

# Introduction to Kotlin Programming

---

Produced  
by

David Drohan ([ddrohan@wit.ie](mailto:ddrohan@wit.ie))

Dr. Siobhan Drohan ([sdrohan@wit.ie](mailto:sdrohan@wit.ie))

Department of Computing & Mathematics

Waterford Institute of Technology

<http://www.wit.ie>



Waterford Institute *of* Technology

INSTITIÚID TEICNEOLAÍOCHTA PHORT LÁIRGE



# Introducing Kotlin

---

Overview - Part 3



# Agenda

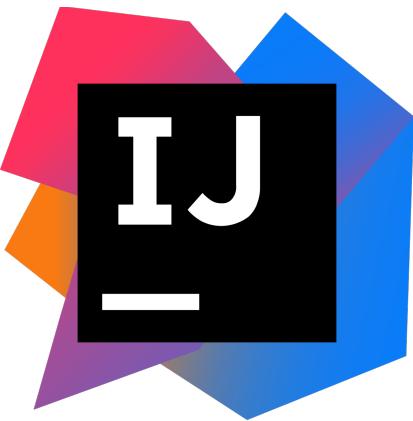
---

- ❑ What is Kotlin?
- ❑ Context - Java Vs JVM
- ❑ Kotlin History
- ❑ Milestones
- ❑ General Overview & Features
- ❑ Kotlin & IntelliJ IDEA
- ❑ Conclusion

# Agenda

---

- ❑ What is Kotlin?
- ❑ Context - Java Vs JVM
- ❑ Kotlin History
- ❑ Milestones
- ❑ General Overview & Features
- ❑ **Kotlin & IntelliJ IDEA**
- ❑ Conclusion



# New Project using IntelliJ



# New Project using IntelliJ



New Project

Project SDK: 1.8 (java version "1.8.0\_65")

