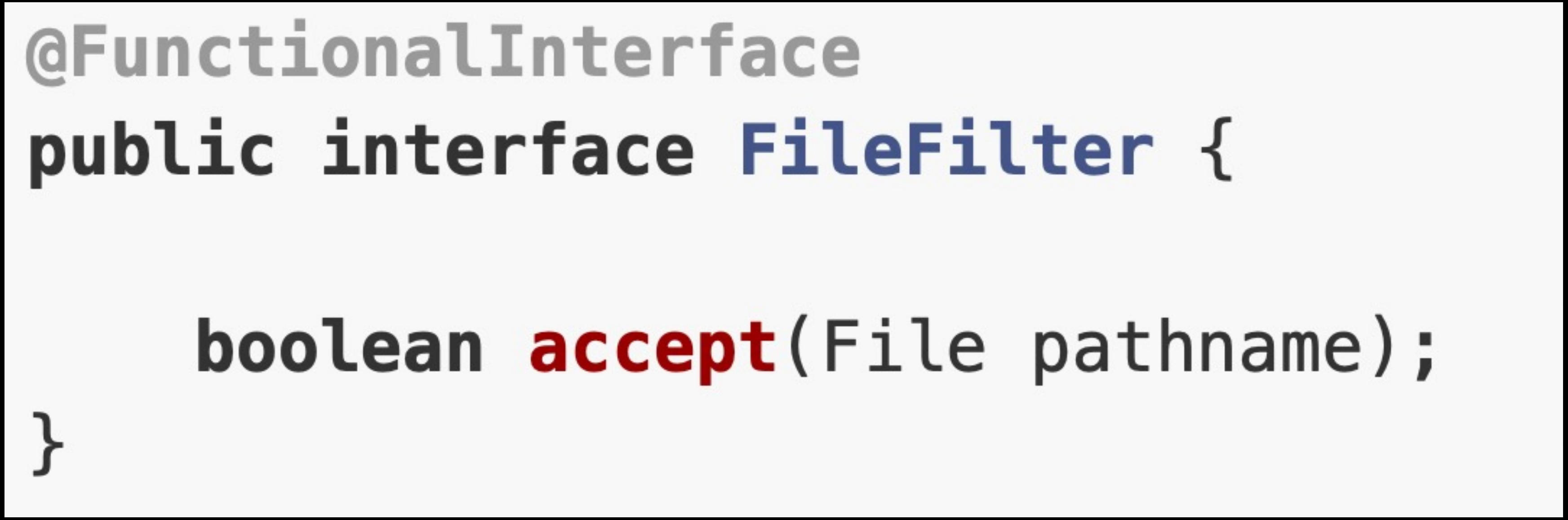
Java 8



```java
public interface Vehicle {

    // regular / default interface methods

    static int getHorsePower(int kwh, int torque) {
        return (kwh * torque) / 4242;
    }
}
```

FUNCTIONAL INTERFACES

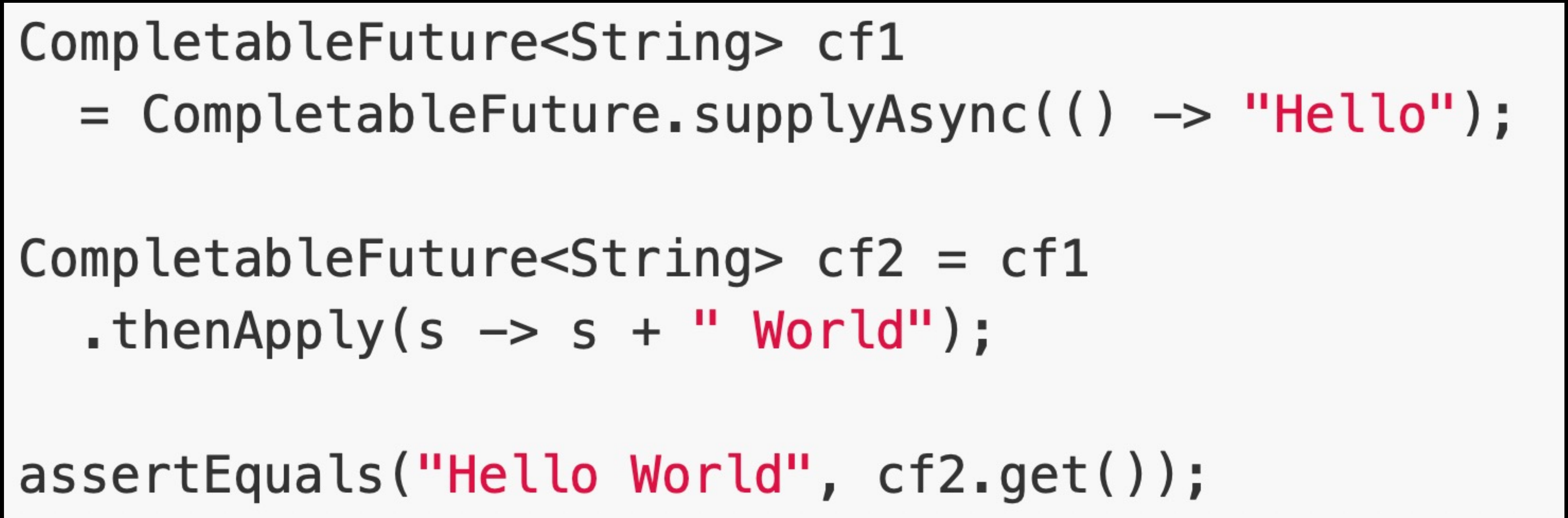
Java 8



```java
@FunctionalInterface
public interface FileFilter {

    boolean accept(File pathname);
}
```

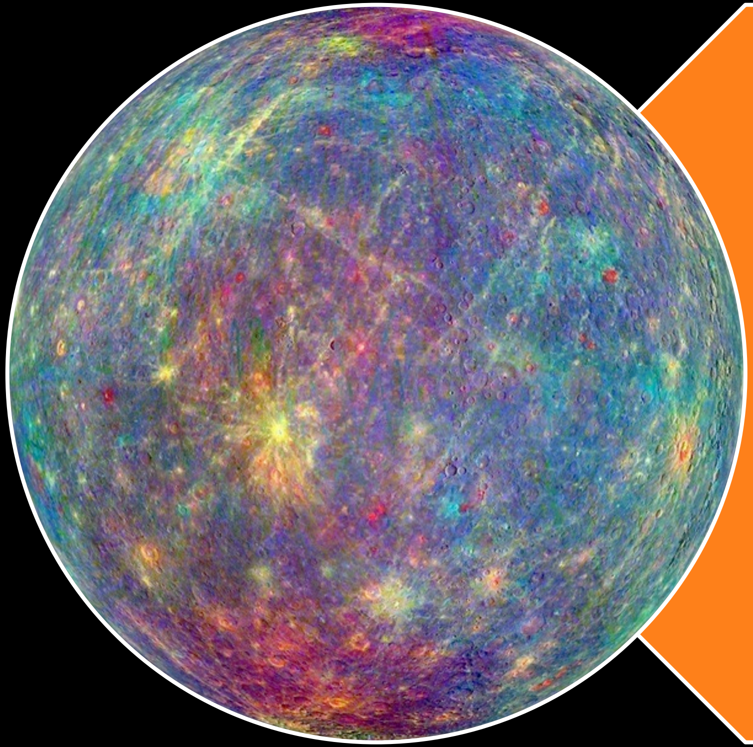
COMPLETABLE FUTURE

Java 8

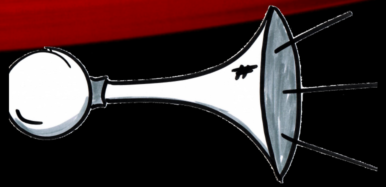


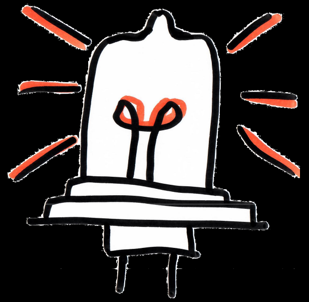
```
CompletableFuture<String> cf1
  = CompletableFuture.supplyAsync(() -> "Hello");

CompletableFuture<String> cf2 = cf1
  .thenApply(s -> s + " World");

assertEquals("Hello World", cf2.get());
```

QUESTION



Which of these popular languages is older?



