Kotlin… Some interesting bits! (For a Java Developer)

Extension Functions, Destructuring declarations and Scope Functions

Everything that I’m about to tell you has already been explained by people much smarter than me.
Read the Kotlin Docs!

https://kotlinlang.org/docs/home.html

Thank you for coming to my TED Talk

Who am I?

- Some random person Ben Dale once met

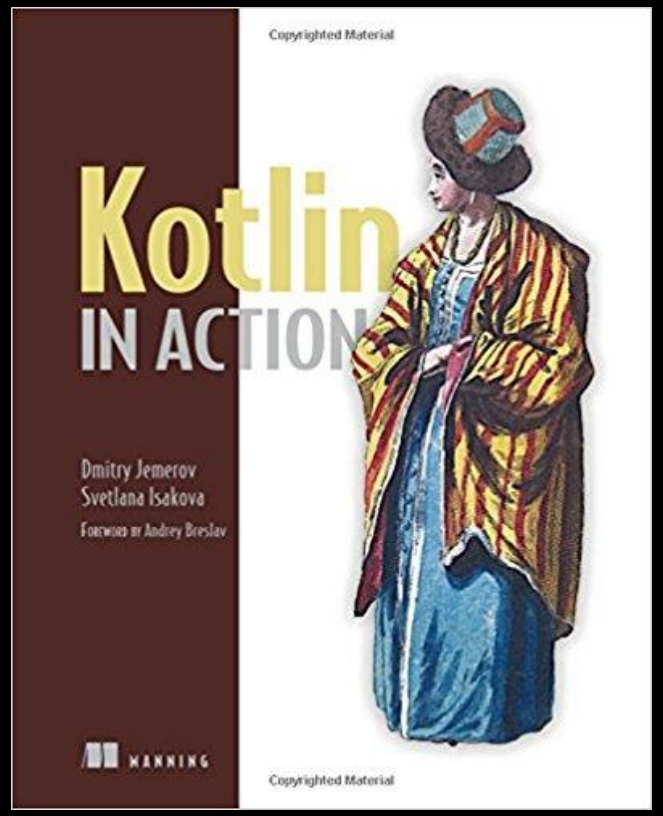
- I'm now working for myself, so:
  - No disclaimers necessary
  - I can describe myself as a Software Engineer (no fancy titles necessary)

I’m not a Kotlin Developer

- I’ve passed a Kotlin technical interview
- And then another
- And another
- And I’m currently working with Kotlin
- But I’m not a Kotlin Developer

My path as a non-Kotlin developer

- I've read the book



- I took an online course by JetBrains:

https://www.coursera.org/learn/kotlin-for-java-developers

But I’m kind of a Java Developer

- I also wrote a lot of Scala code
- And, as everyone knows:

(Long unnecessary explanation about obviously ironic statement)

- Andrey’s slides: https://www.slideshare.net/abreslav/2022-may-shoulders-of-giants-amsterdam-kotlin-dev-daypdf
- Kotlin Channel: https://www.youtube.com/c/Kotlin

Okay… Kotlin

Or actually: Java

Java

How would you implement “racecar”.isPalindrome()?

You can’t! Well…

```
public final class StringUtils {

    private StringUtils() {
        throw new UnsupportedOperationException(
                "This is a utility class and cannot be instantiated");
    }
    public static String reverse(String s) {
        return new StringBuilder(s).reverse().toString();
    }
    public static boolean isPalindrome(String s) {
        return s.equals(reverse(s));
    }
}
```

Or use Project Lombok’s @UtilityClass

Trouble?

- String is (and should remain) immutable
- Utility classes all over the place
- Code without context
- Apache Commons Lang StringUtils class has ~10k lines

Kotlin

Extension functions to the rescue

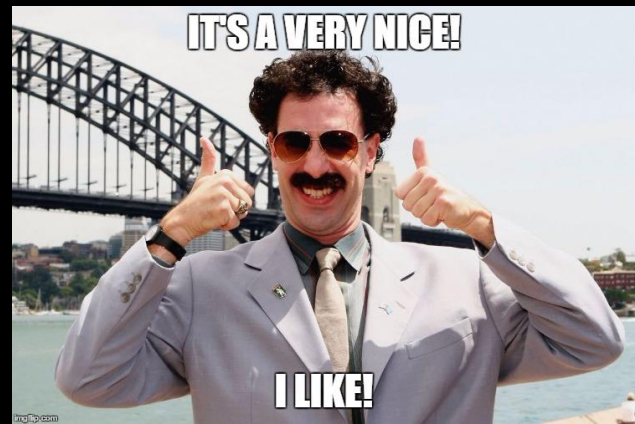
Kotlin functions!

```kotlin
fun isPalindrome(string: String): Boolean {
    return string == string.reversed()
}
```

```kotlin
fun isPalindrome(string: String): Boolean =
    string == string.reversed()
```

