

A comparative study: Java Vs kotlin Programming in Android

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Abstract : The purpose of this paper is to explore the field of Kotlin Programming with Android by conducting an extensive literature review of the research done in the past. This paper attempts to understand Kotlin Programming as well as scope in development work. The key point discussed in this research paper how to Kotlin is differ than Java.

Keywords: Kotlin, Android, Java

I. INTRODUCTION TO KOTLIN

What is Kotlin?

Kotlin (Android_and_Kotlin) is a statically-typed programming language that runs on the Java Virtual Machine and also can be compiled to JavaScript source code. Its primary development is from a team of JetBrains programmers based in Saint Petersburg, Russia (the name comes from Kotlin Island, near St. Petersburg).

Who is introduced Kotlin?

It's developed by team of JetBrains at the primary level programmers based in Saint Petersburg, Russia. JetBrains is Most Fast Grow able company its publish so many IDEs like IntelliJIDE, CLion, DataGrip, PhpStorm etc.

There are so many Programming Language are there, but Why did it published kotlin? When JetBrains Developed its own IDE, that time JetBrains Suffering some programming problem in java. Java is Most popular and most Power Full Language but during the development JetBrains suffer some problem. so JetBrains Find some Other Options that Time scala programming is most runnable in 2010.

That time JetBrains decide after comparison of Java & Scala Programming but that time scala is not popular and there is also no more library's in scala then JetBrains decided to developed Programming Language its known as Kotlin in 2010 using JAVA based JVM environment. Actually it's not a new language but is one step ahead of JAVA using some Idea on C#, java, Scala, and many more other Languages.

Kotlin was introduce by JetBrains for Private use in 2010 to 2011. In 2011 with apache license kotlin published as a Open Source. After day by day Updates are come in kotlin have some extra features kotlin is powerful programming Language. In 2015 - 2016 Google know about kotlin after the testing in Android Studio using as Plug-In.

In 2017 Google IO Conformance announce to officially declared Android Programming Language. We can't crate only Android Programming, but we can also Developed Java supported Application, Window base Software, Application, Browser base software.

Why Kotlin?

While Java is one of the world's most widely used programming languages and the official language of Android development, there are many reasons why Java might not always be the best option for your Android projects.

Java was one of the most usable languages, back in its heyday. But today, and the Java I use on Android doesn't even have support for lambdas, method references, streams, try-with-resources ($\text{minSdk} \geq 19$). I still have to use the `javax.time` APIs from the old Java 6/7 worlds. One of the biggest flaws in Java is the way it handles “null,” leading to the dreaded `NulPointerException` (NPE), popularly known as The Billion Dollar Mistake).

Developers love clean, concise code. Less code takes less time to write, less time to read, and is less susceptible to bugs. But with Java, you must write a lot of code to get even the simplest things done. You've probably already experienced this if you're an Android developer but Kotlin is exactly opposite to the Java.

II. MOTIVATION

A major reason (Shweta_Sharma, 2017) is the support google has offered for the language.

Kotlin has many useful features

1. We early mentioned NULL Safety in Kotlin Compare to other Language we cannot declare NULL, there for we pass Zero-overhand.
2. Autogeneration of boilerplate like equals, hashCode, toString, a copy method and variable spreading support (destructuring)

Advantages of Kotlin

1. Interchangeability With Java

- You can do java and Kotlin code existing side by side in the same project. compiler support both cord to compile.
- user will able to know which part of your project is written in java and which part are written in kotlin.
- if you have project in java which is already working on you can trial kotlin in a small part of the project without affecting the rest of your code base.
- if one you decide to continue with kotlin, you can either migrate the hold project existing java code to kotlin one file at a time.

2. No NULL Pointer Exceptions

- It's a most common reason for crashes in our application.
- it's most time consuming process to fix all of the null point exception. it's a also boring task.
- In the kotlin you don't need to worry about null Pointer Exceptions because Null Safely is baked into kotlin type system.

3. Easy to Learning

- Kotlin is a enhancement of Java.
- if you want to create a new class in kotlin is very similar to java:

```
class MainActivity : AppCompatActivity() {  
  
    override fun onCreate(savedInstanceState: Bundle?) {  
        super.onCreate(savedInstanceState)  
        setContentView(R.layout.activity_main)  
        println("Hello Akshay!")  
    }  
}
```

- Compare to java kotlin is easy to write and understand the code.

