效率的抉择：用 Kotlin 做Android开发

Bennyhuo

个人简介

- 霍丙乾，Bennyhuo，
- 就职于腾讯地图
- Github: https://github.com/enbandari
- Kotlin 微信公众号
- Kotlin 社区：https://kotliner.cn
- Kotlin 博客：https://blog.kotliner.cn

Kotlin 简介

Kotlin 的基本情况

Kotlin 的基本情况

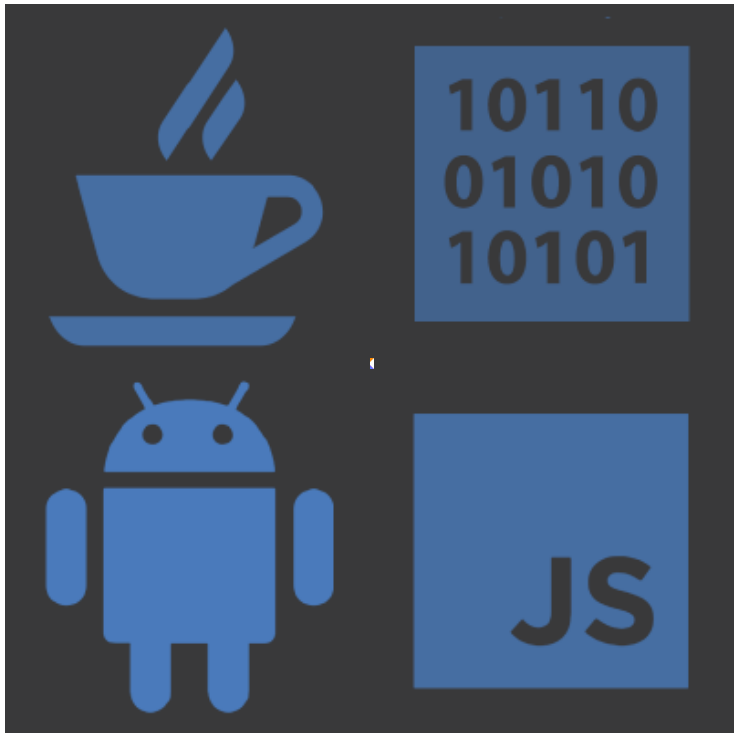
Kotlin 的基本情况

Andrey Breslav

Hadi Hariri

Kotlin 的基本情况

Kotlin 的基本情况



Kotlin 的基本情况

100% 兼容 Java

Kotlin 的基本情况

Kotlin 的基本情况

Kotlin 的基本情况

Android 官方开发语言

Kotlin 的基本情况

Kotlin 的基本情况

Kotlin 的基本情况

正式支持 JavaScript Target

Kotlin 的基本情况

Kotlin 的基本情况

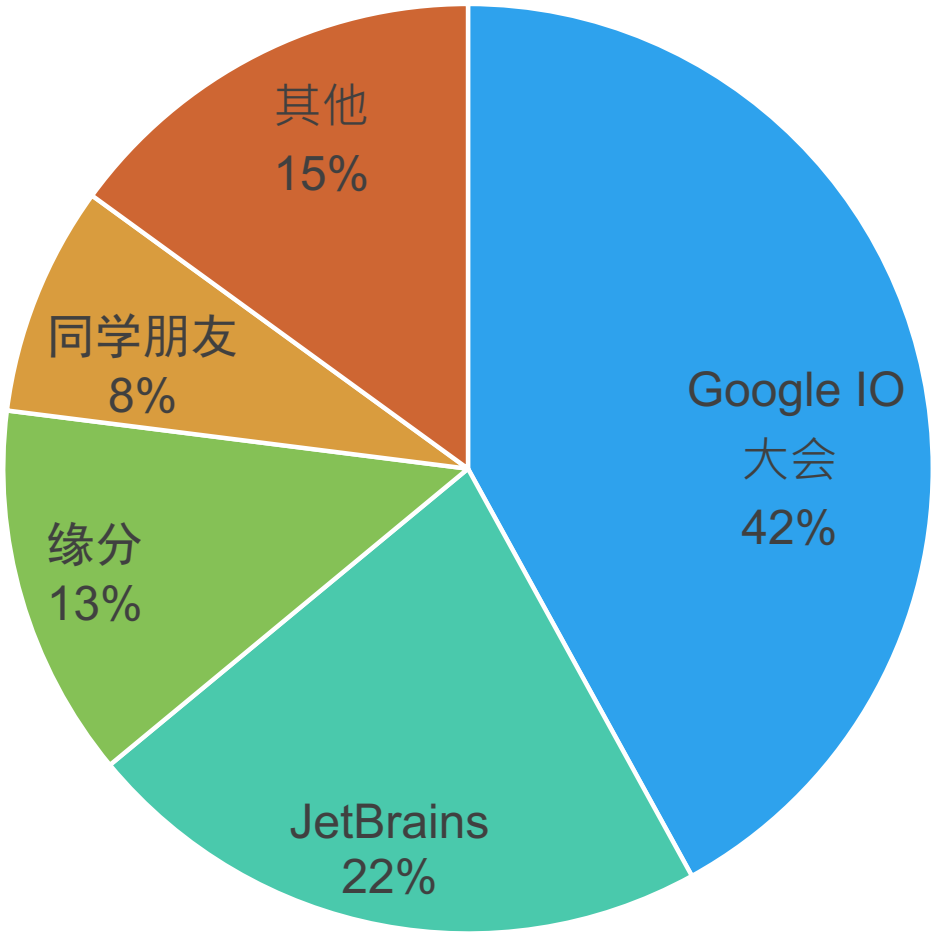