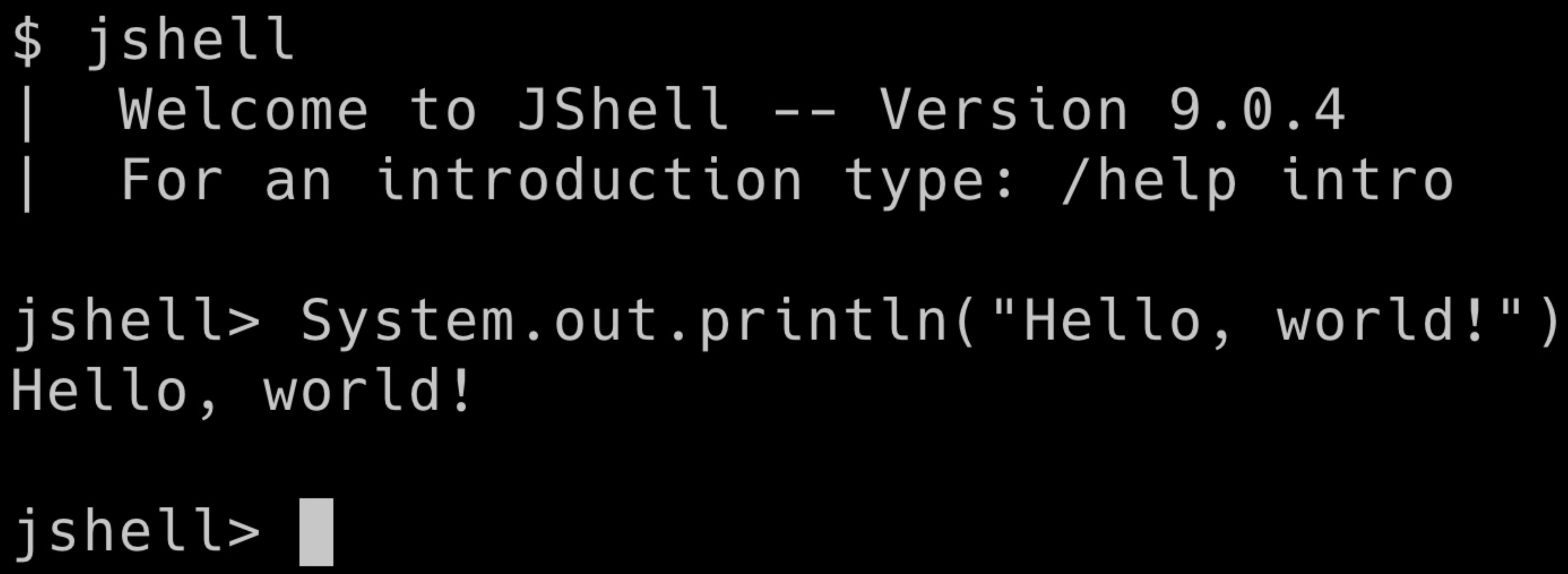


Java

python

2015-2017

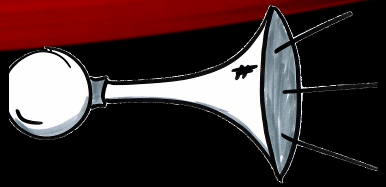
JSHELL REPL



```
$ jshell
|  Welcome to JShell -- Version 9.0.4
|  For an introduction type: /help intro

jshell> System.out.println("Hello, world!")
Hello, world!

jshell> █
```

QUESTION

What are the core principles of OOP?



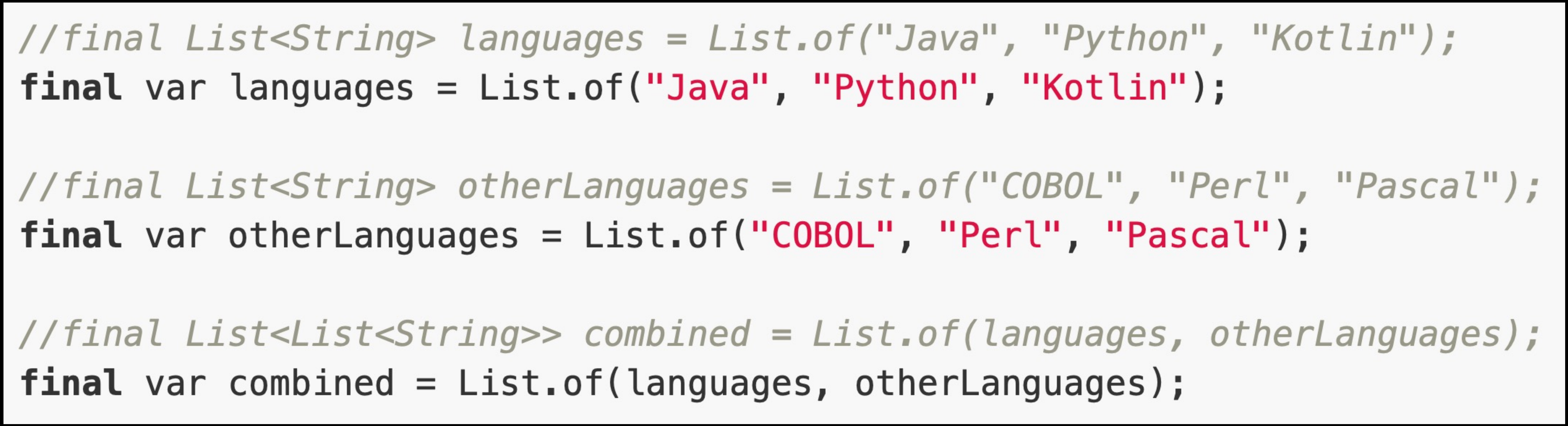
- Encapsulation
- Abstraction
- Inheritance
- Polymorphism

- Containment
- wool-gathering
- Legacy
- Multifariousness

2018

LOCAL TYPE INFERENCE

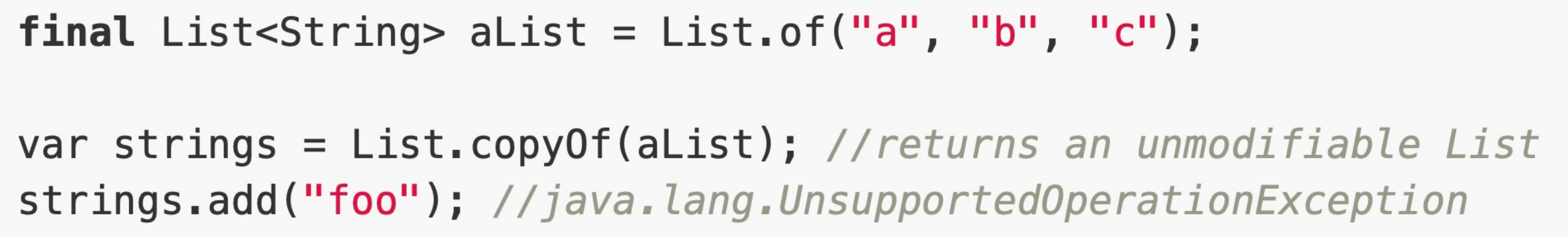
Java 10



```
//final List<String> languages = List.of("Java", "Python", "Kotlin");
final var languages = List.of("Java", "Python", "Kotlin");

//final List<String> otherLanguages = List.of("COBOL", "Perl", "Pascal");
final var otherLanguages = List.of("COBOL", "Perl", "Pascal");

//final List<List<String>> combined = List.of(languages, otherLanguages);
final var combined = List.of(languages, otherLanguages);
```