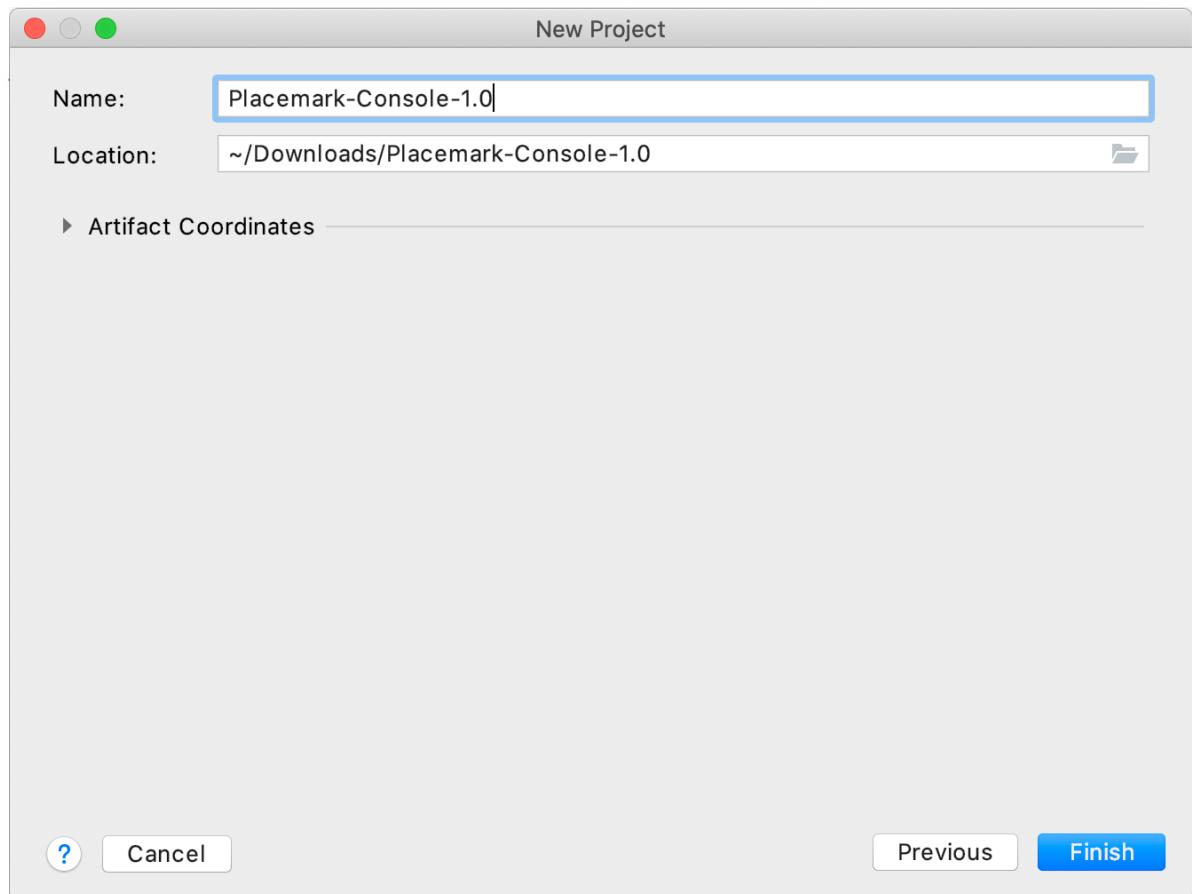
Kotlin DSL build script

Additional Libraries and Frameworks:

- Java
- Groovy
- IntelliJ Platform Plugin
- Kotlin/JS for browser
- Kotlin/JS for Node.js
- Kotlin/JVM
- Kotlin/Multiplatform

A single-platform Kotlin library or application targeting the JVM

# New Project using IntelliJ



# New Project using IntelliJ



New Project

Name: Placemark-Console-1.0

Location: ~/Downloads/Placemark-Console-1.0

▼ Artifact Coordinates

GroupId: org.wit.placemark

The name of the artifact group, usually a company domain

ArtifactId: Placemark-Console-1.0

The name of the artifact within the group, usually a project name

Version: 1.0-SNAPSHOT

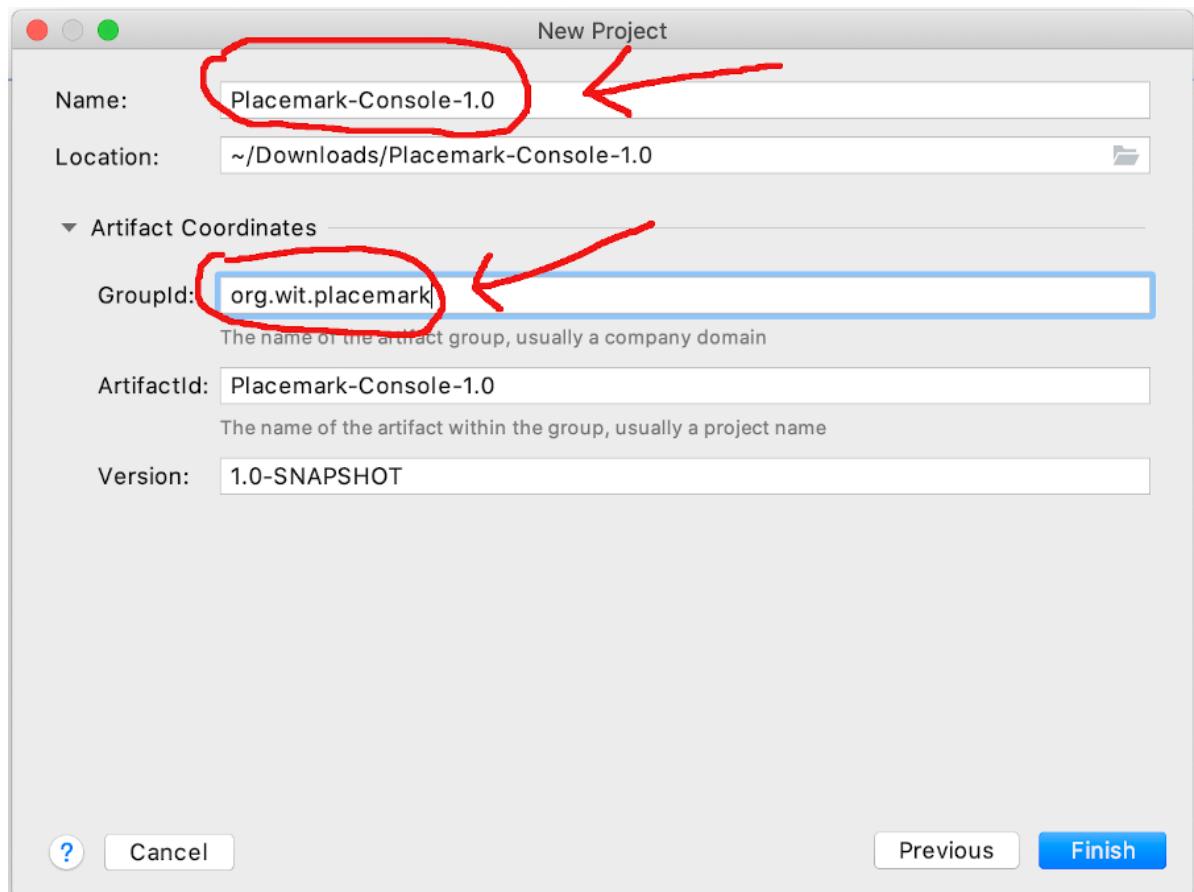
?

