Kotlin

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About the Tutorial

Kotlin is a programming language introduced by JetBrains, the official designer of the most intelligent Java IDE, named Intellij IDEA. This is a strongly statically typed language that runs on JVM. In 2017, Google announced Kotlin is an official language for android development.

Kotlin is an open source programming language that combines object-oriented programming and functional features into a unique platform. The content is divided into various chapters that contain related topics with simple and useful examples.

Audience

This tutorial has been prepared for the beginners to help them understand the basics of Kotlin programming language. After completing this tutorial, you will find yourself at a moderate level of expertise in Kotlin, from where you can take yourself to the next levels.

Prerequisites

Before proceeding with this tutorial you should have a basic understanding of Java programming language. Although it is a beginners' tutorial, we assume that the readers have a reasonable exposure to any programming environment and knowledge of basic concepts such as variables, commands, syntax, etc. We strongly recommend that you gain some basic knowledge of Java programming language before proceeding with Kotlin programming.

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1. Kotlin - Overview

Kotlin is a new open source programming language like Java, JavaScript, etc. It is a high level strongly statically typed language that combines functional and technical part in a same place. Currently, Kotlin targets Java and JavaScript. It runs on JVM.

Kotlin is influenced by other programming languages such as Java, Scala, Groovy, Gosu, etc. The syntax of Kotlin may not be exactly similar to JAVA, however, internally Kotlin is reliant on the existing Java Class library to produce wonderful results for the programmers. Kotlin provides interoperability, code safety, and clarity to the developers around the world.

Advantages & Disadvantages

Following are some of the advantages of using Kotlin for your application development.

Easy Language: Kotlin is a functional language and very easy to learn. The syntax is pretty much similar to Java, hence it is very easy to remember. Kotlin is more expressive, which makes your code more readable and understandable.

Concise: Kotlin is based on JVM and it is a functional language. Thus, it reduce lots of boiler plate code used in other programming languages.

Runtime and Performance: Better performance and small runtime.

Interoperability: Kotlin is mature enough to build an interoperable application in a less complex manner.

Brand New: Kotlin is a brand new language that gives developers a fresh start. It is not a replacement of Java, though it is developed over JVM. It is accepted as the first official language of android development. Kotlin can be defined as - Kotlin= JAVA +extra updated new features.

