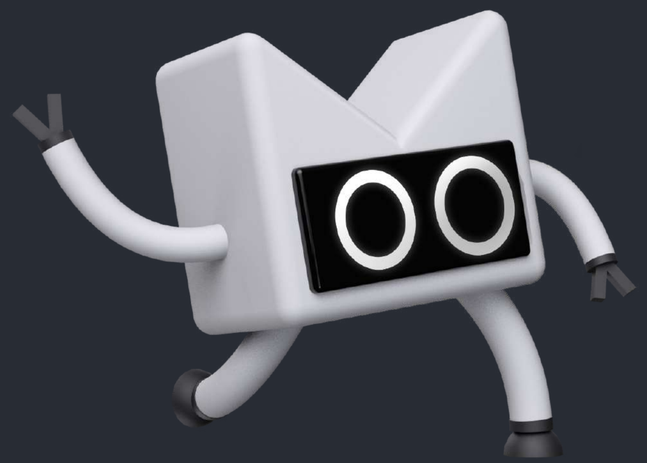
You Might Need to Resign Your Java Codes in Kotlin



Gary LO
@Gap撈Tech

My Kotlin Journey

since Kotlin 1.0

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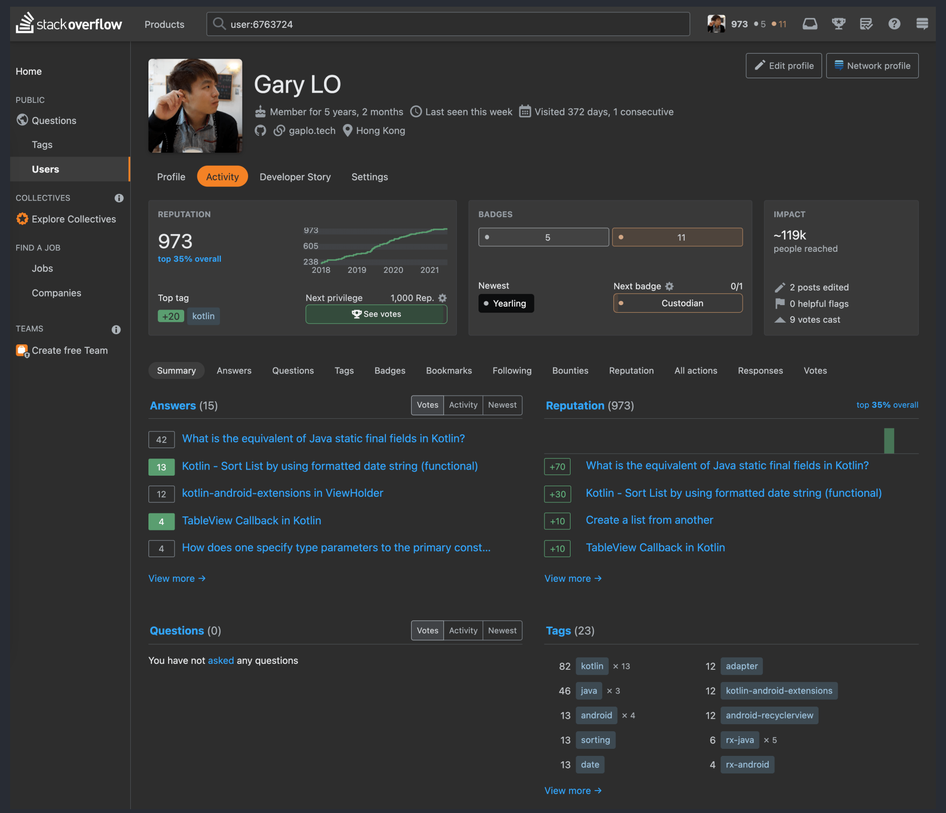
Picking Kotlin for Android



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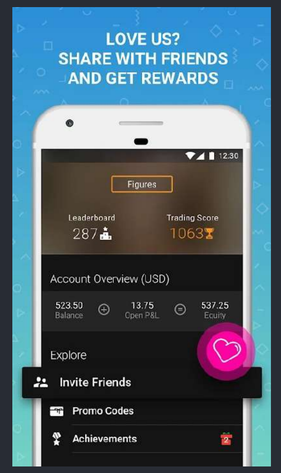