Kotlin 的基本情况

Native Target 预览版 0.4

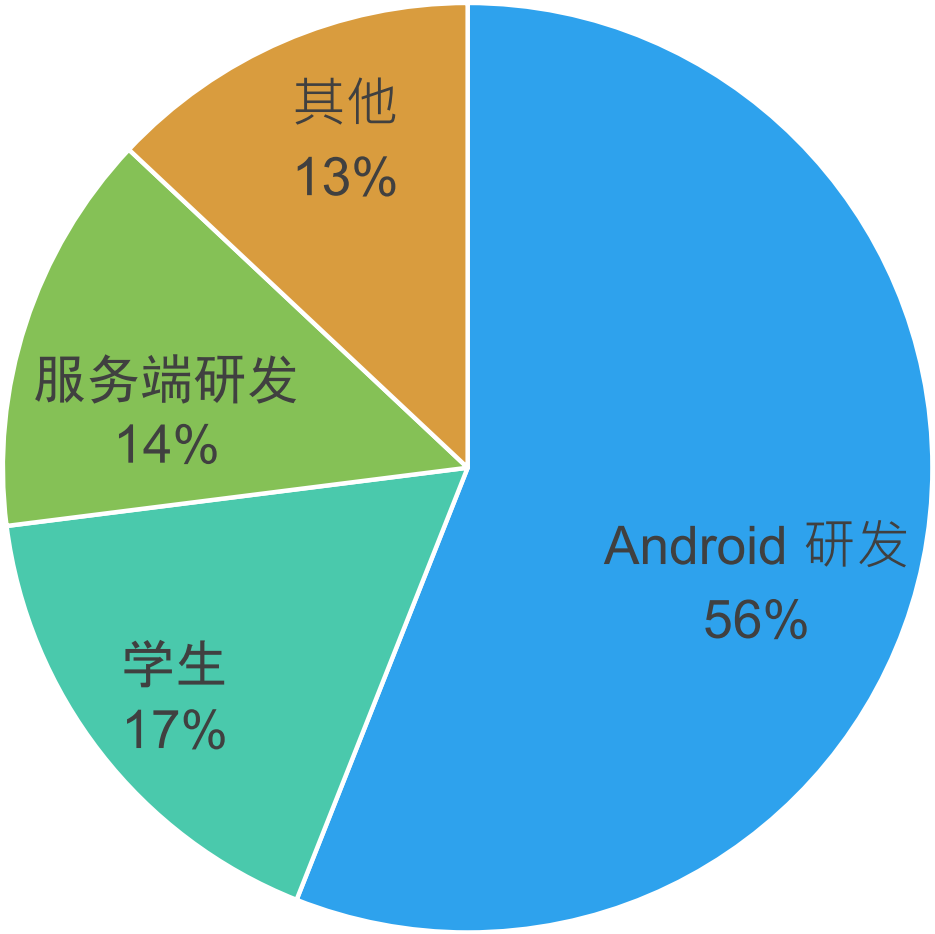
Kotlin 的基本情况

Kotlin 的基本情况

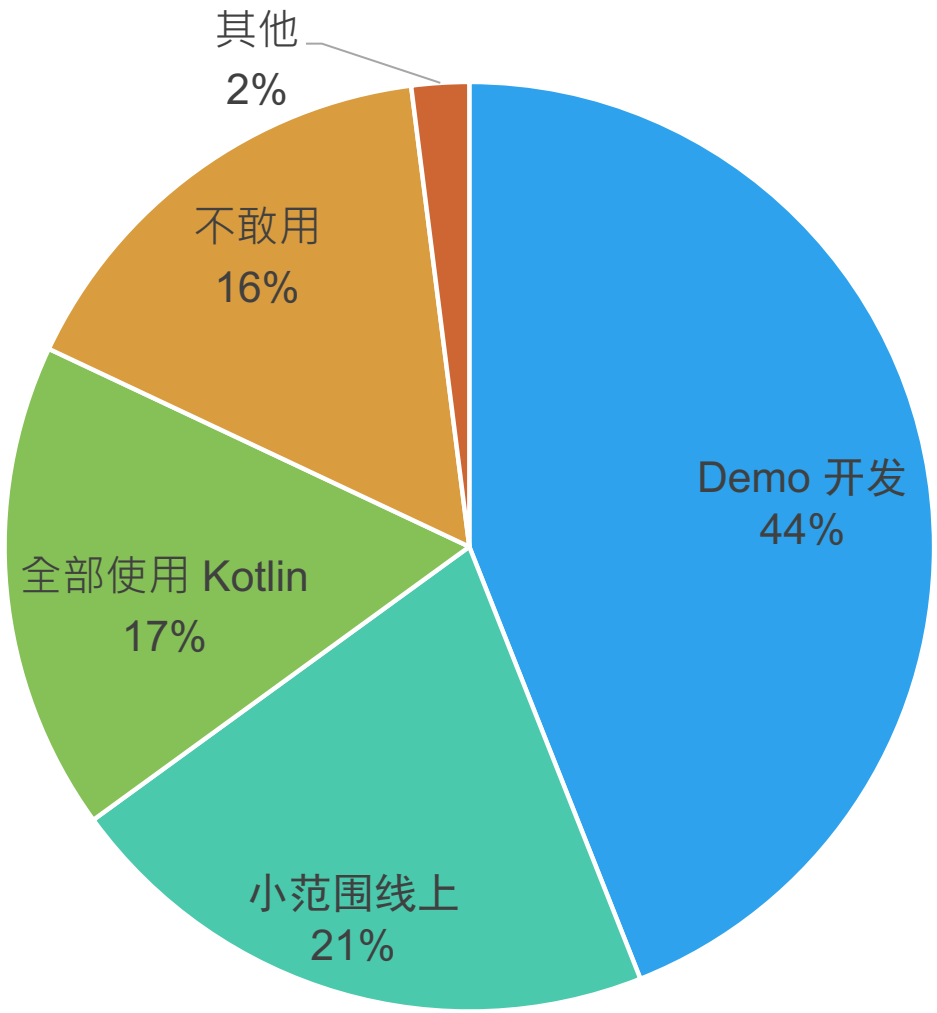
你是如何认识 Kotlin 的？



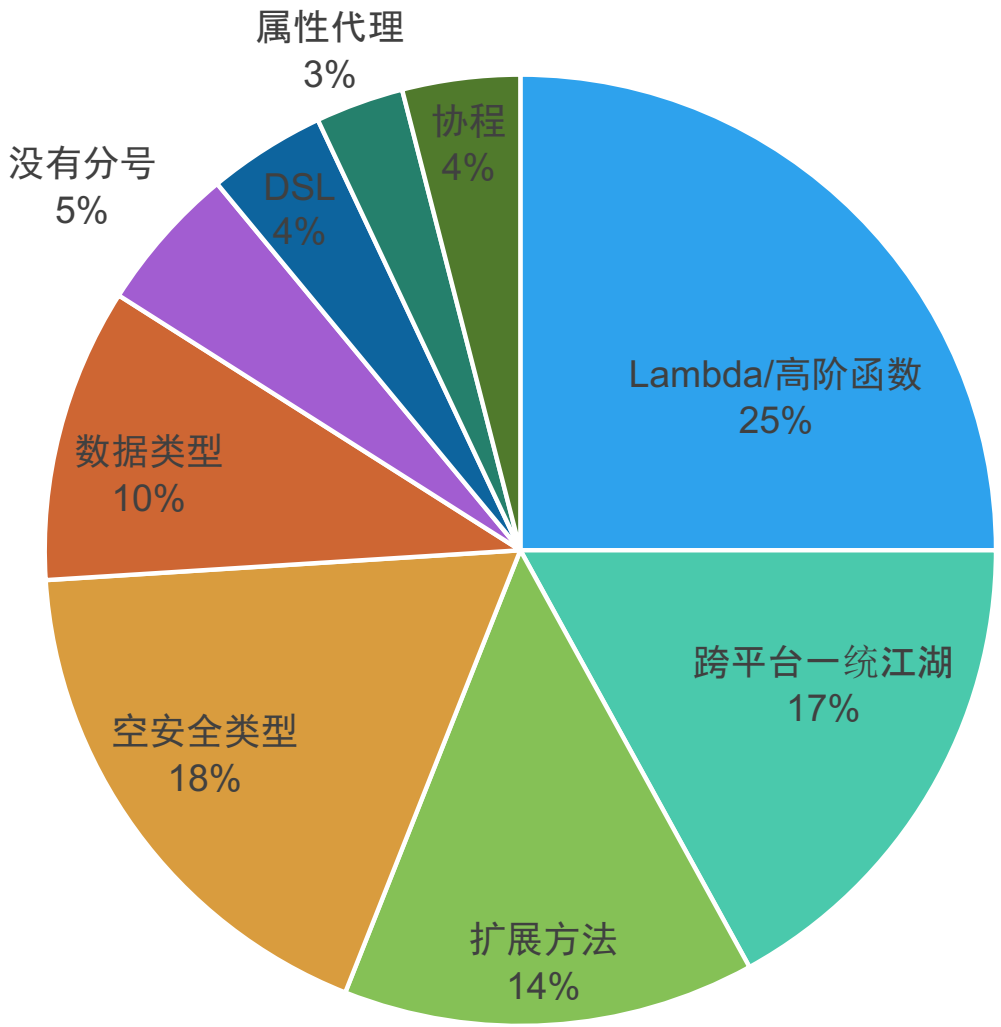
你从事何种职业？



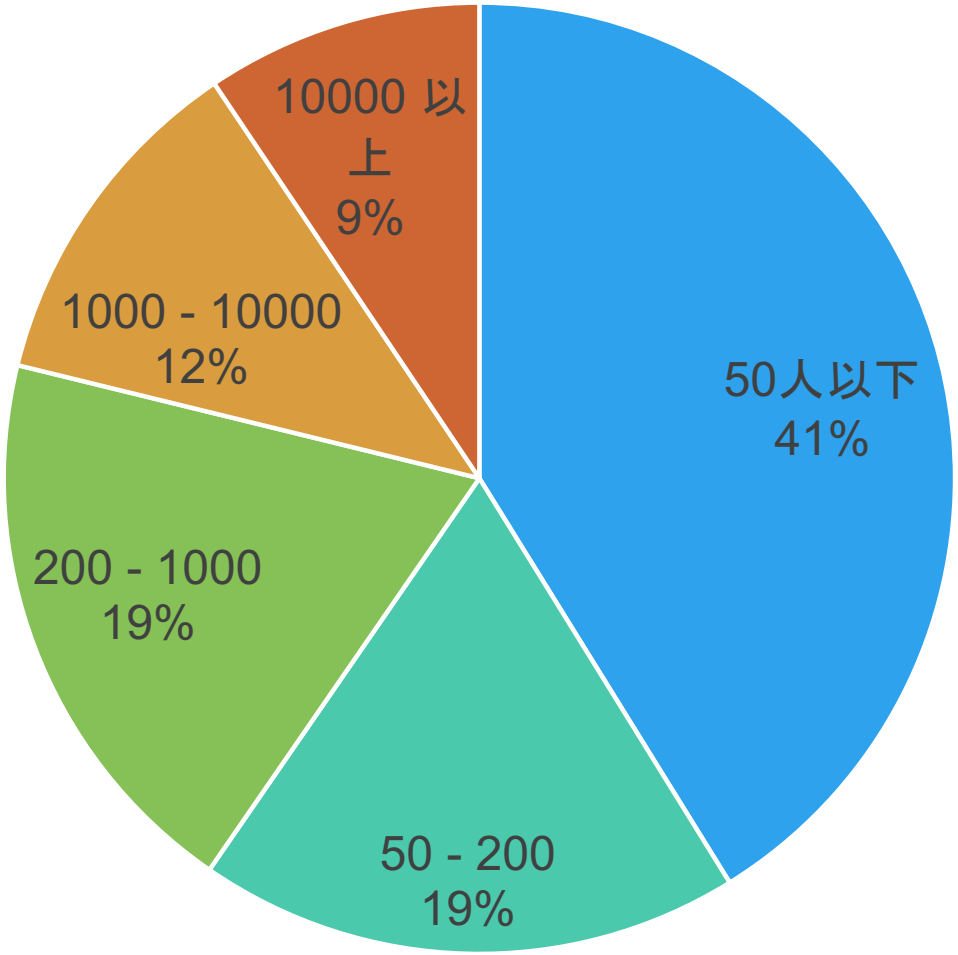
你或者你所在的项目如何使用 Kotlin 的？



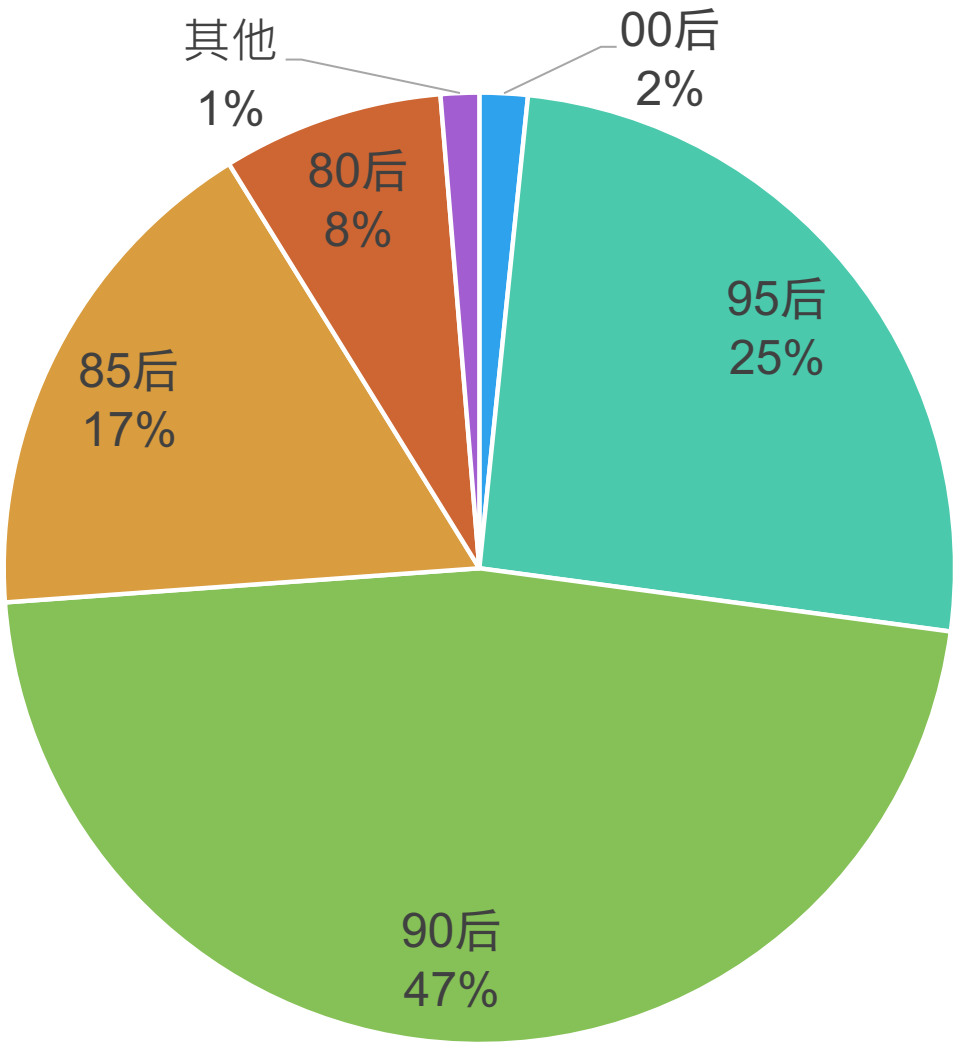
你觉得 Kotlin 最吸引你的特性是什么？

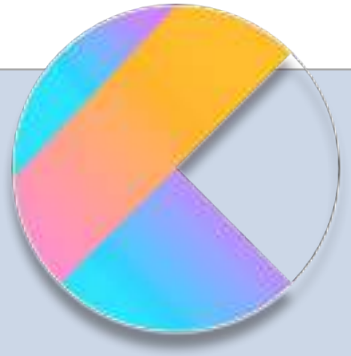


你所在的公司人数？



你的年龄范围？





Kotlin

高端大气上档次

♂ Gender

7 Age

Tiger

♏ Scorpio

11 | 8 Birthday

年轻

有实力

有潜力

爸爸有钱

家里有地

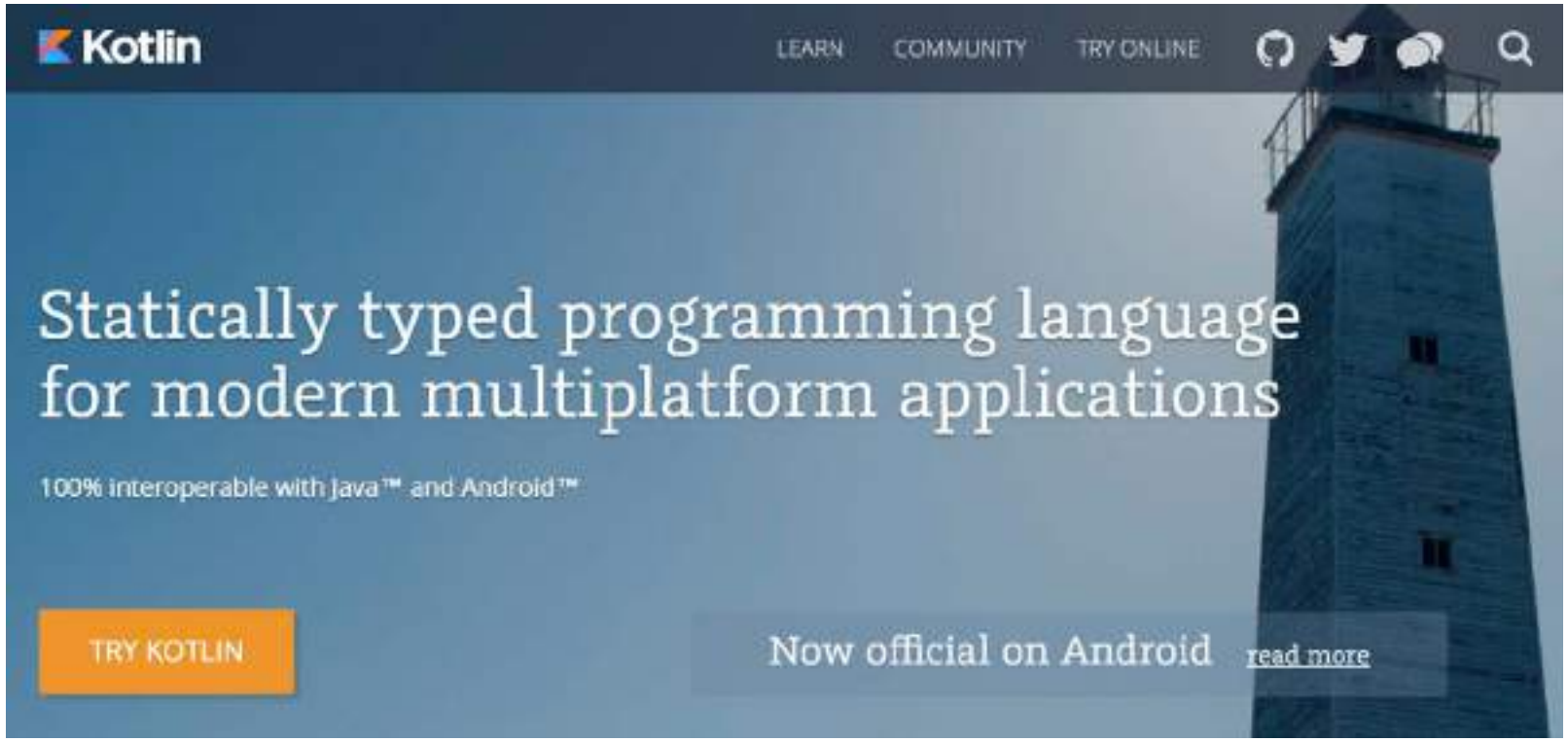