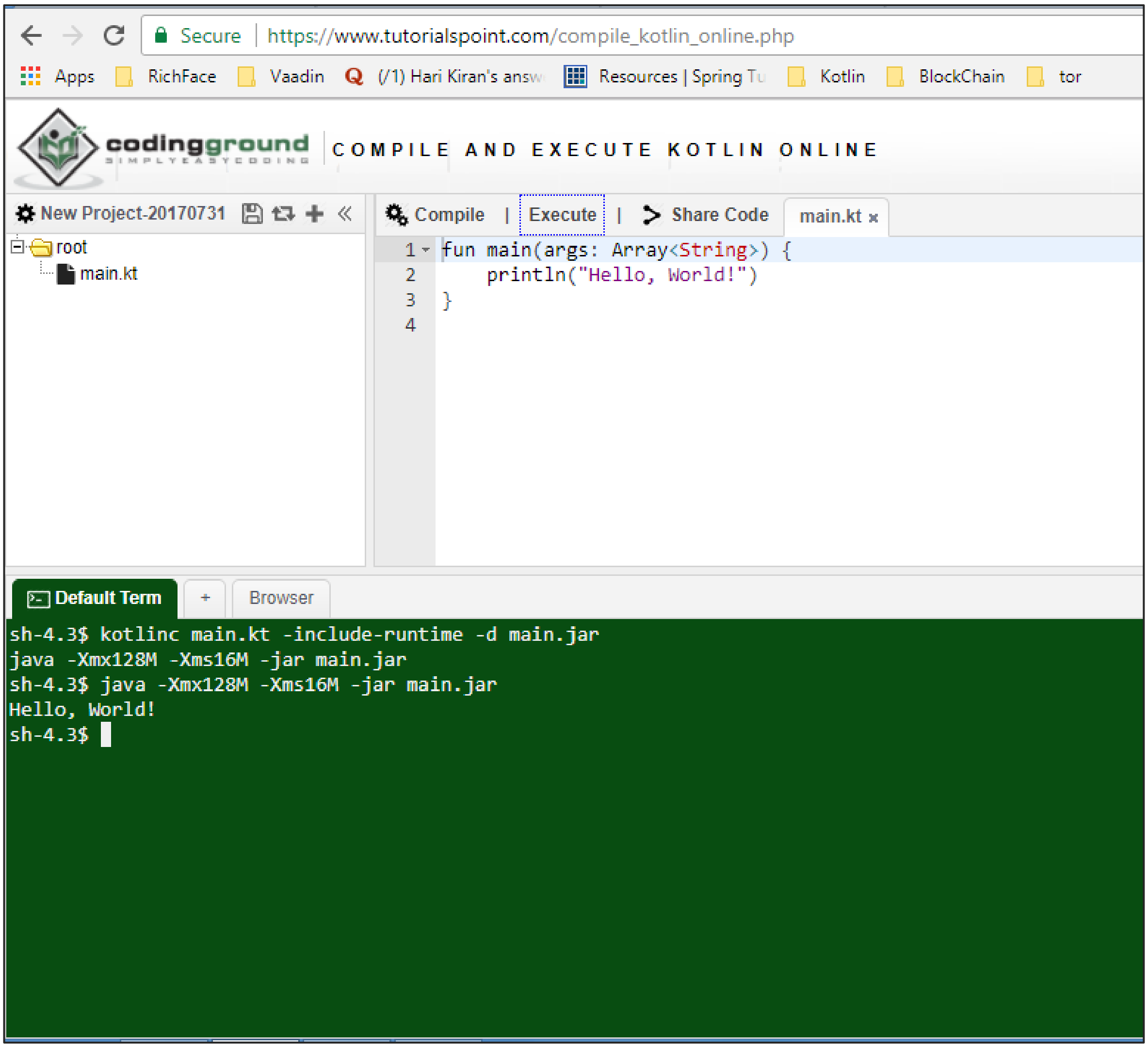
Following are some of the disadvantages of Kotlin.

Namespace declaration: Kotlin allows developers to declare the functions at the top level. However, whenever the same function is declared in many places of your application, then it is hard to understand which function is being called.

No Static Declaration: Kotlin does not have usual static handling modifier like Java, which can cause some problem to the conventional Java developer.

2. Kotlin - Environment Setup

In this chapter, we will set up our local environment to start with Kotlin programming. However, we already have set up Kotlin environment online (coding ground), so that compilation and execution of all available examples online can be easier. This gives confidence as you can check the result with different options. Feel free to modify any example and execute it online. Following is the screenshot of our online coding ground.



```kotlin
fun main(args: Array<String>) {
    println("Hello, World!")
}
```

```
sh-4.3$ kotlinc main.kt -include-runtime -d main.jar
java -Xmx128M -Xms16M -jar main.jar
sh-4.3$ java -Xmx128M -Xms16M -jar main.jar
Hello, World!
sh-4.3$
```

However, if you still want to use Kotlin offline in your local system, then you need to execute the following steps to configure your local workspace.

Step 1: Java 8 installation.

Kotlin runs on JVM, hence. it is really necessary to use JDK 8 for your local Kotlin development. Please refer to the official website of oracle to download and install JDK 8 or an above version. You might have to set the environment variable for JAVA such that it can work properly. To verify your installation in Windows operating system, hit "java –version" in the command prompt and as an output it will show you the java version installed in your system.

Step 2: IDE installation.