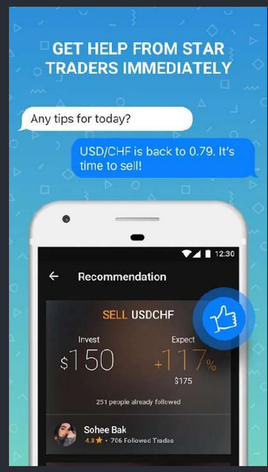

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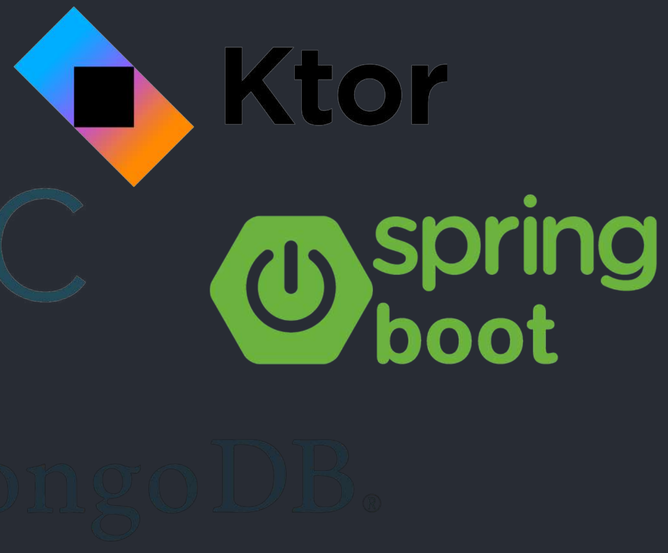

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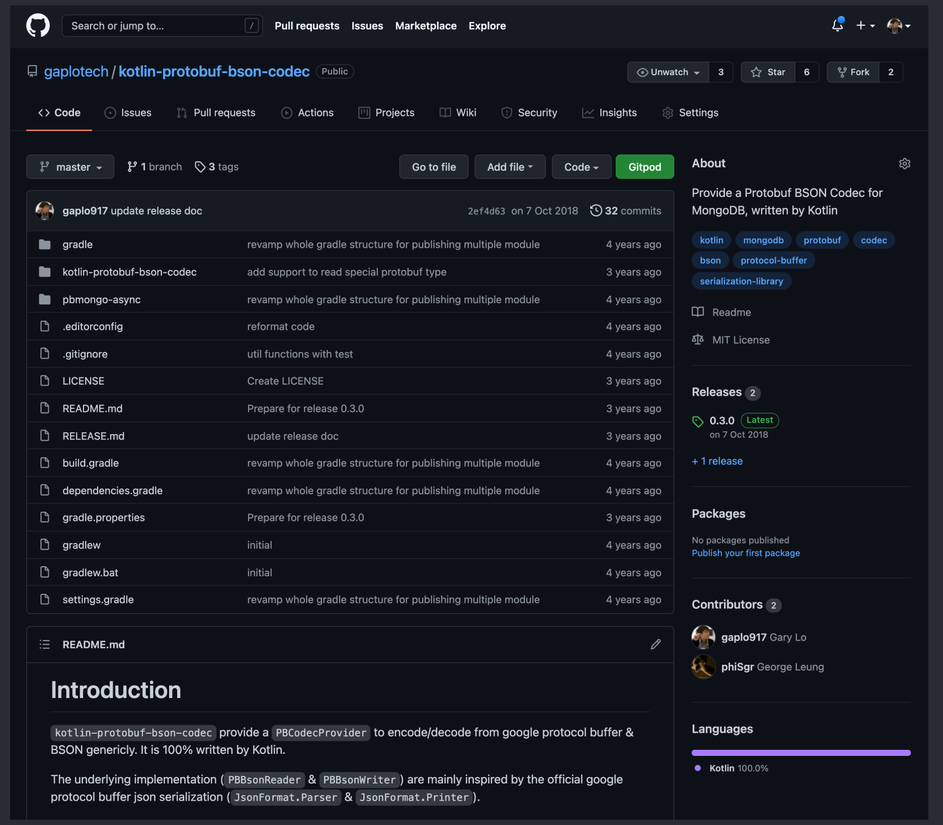