COLLECTION COPYOF()

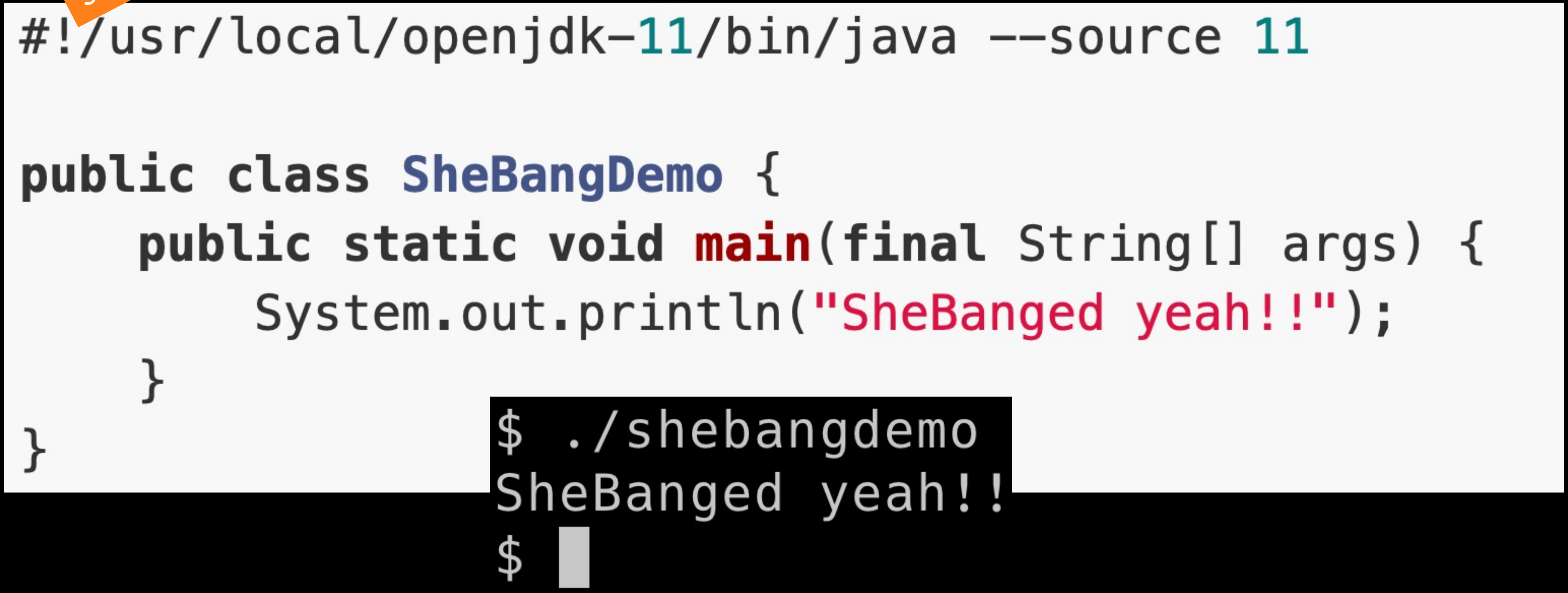
Java 10



```
final List<String> aList = List.of("a", "b", "c");

var strings = List.copyOf(aList); //returns an unmodifiable List
strings.add("foo"); //java.lang.UnsupportedOperationException
```

SHEBANG

Java 11

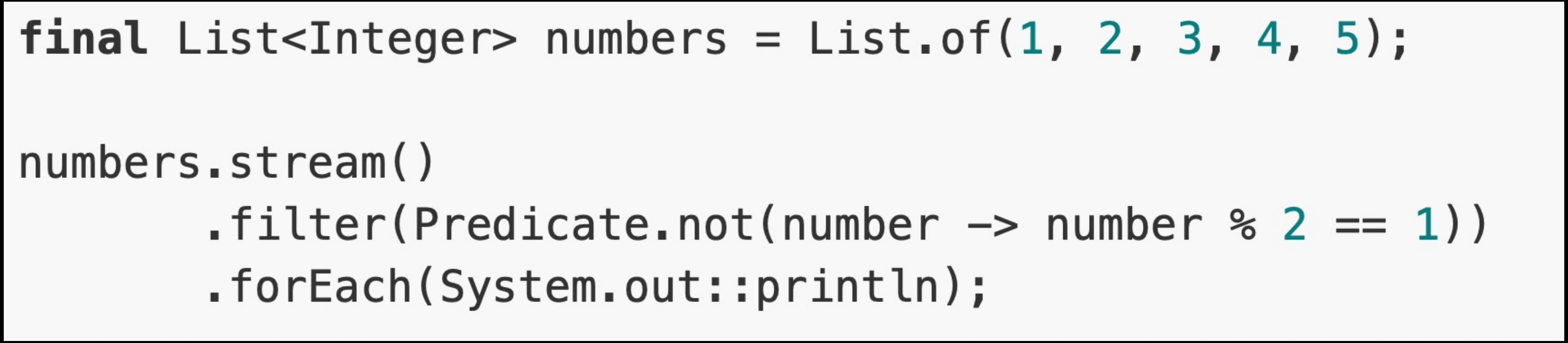


```java
#!/usr/local/openjdk-11/bin/java --source 11

public class SheBangDemo {
    public static void main(final String[] args) {
        System.out.println("SheBanged yeah!!");
    }
}
```

```
$ ./shebangdemo
SheBanged yeah!!
$ █
```