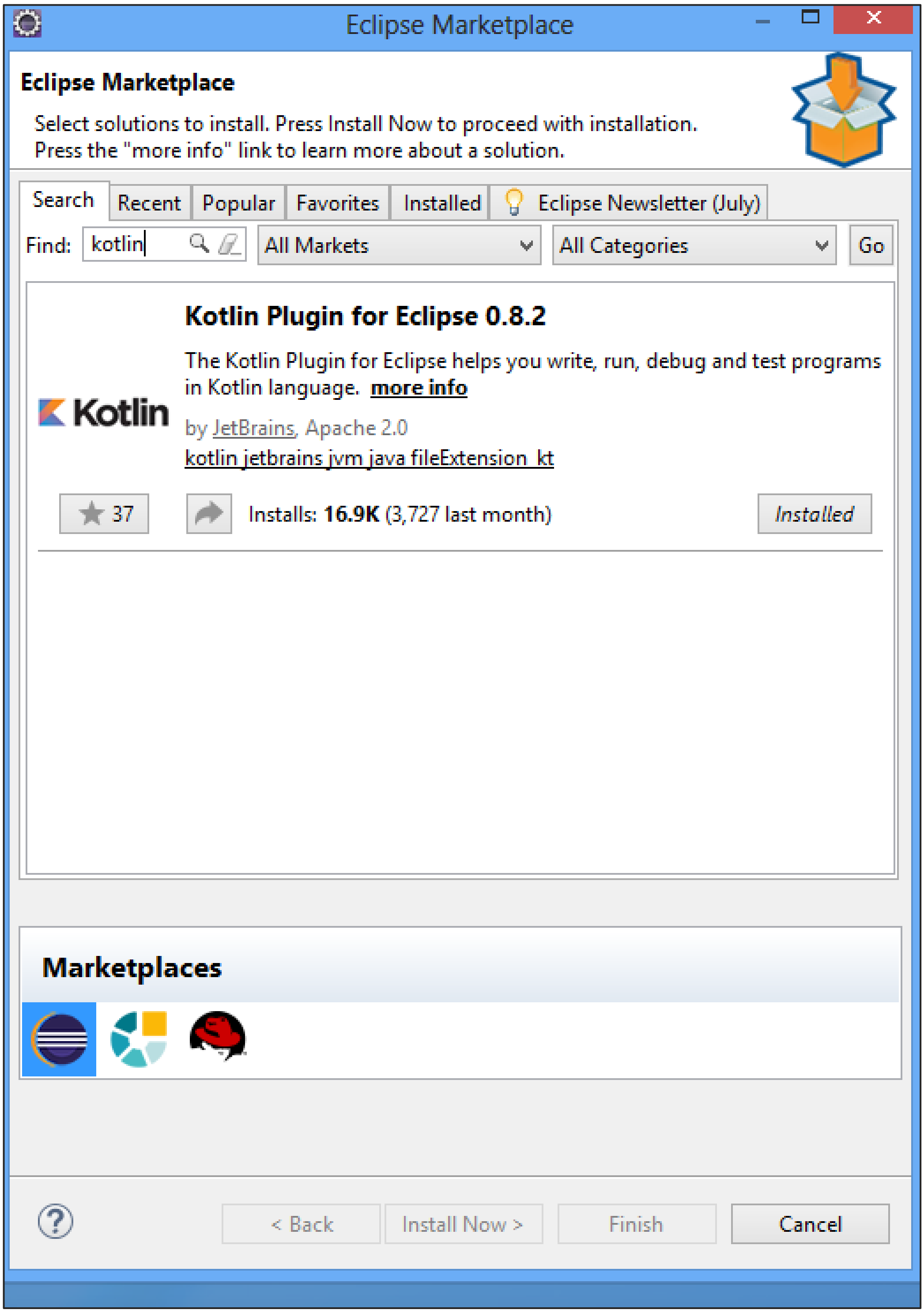
There are a number of IDE available over the internet. You can use any of your choice. You can find the download link of different IDE in the following table.

IDE Name	Installation Link
NetBeans	https://netbeans.org/downloads/
Eclipse	https://www.eclipse.org/downloads/
Intellij	https://www.jetbrains.com/idea/download/#section=windows

It is always recommended to use the recent software version to drag out maximum facility from it.

Step 3: Configuring Eclipse.

