



# Kotlin for Java Developers

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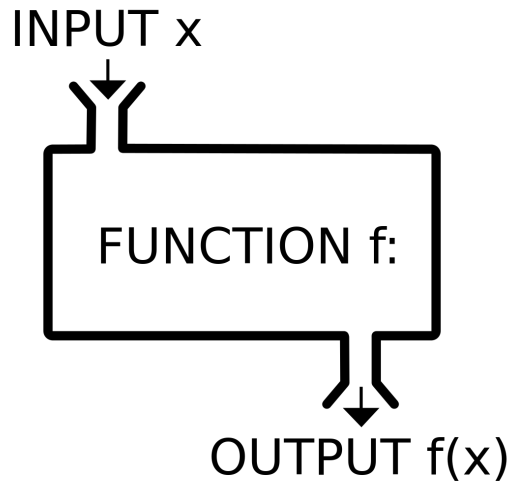
Mobile Software Engineer

# Overview of Kotlin

- Functional programming language
- Developed by JetBrains (see also: **Android Studio**)
- Runs on JVM
- Popular for Android development
  - 2017: Supported for Android
  - 2019: Primary language for Android
- Not just for Android
  - Libraries
  - Data science & machine learning
  - Backend web

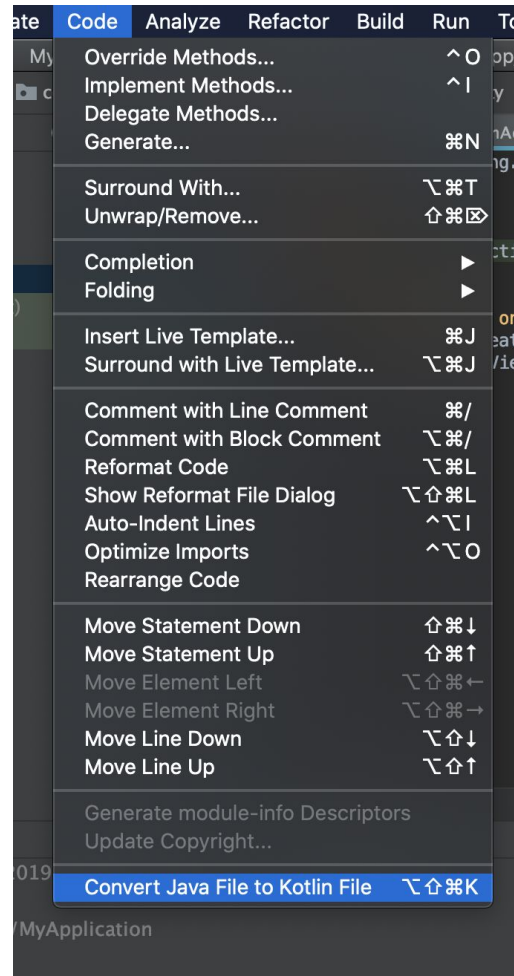
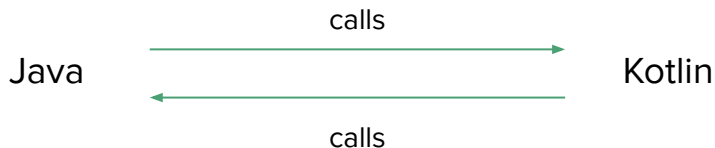
# What is Functional Programming?

- Paradigm shift from object-oriented programming
- Similar to mathematical functions
  - $f(x)$ : input  $x$  produces output  $y$
- Strive to achieve immutability
- Strive to produce no side effects



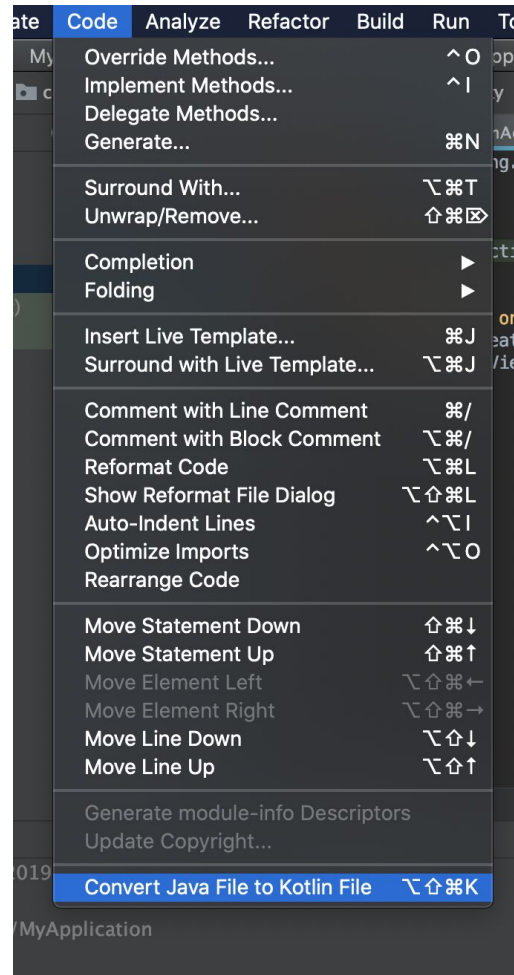
# Interoperability with Java

- Runs on JVM
- Easy conversion from Java to Kotlin
  - Android Studio
  - IntelliJ



# Interoperability with Java

- Auto-conversion pitfalls:
  - Class constructors
  - Data classes
  - Static modifiers
  - Nullable types



# Type Inference

- Property type inference -> val, var
- Functions use the keyword -> fun
  - Must specify return type
  - Must specify argument types