PREDICATE NOT

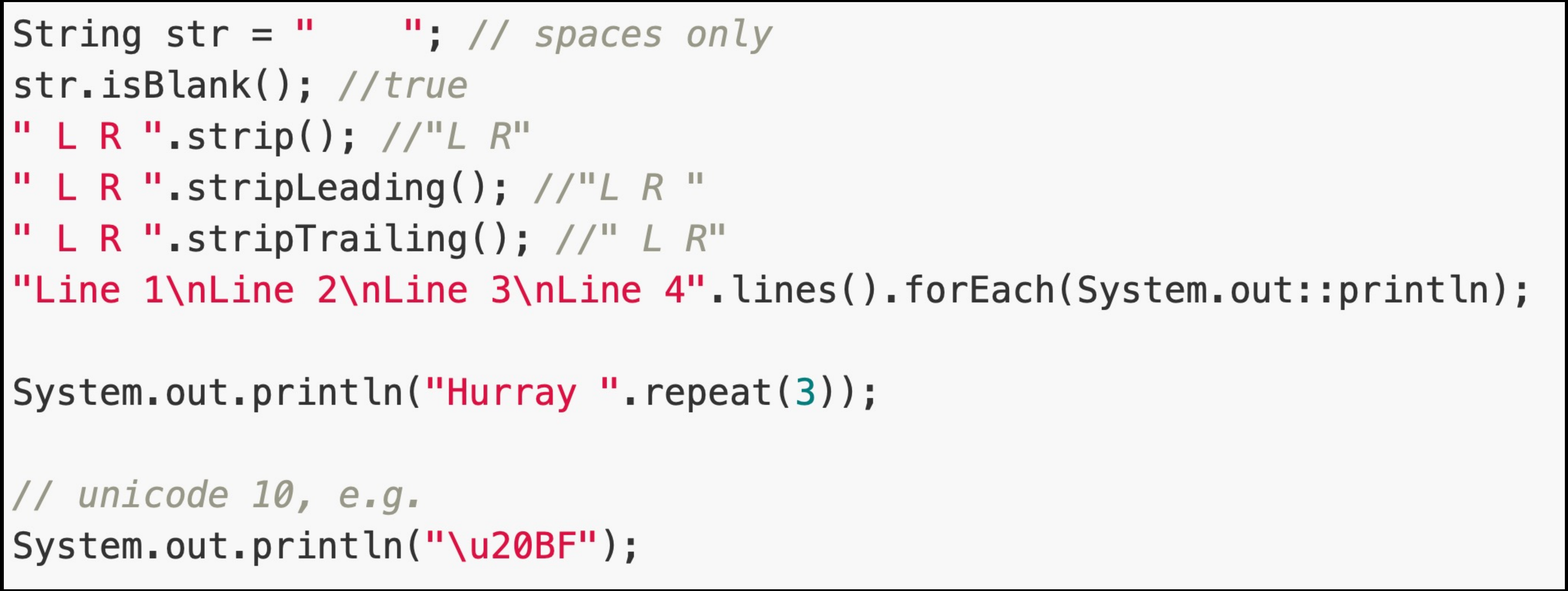
Java 11



```
final List<Integer> numbers = List.of(1, 2, 3, 4, 5);

numbers.stream()
       .filter(Predicate.not(number -> number % 2 == 1))
       .forEach(System.out::println);
```

Java 11

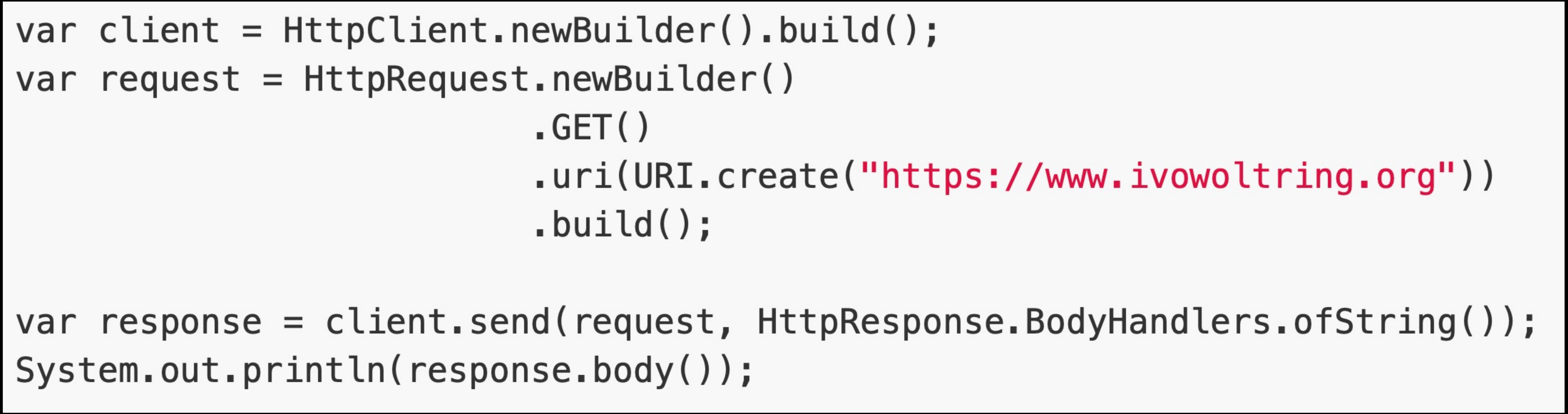
STRING METHODS



```
String str = "    "; // spaces only
str.isBlank(); //true
" L R ".strip(); //"L R"
" L R ".stripLeading(); //"L R "
" L R ".stripTrailing(); //" L R"
"Line 1\nLine 2\nLine 3\nLine 4".lines().forEach(System.out::println);

System.out.println("Hurray ".repeat(3));

// unicode 10, e.g.
System.out.println("\u20BF");
```

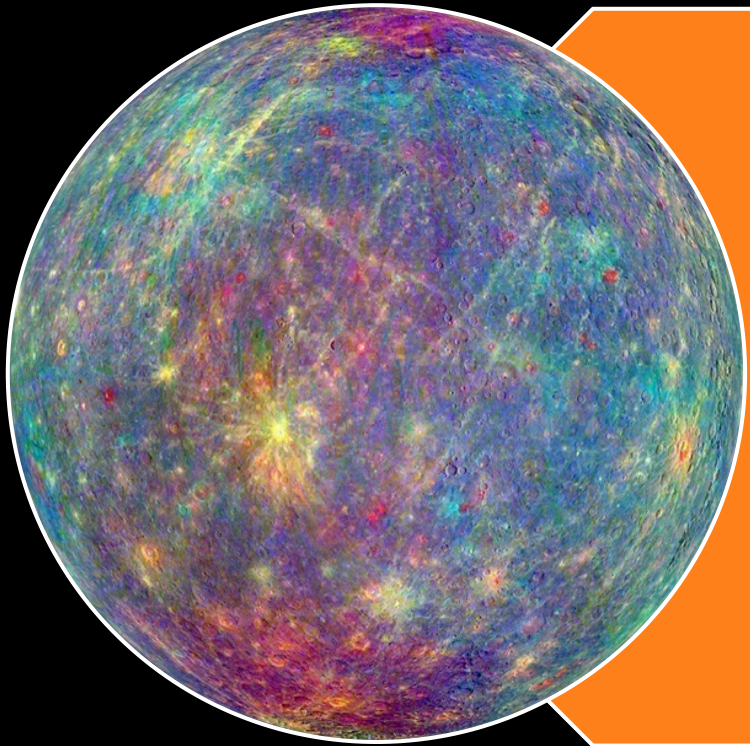
HTTPCLIENT

Java 11



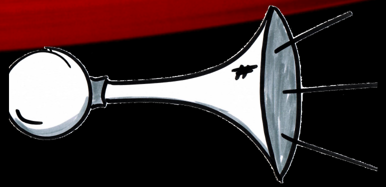
```
var client = HttpClient.newBuilder().build();
var request = HttpRequest.newBuilder()
                         .GET()
                         .uri(URI.create("https://www.ivowoltring.org"))
                         .build();

var response = client.send(request, HttpResponse.BodyHandlers.ofString());
System.out.println(response.body());
```

QUESTION

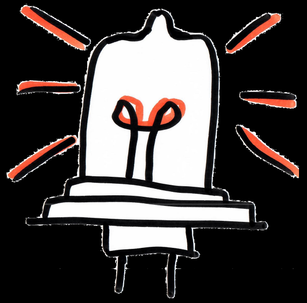


Is this statement valid in Java 10+?

```
var var = "var";
```



NO



YES

ANSWER

- YES it is valid
- The identifier var is not a keyword; instead it is a *reserved type name*. This means that code that uses var as a variable, method, or package name will not be affected; code that uses var as a class or interface name will be affected
- Therefore var var = ”var”; is a completely valid statement. Not advisable but valid.