Open Eclipse and go to "Eclipse Market Place". You will find the following screen.



Eclipse Marketplace

Select solutions to install. Press Install Now to proceed with installation.
Press the "more info" link to learn more about a solution.

Find: kotlin

Kotlin Plugin for Eclipse 0.8.2

The Kotlin Plugin for Eclipse helps you write, run, debug and test programs in Kotlin language. more info

by JetBrains, Apache 2.0

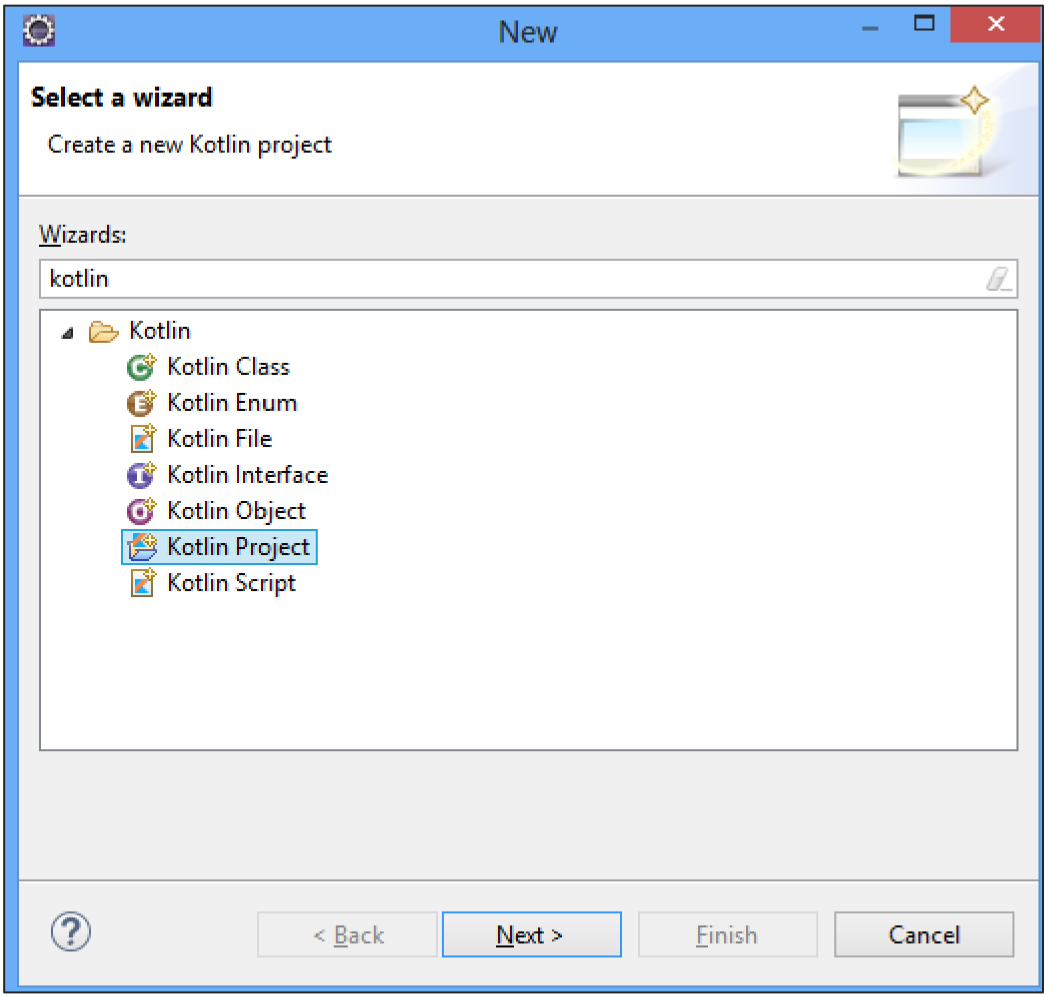
kotlin jetbrains jvm java fileExtension_kt

Installs: **16.9K** (3,727 last month)

