Working with IntelliJ IDE

Student Workbook 1c – Integrated Development Environments

Version 7.0 Y

Table of Contents

Module 1

IntelliJ Basics

Section 1–1

The IntelliJ IDE

Understanding IntelliJ IDE

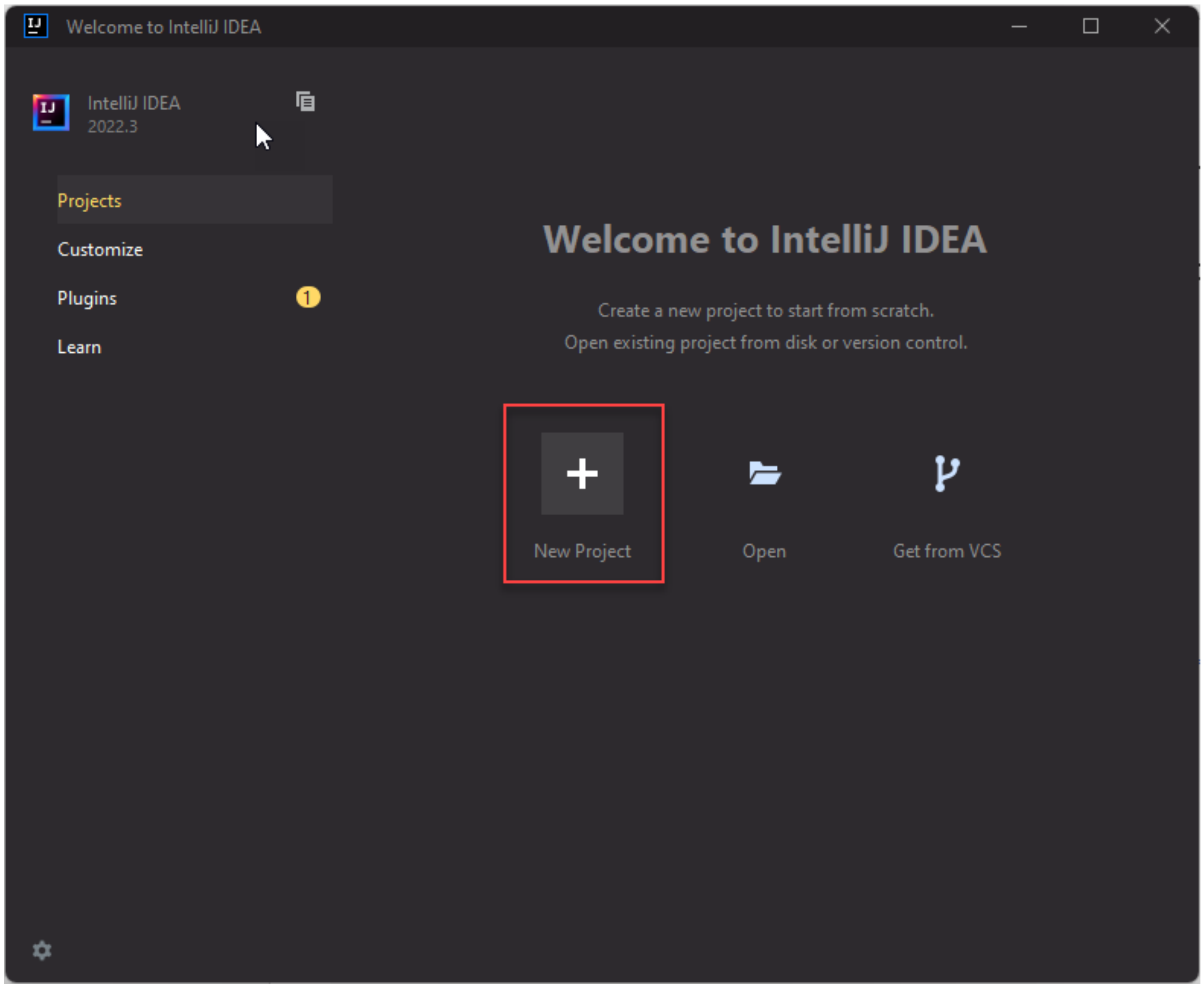
- **Integrated Development Environment - A program that contains comprehensive utilities to develop software**
- **The leading IDE for Java and Kotlin development**
  - Run, Test and Debug Java projects
  - Integrated with Git
- **Plugins available to customize and extend your environment**
- **A product of JetBrains**
  - Free Community Edition or paid Ultimate Edition

Java Projects

- **A Java Project is just a folder that contains all of the project files**
- **Java source code**
- **IntelliJ manages all types of Java projects and build tools**
  - There are a few different project build management tools
    - Maven – currently the most popular build manager for java
    - Gradle
    - Ant
- **Multiple ways to create projects**
  - Create the project directly from IntelliJ
    - IntelliJ will build the appropriate folder structure and starter files
  - Import a project from a VCS such as Git
  - Create a project manually, then open it in IntelliJ
    - Projects can also be created with tools like Maven

Creating a New Java Project

- Open IntelliJ and select Projects -> New Project

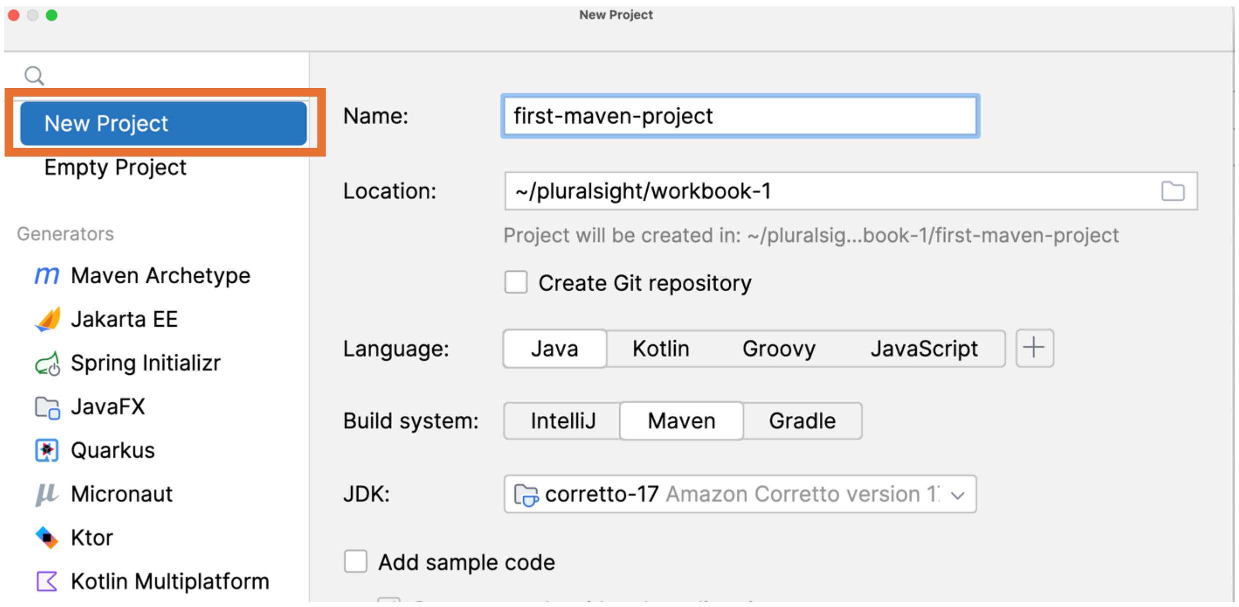


Welcome to IntelliJ IDEA

Create a new project to start from scratch.
Open existing project from disk or version control.