2019

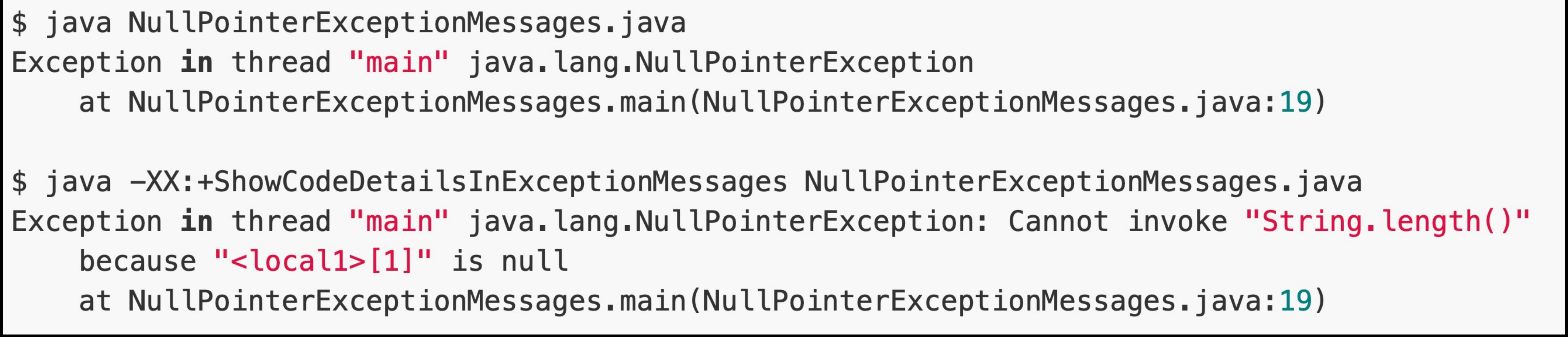
ALITA
BATTLE ANGEL
THE ANSWERS WE SEEK ARE JUST OUTSIDE OUR REACH
AD ASTRA

2020

Java™ 25 Years

USEFUL NULLPOINTER MESSAGES

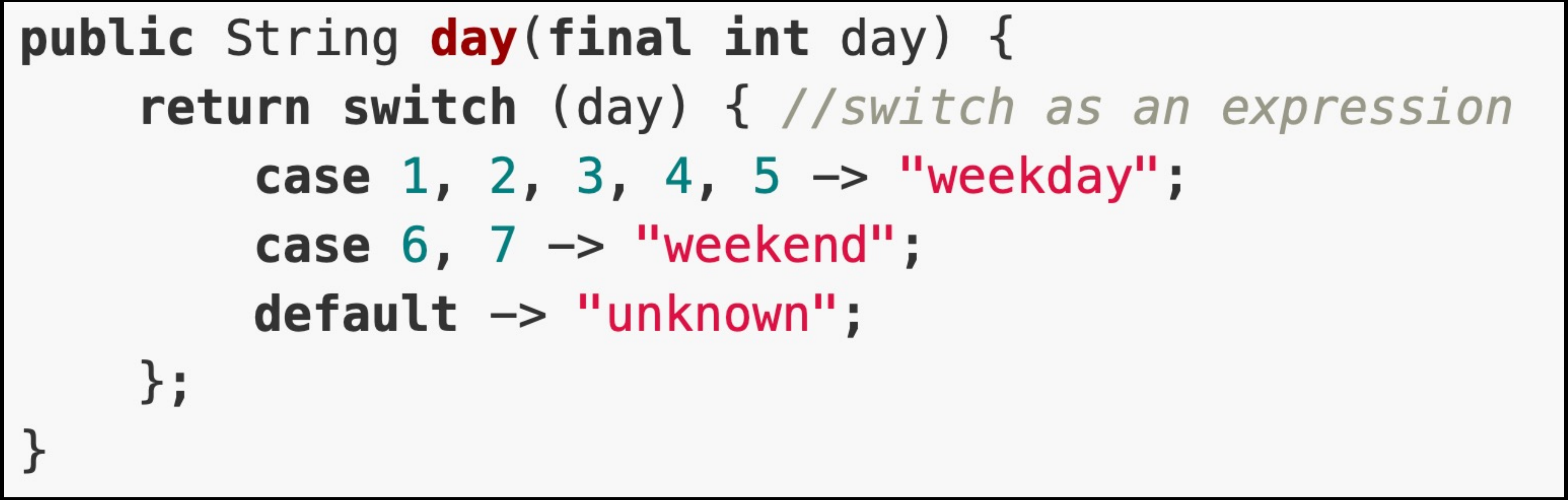
Java 14



```
$ java NullPointerExceptionMessages.java
Exception in thread "main" java.lang.NullPointerException
    at NullPointerExceptionMessages.main(NullPointerExceptionMessages.java:19)

$ java -XX:+ShowCodeDetailsInExceptionMessages NullPointerExceptionMessages.java
Exception in thread "main" java.lang.NullPointerException: Cannot invoke "String.length()"
    because "<local1>[1]" is null
    at NullPointerExceptionMessages.main(NullPointerExceptionMessages.java:19)
```

SWITCH EXPRESSION

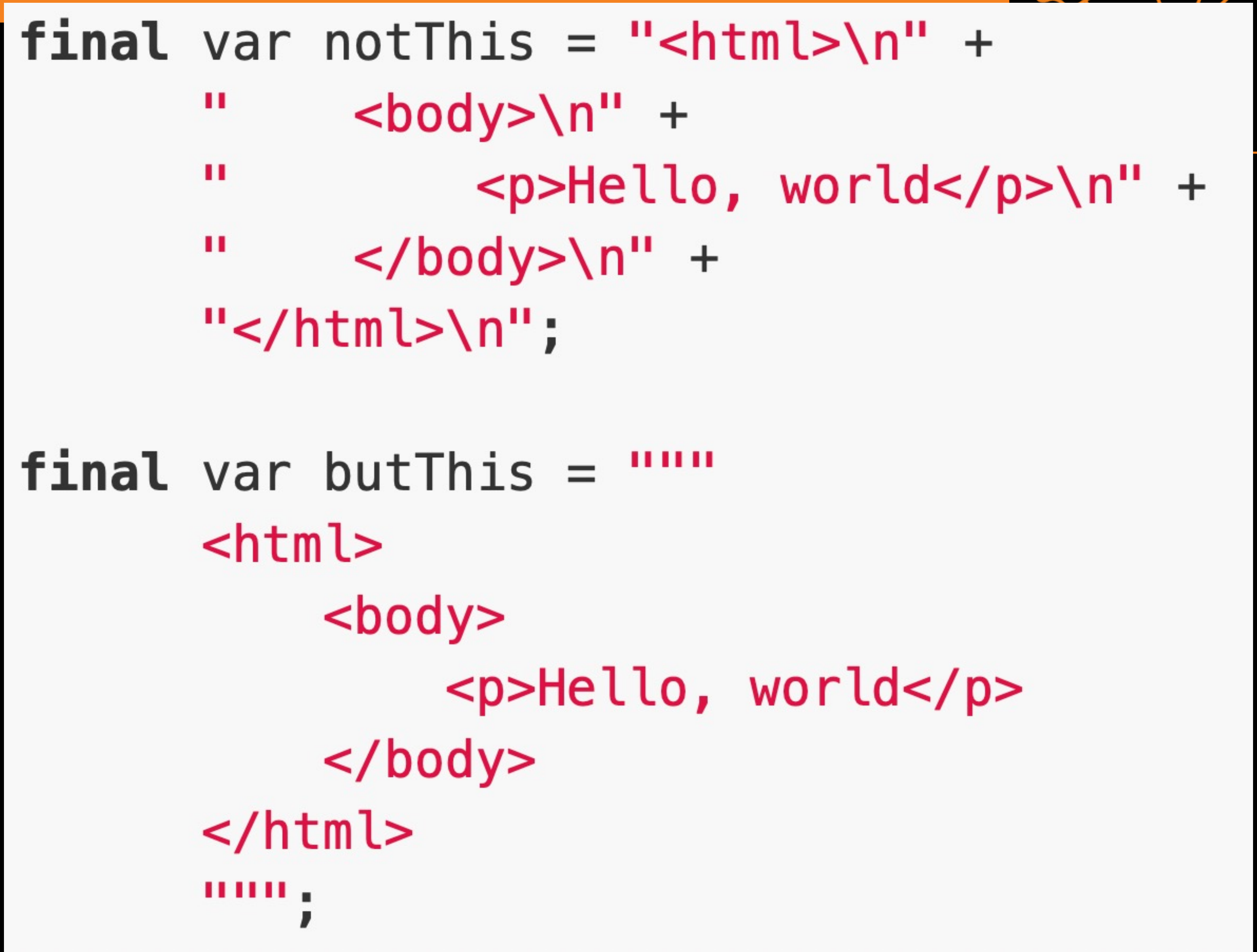
Java 14



```java
public String day(final int day) {
    return switch (day) { //switch as an expression
        case 1, 2, 3, 4, 5 -> "weekday";
        case 6, 7 -> "weekend";
        default -> "unknown";
    };
}
```