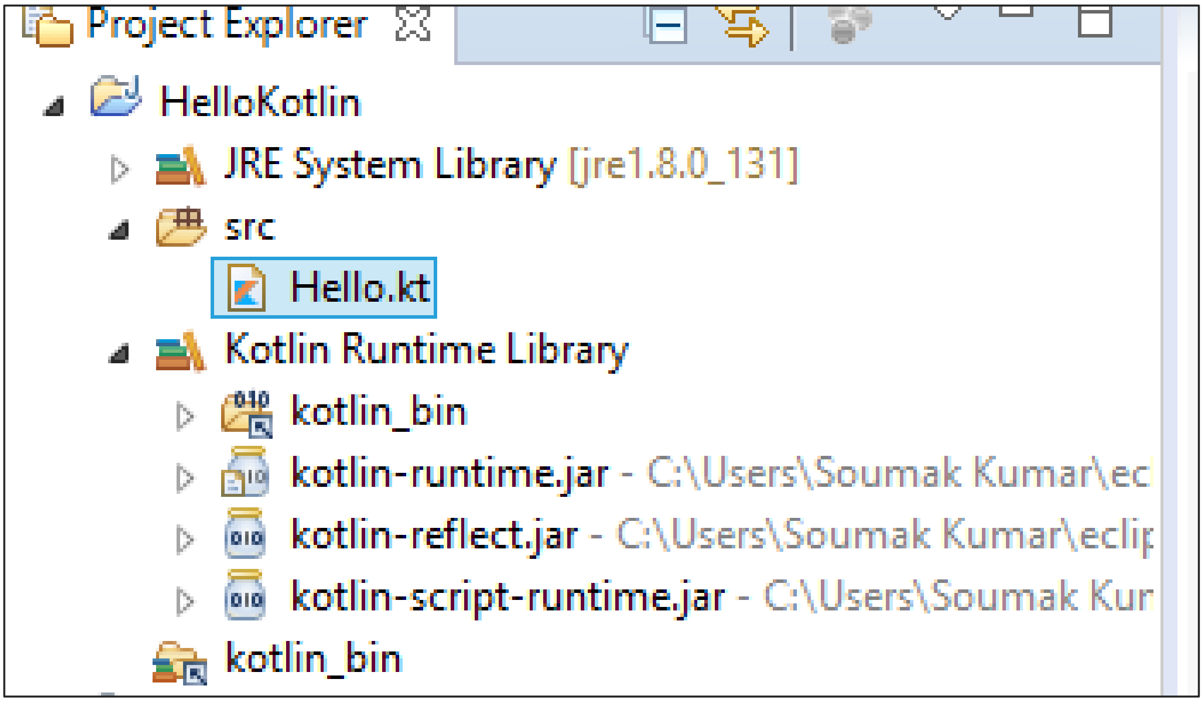
Search for Kotlin in the search box and install the same in your local system. It might take some time depending on the internet speed. You may have to restart your Eclipse, once it is successfully installed.

Step 4: Kotlin Project.

Once Eclipse is successfully restarted and Kotlin is installed, you will be able to create a Kotlin project on the fly. Go to **File → New → Others** and select "Kotlin project" from the list.



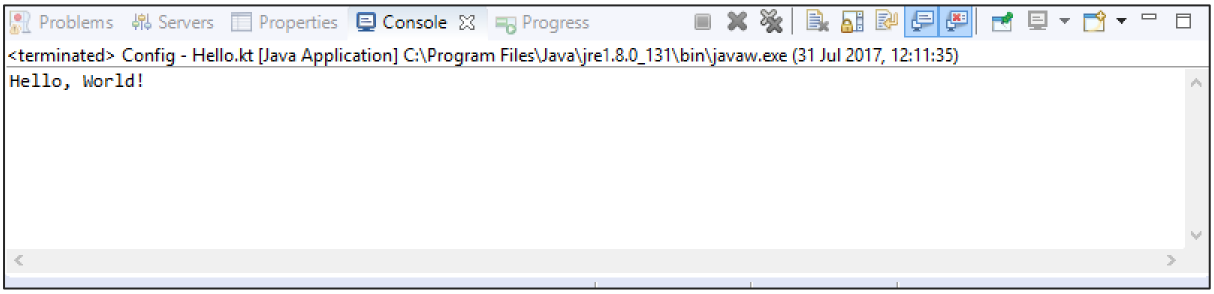
Once the project setup is done, you can create a Kotlin file under "SRC" folder. Left-click on the "Src" folder and hit "new". You will get an option for Kotlin file, otherwise you may have to search from the "others". Once the new file is created, your project directory will be look like the following.