The New Project Dialog

- **The New Project dialog lets you choose from various ways to create and initialize your project**



Name: first-maven-project

Location: ~/pluralsight/workbook-1

Project will be created in: ~/pluralsig...book-1/first-maven-project

☐ Create Git repository

Language: [✓ Java] Kotlin Groovy JavaScript +

Build system: IntelliJ [✓ Maven] Gradle

JDK: corretto-17 Amazon Corretto version 1

☐ Add sample code

  - New Project creates a basic project with some minimal starter code

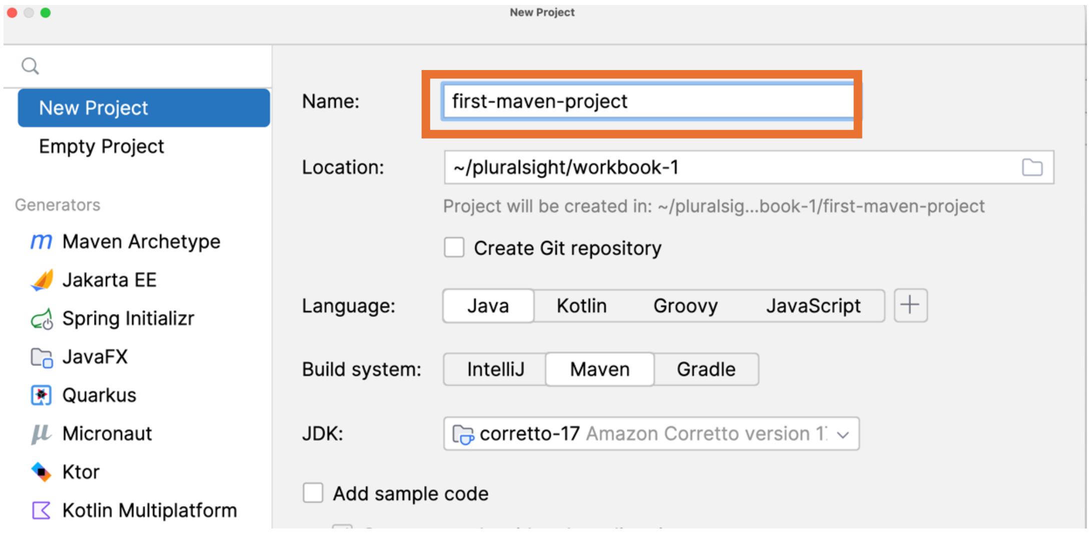
  - Empty Project creates the project folder only; all other configurations must be added manually later

  - Generators are specialized project templates

    * These allow you to create projects with significant pre-generated boilerplate (or starter) code

Project Name and Location

- Enter a Project Name


New Project

New Project
Empty Project

Generators
Maven Archetype
Jakarta EE
Spring Initializr
JavaFX
Quarkus
Micronaut
Ktor
Kotlin Multiplatform

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Create Git repository
Language: Java | Kotlin | Groovy | JavaScript
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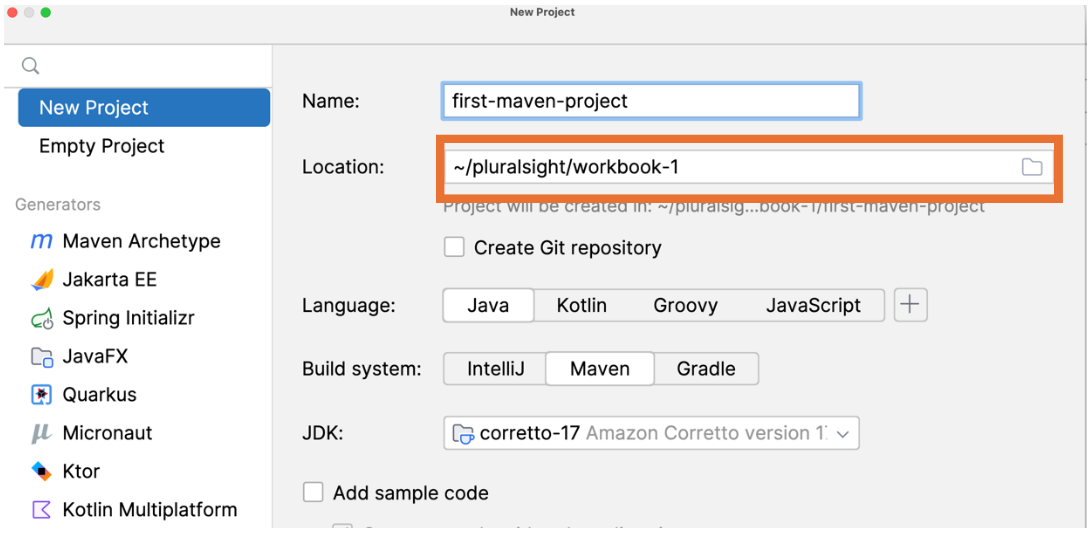
Add sample code

- Select the directory/folder where the project will be saved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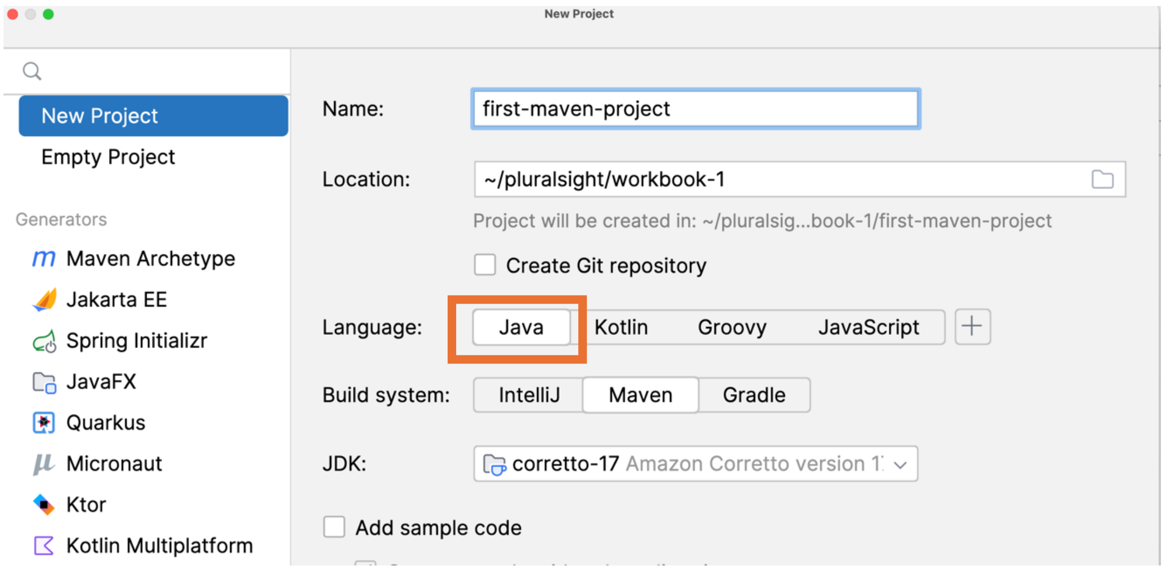
Add sample code

- You can choose whether to create a local Git repository to hold the project code

Project Language and Build System

- Select the project language



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Create Git repository

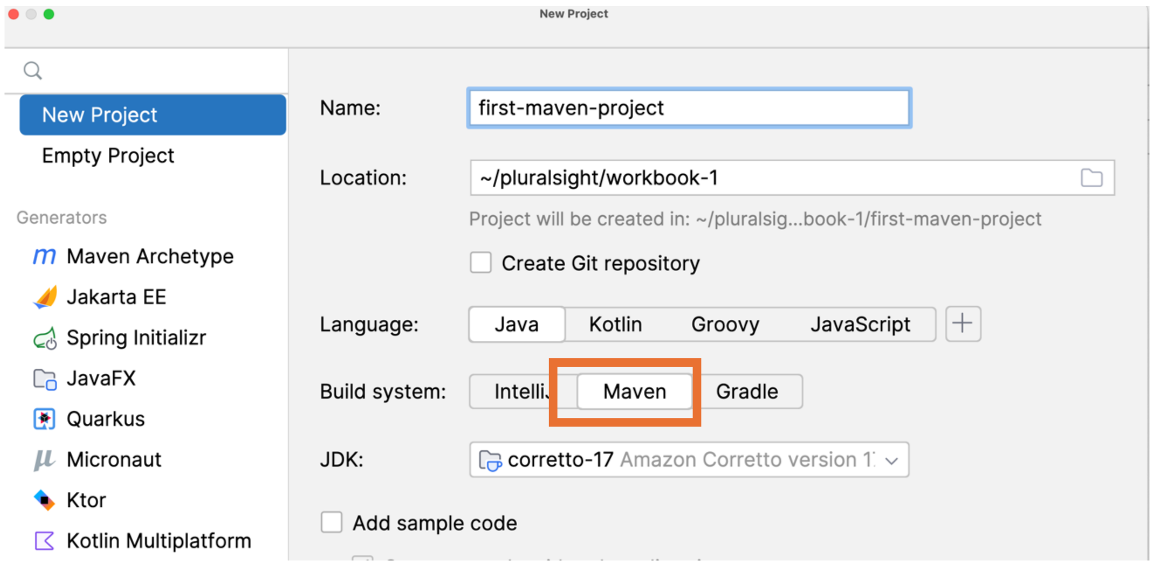
Language: Java | Kotlin | Groovy | JavaScript | +