4. Easy and Great IDE and Tooling Support

- JetBrains Specialize in creating Some of the most used IDEs in the world.
- In Android Studio's Kotlin Support is install as a Plug-in. it's that simple. it as to Eclipse Plugin.
- All Android Studio's IDE Features work perfectly in kotlin. at a same time we can use mix kotlin java code. The IDEs support for other JVM based Languages doesn't even come close.
- Android Studio have a one amazing feature that kotlin plug-in to Android Studio is the "convert java file to Kotlin" feature.

5. Write Less code

- Compare with Java kotlin is less code. and fewer lines of code means smaller file sizes for kotlin compared to java equivalents.
- kotlin is more readable too, Understand it's syntax. it is crisp, concise and reduce a lot of much of unnecessary cord. that developers must written every day.

How To Install Kotlin In Android Studio

Follwing some Step to Install Kotlin In Android Studio.

Step 1: Create Project

Step 2: Go To File Menu -> Select New Project Option. follwing Screen is Appear.

Step 3: Click On Next Button After Give The Application Name and Project Location. Select The form Factors your app will run on

Step 4: Click On Next Button. Select Activity Form The List.

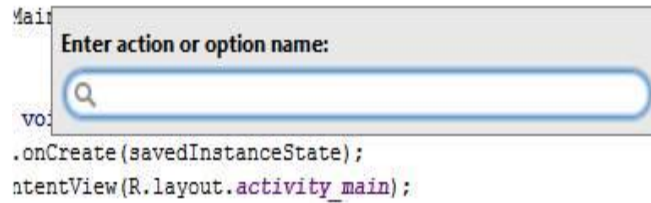
Step 5: Click On Next Button. Give the Activity Name.

Step 6: Click on Finish Button. Your Project is Create Successfully.

In Android Studio 3.0, you can choose to create the activity in Kotlin right away, so you can skip the "Converting Java code to Kotlin" step. Earlier versions will create an activity in Java, and you can use the automated converter tool to convert it.

Converting Java code to Kotlin

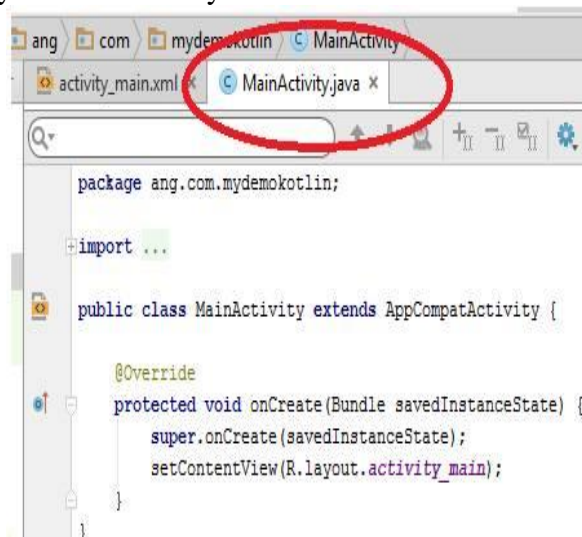
Open MainActivity.java file. Then invoke action Convert Java File to Kotlin File. there is multiple way but one is easiest way is Find Action (Ctrl + Shift + A). The pop-up window that opens, shows the suggestion list of matching names.



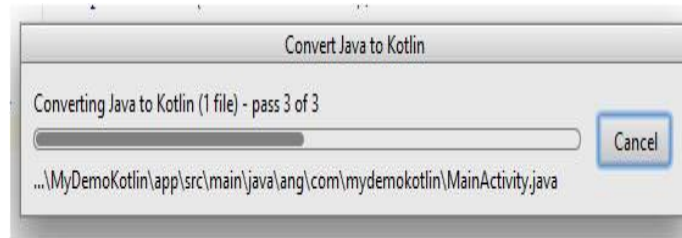
Start typing the desired action name. As you type, the suggestion list displays the matching names of actions. The actions that are not valid in the current context are displayed gray.



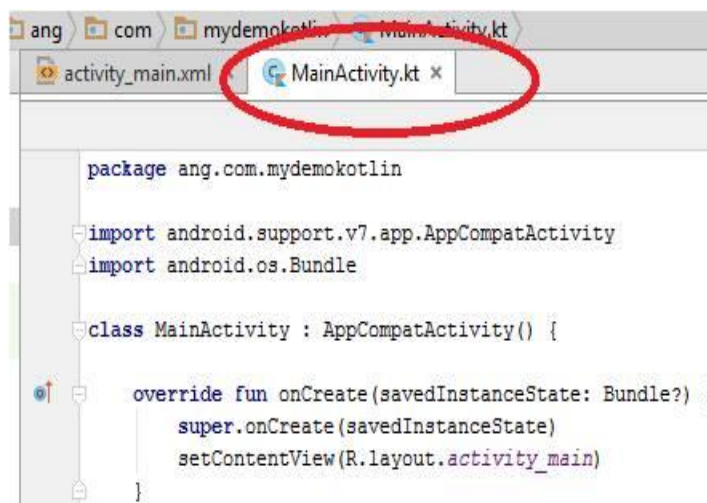
You Can also Press Ctrl + Alt + Shift + K option instate of Find Action. before converting java to kotlin file extension of main activity is MainActivity.Java.