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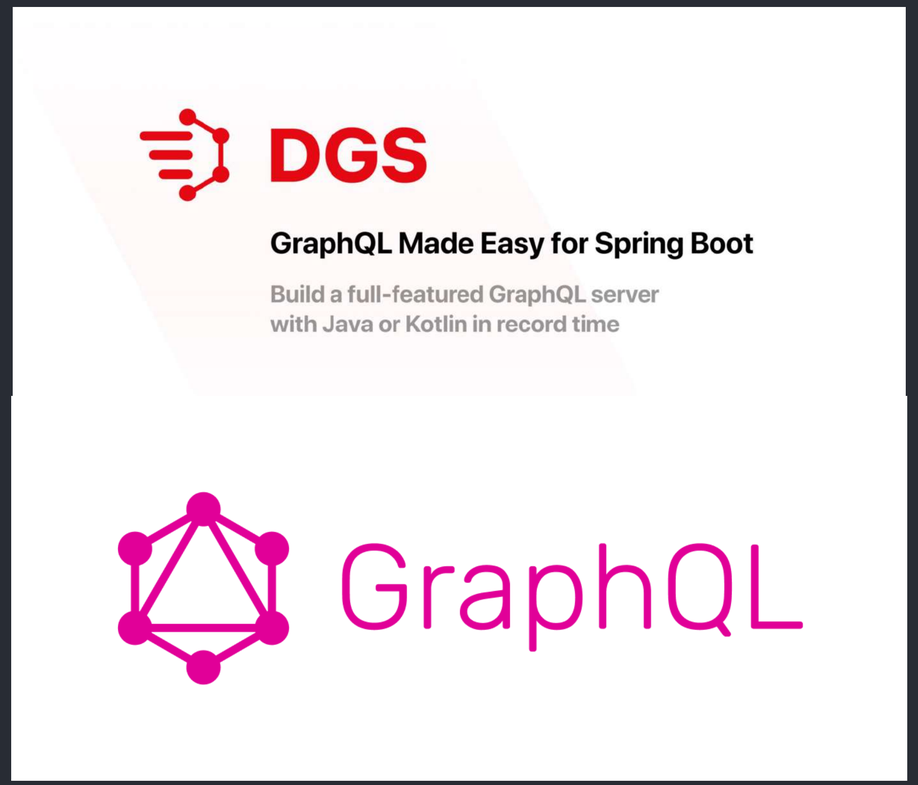

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- 2021 Feb — Advocate Kotlin GraphQL (Netflix DGS framework) for new projects
- 2021 - 2022 — Design & build Kotlin/Native & Kotlin/JS usage on WebView message bridge
  for next-gen mobile development

Recap about
Fundamental Kotlin Language Features

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changing the interface and model design

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- Infix function and operator overloading
- Coroutine

Why Redesign?

Kotlin can do what Java does in the Same Way. But...

Kotlin can do much better than Java

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You can reduce “debug complexity“
by
designing “Kotlin-way” abstraction.

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$O(N^2)$ -> $O(N \log N)$

Compile Time Null Safety

Compile Time Null Safty

Color Scheme:  GapStyle

Compile Time Null Safty

```java
public class NullSafeDemoJava {
    Integer something = null;

    public Integer someCalculation(Integer other) {
        return something * other;
    }

}
```

Easy do it wrong

Color Scheme: GapStyle

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Easy do it wrong

Do more work to let IDE alert the nullable value
by adding `@Nullable`

```java
import org.jetbrains.annotations.Nullable;

public class NullSafeDemoJava {
    @Nullable Integer something = null;

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Unboxing of 'other' may produce 'NullPointerException'

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@Nullable
Integer other
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Integer other
```

The above code still pass in Java compiler

```kotlin
class NullSafeDemo {
    private var something: Int? = null

    fun someCalculation(other: Int?): Int? {
        return something * other
    }
}
```

Type mismatch.
Required: Int
Found: Int?

Add non-null asserted (!!) call ⌥⇧⏎ More actions... ⌥⏎

value-parameter other: Int?