Project Explorer
HelloKotlin
JRE System Library [jre1.8.0_131]
src
Hello.kt
Kotlin Runtime Library
kotlin_bin
kotlin-runtime.jar - C:\Users\Soumak Kumar\ec
kotlin-reflect.jar - C:\Users\Soumak Kumar\eclip
kotlin-script-runtime.jar - C:\Users\Soumak Kur
kotlin_bin

Your development environment is ready now. Go ahead and add the following piece of code in the "Hello.kt" file .

```
fun main(args: Array<String>) {
    println("Hello, World!")
}
```

Run it as a Kotlin application and see the output in the console as shown in the following screenshot. For better understanding and availability, we will be using our coding ground tool.

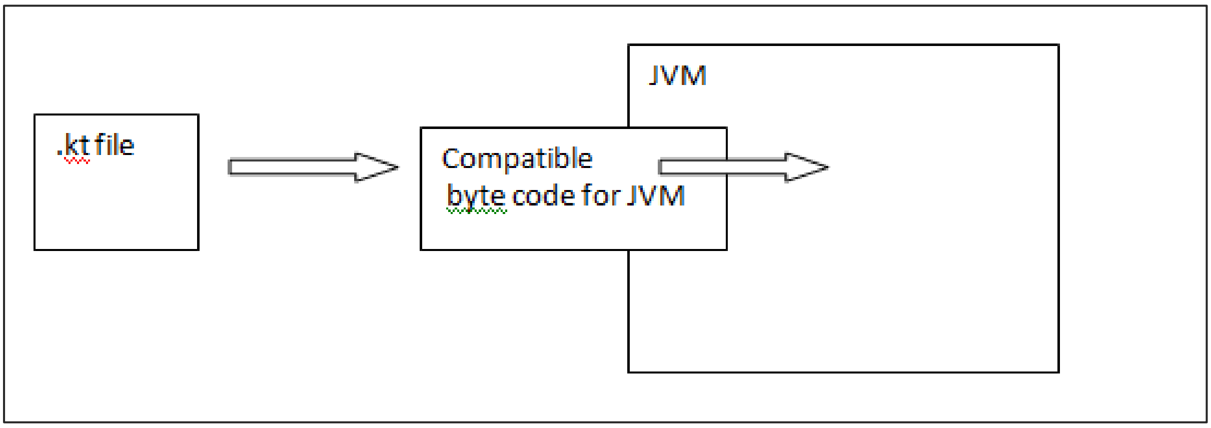


```
<terminated> Config - Hello.kt [Java Application] C:\Program Files\Java\jre1.8.0_131\bin\javaw.exe (31 Jul 2017, 12:11:35)
Hello, World!
```

3. Kotlin - Architecture

Kotlin is a programming language and has its own architecture to allocate memory and produce a quality output to the end user. Following are the different scenarios where Kotlin compiler will work differently, whenever it is targeting different other kind of languages such as Java and JavaScript.

Kotlin compiler creates a byte code and that byte code can run on the JVM, which is exactly equal to the byte code generated by the Java **.class** file. Whenever two byte coded file runs on the JVM, they can communicate with each other and this is how an interoperable feature is established in Kotlin for Java.



Whenever Kotlin targets JavaScript, the Kotlin compiler converts the **.kt** file into ES5.1 and generates a compatible code for JavaScript. Kotlin compiler is capable of creating platform basis compatible codes via LLVM.