相关资料

Android developer

- 地址： https://developer.android.com/kotlin/index.html

Kotlin 官网

- 地址： http://kotlinlang.org/

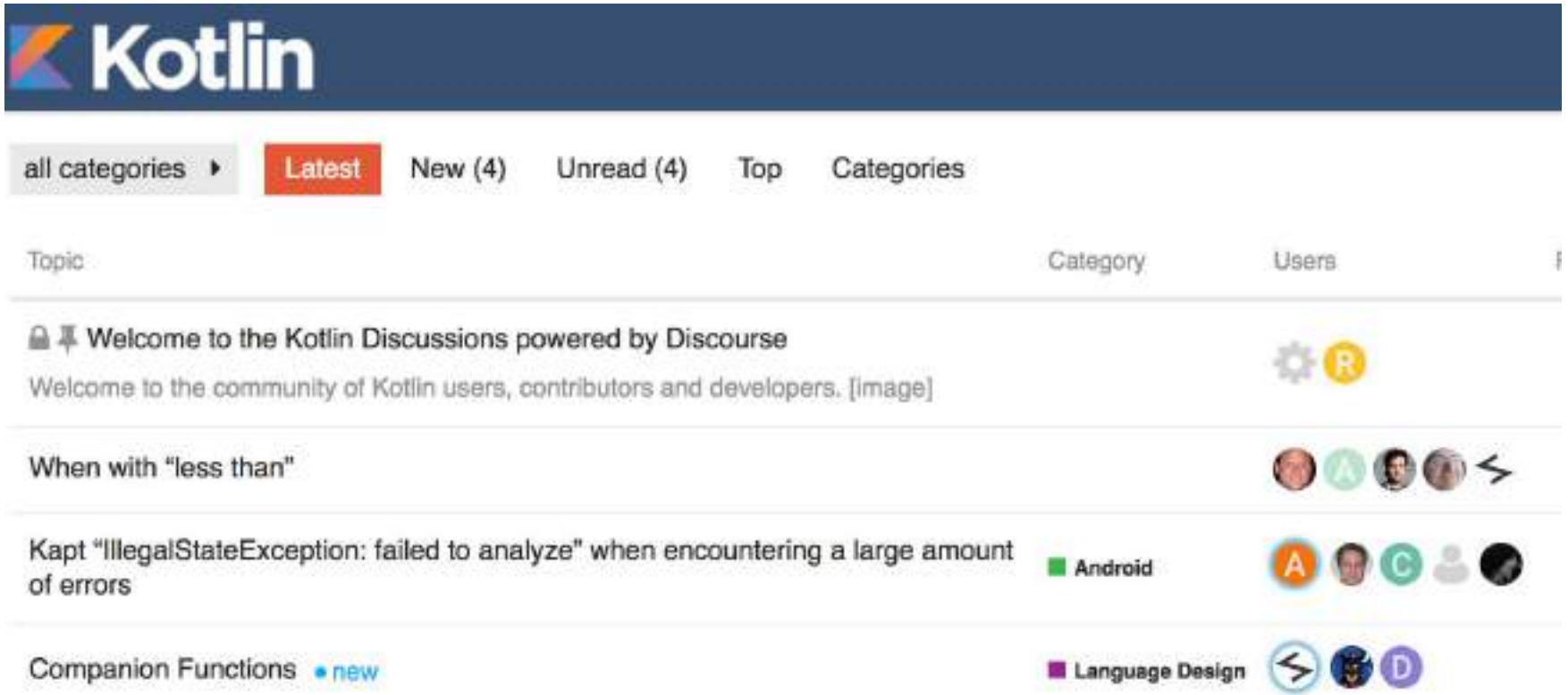


Kotlin 官网（中文版）

- 地址：https://www.kotlincn.net/

Kotlin 论坛

- 地址：https://discuss.kotlinlang.org/

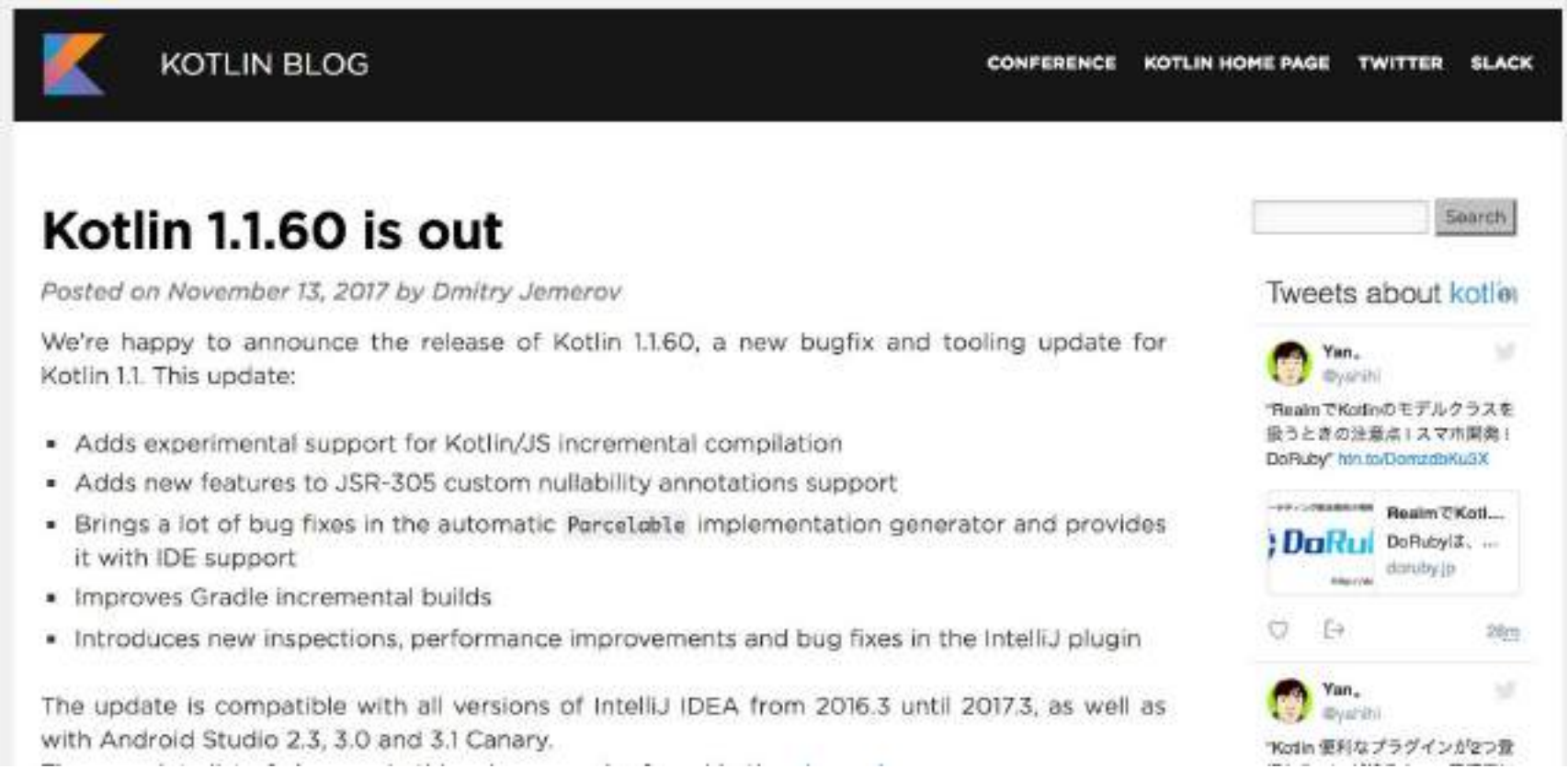


Kotlin 论坛（中文版）

- 地址：https://kotliner.cn/

Kotlin 博客

- 地址：https://blog.jetbrains.com/kotlin



Kotlin 博客（中文版）

- 地址：https://blog.kotliner.cn/

Kotlin 公众号

- 微信公众号：Kotlin

Kotlin 教学视频

- O'Reilly **Introduction to Kotlin Programming**：http://hadihariri.com/2016/11/01/oreilly-kotlin-course/