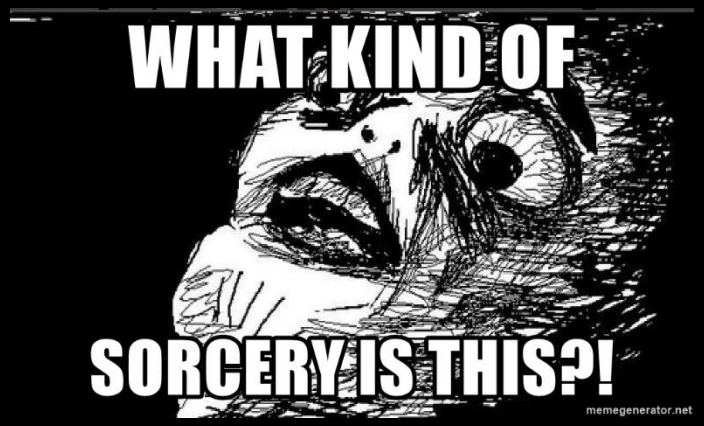
```kotlin
fun isPalindrome(string: String) =
    string == string.reversed()
```

- Top-level function
- Single-expression function
- Return type is optional



But we can still do better!

```
fun String.isPalindrome() =
    this == this.reversed()
```



- Extension functions!
- Call direct on a string

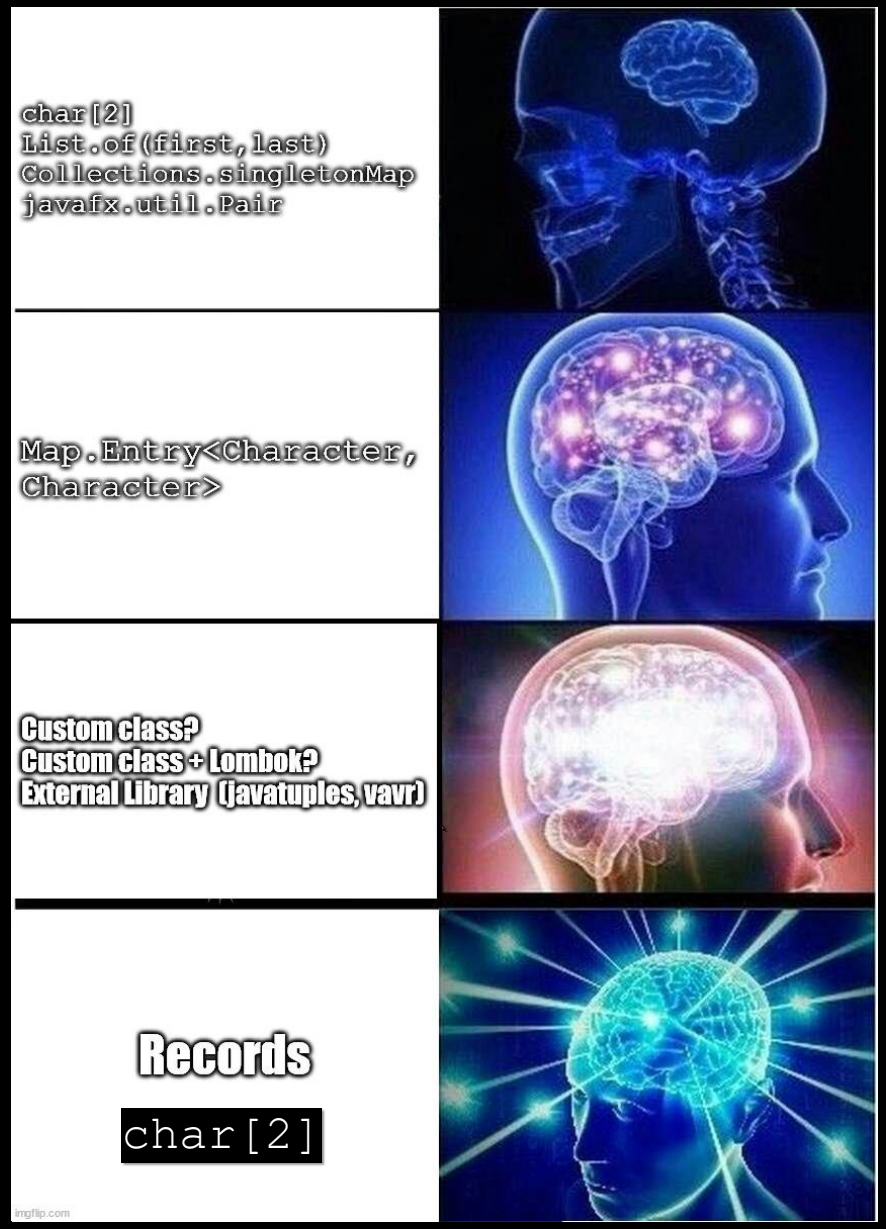
```
@file:JvmName("KotlinStringUtils")
```