Build system: IntelliJ | Maven | Gradle

JDK: corretto-17 Amazon Corretto version 1

Add sample code

- Select the project build system



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Name: first-maven-project

Location: ~/pluralsight/workbook-1

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Create Git repository

Language: Java | Kotlin | Groovy | JavaScript | +

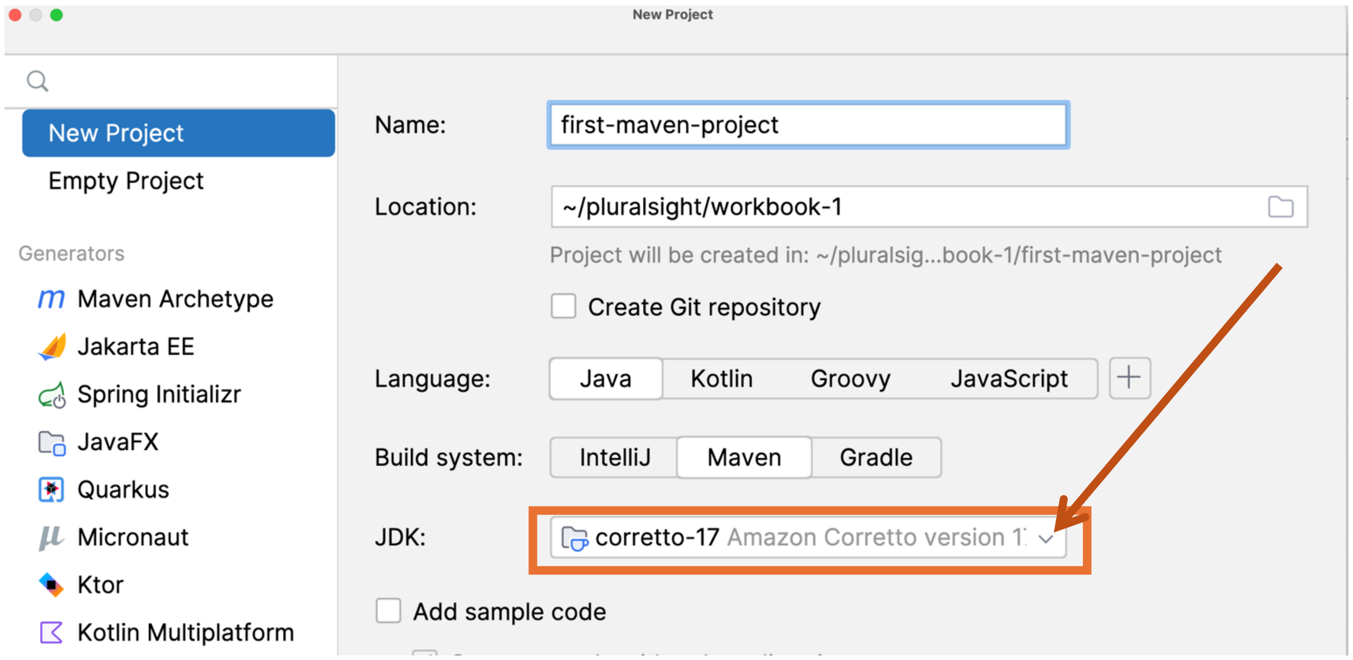
Build system: IntelliJ | Maven | Gradle

JDK: corretto-17 Amazon Corretto version 1

Add sample code

Select the Java Version

- **We will be using Java 17 during this course**
  - If you do not have the Java 17 JDK, IntelliJ will give you options to download and install it directly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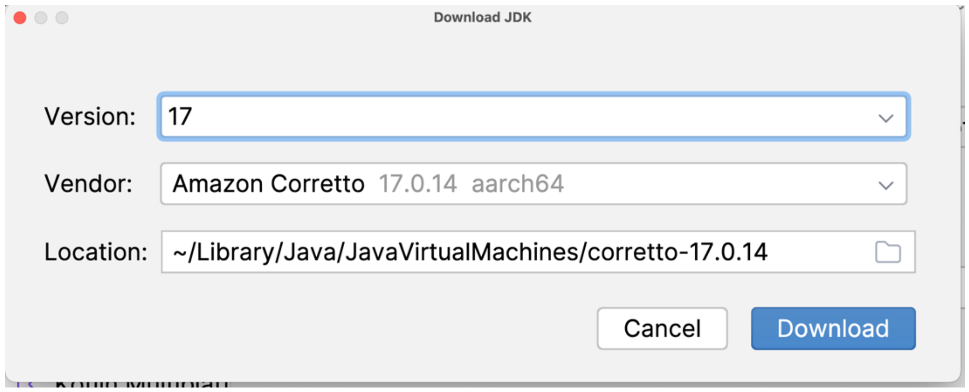
Create Git repository
Language: Java | Kotlin | Groovy | JavaScript
Build system: IntelliJ | Maven | Gradle
JDK: corretto-17 Amazon Corretto version 1
Add sample code

Installing JDK 17 (If Necessary)