- O'Reilly **Advanced Kotlin Programming**：http://hadihariri.com/2016/11/01/oreilly-kotlin-course/

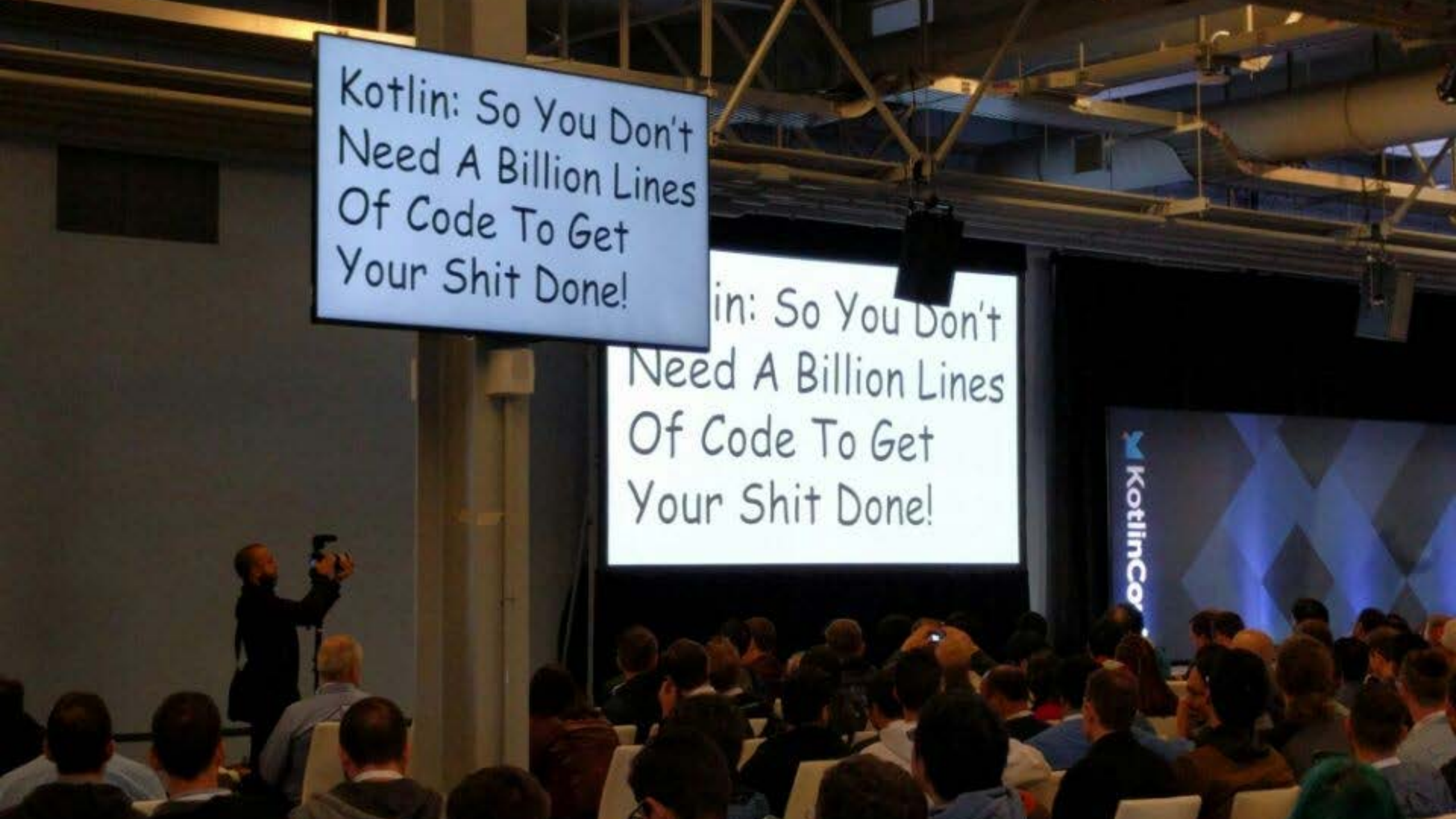
- Github **Kotlin 入门到“放弃”** ：https://github.com/enbandari/Kotlin-Tutorials
- 慕课网 **Kotlin 入门到进阶**：http://coding.imooc.com/class/108.html

培训目标

- 认识 Kotlin
- 了解 Kotlin 的基本语法
- 熟悉 Kotlin 特性的一些应用场景
- 最后把培训的内容都忘了


腾讯视频
不坏不坏 忘得真快呀

下面开始讲代码


Kotlin: So You Don't
Need A Billion Lines
Of Code To Get
Your Shit Done!
in: So You Don't
Need A Billion Lines
Of Code To Get
Your Shit Done!