- Compiles to a static method
- FileStrings.kt → Default class StringsKt

- Can be customized
- Can be instantiated from Java (reference). Well, nothing is perfect!

Java

How would you implement String.firstAndLast()?



Records are Okay…ish!

```
record FirstAndLast(char first, char last) {
}

public static FirstAndLast firstAndLast(String s) {
    return new FirstAndLast(
            s.charAt(0),
            s.charAt(s.length() - 1));
}
```

Kotlin

Destructuring declarations

Kotlin can do something similar

```kotlin
data class FirstAndLast(val first: Char, val last: Char)

fun String.firstAndLast(): FirstAndLast =
    FirstAndLast(first(), last())
```

But with better syntax

```kotlin
fun `returns first and last characters at once`()
{
    val input = "behind the scenes"
    val (first, last) = input.firstAndLast()
    first shouldBe 'b'
    last shouldBe 's'
}
```

Also…

- Backticks for method names with spaces
- Infix notation for matchers
- Kotest
- Great way to introduce Kotlin

Destructuring declarations

- Behind the scenes:
- You can implement your own
- Or use Pair
- Kotlin used to have Tuples but… Discontinued - RIP!
- Use underscore if you don't care:
- Very useful with collections and lambdas

```
operator fun component1() = first
operator fun component2() = last

fun String.firstAndLast(): Pair<Char, Char> =
    first() to last()
```

```
val (first, _) = input.firstAndLast()
```

```
fun initials(firstName: String, lastName: String) =
    "${firstName.first()}.${lastName.first()}"

val names = mapOfNames.map { (fn, ln) ->
    initials(fn, ln)
}
```

Kotlin

Scope functions

Speaking of lambdas… Scope Functions

- Run a block of code against an object and lets you chain operations
- Idiomatic, but prone to abuse

Function	Object reference	Return value	Is extension function
`let`	`it`	Lambda result	Yes
`run`	`this`	Lambda result	Yes
`run`	-	Lambda result	No: called without the context object
`with`	`this`	Lambda result	No: takes the context object as an argument.
`apply`	`this`	Context object	Yes
`also`	`it`	Context object	Yes

```kotlin
val jackson = Person("Michael", "Jackson", 50)

val result = jackson.copy(lastName = "Jordan", age = 59)
    .let { jordan -> // Temporary variable for Michael Jordan
        jordan.firstName shouldBe "Michael"
        jordan.lastName shouldBe "Jordan"
        jordan.age shouldBe 59 // Michael Jordan is 59 as of 16/06/2022
        jackson// Forwards Michael Jackson, despite operating on Michael Jordan
    }.apply {
        age += 13
    }.also { // Useful for logging and additional effects
        it.age shouldBe 63 // Michael Jackson would be 63 as of 16/06/2022
    }.run {
        age += 1
        val mjInitials = initials(firstName, lastName)
        "By 29 August 2022 $mjInitials would be $age years old"
    }

with(result) {
    shouldBeSingleLine()
    shouldContain("64")
    shouldBe("By 29 August 2022 M.J. would be 64 years old")
}
```

Interesting usages and other goodies

- `?.let` to skip through null
- `run` without a receiver to give a scope to variables
- also for logging
- `takeIf` and `takeUnless` null based filtering
- `use` Kotlin equivalent of try-with-resource
- `Result` Try like type
- Arrow types

Questions?

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Slides will be available at:
https://github.com/aaccioly-demos/source-talks-on-kotlin-3 (Soon)