The above code don't pass in Kotlin compiler

Color Scheme: GapStyle

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```kotlin
class NullSafeDemo {
    private var something: Int? = null

    fun someCalculation(other: Int): Int? {
        return something * other
    }
}
```

Operator call corresponds to a dot-qualified call 'something.times(other)' which is not allowed on a nullable receiver 'something'.

Replace with safe (?.) call ⌥⇧⏎ More actions... ⌥⏎

The above code don't pass in Kotlin compiler

Color Scheme: GapStyle

Nullable Chaining

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Color Scheme: GapStyle

Nullable Chaining

```java
import java.util.Date;

public class NullableChainingJava {
    static class A {
        public B someB = null;
        static class B {
            public C someC = null;
            static class C {
                public Date date = null;
            }
        }
    }

    void run() {
        A a = new A();
        if(a.someB != null) {
            if(a.someB.someC != null){
                if(a.someB.someC.date != null) {
                    // safe to use date
                    System.out.println(a.someB.someC.date);
                }
            }
        }
    }
}
```

Chaining in Java

Color Scheme: GapStyle

Nullable Chaining

```java
import java.util.Date;

public class NullableChainingJava {
    static class A {
        public B someB = null;
        static class B {
            public C someC = null;
            static class C {
                public Date date = null;
            }
        }
    }

    void run() {
        A a = new A();
        if(a.someB != null) {
            if(a.someB.someC != null){
                if(a.someB.someC.date != null) {
                    // safe to use date
                    System.out.println(a.someB.someC.date);
                }
            }
        }
    }
}
```

Chaining in Java

```kotlin
class NullableChaining {
    internal class A {
        var someB: B? = null
        internal class B {
            var someC: C? = null
            internal class C {
                var date: Date? = null
            }
        }
    }

    fun run() {
        val a = A()
        println(a.someB?.someC?.date)
    }
}
```

Nullable Chaining in Kotlin

Color Scheme: GapStyle

Named Arguments and Default Value

Named Arguments and Default Value

Named Arguments and Default Value

```java
import org.jetbrains.annotations.Nullable;
import java.util.Date;

public class NamedArgumentsJava {
    @Nullable Integer someInt;
    @Nullable Boolean someBoolean;
    @Nullable Date someDate;

    void updateSomething(@Nullable Boolean bool) {
        updateSomething(bool,  integer: null,  someDate: null);
    }

    void updateSomething(@Nullable Integer integer) {
        updateSomething( bool: null, integer,  someDate: null);
    }

    void updateSomething(@Nullable Date date, @Nullable Integer integer) {
        updateSomething( bool: null, integer, date);
    }

    void updateSomething(@Nullable Boolean bool, @Nullable Integer integer, @Nullable Date someDate) {
        this.someBoolean = bool;
        this.someInt = integer;
        this.someDate = someDate;
        sideEffect();
    }


    void sideEffect() {}
}
```

Method Overloading in Java

Color Scheme: GapStyle

Named Arguments and Default Value

Named Arguments and Default Value

```
import java.util.*

class NamedArgumentsKt {
    private var someInt: Int? = null
    private var someBoolean: Boolean? = null
    private var someDate: Date? = null

    fun updateSomething(someBoolean: Boolean? = null, someInt: Int? = null, someDate: Date? = null) {
        this.someBoolean = someBoolean
        this.someInt = someInt
        this.someDate = someDate
        sideEffect()
    }

    private fun sideEffect() {}
}
```

Use Default Value in the parameter design

Color Scheme: GapStyle

Named Arguments and Default Value

```kotlin
import java.util.*

class NamedArgumentsKt {
    private var someInt: Int? = null
    private var someBoolean: Boolean? = null
    private var someDate: Date? = null

    fun updateSomething(someBoolean: Boolean? = null, someInt: Int? = null, someDate: Date? = null) {
        this.someBoolean = someBoolean
        this.someInt = someInt
        this.someDate = someDate
        sideEffect()
    }

    private fun sideEffect() {}
}
```

Use Default Value in the parameter design

```kotlin
    fun main(){
        val sth = NamedArgumentsKt()
        sth.updateSomething(someInt = 1, someBoolean = true, someDate = Date())
        sth.updateSomething(someBoolean = true)
        sth.updateSomething(someInt = 1, someDate = Date())
        sth.updateSomething(someDate = Date())
    }
```

Use Named Arguments in design

Color Scheme: GapStyle

Everything is an expression
&
Type Inference

Everything is an expression
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Type Inference

Everything is an expression
&
Type Inference

```java
public class EverythingIsExpressionJava {
    String sth;
    String sth2;

    void run() {
        Integer a;
        if(sth.equals("something")) {
            a = 1;
        } else if(sth2.equals("something2")) {
            a = 2;
        } else {
            a = 3;
        }
        System.out.println(a);
    }
}
```

Standard Java Implementation

Color Scheme: GapStyle

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        } else {
            a = 3;
        }
        System.out.println(a);
    }
}
```