“

简洁，就要少写废话

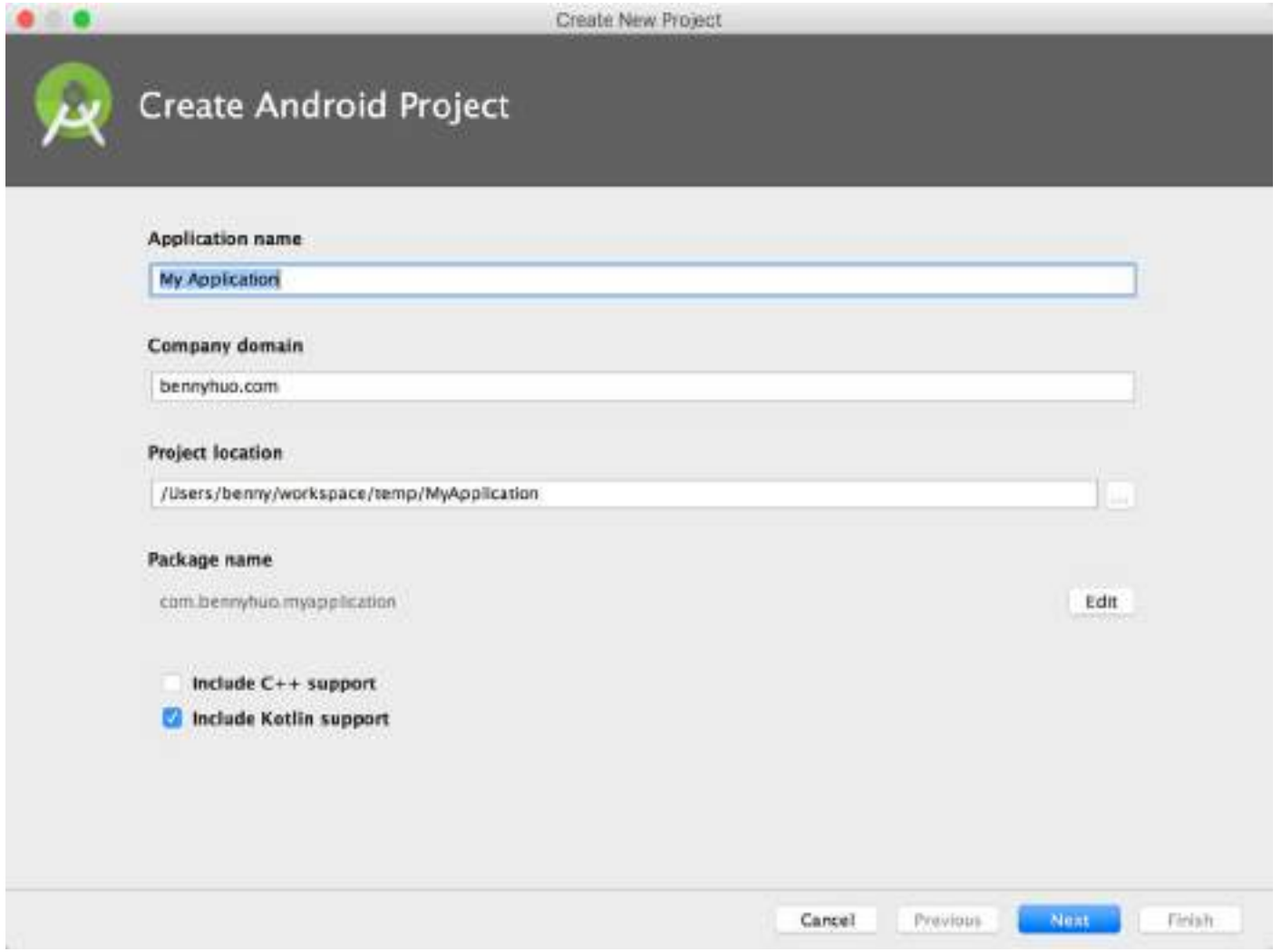
”

“

高效，就要少犯错误

”

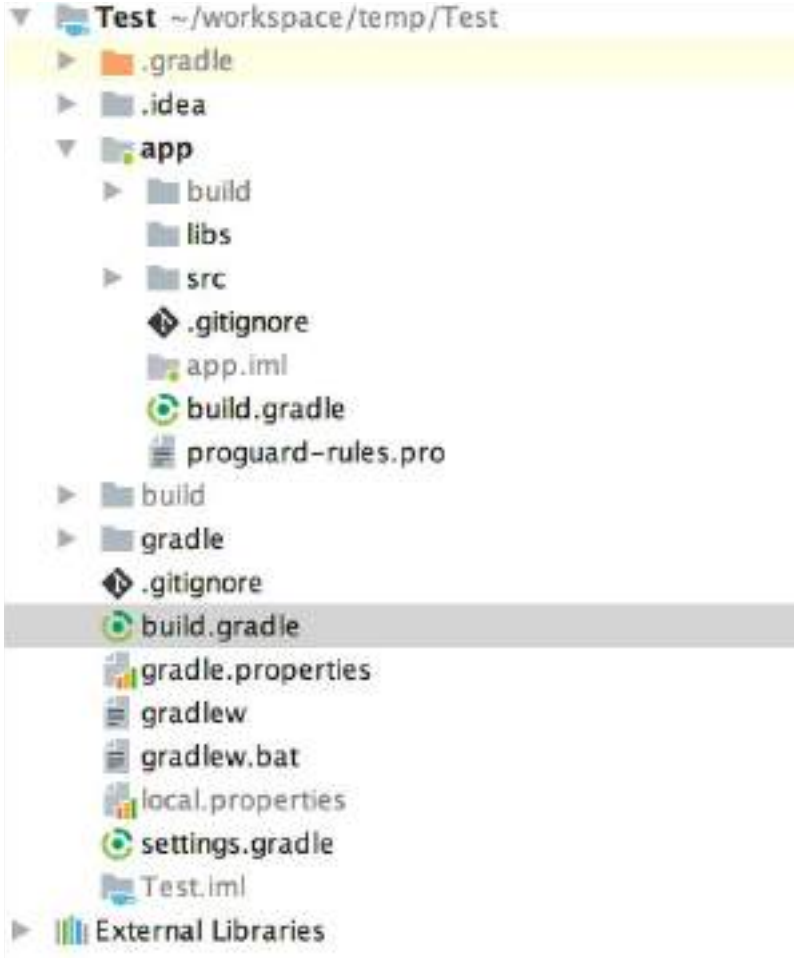
创建工程


Create New Project
Create Android Project
Application name
My Application
Company domain
bennyhuo.com
Project location
/Users/benny/workspace/temp/MyApplication
Package name
com.bennyhuo.myapplication
Edit
Include C++ support
Include Kotlin support
Cancel
Previous
Next
Finish

创建工程


Test ~/workspace/temp/Test
.gradle
.idea
app
build
libs
src
.gitignore
app.iml
build.gradle
proguard-rules.pro
build
gradle
.gitignore
build.gradle
gradle.properties
gradlew
gradlew.bat
local.properties
settings.gradle
Test.iml
External Libraries

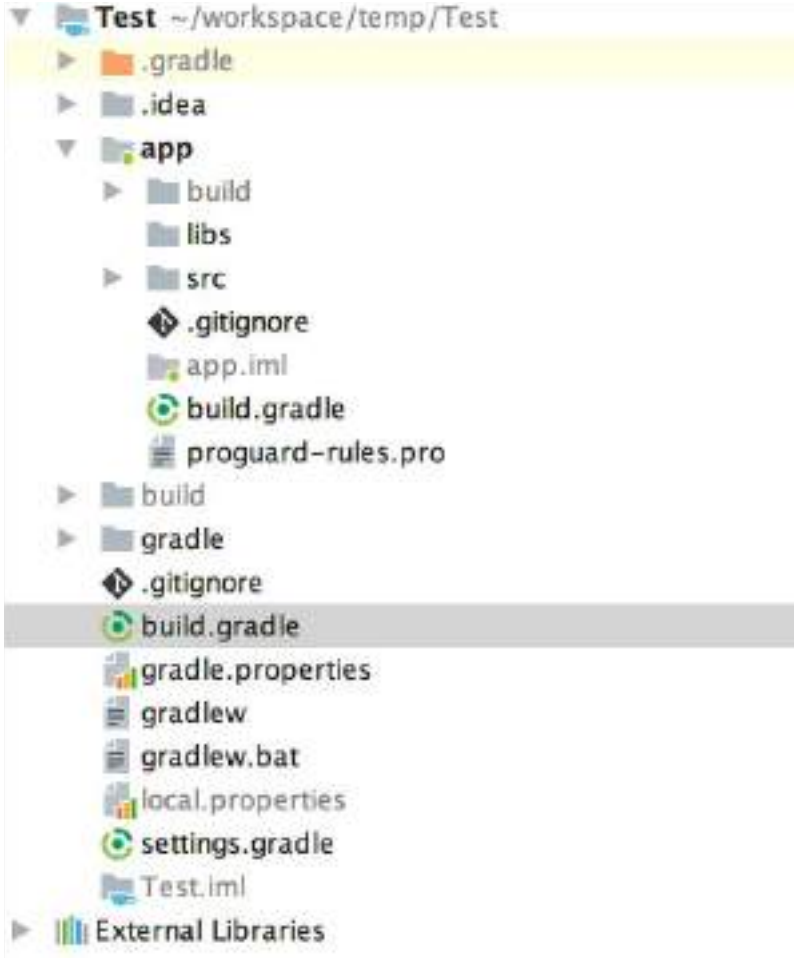
配置工程




```
buildscript {
    ext.kotlin_version = '1.1.51'
    repositories {
        google()
        jcenter()
    }
    dependencies {
        classpath 'com.android.tools.build:gradle:3.0.0'
        classpath "org.jetbrains.kotlin:kotlin-gradle-plugin:$kotlin_version"

        // NOTE: Do not place your application dependencies here; they belong
        // in the individual module build.gradle files
    }
}
```

配置工程




```
buildscript {
    ext.kotlin_version = '1.1.51'
    repositories {
        google()
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    dependencies {
        classpath 'com.android.tools.build:gradle:3.0.0'
        classpath "org.jetbrains.kotlin:kotlin-gradle-plugin:$kotlin_version"

        // NOTE: Do not place your application dependencies here; they belong
        // in the individual module build.gradle files
    }
}
```

配置工程


```
apply plugin: 'com.android.application'

apply plugin: 'kotlin-android'

android {
    ...
}

dependencies {
    implementation fileTree(dir: 'libs', include: ['*.jar'])
    implementation"org.jetbrains.kotlin:kotlin-stdlib-jre7:$kotlin_version
    ...
}
```

配置工程


```
apply plugin: 'com.android.application'

apply plugin: 'kotlin-android'

android {
    ...
}

dependencies {
    implementation fileTree(dir: 'libs', include: ['*.jar'])
    implementation"org.jetbrains.kotlin:kotlin-stdlib-jre7:$kotlin_version
    ...
}
```