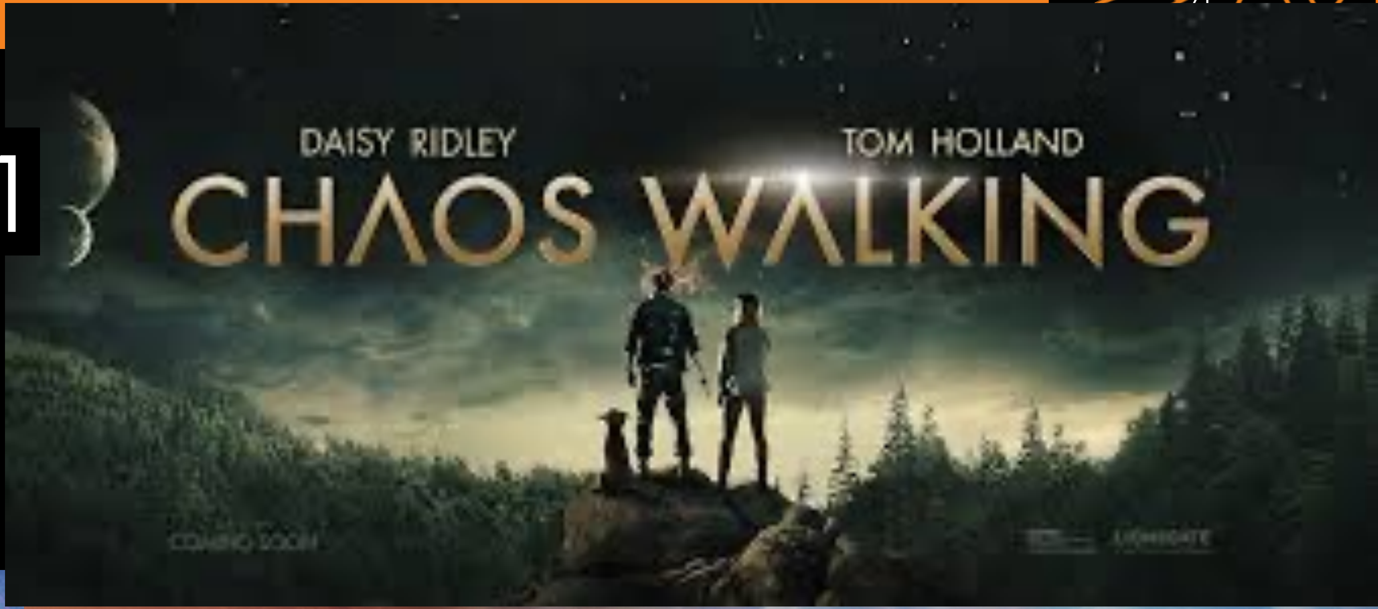
TEXTBLOCKS

Java 15



```
final var notThis = "<html>\n" +
      "    <body>\n" +
      "        <p>Hello, world</p>\n" +
      "    </body>\n" +
      "</html>\n";

final var butThis = """
      <html>
          <body>
              <p>Hello, world</p>
          </body>
      </html>
      """;
```