Cancel

Previous

Finish

# New Project using IntelliJ



# New Project using IntelliJ



Placemark-Console-1.0 [~/Downloads/Placemark-Console-1.0]

Add Configuration... Project Art Gradle

1: Project Placemark-Console-1.0 ~/Downloads/Placemark-Console-1.0

src .gradle .idea gradle

src main test build.gradle gradle.properties gradlew gradlew.bat settings.gradle External Libraries Scratches and Consoles

Search Everywhere Double ⌘F

Go to File ⌘O

Recent Files ⌘E

Navigation Bar ⌘↑

Drop files here to open

Build: Sync

Placemark-Console-1.0: fini 48 s 148 ms

Download <https://services.gradle.org/distributions/gradle-5.2.1-bin.zip> (87.43 MB)

Download <https://services.gradle.org/distributions/gradle-5.2.1-bin.zip> finished successfully

Starting Gradle Daemon...

Gradle Daemon started in 826 ms

> Task :wrapper

BUILD SUCCESSFUL in 13s

1 actionable task: 1 executed

CONFIGURE SUCCESSFUL in 24s

Event Log

2: Favorites

3: Structure

Terminal Build TODO Event Log

# New Project using IntelliJ



The screenshot shows the IntelliJ IDEA interface with the following details:

- Project Bar:** Placemark-Console-1.0 [~/Downloads/Placemark-Console-1.0]
- Toolbars:** Add Configuration..., Ant, Gradle
- Left Sidebar:** Project (expanded to show .gradle, .idea, gradle, src, main, kotlin), Recent Files, External Links, Scratches, Favorites (2 items).
- Central Area:** A context menu is open over the 'main' directory in the Project view. The 'New' submenu is selected, showing options like Java Class, Package (which is highlighted), and FXML File.
- Bottom Status Bar:** Event Log (1 event)
- Bottom Navigation:** Terminal, Create Gist...