- Select and download the Java 17 JDK



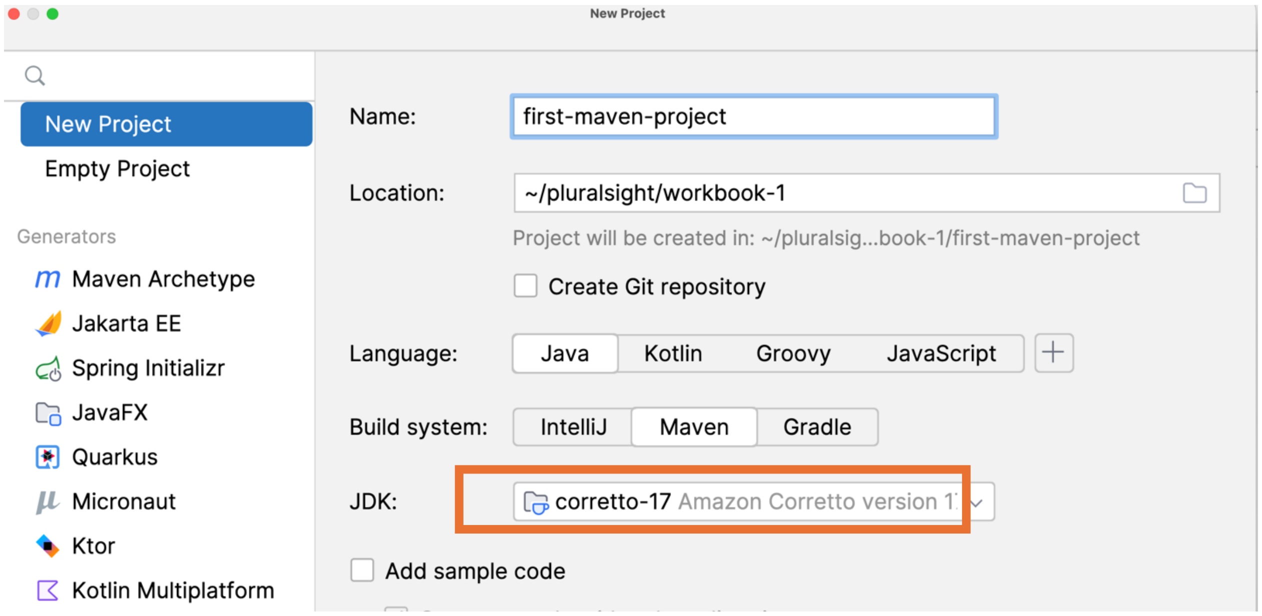
Download JDK

Version: 17

Vendor: Amazon Corretto 17.0.14 aarch64

Location: ~/Library/Java/JavaVirtualMachines/corretto-17.0.14

- Ensure that JDK 17 is selected



New Project

Name: first-maven-project

Location: ~/pluralsight/workbook-1

Project will be created in: ~/pluralsig...book-1/first-maven-project

Create Git repository

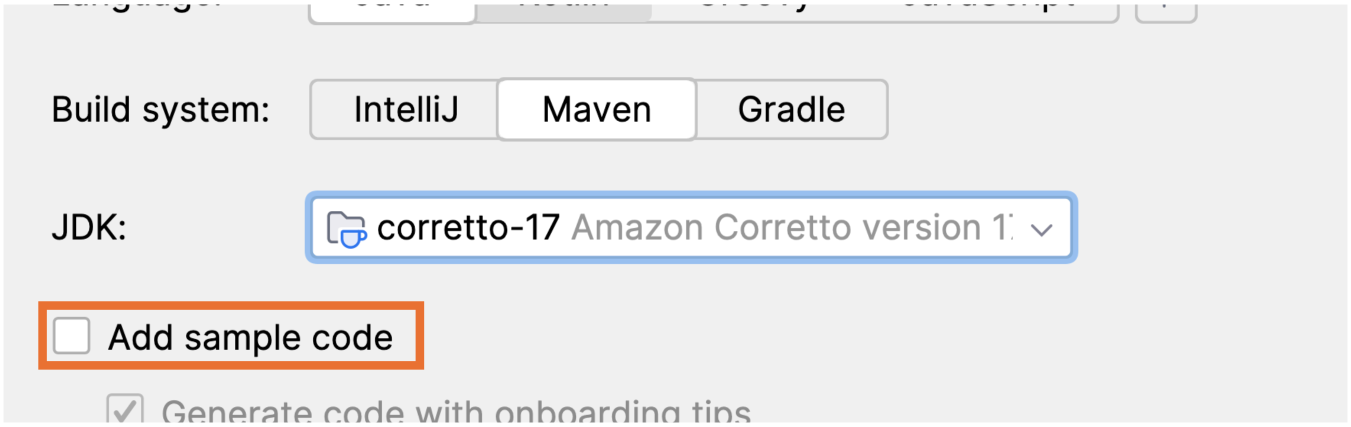
Language: Java

Build system: Maven

JDK: corretto-17 Amazon Corretto version 1

Add sample code

- Uncheck **Add sample code**



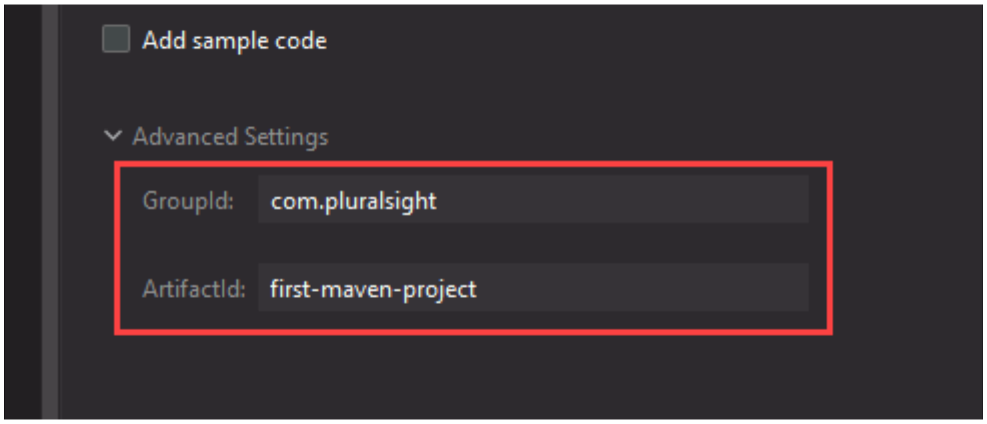
Build system: IntelliJ Maven Gradle

JDK: corretto-17 Amazon Corretto version 1

☐ Add sample code

☑ Generate code with onboarding tips

- Expand the Advanced Settings tab and update the **GroupId** and **ArtifactId**



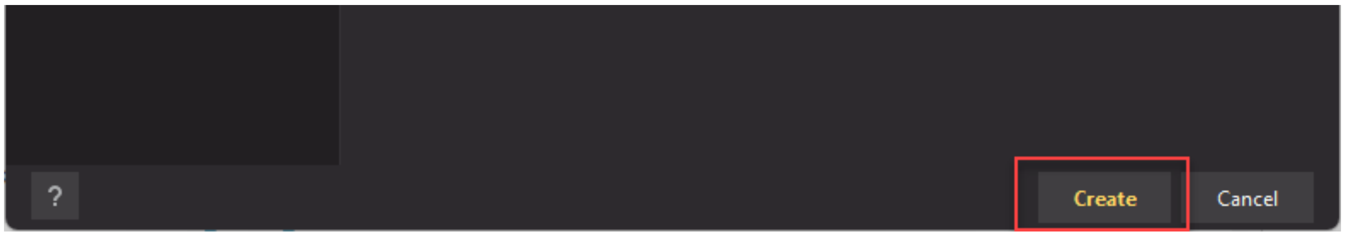
☐ Add sample code

Advanced Settings

GroupId: com.pluralsight

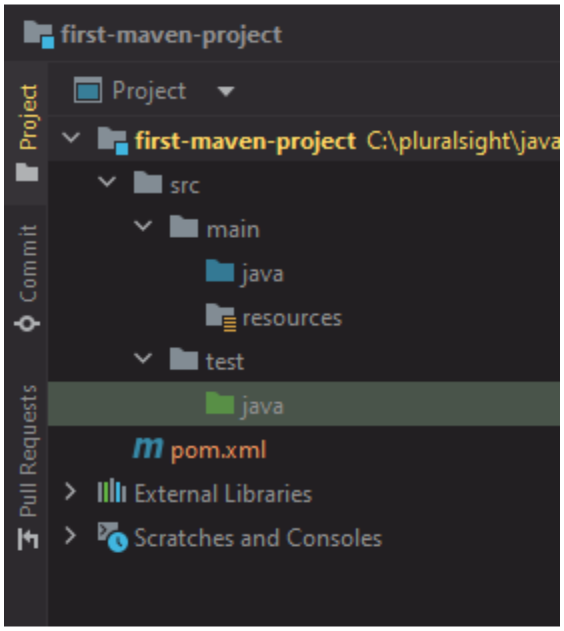
ArtifactId: first-maven-project

- Click Create



Explore the Project

- **After creating the project IntelliJ will open the project folder**

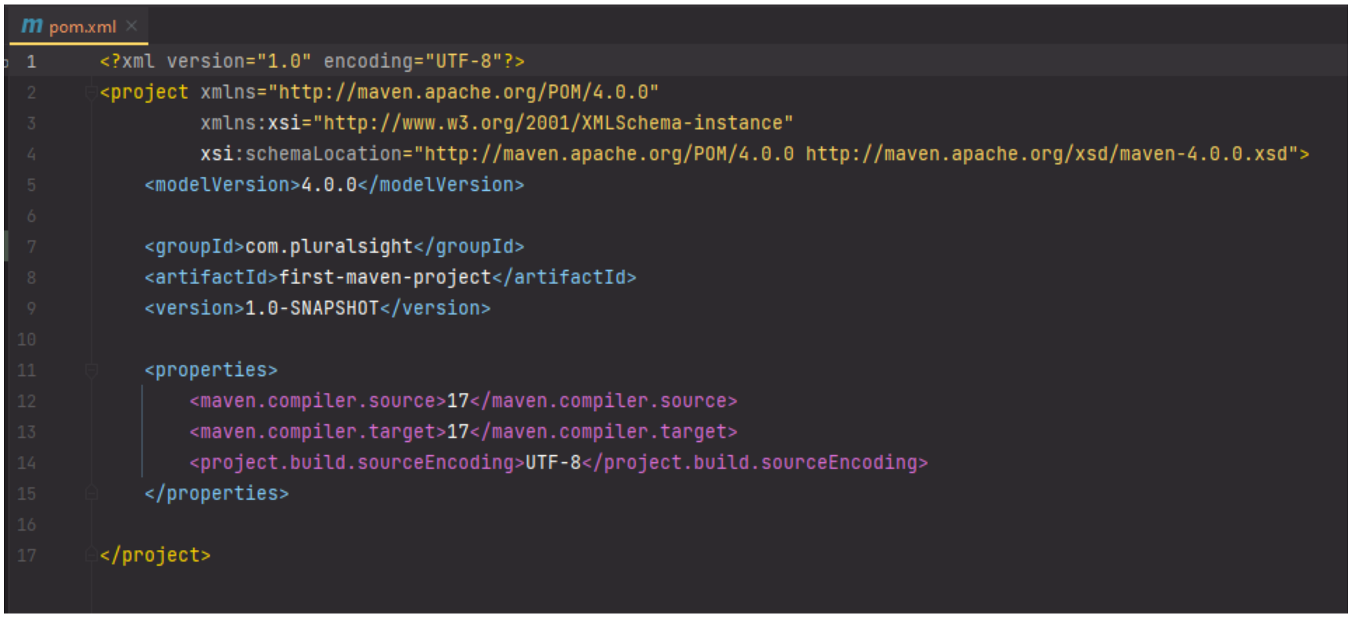


- **This folder structure is the standard structure for Maven Projects**

```
First-maven-project/
    ├── pom.xml
    └── src/
        └── main/
            └── java/
        └── test/
            └── java/
```