如何定义变量

```
int anInt = 2;
```

如何定义变量

```
val anInt: Int = 2
```

如何定义变量

```
val anInt: Int = 2
```

如何定义变量

```
val anInt = 2
```

如何定义变量

```
val anInt = 2
anInt = 3
```

如何定义变量

```
val anInt = 2
anInt = 3
```

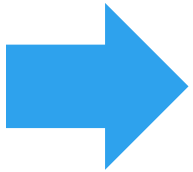
Val cannot be reassigned

如何定义变量

```
var anInt = 2
anInt = 3
```

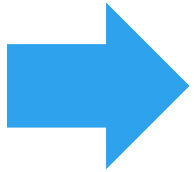
如何定义变量

```
val anInt = 2
```



```
final int anInt = 2;
```

```
var anInt = 2
```



```
int anInt = 2;
```

Kotlin

Java

如何定义函数

```
void hello(int anInt){
    System.out.println(anInt);
}
```

如何定义函数

```
fun hello(anInt: Int): Unit{
    println(anInt)
}
```

如何定义函数

```
fun hello(anInt: Int): Unit{
    println(anInt)
}
```

如何定义函数

```
fun hello(anInt: Int) {
    println(anInt)
}
```

如何定义函数

```
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fun hello(anInt: Int) {
    println(anInt)
}
```

如何定义函数

```
fun hello(anInt: Int): Unit{
    println(anInt)
}
```

如何定义数组

```
int[] intArray = new int[5];

int[] anotherIntArray = {1,2, 3,4,5};
```

如何定义数组

```
val intArray = IntArray(5)
val anotherIntArray = intArrayOf(1, 2, 3, 4, 5)
```

如何定义数组

```
int[] intArray = new int[5];
```

如何定义数组

```
int[] intArray = new int[5];

for (int i = 0; i < intArray.length; i++) {
    intArray[i] = i;
}
```

如何定义数组

```
val intArray = IntArray(5){ it }
```

如何定义数组

```
val intArray = IntArray(5){ it * 2 }
```

如何操作数组

```
intArray[1] = 2;
int element3 = intArray[3] ;
```

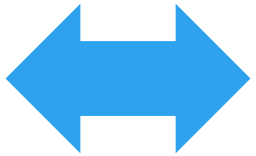
如何操作数组

```
intArray[1] = 2

val element3 = intArray[3]
```

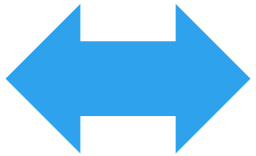
运算符

```
intArray[1] = 2
```



```
intArray.set(1, 2)
```

```
val element3 = intArray[3]
```



```
val element3 = intArray.get(3)
```

如果是 List、Set 呢？

运算符

```
class 逗你玩{
    operator fun set(int: Int, value: Any){}

    operator fun get(int: Int) = Unit
}
```

运算符

```
class 逗你玩{
    operator fun set(int: Int, value: Any){}

    operator fun get(int: Int) = Unit
}
```

```
val 逗你玩的实例 = 逗你玩()

逗你玩的实例[2] = 3

val x = 逗你玩的实例[1]
```

WARNING

请不要用中文编程，

不然你可能找不到工作。

数组的类型

- 基本类型的数组
  - ShortArray/IntArray/LongArray/FloatArray/DoubleArray/CharArray/BooleanArray
- 其他类型数组
  - **val** stringArray = Array(5)**{ it**.toString()**}** *// Array<String>*
  - **val** anotherStringArray = *arrayOf*(**"hello"**, **"world"**)
  - **val** strings = *arrayOfNulls*<String>(5)

数组的类型

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  - **val** stringArray = Array(5){ **it**.toString()} *// Array<String>*
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数组的类型

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  - **val** stringArray = Array(5){ **it**.toString()} // *Array<String>*
  - **val** anotherStringArray = *arrayOf*(**"hello"**, **"world"**)
  - **val** strings = *arrayOfNulls*<String>(5)

如何定义类

```
interface AnInterface{}

class SuperClass{
    public SuperClass() {
    }
}

class SubClass extends SuperClass implements AnInterface{
    public SubClass() {
        super();
    }
}
```

如何定义类

```
interface AnInterface

class SuperClass(){}

class SubClass : SuperClass(), AnInterface{}
```

如何定义类

```
interface AnInterface

class SuperClass{}

class SubClass : SuperClass(), AnInterface{}
```

如何定义类

```
interface AnInterface

class SuperClass

class SubClass : SuperClass(), AnInterface
```

如何定义类

```
interface AnInterface

class SuperClass

class SubClass : SuperClass(), AnInterface
```

This type is final, so it cannot be inherited from

如何定义类

```
interface AnInterface

open class SuperClass

class SubClass : SuperClass(), AnInterface
```

如何定义类

```
interface AnInterface

open class SuperClass

class SubClass : SuperClass(), AnInterface
```

如何实例化类

```
SubClass subClass = new SubClass();
```

如何实例化类

```
val subClass = new SubClass()
```

如何实例化类

```
val subClass = new SubClass()
```

如何实例化类

```
val subClass = SubClass()
```

如何实例化类

```
var subClass = SubClass()
```

构造方法

```
interface AnInterface

open class SuperClass

class SubClass : SuperClass(), AnInterface
```

构造方法

```
interface AnInterface

open class SuperClass( aParam: Int )

class SubClass : SuperClass( 10 ), AnInterface
```

构造方法

```
interface AnInterface

open class SuperClass(aParam: Int) {
    init {
        println(aParam)
    }

    val aProperty = aParam
}

class SubClass : SuperClass(10), AnInterface
```

构造方法

```
interface AnInterface

open class SuperClass(aParam: Int) {
    init {
        println(aParam)
    }

    val aProperty = aParam
}

class SubClass ( aParamForSuper: Int )
            : SuperClass( aParamForSuper ), AnInterface
```

构造方法

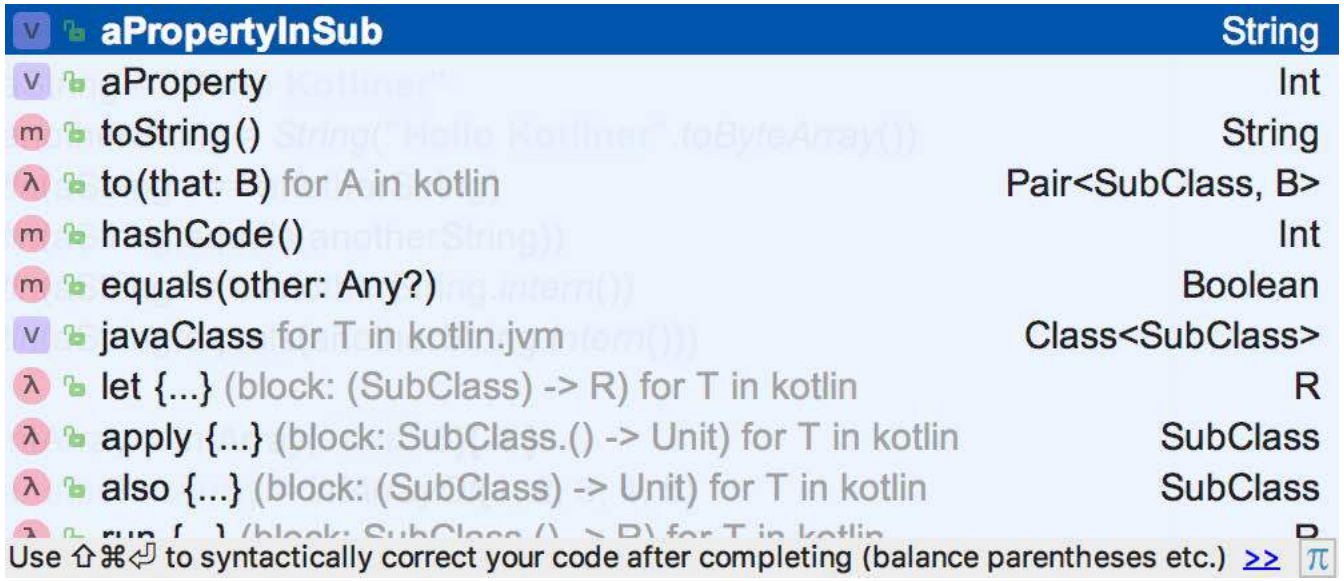
```
class SubClass( val aPropertyInSub: String, aParamForSuper: Int )
        : SuperClass( aParamForSuper ), AnInterface
```

构造方法

```
class SubClass( val aPropertyInSub: String, aParamForSuper: Int )
        : SuperClass( aParamForSuper ), AnInterface
```

```
val subClass = SubClass("Hello", 10)

subClass.
```



构造方法

```
public class Call {

    private String callId;

}
```

构造方法

```
public class Call {

    private String callId;

    public Call(String callId) {
        this.callId = callId;
    }

}
```

构造方法

```
public class Call {

    private String callId;

    public Call(){
        // 稍后再初始化 callId
    }

    public Call(String callId) {
        this.callId = callId;
    }

}
```

构造方法

```
public class Call {

    private final String callId;

    public Call(String callId) {
        this.callId = callId;
    }

}
```

构造方法

```
class Call(val callId: String)
```

构造方法

```
class Call(val callId: String){

    constructor()

}
```

构造方法

```
class Call(val callId: String){

    constructor()
}
```

Primary constructor call expected

构造方法

```
class Call(val callId: String){

    constructor(): this()

}
```

callId: String

构造方法

```
public ViewGroup(Context context) {
    this(context, null);
}

public ViewGroup(Context context, AttributeSet attrs) {
    this(context, attrs, 0);
}

public ViewGroup(Context context, AttributeSet attrs, int defStyleAttr) {
    this(context, attrs, defStyleAttr, 0);
}

public ViewGroup(Context context, AttributeSet attrs, int defStyleAttr, int defStyleRes) {
    super(context, attrs, defStyleAttr, defStyleRes);
    ...
}
```


