Extension Methods in Scala and Kotlin

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Structure and Thesis

1) History of Programming Languages
2) Scala Features
3) Kotlin Features
4) Extension Methods in Scala and Kotlin

ALGOL 60 Report

- Nested block structures
- Lexical scoping
- Backus-Naur form (BNF)

ALGOL 68

- Anonymous routines and recursive typing system with high-order functions
- Van Wijngaarden grammar

Scala's key features

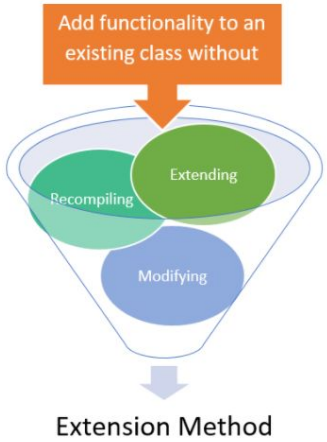
- syntactic flexibility
- unified type system
- for-expressions
- functional tendencies
- object-oriented extensions
- an expressive type system
- type enrichment

Kotlin’s key features

- Semicolons optional
- Data type requirements
- val and var keywords
- Classes are final
- Class members are public

What are Extension Methods?

- methods added to objects after the original objects are compiled



Defining an Extension Method in Scala

```
object StringExtensions {
  extension (str: String) {
    def toSnakeCase = {
      str.replaceAll("([A-Z])", "_" + "$1").toLowerCase
    }
  }
}
```

Multiple extension methods in Scala

```
object StringExtensions {
            extension (str: String) {
                    def toSnakeCase = {
            str.replaceAll("([A-Z])", "_" + "$1").toLowerCase
                    }
                    def isNumber = {
        str.matches("[0-9]+")
                    }
            }
}
```

Generic Extensions in Scala

```
object GenericExtensions {
	extension [T](list: List[T]) {
		def getSecond = if(list.isEmpty) None
else list.tail.headOption
	}
}
```

Type constraints in Scala

```
extension [T: Numeric](a: T) {
      def add(b:T): T = {
            val numeric = summon[Numeric[T]]
            numeric.plus(a, b)
      }
}
```

Defining an extension method in Kotlin

```
fun String.escapeForXml() : String {
  return this
    .replace("&", "&amp;")
    .replace("<", "&lt;")
    .replace(">", "&gt;")
}
```

Generic Extensions in Kotlin

```
fun <T> T.concatAsString(b: T) : String {
    return this.toString() + b.toString()
}
```

Infix extension methods in Kotlin

```
infix fun Number.toPowerOf(exponent: Number): Double {
    return Math.pow(this.toDouble(), exponent.toDouble())
}
```

To call this method

```
3 toPowerOf 2 // 9
9 toPowerOf 0.5 // 3
```

Shorthand operator method in Kotlin

```
operator fun List<Int>.times(by: Int): List<Int> {
    return this.map { it * by }
}
```

To call this method:

```
listOf(1, 2, 3) * 4 // [4, 8, 12]
```