The `pom.xml` file

- **The `pom.xml` file is a Maven file that is used to define**
  - project configurations (name, version, jdk build version, etc.)
  - a list of external project dependencies



pom.xml

```xml
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
         xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http://maven.apache.org/xsd/maven-4.0.0.xsd">
    <modelVersion>4.0.0</modelVersion>

    <groupId>com.pluralsight</groupId>
    <artifactId>first-maven-project</artifactId>
    <version>1.0-SNAPSHOT</version>

    <properties>
        <maven.compiler.source>17</maven.compiler.source>
        <maven.compiler.target>17</maven.compiler.target>
        <project.build.sourceEncoding>UTF-8</project.build.sourceEncoding>
    </properties>

</project>
```

- **We will learn more about this file later in the cohort**

Maven project folder structure

- **All application code must be added to the** `src/main/java` **directory**

- **Unit tests are added to the** `src/test/java` **directory**
  - You will learn more about unit tests later in the cohort

Adding a package

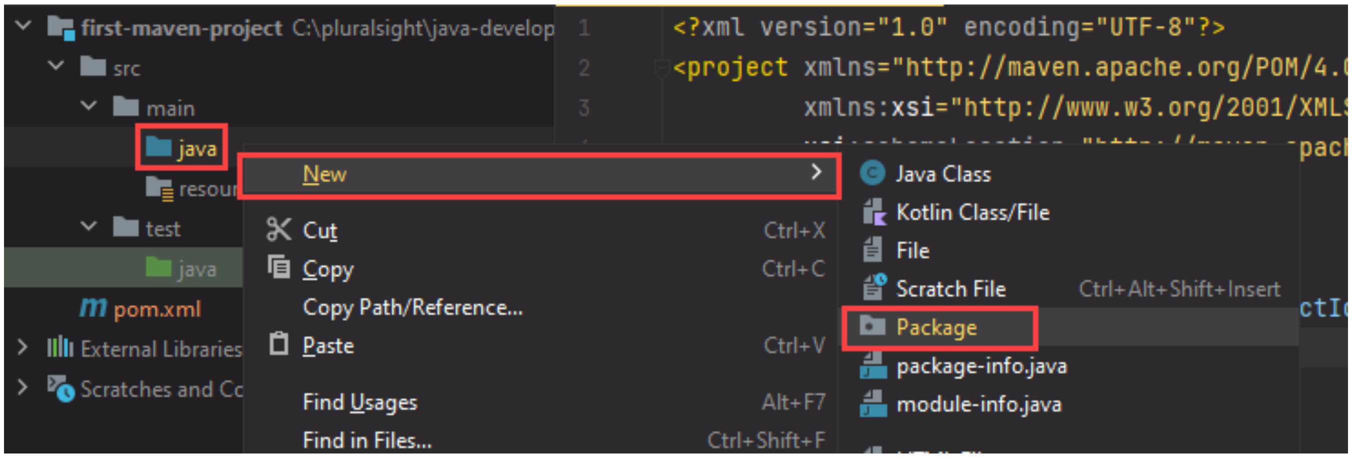
- **Packages appear as folders in a Java project**
  - They allow us to organize our code
  - Packages names are all lower case and follow the following convention

    `com.companyname.projectname`

- **Each dot in the package name implies a subdirectory in the java source tree**

- **Packages are added relative to the** `src/main/java` **folder**
  - All Java projects *should* have at least one package
    - i.e. we should not add a Java file directly into the `java` folder

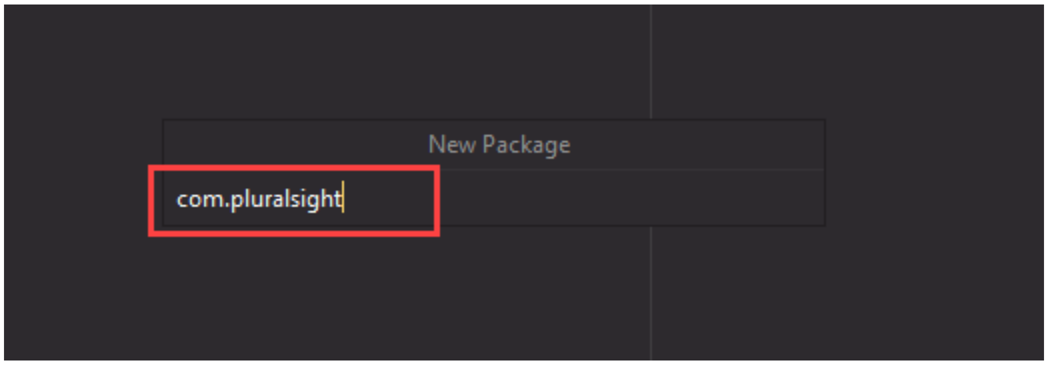
- **Create a package by right-clicking on the** **`main/java`** **folder and select New -> Package**



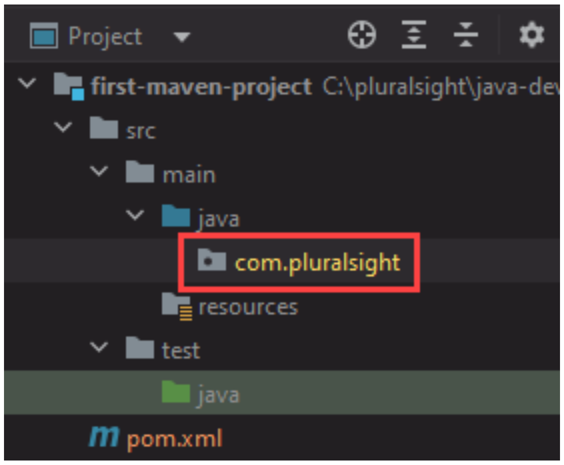
```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.
         xmlns:xsi="http://www.w3.org/2001/XMLS
```

Set the package name

- Add a package name in the **New Package** window and hit **Enter**



- A new **Package** will have been created for you

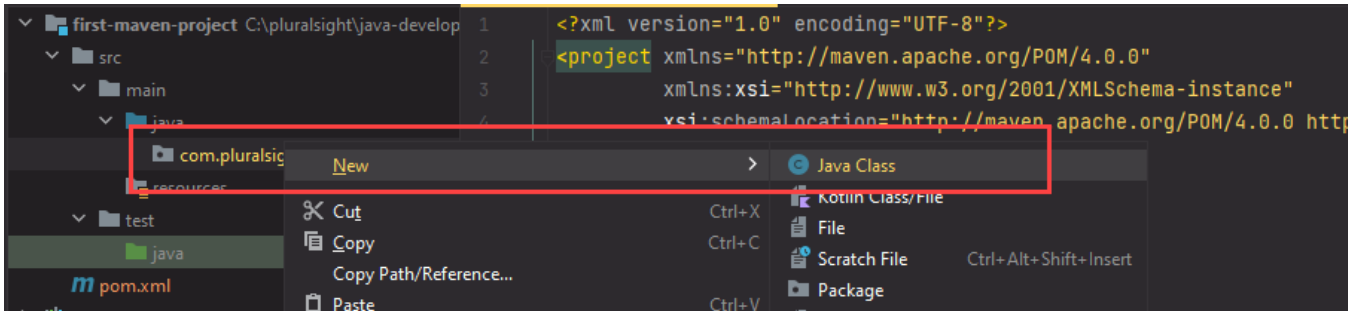


```
Project
first-maven-project C:\pluralsight\java-de
  src
    main
      java
        com.pluralsight
      resources
    test
      java
  pom.xml
```

Creating a class

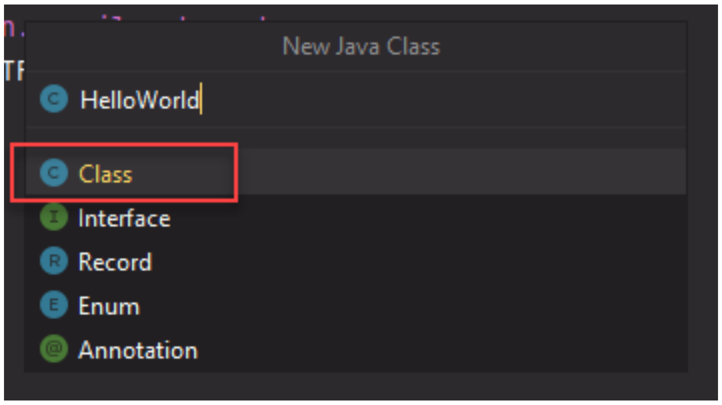
- Now that you have created the package, you can create a class in the package.