失败
DEFEAT

构造方法

```
public SomeViewGroup(Context context) {
    super(context);
    init();
}

public SomeViewGroup(Context context, AttributeSet attrs) {
    super(context, attrs);
    init();
}
```

构造方法

```
public SomeViewGroup(Context context) {
    super(context);
    init();
    initData();
}

public SomeViewGroup(Context context, AttributeSet attrs) {
    super(context, attrs);
    init();
}
```

构造方法

```
public SomeViewGroup(Context context) {
    super(context);
    init();
    initData();
}

public SomeViewGroup(Context context, AttributeSet attrs) {
    super(context, attrs);
    init();
    initData();
}
```

构造方法

```
481  public SomeViewGroup(Context context) {
482      super(context);
485      init();
486      initData();
     }
```

```
547  public SomeViewGroup(Context context, AttributeSet attrs) {
548      super(context, attrs);
549      init();
550      initData();
551  }
```

方法重载

```
public interface List<E> extends Collection<E> {
    ...
    public E remove(int location);

    public boolean remove(Object object);
    ...
}
```

方法重载

```
public interface List<E> extends Collection<E> {
        ...
        public E remove(int location);

        public boolean remove(Object object);
        ...
}
```

```
List<Integer> integers = new ArrayList<>();

...

integers.remove(2);
```

方法重载

```
public interface List<E> extends Collection<E> {
        ...
        public E remove(int location);

        public boolean remove(Object object);
        ...
}
```

```
val integers = ArrayList<Int>()

...

integers.removeAt(2)
```

方法重载

```
public interface List<E> extends Collection<E> {
        ...
        public E remove(int location);

        public boolean remove(Object object);
        ...
}
```

```
val integers = ArrayList<Int>()

...

integers.removeAt(2)
```

默认参数

```
class SomeViewGroup(context: Context,
                    attrs: AttributeSet?,
                    defStyleAttr: Int,
                    defStyleRes: Int)
    : ViewGroup(context, attrs, defStyleAttr, defStyleRes) {

    init {
            ...
    }
}
```

默认参数

```
class SomeViewGroup(context: Context,
                    attrs: AttributeSet? = null,
                    defStyleAttr: Int = 0,
                    defStyleRes: Int = 0)
    : ViewGroup(context, attrs, defStyleAttr, defStyleRes) {

    init {
        ...
    }
}
```

覆写父类成员

```
@Override
protected void onResume() {
    super.onResume();
    tencentMapView.onResume();
}

@Override
protected void onPause() {
    super.onPause();
    tencentMapView.onPause();
}
```

覆写父类成员

```
public class MyMapView extends MapView {
    ...
    public void onResume() {
        doSomethingOnResume();
    }

    @Override
    public void onPause() {
        super.onPause();
        doSomethingOnPause();
    }
    ...
}
```

覆写父类成员

```
class MyMapView(context: Context) : MapView(context) {

    fun onResume() {
        doSomethingOnResume()
    }

    override fun onPause() {
        super.onPause()
        doSomethingOnPause()
    }
}
```

'onResume' hides member of supertype 'MapView' and needs 'override' modifier

覆写父类成员

```
class MyMapView(context: Context) : MapView(context) {

    override fun onResume() {
        doSomethingOnResume()
    }

    override fun onPause() {
         super.onPause()
        doSomethingOnPause()
    }
}
```

属性代理

```
public class Link {
    private double length = -1;

    private List<LatLng> points;

    ...
}
```

属性代理

```
public void update(LatLng latLng){
    ...
    if(length == -1){
        length = resolveLength();
    }
    ...
}

private double resolveLength(){
    return ...;
}
```

属性代理

```
public void update(LatLng latLng){
    ...
    double length = getLength();
    ...
}

public double getLength(){
    if(length == -1){
        length = resolveLength();
    }
    return length;
}

private double resolveLength(){
    return ...;
}
```

属性代理

```
private val length by lazy {
    resolveLength()
}

private fun resolveLength(): Double {
    return ...
}
```

属性代理

```
private val length by lazy {
    ...
}
```

属性代理

```
private val length by lazy( SYNCHRONIZED ) {
    ...
}
```

属性代理

```
enum class LazyThreadSafetyMode {
    SYNCHRONIZED,
    PUBLICATION,
    NONE,
}
```

属性代理

```
inline operator fun <T> Lazy<T>.getValue(
        thisRef: Any?,
        property: KProperty<*>
): T = value
```

属性代理

```
private var _value: Any? = UNINITIALIZED_VALUE
override val value: T
    get() {
        if (_value === UNINITIALIZED_VALUE) {
            _value = initializer!!()
            initializer = null
        }
        return _value as T
    }
```

属性代理

```
private var _value: Any? = UNINITIALIZED_VALUE
override val value: T
    get() {
        if (_value === UNINITIALIZED_VALUE) {
            _value = initializer!!()
            initializer = null
        }
        return _value as T
    }
```

```
private val length by lazy {
    ...
}
```

属性代理

```
public interface ReadWriteProperty<in R, T> {

    public operator fun getValue(thisRef: R, property: KProperty<*>): T

    public operator fun setValue(thisRef: R, property: KProperty<*>, value: T)
}
```

属性代理

```
class PropertiesDelegate <T> (val path: String): ReadWriteProperty <Any, T> {

    val properties: Properties by lazy {
        ... // 读属性
    }

    override operator fun getValue(thisRef: Any, property: KProperty<*>): T {
        val value = properties[property.name]
        val classOfT = property.returnType.classifier as KClass<*>
        return if (Number::class.isSuperclassOf(classOfT)) {
                ... // 如果是数值需要做一些转换
        } else {
            value
        } as T
    }

    override operator fun setValue(thisRef: Any, property: KProperty<*>, value: T) {
        properties[property.name] = value
        ... // 存属性
    }
}
```

属性代理

```
class PropertiesDelegate (val path: String) {

    val properties: Properties by lazy {
        ... // 读属性
    }

    operator fun <T> getValue(thisRef: Any, property: KProperty<*>): T {
        val value = properties[property.name]
        val classOfT = property.returnType.classifier as KClass<*>
        return if (Number::class.isSuperclassOf(classOfT)) {
                ... // 如果是数值需要做一些转换
        } else {
            value
        } as T
    }

    operator fun <T> setValue(thisRef: Any, property: KProperty<*>, value: T) {
        properties[property.name] = value
        ... // 存属性
    }
}
```

属性代理

```
abstract class AbsProperties(path: String) {
    protected val prop = PropertiesDelegate(path)
}
```

属性代理

```
abstract class AbsProperties(path: String) {
    protected val prop = PropertiesDelegate(path)
}

object MetaInfo: AbsProperties("/meta.properties"){
    val version: String by prop
    val author: String by prop
    val name: String by prop
    val desc: String by prop
}
```

属性代理

```
object MetaInfo: AbsProperties("/meta.properties"){
    val version: String by prop
    val author: String by prop
    val name: String by prop
    val desc: String by prop
}
```

```
version=1.0-SNAPSHOT
author=bennyhuo@kotliner.cn
name=QCloudImageUploader
desc=方便地批量上传指定目录的图片到腾讯云的免费 50G 图床
```

属性代理

link: <https://api.github.com/user/repos?page=2>; rel="next",

<https://api.github.com/user/repos?page=5>; rel="last"

属性代理

link: <https://api.github.com/user/repos?page=2>; rel="next",

<https://api.github.com/user/repos?page=5>; rel="last"

属性代理

map["next"] = "https://api.github.com/user/repos?page=2"

map["last"] = "https://api.github.com/user/repos?page=5"

属性代理

map["next"] = "https://api.github.com/user/repos?page=2"

map["last"] = "https://api.github.com/user/repos?page=5"

map["first"] = "https://api.github.com/user/repos?page=1"

map["prev"] = "https://api.github.com/user/repos?page=1"

属性代理

```
class GitHubPaging{
    val isLast: Boolean = ?
    val isFirst: Boolean = ?
    val hasPrev: Boolean = ?
    val hasNext: Boolean = ?
    operator fun get(key: String): String?{
        return ?
    }
}
```

属性代理

```
class GitHubPaging{
    val first: String? = ?
    val last: String? = ?
    val next: String? = ?
    val prev: String? = ?
    val isLast: Boolean = ?
    val isFirst: Boolean = ?
    val hasPrev: Boolean = ?
    val hasNext: Boolean = ?
}
```

属性代理

```
class GitHubPaging{
    val first by map
    ...
    val isFirst
        get() = first == null
    ...
}
```

参考 Kotlin 公众号文章：用 Map 为你的属性做代理

属性代理

```
object Settings {

    var lastPage by pref(0)

    var dayNightMode by pref(false)

    var enablePush by pref(false)
}
```

参考 Kotlin 公众号文章：用 Map 为你的属性做代理

接口代理

```
interface PageManager {
    fun showPage(clazz: KClass<out Page>)

    fun goBack()
}
```

接口代理

```
class PageManagerImpl: PageManager{
    override fun showPage(clazz: KClass<out Page>) {
        ...
    }

    override fun goBack() {
        ...
    }

    override fun dismiss() {
        ..
    }
}
```

接口代理

```
abstract class AbstractPage(val pageManager: PageManager)
    : Page, PageManager {
    override fun showPage(clazz: KClass<out Page>) {
        pageManager.showPage(clazz)
    }

    override fun goBack() {
        pageManager.goBack()
    }

    override fun dismiss() {
        pageManager.dismiss()
    }
}
```

接口代理

```
abstract class AbstractPage(val pageManager: PageManager)
    : Page, PageManager by pageManager{

}
```

接口代理

```
abstract class AbstractPage(val pageManager: PageManager)
    : Page, PageManager by pageManager
```

扩展成员

```
inline operator fun <T> Lazy<T>.getValue(
        thisRef: Any?,
        property: KProperty<*>
): T = value
```