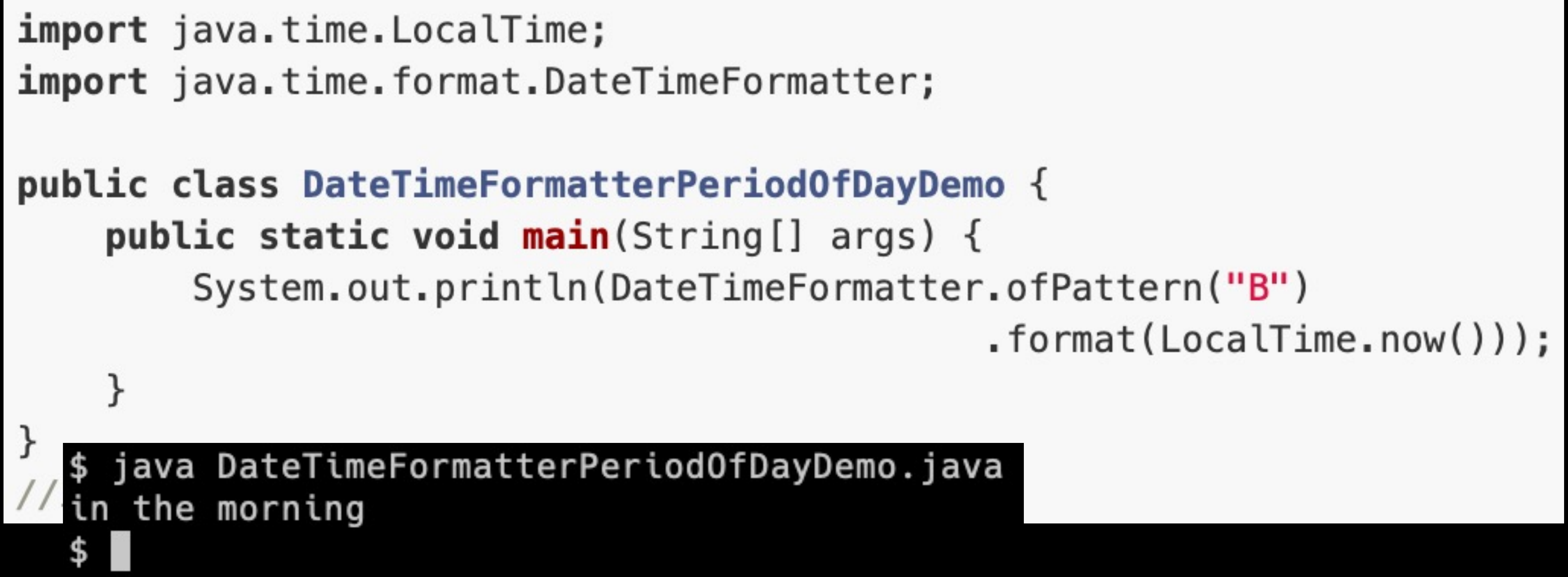
2021


DAISY RIDLEY
TOM HOLLAND
CHAOS WALKING
COMING SOON
LIONSGATE

CHRIS PRATT
THE TOMORROW WAR

PERIOD OF DAY

Java 16

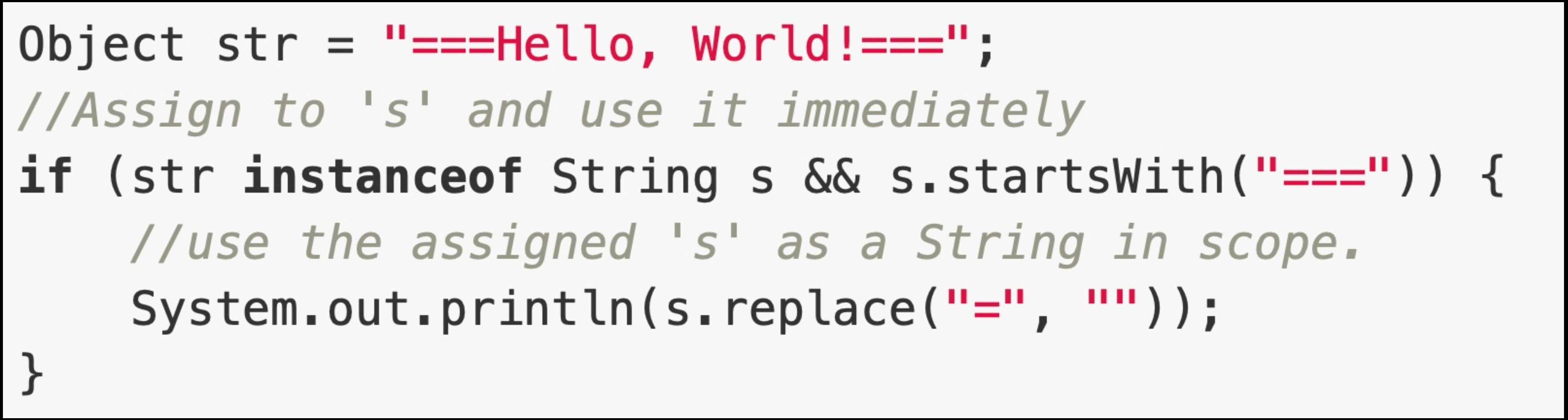


```java
import java.time.LocalTime;
import java.time.format.DateTimeFormatter;

public class DateTimeFormatterPeriodOfDayDemo {
    public static void main(String[] args) {
        System.out.println(DateTimeFormatter.ofPattern("B")
                                            .format(LocalTime.now()));
    }
}
//
```

```
$ java DateTimeFormatterPeriodOfDayDemo.java
in the morning
$ 
```

PATTERNMATCHING INSTANCEOF

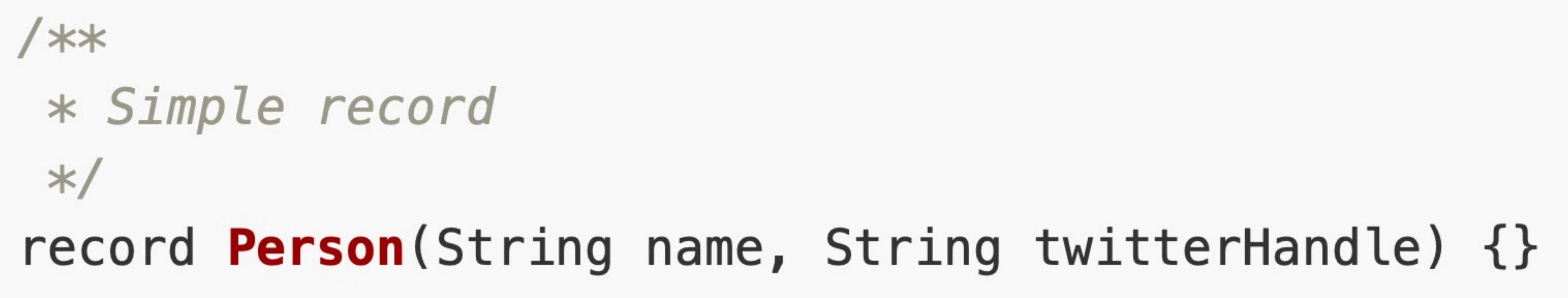
Java 16



```
Object str = "===Hello, World!===";
//Assign to 's' and use it immediately
if (str instanceof String s && s.startsWith("===")) {
    //use the assigned 's' as a String in scope.
    System.out.println(s.replace("=", ""));
}
```

RECORDS

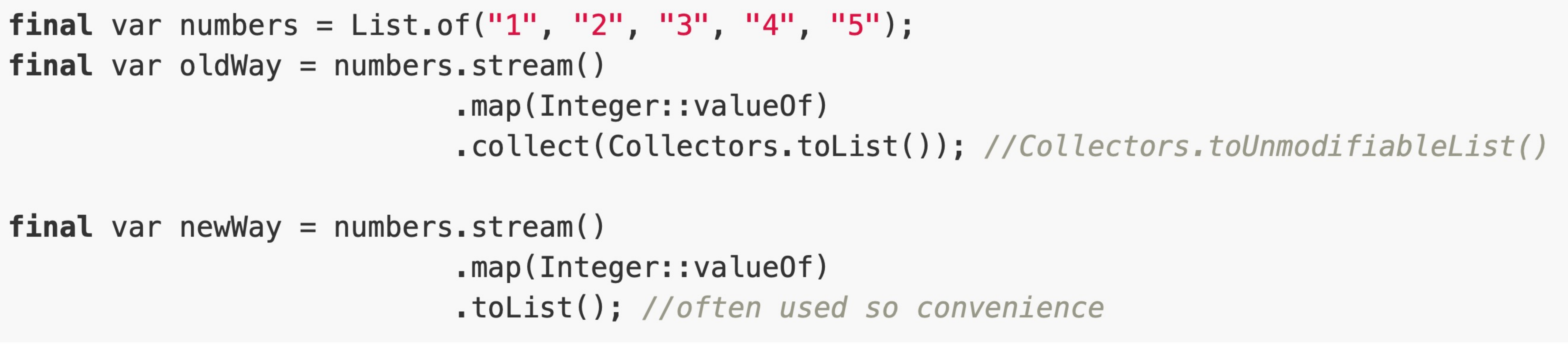
Java 16



```
/**
 * Simple record
 */
record Person(String name, String twitterHandle) {}
```