- **Right-click** on the package you just create in the **Project Explorer** on the left hand window. Select **New -> Java Class**



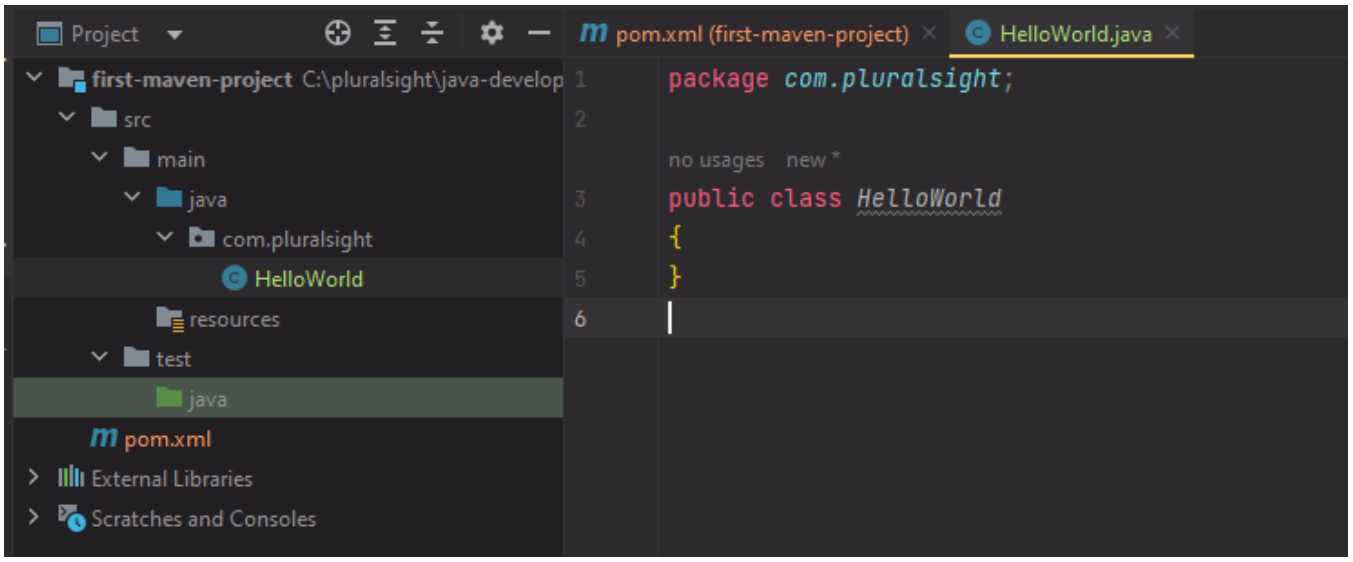
```
<?xml version="1.0" encoding="UTF-8"?>
<project xmlns="http://maven.apache.org/POM/4.0.0"
         xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
         xsi:schemaLocation="http://maven.apache.org/POM/4.0.0 http
```

- In the **New Java Class** window enter the name of your class and hit **Enter**
  - Class names always start with an uppercase letter



The Java source file

- Your new class will be created and open in IntelliJ



```java
package com.pluralsight;

public class HelloWorld
{
}

```

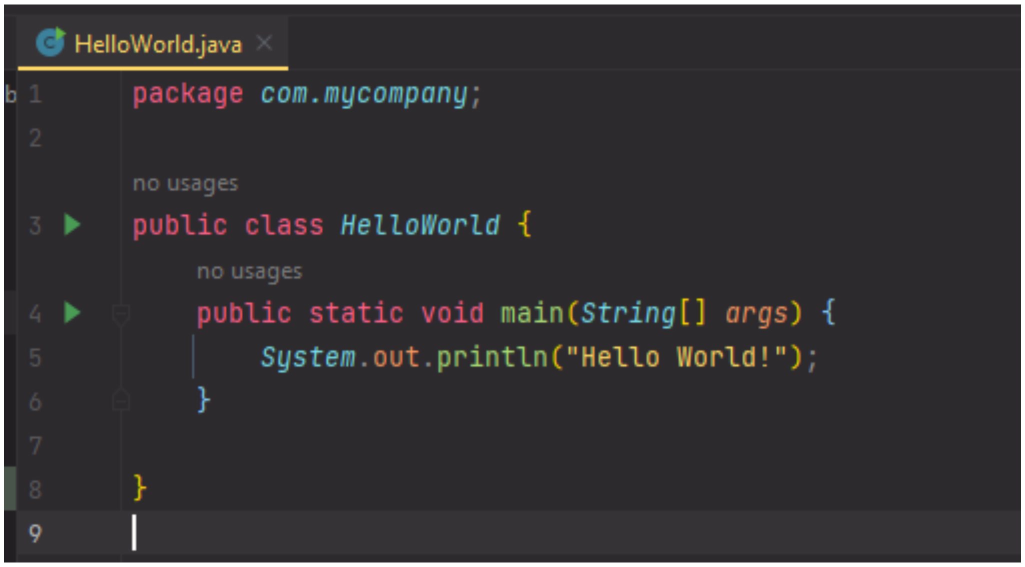
Finishing the Application

- A Java application must have an **Entry Point** into the application in order to run it

- The **Entry Point** is a function named main, defined like this

```
public static void main(String[] args) {
   // your code goes here
}
```

- Finish the HelloWorld project



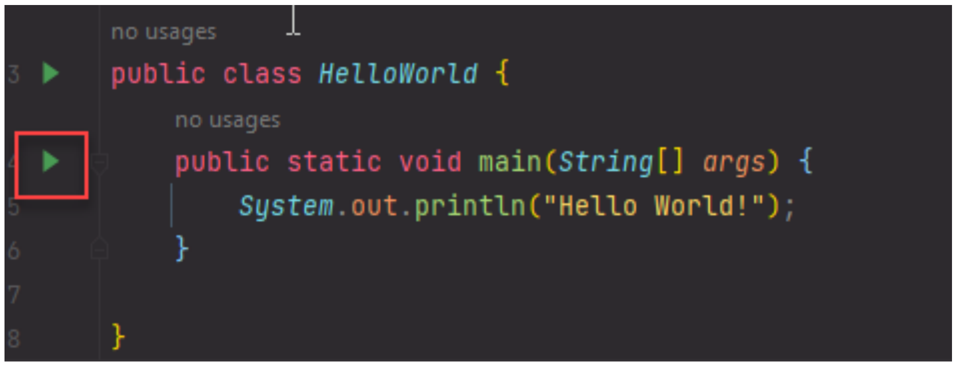
HelloWorld.java

```
package com.mycompany;

no usages
public class HelloWorld {
    no usages
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }

}
```

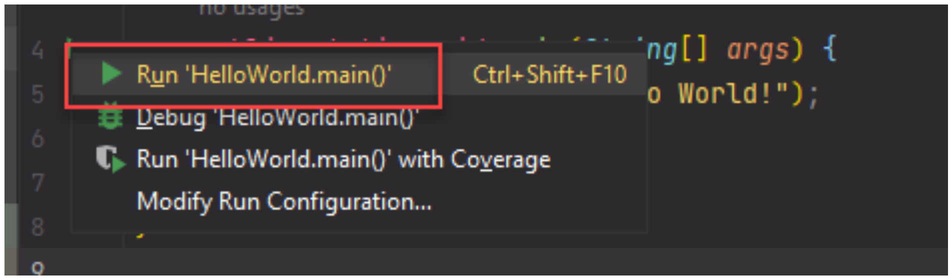
Running your application

- Once you have added the `static void main` function, a green arrow appears next to that function