Standard Java Implementation

```kotlin
var sth: String? = null
var sth2: String? = null

fun run() {
    val a: Int?
    if (sth == "something") {
        a = 1
    } else if (sth2 == "something2") {
        a = 2
    } else {
        a = 3
    }
    println(a)
}
```

Kotlin in Java way

Color Scheme: GapStyle

Everything is an expression
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public class EverythingIsExpressionJava {
    String sth;
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    void run() {
        Integer a;
        if(sth.equals("something")) {
            a = 1;
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        a = 2
    } else {
        a = 3
    }
    println(a)
}
```

Kotlin in Java way

```kotlin
var sth: String? = null
var sth2: String? = null

fun optimized() {
    val a = when (sth) {
        "something" -> 1
        "something2" -> 2
        else -> 3
    }
    println(a)
}
```

Kotlin way

Color Scheme:  GapStyle

Extension Function

Extension Function

Extension Function

```java
public class StringUtils {
    String append2021Kotlin(String string) {
        return string + " " + "2021 kotlin";
    }

    String appendChineseMeetup(String string) {
        return string + " " + " 中文大會";
    }

    void run() {
        appendChineseMeetup(append2021Kotlin( string: "Gap is in"));
    }
}
```

Standard Java Implementation

Color Scheme: GapStyle

Extension Function

```java
public class StringUtils {
    String append2021Kotlin(String string) {
        return string + " " + "2021 kotlin";
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    }

    void run() {
        appendChineseMeetup(append2021Kotlin( string: "Gap is in"));
    }
}
```

Standard Java Implementation

```kotlin
object StringUtils {
    fun append2021Kotlin(string: String): String {
        return "$string 2021 kotlin"
    }

    fun appendChineseMeetup(string: String): String {
        return "$string 中文大會"
    }

    fun run() {
        appendChineseMeetup(append2021Kotlin( string: "Gap is in"))
    }
}
```

Kotlin in Java way

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Extension Function

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public class StringUtils {
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        return string + " " + "2021 kotlin";
    }

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    void run() {
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public class StringUtils {
    String append2021Kotlin(String string) {
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    }

    void run() {
        appendChineseMeetup(append2021Kotlin( string: "Gap is in"));
    }
}
```

Standard Java Implementation

```kotlin
fun String.append2021Kotlin(): String {
    return "$this 2021 kotlin"
}

fun String.appendChineseMeetup(): String {
    return "$this 中文大會"
}

fun main() {
    "Gap is in"
        .append2021Kotlin()
        .appendChineseMeetup()
}
```

