



JDK 8 MOOC: Functional Programming in Java with Lambdas and Streams

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In this course, you will learn how to use Lambda expressions and the Streams API to program in a more functional style using JDK 8. This will enable you to solve common problems in a more concise and more flexible way that can take advantage of multiple cores and CPUs in your machine



Lesson 1:

Lambda Expressions

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Lesson Agenda

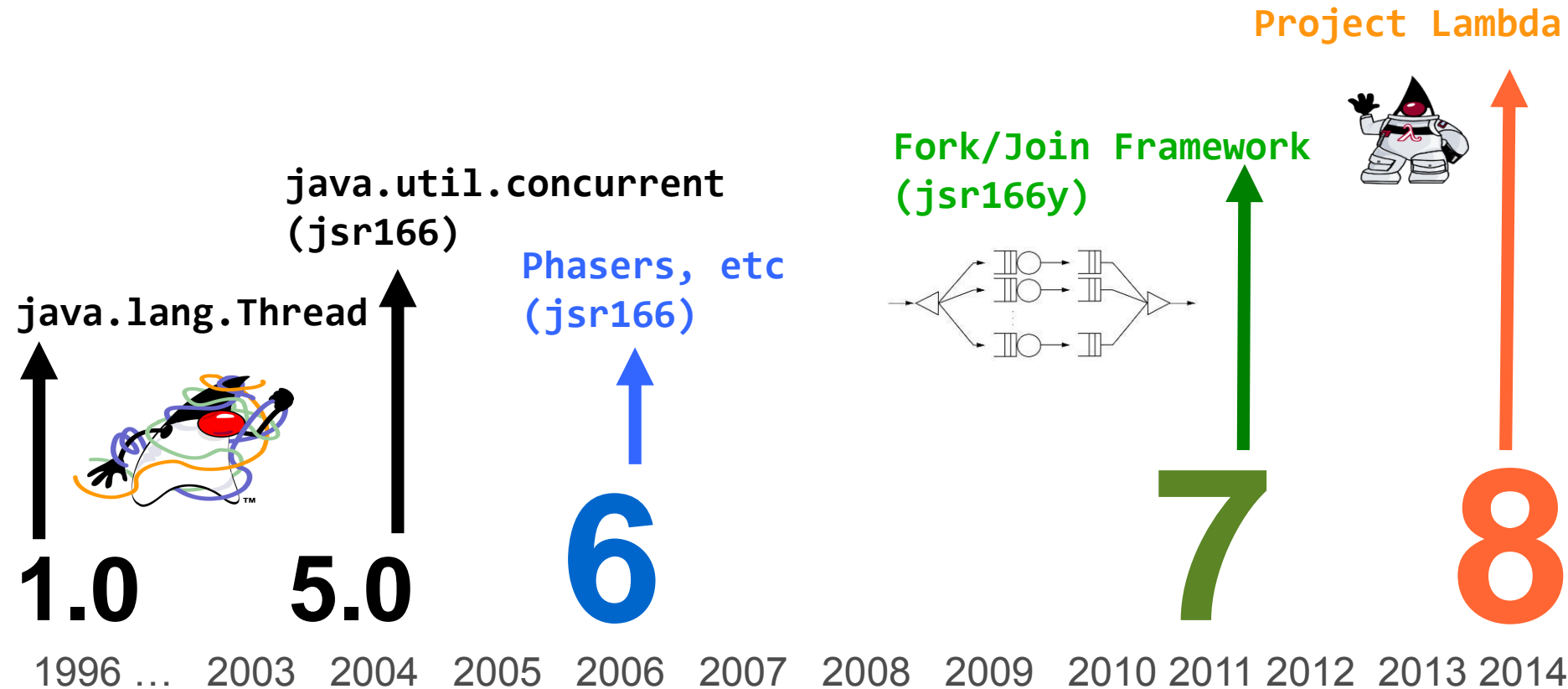
- Why does Java need Lambda expressions
- Lambda expression syntax
- Functional interfaces and their definition
- Functional Interfaces in the `java.util.function` package
- Method and constructor references
- Referencing external variables in Lambdas
- Useful new methods in JDK 8 that can use Lambdas









Lesson 1-1: Why Does Java Need Lambda Expressions?

Concurrency in Java



The Problem: External Iteration

```
List<Student> students = ...  
double highestScore = 0.0;   
  
for (Student s : students) {   
    if (s.getGradYear() == 2011) {   
        if (s.getScore() > highestScore)  
            highestScore = s.getScore();   
    }  
}
```

- Our code controls iteration
- *Inherently serial*: iterate from beginning to end
- Not thread-safe
 - Business logic is stateful
 - Mutable accumulator variable

Internal Iteration With Inner Classes

More Functional

```
double highestScore = students
    .filter(new Predicate<Student>() {
        public boolean op(Student s) {
            return s.getGradYear() == 2011;
        }
    })
    .map(new Mapper<Student, Double>() {
        public Double extract(Student s) {
            return s.getScore();
        }
    })
    .max();
```

- Iteration handled by the library
- Not inherently serial – traversal *may* be done in parallel
- Traversal *may* be done lazily – so one pass, rather than three
- Thread safe – client logic is stateless
- High barrier to use
 - Syntactically ugly

Internal Iteration With Lambda Expressions

```
List<Student> students = ...
```

```
double highestScore = students
```

```
    .filter(Student s -> s.getGradYear() == 2011)
```

```
    .map(Student s -> s.getScore())
```

```
    .max();
```

- More readable
- More abstract
- Less error-prone

Section 1

Summary

- Need changes to Java to simplify parallel coding
- Lambda expressions simplify how to pass behaviour as a parameter

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