- At any time, you can click on the green arrow, to run your application

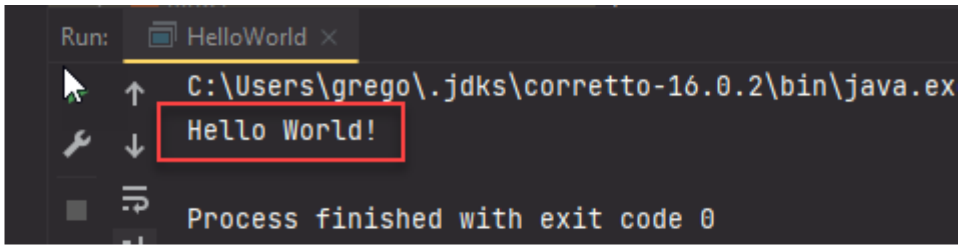


```
no usages
public class HelloWorld {
    no usages
    public static void main(String[] args) {
        System.out.println("Hello World!");
    }

}
```



Run 'HelloWorld.main()'
Ctrl+Shift+F10
Debug 'HelloWorld.main()'
Run 'HelloWorld.main()' with Coverage
Modify Run Configuration...

- This should immediately print the results at the bottom of the window

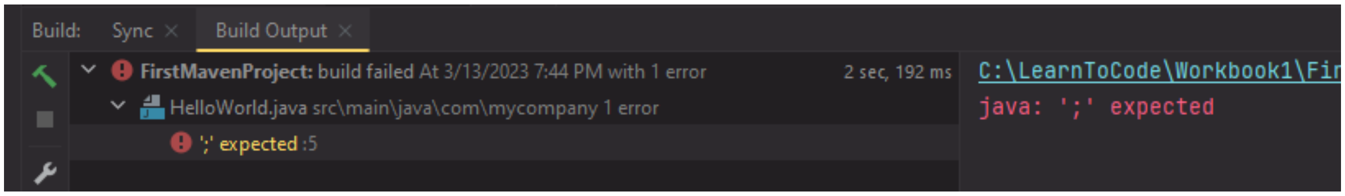


```
C:\Users\grego\.jdks\corretto-16.0.2\bin\java.ex
Hello World!

Process finished with exit code 0
```

Detecting and Fixing Errors

- **If your application does not run, it is most likely because of an error in your code**
  - IntelliJ can help find errors quickly

- **When you attempt to run the application, you may get a compile error message**

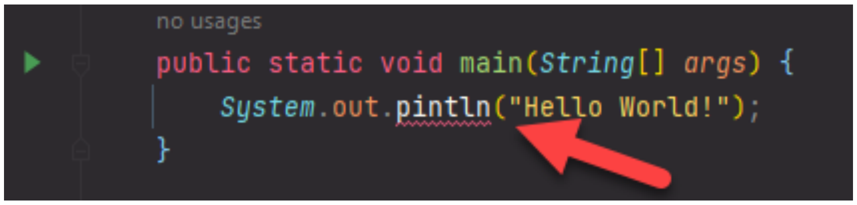


```
FirstMavenProject: build failed At 3/13/2023 7:44 PM with 1 error    2 sec, 192 ms
  HelloWorld.java src\main\java\com\mycompany 1 error
    ';' expected :5
```

```
C:\LearnToCode\Workbook1\Fir
java: ';' expected
```

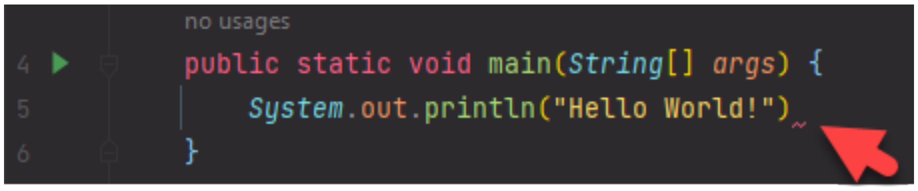
Common Errors

- **Misspelled functions or variables**
  - Missing “r” in `println()`



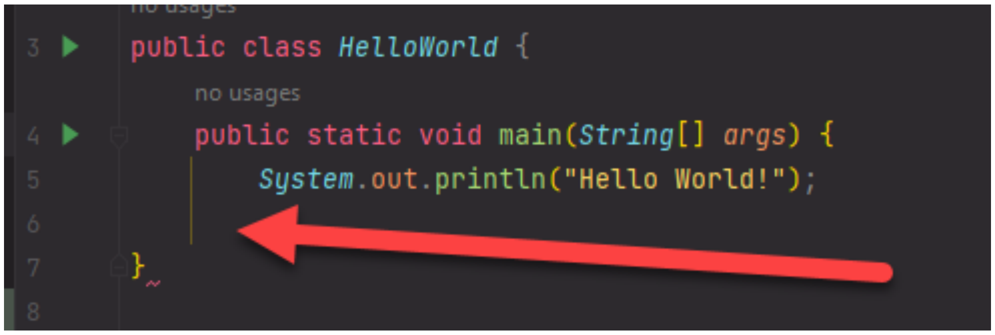
```
no usages
public static void main(String[] args) {
    System.out.pintln("Hello World!");
}
```

- **Missing semi-colon at the end of a line**



```
no usages
public static void main(String[] args) {
    System.out.println("Hello World!")
}
```

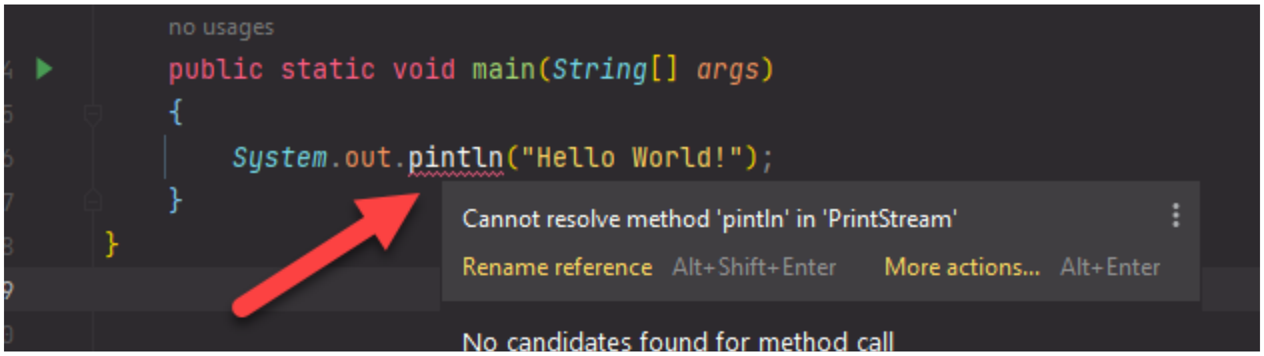
- **Missing close curly brace**
  - Here the compiler believes that the function has a close curly, but the class is missing one



```
no usages
public class HelloWorld {
    no usages
    public static void main(String[] args) {
        System.out.println("Hello World!");

}
```

Lean on Your Tools

- DO read the error messages; they really want to help!
- You can also hover over the **red squiggly** line to get information about the error