Kotlin Way

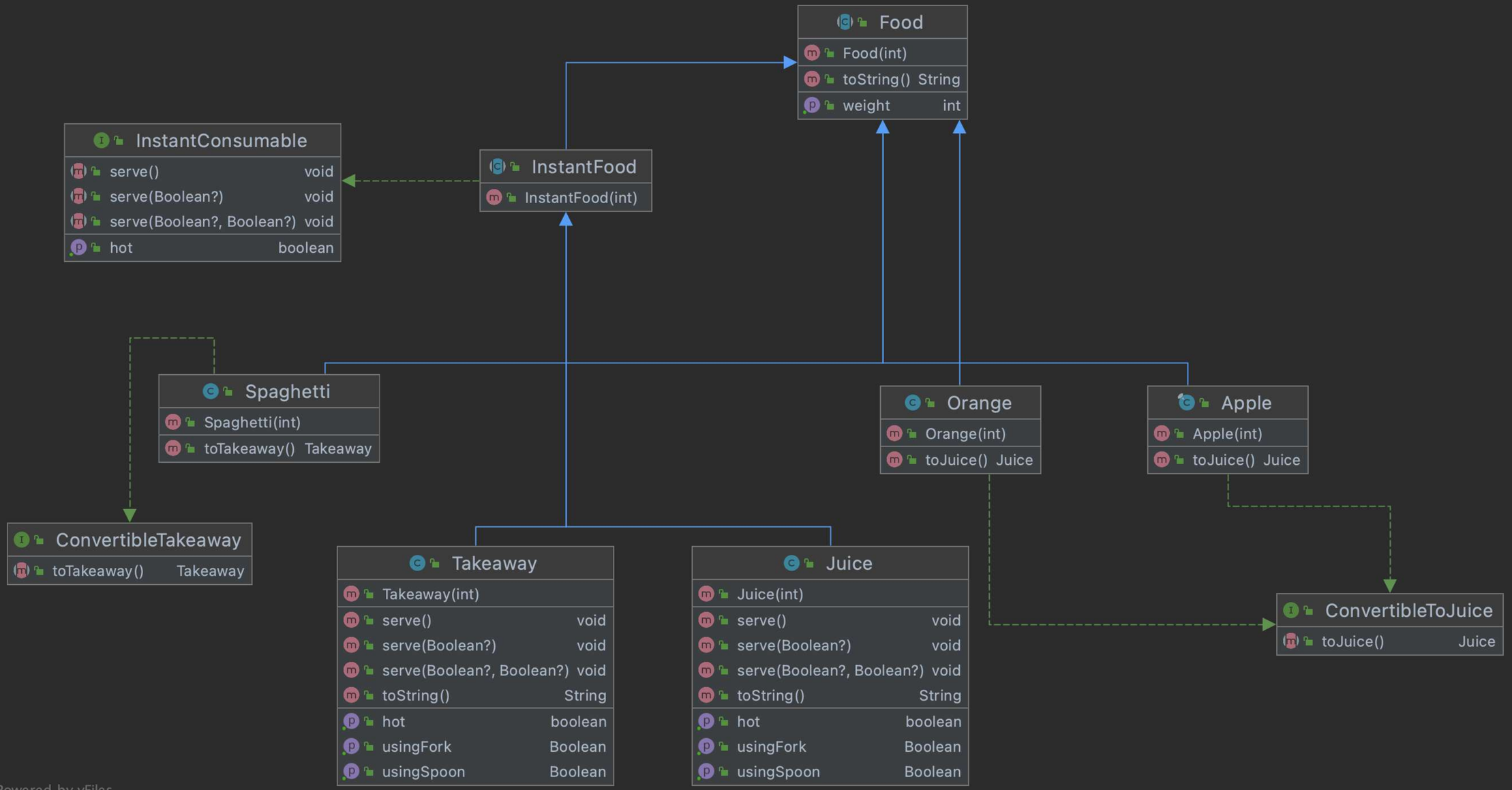
Color Scheme: GapStyle

Sample Use Case
Live Demo Migrate Java Code

Sample Use Case - Migrating Java Code

Color Scheme: GapStyle

Sample Use Case - Migrating Java Code



Live Demo

Challenge: Create your Bio with own DSL

GitHub: Source

```kotlin
package gaplotech

import java.util.concurrent.Future
import bio.*

/**
 * Created By Gary Lo on 30/3/2018
 * FacebookCoverPhoto.kt
 */
object GapLoTech: SoftwareEngineer(), Passion, ProgrammingLanguage by (Kotlin + Swift + Scala + Javascript) {

    fun write(): Future<Article> {
        return releaseEnergy()
            .exceptionally { throw GapShouldGoSleepException() }
            .thenApply { energy ->
                when(energy.type) {
                    is Work -> Experiences(
                        energy on FunctionalProgramming withLanguage Scala `for` "training declarative mindset",
                        energy on ReactiveProgramming withLanguage (Kotlin + Swift) `for` "training reactive mindset",
                        energy on Akka withLanguage Scala `for` "building highly concurrent & fault tolerant & distributed system",
                        energy on Coroutine withLanguage Kotlin `for` "building low latency & efficient application",
                        energy on (Mobile withPattern MVVM)
                                withTool (RxKotlin + RxSwift) `for` "building reactive mobile apps"
                    )

                    is Leisure -> Experiences(
                        energy on SideProject withLanguage Javascript `for` "fun",
                        energy on ModernWeb withTool (React + Vue + Babel + Webpack) `for` "progressive web app",
                        energy on Ops withTool (Docker + Kubernetes + GitLabCI) `for` "scaling & automation"
                    )
                }
            }
            .thenApply { experience -> Inspiration(source = experience) }
            .thenApply { inspiration -> Article(inspiration) }
    }

}

fun main(){
    GapLoTech.write()
}
```

Color Scheme: GapStyle

Thank You

Gap撈Tech

Blogs (Cantonese)
https://gaplo.tech

Blogs (English)
https://intl.gaplo.tech

Facebook Page
https://facebook.com/gaplotech