Recent Files ⌘E

New Package

org.wit.placemark

DROP FILES HERE TO OPEN

# New Project using IntelliJ



The screenshot shows the IntelliJ IDEA interface with a project named "Placemark-Console-1.0". The project structure is displayed in the left-hand navigation pane:

- Project
- Placemark-Console-1.0 (~/Downloads/Placemark-Console-1.0)
  - .gradle
  - .idea
  - gradle
  - src
    - main
      - java
      - kotlin
    - test
    - build.gradle
    - gradle.properties
    - gradlew
    - gradlew.bat
    - settings.gradle
  - External Libraries
  - Scratches and Consoles

The "kotlin" folder under "src/main" is currently selected. The main workspace area is mostly empty, with placeholder text: "Search Everywhere Double ⌘F", "Go to File ⌘O", "Recent Files ⌘E", "Navigation Bar ⌘↑", and "Drop files here to open".

At the bottom, the "Build" tab is active, showing the build log:

```
Build: Sync X
✓ Placemark-Console-1.0: fir 36 s 796 ms
Download https://services.gradle.org/distributions/gradle-5.2.1-bin.zip (87.43 MB)
Download https://services.gradle.org/distributions/gradle-5.2.1-bin.zip finished successfully
Starting Gradle Daemon...
Gradle Daemon started in 708 ms
> Task :wrapper

BUILD SUCCESSFUL in 5s
1 actionable task: 1 executed

CONFIGURE SUCCESSFUL in 25s
```

The bottom status bar indicates: "IntelliJ IDEA 2020.1 available: // Update... (3 minutes ago)".

# New Project using IntelliJ



Placemark-Console-1.0 [-/Downloads/Placemark-Console-1.0]

Add Configuration... Project .gradle .idea gradle src main kotlin

Search Everywhere Double ⌂

New Java Class Kotlin File/Class

Cut Copy Paste

File Scratch File Package FXML File package-info.java

Copy Reference Copy Path...

HTML File Kotlin Script Kotlin Worksheet JavaFXApplication XSLT Stylesheet

Find Usages Find in Path... Replace in Path... Analyze

Refactor

Add to Favorites

Edit File Templates... EditorConfig File Swing UI Designer Resource Bundle

Reformat Code Optimize Imports Delete...

Build Module 'Placemark-Console-1.0.main' Rebuild '<default>' Run 'Tests in 'Placemark-Console-1.0.main'' Debug 'Tests in 'Placemark-Console-1.0.main'' Run 'Tests in 'Placemark-Console-1.0.main'' with Coverage

Create 'Tests in 'Placemark-Console-1.0.main'' Reveal in Finder Open in Terminal

Local History Reload from Disk Compare With...

Open Module Settings Load/Unload Modules... Mark Directory as Remove BOM Convert Java File to Kotlin File Create Gist...

Creates new Kotlin file or class

New Kotlin File/Class

main.kt

File Class Interface Enum class Object

/services.gradle.org/distributions/gradle-5.2.1-bin.zip (87.43 MB) /services.gradle.org/distributions/gradle-5.2.1-bin.zip finished s Daemon... started in 708 ms in 5s k: 1 executed SFUL in 25s

Event Log

Project Structure Z: Structure 2: Favorites Placer Sync Build: Sync

Creates new Kotlin file or class

# New Project using IntelliJ



The screenshot shows the IntelliJ IDEA interface with the following details:

- Title Bar:** Placemark-Console-1.0 [~/Downloads/Placemark-Console-1.0] - .../src/main/kotlin/org/wit/placemark/main.kt [Placemark-Console-1.0.main]
- Project View (Left):** Shows the project structure: Placemark-Console-1.0, .gradle, .idea, gradle, src (containing main, java, kotlin, org.wit.placemark), test, build.gradle, gradle.properties, gradlew, gradlew.bat, settings.gradle, External Libraries, and Scratches and Consoles.
- Code Editor (Top Right):** The file main.kt is open, displaying the package declaration: package org.wit.placemark.
- Build Log (Bottom Left):** Shows the build process for Placemark-Console-1.0:
  - Download <https://services.gradle.org/distributions/gradle-5.2.1-bin.zip> (87.43 MB)
  - Download <https://services.gradle.org/distributions/gradle-5.2.1-bin.zip> finished successfully
  - Starting Gradle Daemon...
  - Gradle Daemon started in 708 ms
  - > Task :wrapper

BUILD SUCCESSFUL in 5s  
1 actionable task: 1 executed

CONFIGURE SUCCESSFUL in 25s
- Message Bar (Bottom Center):** A tooltip from the Kotlin plugin indicates a new version 1.3.72-release-IJ2019.3-1 is available for download.
- Bottom Navigation:** Terminal, Build, TODO, Event Log.