Now we can convert Java cord to Kotlin using Ctrl + Alt + Shift + K option.



Now you can see the extension of MainActivity.java is Replaced By MainActivity.kt . After the conversion you should have an activity written in Kotlin.

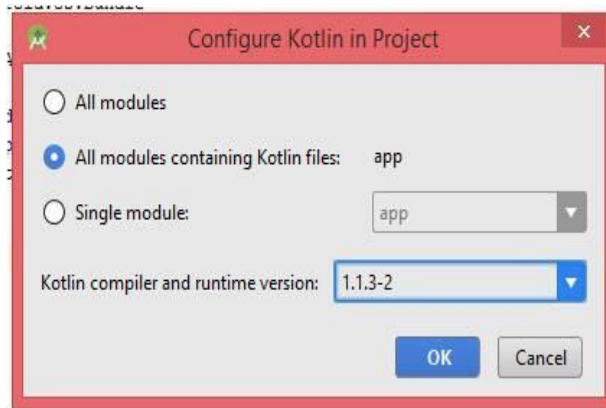


III. CONFIGURING KOTLIN IN THE PROJECT

If you start editing this file, Android Studio shows you a prompt that Kotlin is not configured, so you can configure it. Alternatively, you can invoke the configuration by selecting Tools | Kotlin | Configure Kotlin in Project from the main menu.



Choose the latest available from the list of installed versions.



Click On Ok Button After Selecting Version.

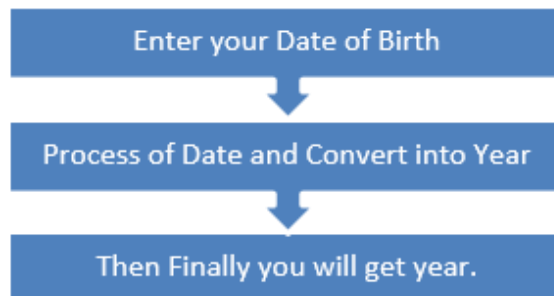
IV. COMPARE JAVA AND KOTLIN IS IN BELOW TABLE:

Sr No	Java	Kotlin
1	Semicolon (;) is use in the end of the statement	There is no Semicolon (;) in the end of the statement
2	Extension of java file is .JAVA	Extension of Kotlin file is .kt
3	Variable declaration using Primitive Data type ex. int a = 5;	Where variablr declaration using Var keyword ex. var a
4	There no Null Safety in java	Where kotlin provide Null Safety
5	Smart Cast is not available	Smart Cast is available
6	Java Does Checked exception	Kotlin Doesn't Checked exception
7	Java Gradle is slow. it's not quite as slow as with kotlin.	The build time for kotlin is little slower using Gradle
8	Java have not Exception Function features	Kotlin have Exception Function features
9	Java Doesn't Data Classes features	Kotlin Does Data Classes features
10	Java Doesn't immutability features	Kotlin Does immutability features
11	Java Doesn't Type aliases features	Kotlin Does Type aliases features
12	Java is Powerful programming language for android.	Kotlin is one step ahead of java for android.


V. IMPLEMENTATION OF DEMO APP WITH KOTLIN

Suppose we take demo related to age counter using Kotlin.

Process of Age Counter



Code



```

package ang.com.kotindemo
import android.support.v7.app.AppCompatActivity
import android.os.Bundle
import android.view.View
import kotlinx.android.synthetic.main.activity_main.*
import java.util.*
class MainActivity : AppCompatActivity(){
    override fun onCreate(savedInstanceState: Bundle?){
        super.onCreate(savedInstanceState)
        setContentView(R.layout.activity_main)
        tvage.setText("");
    }
    public fun CalculateAge(view : View)
    {
        val dob: String = etbirth.text.toString()
        val currentyear =
Calendar.getInstance().get(android.icu.util.Calendar.YEAR
)
        val age = currentyear - dob.toInt()
        tvage.setText("Your Age is : $age")
    }
}

```

VI. CONCLUSION

In this Research Paper, we have study basic Kotlin related to Age Demo Apps. As of today many work in Android with java so we study work with Kotlin instead of Java. This work can further enriched to achieve Kotlin related mobile Apps.

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