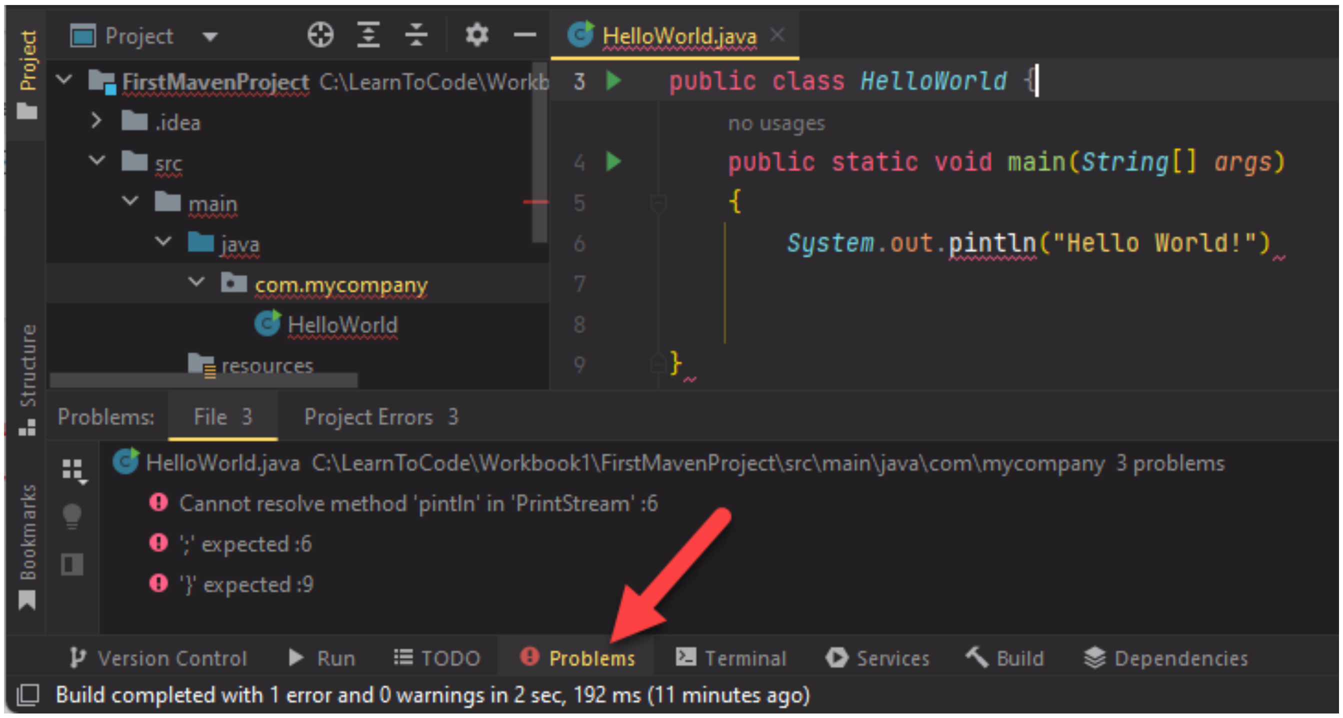
```
no usages
public static void main(String[] args)
{
    System.out.pintln("Hello World!");
}
}
```

Cannot resolve method 'pintln' in 'PrintStream'

Rename reference Alt+Shift+Enter More actions... Alt+Enter

No candidates found for method call

- Additionally, there is a **Problems** tab at the bottom of IntelliJ that will list all potential problems with your code



```
public class HelloWorld {
    no usages
    public static void main(String[] args)
    {
        System.out.pintln("Hello World!")
}
```

Problems: File 3 Project Errors 3

HelloWorld.java C:\LearnToCode\Workbook1\FirstMavenProject\src\main\java\com\mycompany 3 problems

Cannot resolve method 'pintln' in 'PrintStream' :6

';' expected :6

'}' expected :9

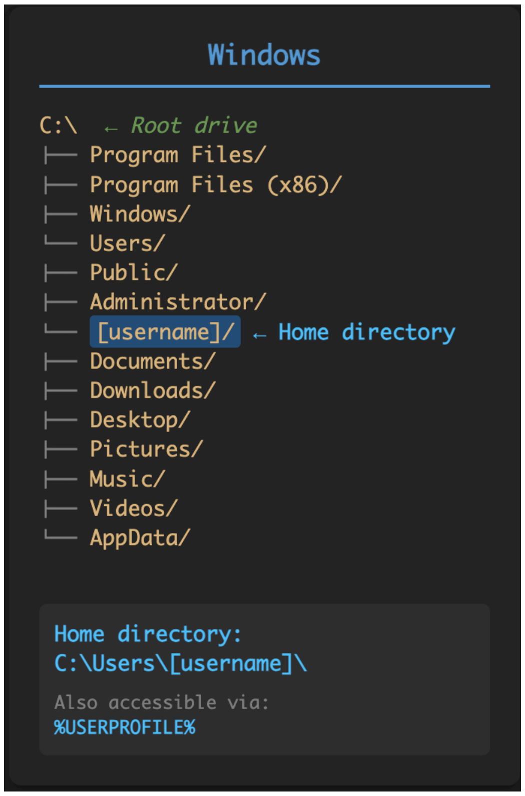
Build completed with 1 error and 0 warnings in 2 sec, 192 ms (11 minutes ago)

Exercises – Shopping List

Complete the following exercise by adding the new project into the workbook-1 folder

If you don't have a workbook-1 folder, create a new folder within the pluralsight directory. The path should look like:

On Mac/Linux: `~/pluralsight/workbook-1`
On Windows: `C:/Users/[username]/pluralsight/workbook-1`

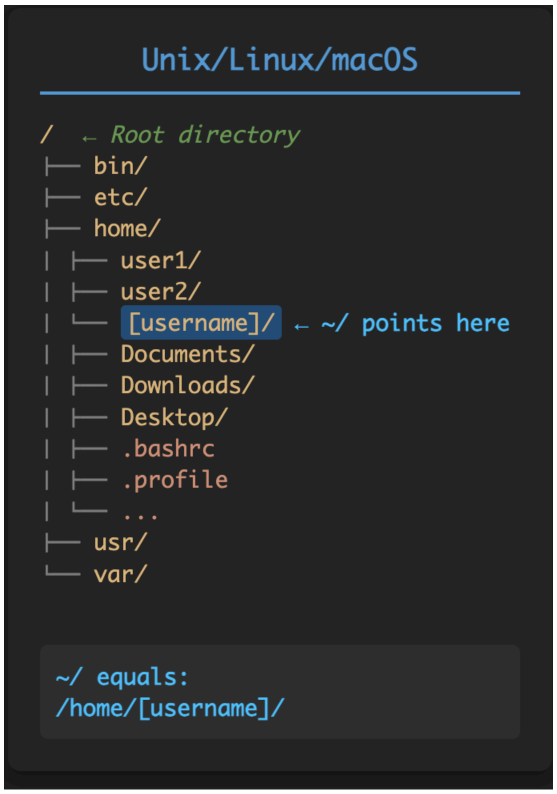


Windows

```
C:\  ← Root drive
├── Program Files/
├── Program Files (x86)/
├── Windows/
└── Users/
├── Public/
├── Administrator/
└── [username]/ ← Home directory
├── Documents/
├── Downloads/
├── Desktop/
├── Pictures/
├── Music/
├── Videos/
└── AppData/
```

Home directory:
C:\Users\[username]\

Also accessible via:
%USERPROFILE%

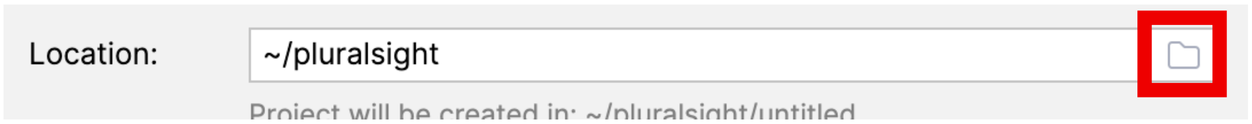


Unix/Linux/macOS

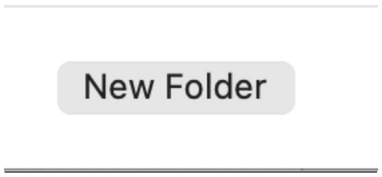
```
/  ← Root directory
├── bin/
├── etc/
├── home/
│  ├── user1/
│  ├── user2/
│  └── [username]/ ← ~/ points here
│  ├── Documents/
│  ├── Downloads/
│  ├── Desktop/
│  ├── .bashrc
│  ├── .profile
│  └── ...
├── usr/
└── var/
```

~/ equals:
/home/[username]/

Also, within Intellij's new project screen, the Location folder button will allow for you to navigate to your home directory and create a new folder!


Location: ~/pluralsight

Project will be created in: ~/pluralsight/untitled



EXERCISE 1

Using IntelliJ, create a new Java application that will list at least 10 items that should be on your shopping list.

1. Create a new package named `com.pluralsight`
2. In the `com.pluralsight` package create a new java class named `ShoppingList`. Remember it must be in a .java file of the same name.
3. Within the `ShoppingList` class, create a `main` method.
4. In the `main()` method use the `System.out.println()` to display a shopping list with at least 10 items. EX. `System.out.println("apricot");`
5. Run the program. If there are any errors, fix them and run it again.
6. Commit and Push your changes to GitHub using your IntelliJ IDE