# New Project using IntelliJ

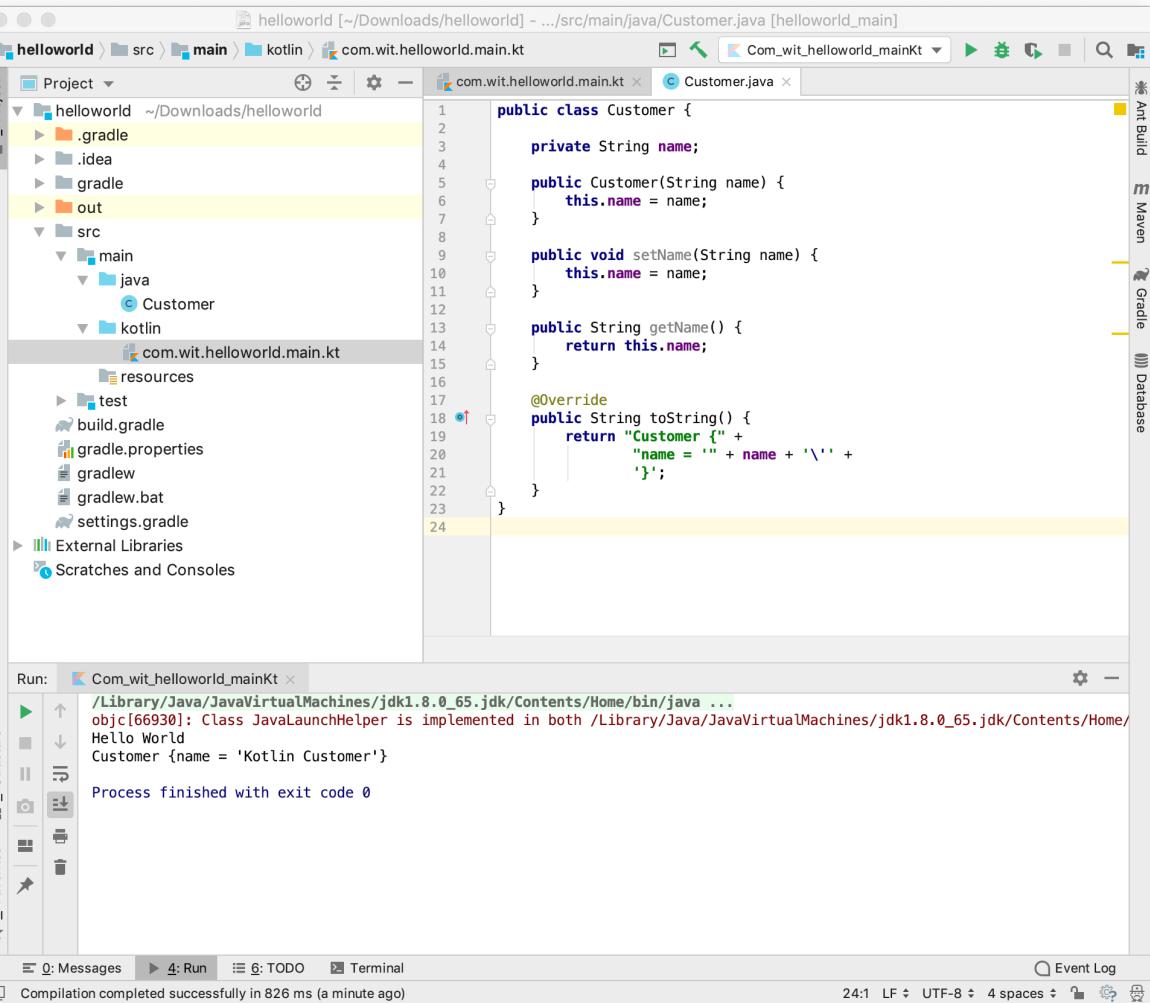


The screenshot shows the IntelliJ IDEA interface with a new project named "Placemark-Console-1.0". The project structure on the left includes .gradle, .idea, gradle, src (containing main and kotlin), and test. The main.kt file under org.wit.placemark is open in the editor, displaying the following code:

```
package org.wit.placemark
fun main(args: Array<String>){
    println("Placemark Kotlin App Version 1.0")
}
```

A red arrow points from the text "Kotlin Overview" at the bottom to the main.kt file in the project tree. A tooltip in the bottom right corner informs the user about a new Kotlin plugin version: "A new version 1.3.72-release-IJ2019.3-1 of the Kotlin plugin is available. [Install](#)".