扩展成员

```
inline operator fun <T> Lazy<T>.getValue(
        thisRef: Any?,
        property: KProperty<*>
): T = value
```

扩展成员

```
inline operator fun <T> Lazy<T>.getValue(
        thisRef: Any?,
        property: KProperty<*>
): T = value
```

扩展成员

```
inline operator fun <T> Lazy<T>.getValue(
        thisRef: Any?,
        property: KProperty<*>
): T = value
```

扩展成员

```
public class DensityUtil {

    /**
     * 根据手机的分辨率从 dp 的单位 转成为 px(像素)
     */
    public static int dip2px(float dpValue) {
        final float scale = ContextHolder.getInstance().getContext().getResources().getDisplayMetrics().density;
        return (int) (dpValue * scale + 0.5f);
    }

    /**
     * 根据手机的分辨率从 px(像素) 的单位 转成为 dp
     */
    public static int px2dip(float pxValue) {
        final float scale = ContextHolder.getInstance().getContext().getResources().getDisplayMetrics().density;
        return (int) (pxValue / scale + 0.5f);
    }
}
```

扩展成员

```
//returns dip(dp) dimension value in pixels
fun Context.dip(value: Int): Int = (value * resources.displayMetrics.density).toInt()
fun Context.dip(value: Float): Int = (value * resources.displayMetrics.density).toInt()

//return sp dimension value in pixels
fun Context.sp(value: Int): Int = (value * resources.displayMetrics.scaledDensity).toInt()
fun Context.sp(value: Float): Int = (value * resources.displayMetrics.scaledDensity).toInt()

//converts px value into dip or sp
fun Context.px2dip(px: Int): Float = px.toFloat() / resources.displayMetrics.density
fun Context.px2sp(px: Int): Float = px.toFloat() / resources.displayMetrics.scaledDensity
```

扩展成员

```
listView.scrollX = dip(2)
paint.strokeWidth = dip(2).toFloat()
paint.textSize = sp(12).toFloat()
```

扩展成员

```
logger.error("**************************")
logger.error("++++++++++++++++++")
```

扩展成员

```
fun String.times(other: Int): String{
    return (1..other).fold(StringBuilder()){ acc, i ->
        acc.append(this)
        acc
    }.toString()
}
```

扩展成员

```
logger.error("**************************")
logger.error("++++++++++++++++++")
```

扩展成员

```
logger.error("*" .times(8) )
logger.error("+" .times(8) )
```

扩展成员

```
fun String.times(other: Int): String{
    return (1..other).fold(StringBuilder()){ acc, i ->
        acc.append(this)
        acc
    }.toString()
}
```

扩展成员

```
operator fun String.times(other: Int): String{
    return (1..other).fold(StringBuilder()){ acc, i ->
        acc.append(this)
        acc
    }.toString()
}
```

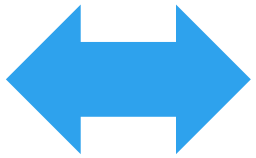
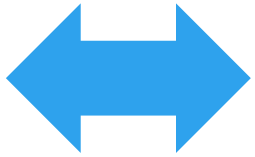
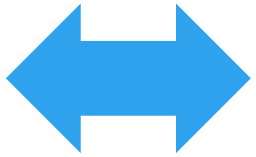
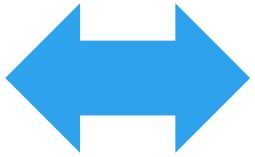
扩展成员

```
logger.error("*" .times(8) )
logger.error("+" .times(8) )
```

扩展成员

```
logger.error("*" * 8 )
logger.error("+" * 8 )
```

运算符

a + b		a.plus(b)
a - b		a.minus(b)
a * b		a.times(b)
a / b		a.div(b)

扩展成员

```
String formattedDate
    = new SimpleDateFormat("yyyy-MM-dd")
        .format(new Date());
```

Java

扩展成员

```
new Date().format("yyyy-MM-dd")
```

Groovy

扩展成员

```
val formattedDate
    = SimpleDateFormat("yyyy-MM-dd").format(Date())
```

Kotlin

扩展成员

```
fun Date.format(format: String) : String{
    return SimpleDateFormat(format).format(this)
}
```

扩展成员

```
fun Date.format(format: String) : String
        = SimpleDateFormat(format).format(this)
```

扩展成员

```
fun Date.format(format: String)
        = SimpleDateFormat(format).format(this)
```

扩展成员

```
val formattedDate
    = SimpleDateFormat("yyyy-MM-dd").format(Date())
```

Kotlin

扩展成员

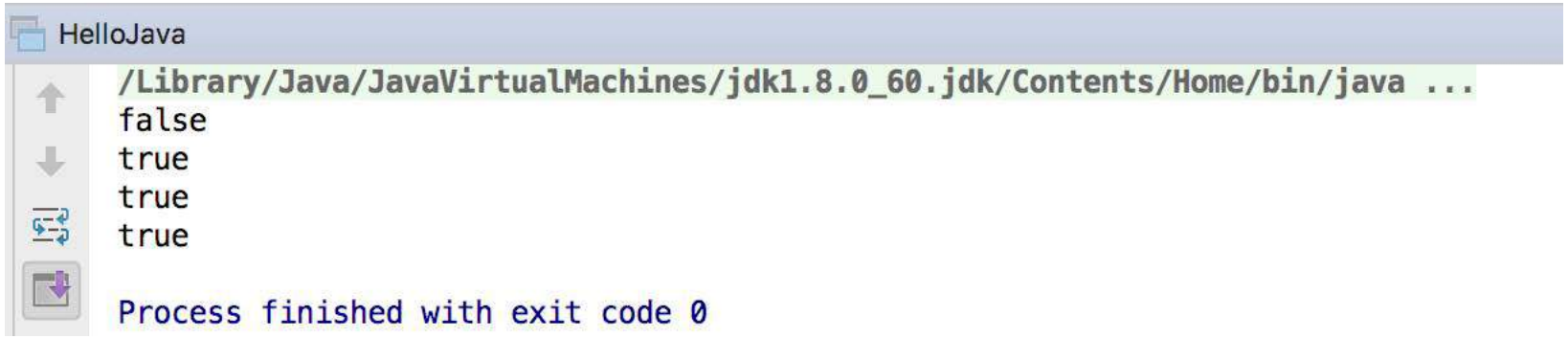
```
val formattedDate = Date().format("yyyy-MM-dd")
```

如何比较对象

```
String aString = "Hello Kotliner";
String anotherString = new String("Hello Kotliner");
System.out.println(aString == anotherString);
System.out.println(aString.equals(anotherString));
System.out.println(aString == anotherString.intern());
System.out.println(aString.equals(anotherString.intern()));
```

如何比较对象

```
String aString = "Hello Kotliner";
String anotherString = new String("Hello Kotliner");
System.out.println(aString == anotherString);
System.out.println(aString.equals(anotherString));
System.out.println(aString == anotherString.intern());
System.out.println(aString.equals(anotherString.intern()));
```



如何比较对象

```
val aString = "Hello Kotliner"
val anotherString = String("Hello Kotliner")
```

如何比较对象

```
val aString = "Hello Kotliner"

val anotherString = String("Hello Kotliner")
```

None of the following functions can be called with the arguments supplied.

- String(**StringBuffer**) *defined in* kotlin.text
- String(**StringBuilder**) *defined in* kotlin.text
- String(**ByteArray**) *defined in* kotlin.text
- String(**CharArray**) *defined in* kotlin.text

如何比较对象

```
val aString = "Hello Kotliner"
val anotherString = String("Hello Kotliner".toByteArray())
println(aString === anotherString)
println(aString == anotherString)
println(aString === anotherString.intern())
println(aString == anotherString.intern())
```

如何比较对象

```
val aString = "Hello Kotliner"
val anotherString = String("Hello Kotliner".toByteArray())
println(aString === anotherString)
println(aString == anotherString)
println(aString === anotherString.intern())
println(aString == anotherString.intern())
```

如何比较对象

```
val aString = "Hello Kotliner"
val anotherString = String("Hello Kotliner".toByteArray())
println(aString === anotherString)
println(aString == anotherString)
println(aString === anotherString.intern())
println(aString == anotherString.intern())
```

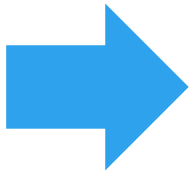
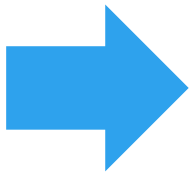
如何比较对象

```
val aString = "Hello Kotliner"
val anotherString = String("Hello Kotliner".toByteArray())
println(aString === anotherString)
println(aString == anotherString)
println(aString === anotherString.intern())
println(aString == anotherString.intern())
```

如何比较对象

```
val aString = "Hello Kotliner"
val anotherString = String("Hello Kotliner".toByteArray())
println(aString === anotherString)
println(aString.equals(anotherString))
println(aString === anotherString.intern())
println(aString.equals(anotherString.intern()))
```

如何比较对象

Kotlin		Java
a == b		a.equals(b)
a === b		a == b

如何比较对象

```
var anInt = ...
var anotherInt = ...
if(anInt < anotherInt){
    println("anInt < anotherInt")
} else {
    println("anInt > anotherInt")
}
```

如何比较对象

```
var anInt = ...
var anotherInt = ...
if(anInt .compareTo( anotherInt ) < 0){
    println("anInt < anotherInt")
} else {
    println("anInt > anotherInt")
}
```

运算符

a == b ⟺ a.equals(b)

a < b ⟺ a.compareTo(b) < 0

a > b ⟺ a.compareTo(b) > 0

a >= b 和 a <= b 呢？

数据类

```
public class Link {
    private String id;
    private double length;
    private String name;
    private String attributes;

    public String getId() {
        return id;
    }

    public void setId(String id) {
        this.id = id;
    }

    ... // Getters/Setters
}
```