STREAMS TOLIST

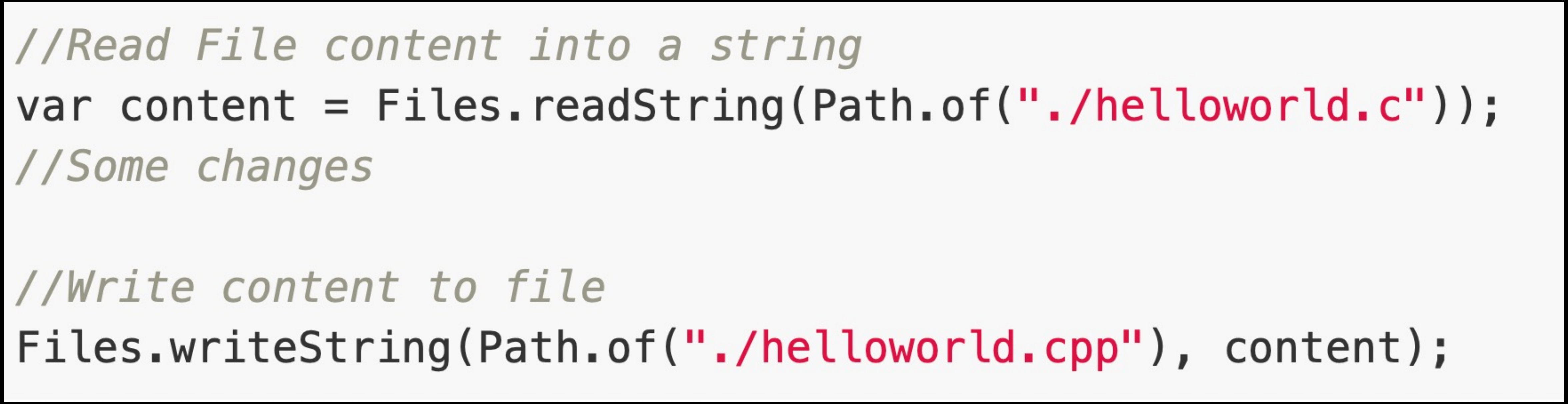
Java 16



```java
final var numbers = List.of("1", "2", "3", "4", "5");
final var oldWay = numbers.stream()
                          .map(Integer::valueOf)
                          .collect(Collectors.toList()); //Collectors.toUnmodifiableList()

final var newWay = numbers.stream()
                          .map(Integer::valueOf)
                          .toList(); //often used so convenience
```

READ-/WRITESTRING

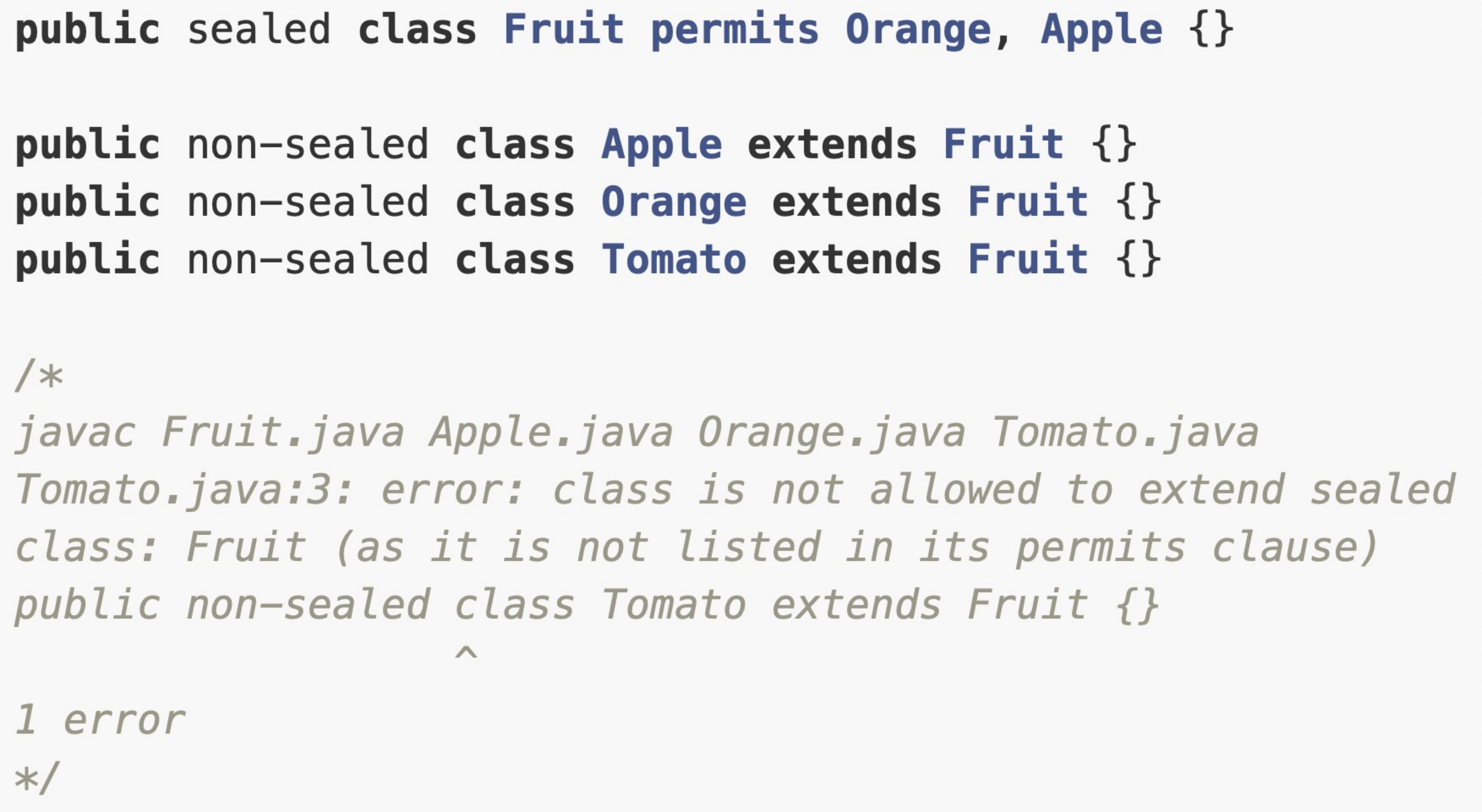
Java 16



```
//Read File content into a string
var content = Files.readString(Path.of("./helloworld.c"));
//Some changes

//Write content to file
Files.writeString(Path.of("./helloworld.cpp"), content);
```

SEALED CLASSES

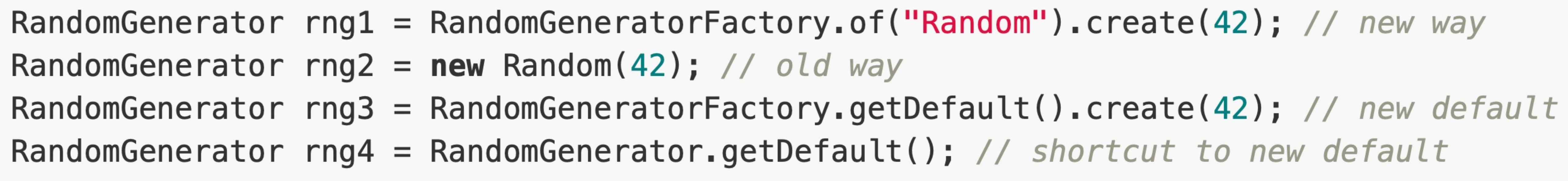
Java 17



```
public sealed class Fruit permits Orange, Apple {}

public non-sealed class Apple extends Fruit {}
public non-sealed class Orange extends Fruit {}
public non-sealed class Tomato extends Fruit {}

/*
javac Fruit.java Apple.java Orange.java Tomato.java
Tomato.java:3: error: class is not allowed to extend sealed
class: Fruit (as it is not listed in its permits clause)
public non-sealed class Tomato extends Fruit {}
                  ^
1 error
*/
```

ENHANCED PSEUDO-RANDOM NUMBER GENERATOR

Java 17



```
RandomGenerator rng1 = RandomGeneratorFactory.of("Random").create(42); // new way
RandomGenerator rng2 = new Random(42); // old way
RandomGenerator rng3 = RandomGeneratorFactory.getDefault().create(42); // new default
RandomGenerator rng4 = RandomGenerator.getDefault(); // shortcut to new default
```

USEFUL LINKS

- Demo code: http://ivo2u.nl/Vy
- Java Magazine Articles: http://ivo2u.nl/oz (nl)
- Blog: https://www.ivonet.nl/
- About: https://www.ivowoltring.org/
- Github: https://github.com/ivonet

2021^{++}

- LTS versions every 2 years