# Interoperability



The screenshot shows the IntelliJ IDEA interface with a project named "helloworld". The project structure on the left includes "src/main/java" containing a "Customer.java" file and "src/kotlin" containing a "com.wit.helloworld.main.kt" file. The "Customer.java" code is:

```

public class Customer {
    private String name;

    public Customer(String name) {
        this.name = name;
    }

    public void setName(String name) {
        this.name = name;
    }

    public String getName() {
        return this.name;
    }

    @Override
    public String toString() {
        return "Customer {" +
            "name = '" + name + '\'' +
            '}';
    }
}

```

The "com.wit.helloworld.main.kt" file contains:

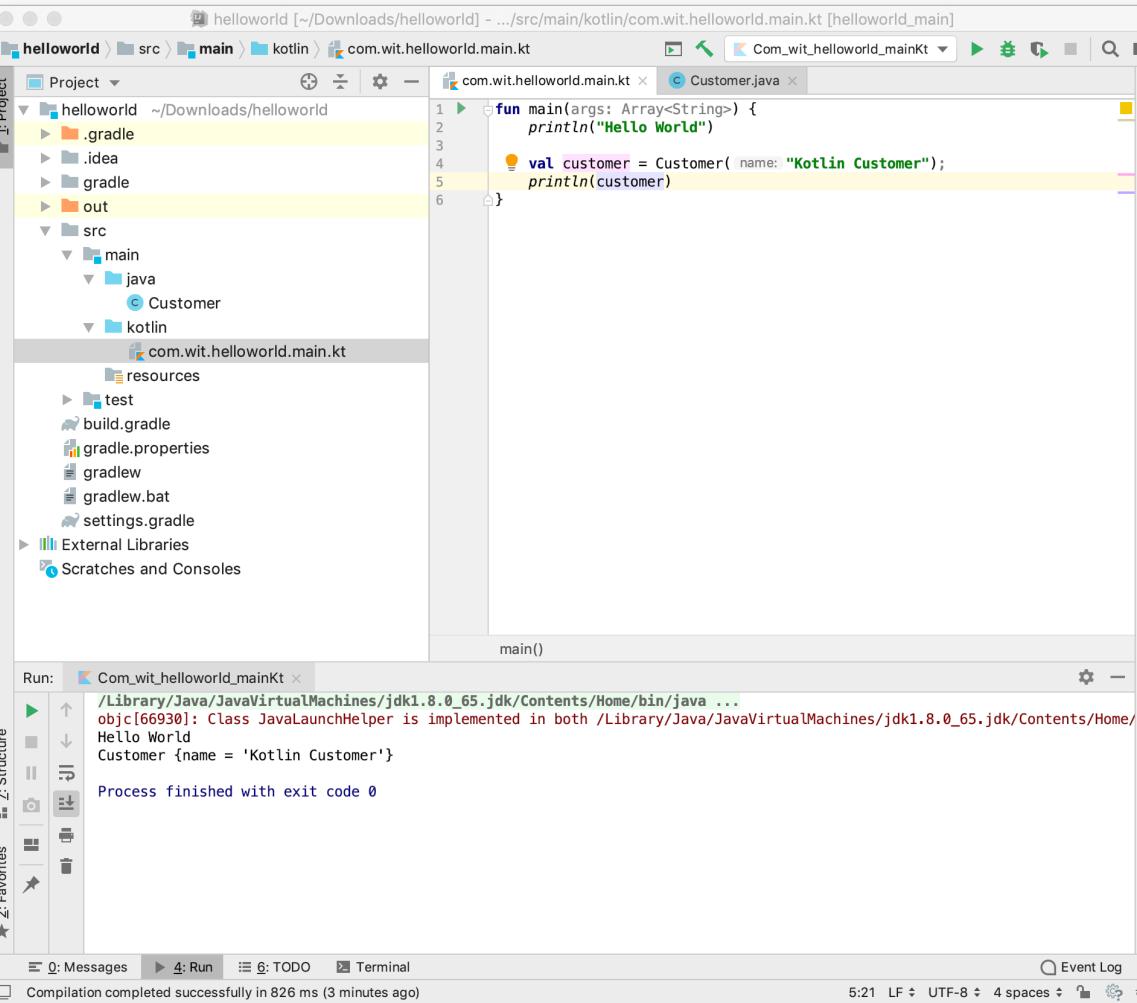
```

// Kotlin code interacting with Java