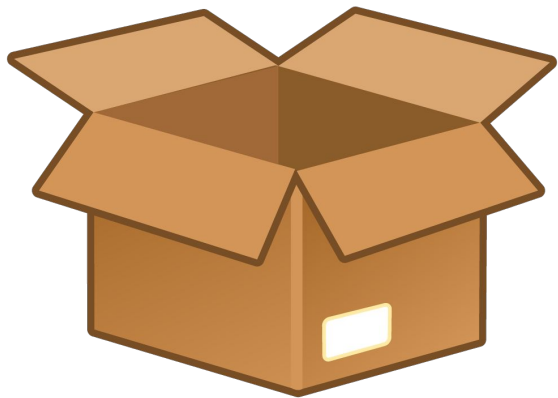
```
fun veryExcitingFunction() {  
    var mutableProp = "Property"  
    val immutableProp = "Also property"  
    var explicitInteger : Int = 5  
}
```

```
fun anotherExcitingFunction() : Boolean {  
    return if (isItTrue) true else false  
}
```

# Null Safety: Nullable Types

Fun Fact: In Swift, we call these “optionals”

```
var helloString: String? = null
```



Could contain a `String`  
Could contain nothing  
Would never contain an `Int`, `Boolean`, etc.

Acts as a container for the  
specified type

# Null Safety: Operators

## Safe Call Operator

```
object?.performFunction()
```

“Does it exist? If so, perform this function from it.”

## Not-Null Assertion Operator

```
object!!?.performFunction()
```

“I know for sure it exists. If I’m wrong, you can crash my app.”

## Elvis Operator

```
assignment = myString ?: ""
```

“I’d like to perform this if this object exists. If not, try this instead.”



# Type Checking & Casting

## Type Checking -> is

```
val excitingDouble: Double = 5.0
if (excitingDouble is String) {
    print("This will not execute.")
} else {
    print("Double failed the type check as a String.")
}
```

## Type Casting -> as, as?

```
var myCoolString = "Type Casting Exercise"
var crashFailure: Int = myCoolString as Int //This will crash
var safeFailure: Int = myCoolString as? Int //This will set safeFailure to null
```

# Scoping Functions

```
.let  
.run  
.apply  
.with  
.also
```

- Executes a block pertaining to a specific object
- Differentiating between each one:
  - How is the object being referred to (`this` or `it`)
  - What is being returned
- Example:

```
object.doThis()  
object.doThat()  
object.done()
```

Normal Flow

```
object.run {  
    doThis()  
    doThat()  
    done()  
}
```

Using a Scope Function

For a deeper look:  
[Check out this Medium article](#)  
[by Elye](#)

# Useful Combos

```
int a = someClass.retrieveA();  
if (a != null) {  
    a.setStatus("Retrieved");  
} else {  
    a = new ConstructorForA();  
    a.setStatus("Created");  
}  
  
//Do some stuff with `a` later on
```

Java

```
someClass.retrieveA()?.let { a ->  
    a.status = "Retrieved"  
} ?: run {  
    var a = ConstructorForA()  
    a.status = "Created"  
}  
  
//Do some stuff with `a` later on
```

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# Lambdas and Higher-Order Functions

- Higher-Order functions
  - Can take functions as arguments
  - Can return functions
- Lambda Expressions
  - Undeclared functions that can be passed like variables

```
val multiplyLambda: (Int) -> Int = { input ->
    input * 2
}

fun higherOrder(lambda: (Int) -> Int) {
    val someValue = 5
    val result = lambda(someValue)
    // Some other stuff
}
```

# The `static` Keyword: Companion Objects

- `static` keyword doesn't exist -> use companion objects instead

```
class MyCoolCar {  
    static void myCoolFunction() {  
        ...  
    }  
}
```

Java

```
class MyCoolCar {  
    companion object MyCompanionClass {  
        fun myCoolFunction() {  
            ...  
        }  
    }  
}
```

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Calling a companion object property/function:


Inside Kotlin: `MyCoolCar.myCoolFunction()`

Inside Java: `MyCoolCar.Companion.myCoolFunction()`

# The static Keyword: @JvmStatic

- Alternative Hack: annotate with @JvmStatic
  - For interactions with Java classes
  - Compiler generates both a static and instance version of the method/variable

```
class MyCoolCar {  
    @JvmStatic  
    fun myCoolFunction() {  
        ...  
    }  
}
```



Inside Kotlin: MyCoolCar.myCoolFunction()  
Inside Java: MyCoolCar.myCoolFunction()

# Syntactic Sugar: Lifting assignments

```
if (condition) {  
    return 1;  
} else {  
    return 0;  
}
```

Java

```
return if (condition) {  
    1  
} else {  
    0  
}
```

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# Syntactic Sugar: Lifting assignments & when

```
String a;  
switch (x) {  
    case 0:  
        a = "0";  
        break;  
    case 1:  
        a = "1";  
        break;  
    default:  
        a = "Other";  
        break;  
}
```

Java

```
val a = when(x) {  
    0 -> "0"  
    1 -> "1"  
    else -> "Other"  
}
```

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# Additional Thoughts

- Is it better? Not necessarily
  - Popular opinion: Kotlin is easier to read
  - Android is “Kotlin-first”
  - Kotlin is open source
- Converting a Java codebase into Kotlin
  - It's okay to have a mix of both
  - Take one file at a time
  - Start any new files in Kotlin
- **If you use Kotlin, write like a Kotlin programmer, not like a Java programmer**

# Further Resources

- [Kotlin Documentation](#)
- [Kotlin vs Java Syntax](#)
- Fragmented Podcast
  - [Episode 83](#)
  - [Episode 120](#)
  - [Episode 121](#)
- [Talking Kotlin Podcast](#) (If you're interested in other use cases of Kotlin)
- [KotlinConf](#) (Annual Kotlin conference from JetBrains)

# Questions

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