```

The "Run" tab at the bottom shows the output of running the Kotlin main function, which prints "Hello World" and a Customer object with name "Kotlin Customer".

# Interoperability



The screenshot shows the IntelliJ IDEA interface with the following details:

- Project View:** Shows the project structure for "helloworld". It includes:
  - src/main/kotlin/com.wit.helloworld.main.kt
  - src/main/java/com/wit/helloworld/Customer.java
  - resources
  - test
  - build.gradle
  - gradle.properties
  - gradlew
  - gradlew.bat
  - settings.gradle
- Code Editor:** Displays the Kotlin file `com.wit.helloworld.main.kt` with the following code:
 

```
1 fun main(args: Array<String>) {
2     println("Hello World")
3
4     val customer = Customer( name: "Kotlin Customer");
5     println(customer)
6 }
```
- Run Tab:** Shows the output of running the application:
 

```
/Library/Java/JavaVirtualMachines/jdk1.8.0_65.jdk/Contents/Home/bin/java ...
objc[6930]: Class JavaLaunchHelper is implemented in both /Library/Java/JavaVirtualMachines/jdk1.8.0_65.jdk/Contents/Home/
Hello World
Customer {name = 'Kotlin Customer'}
```
- Status Bar:** Shows "Compilation completed successfully in 826 ms (3 minutes ago)".

# Interoperability – Java Vs Kotlin

Customer.java

```

1  public class Customer {
2
3      private String name;
4
5      public Customer(String name) { this.name = name; }
6
7      public void setName(String name) { this.name = name; }
8
9      public String getName() { return this.name; }
10
11     @Override
12     public String toString() {
13         return "Customer {" +
14             "name = '" + name + '\'' +
15         '}';
16     }
17 }

```

Customer.kt

```

1  class Customer(name:String?) {
2
3      var name: String? = null
4
5      init { this.name = name }
6
7      override fun toString(): String {
8          return "Customer(name=$name)"
9      }

```

# Conclusion

---

- ❑ Kotlin is low-cost: can be developed in the same IDE, in the same project as Java code
- ❑ It's on track to become one of the leading JVM languages
- ❑ It's best suited to work with IntelliJ idea;
- ❑ It's cool; allows bragging to friends about using the latest technologies ☺

Thanks.

