

## Installing Scala

Scala is a programming language that combines object-oriented and functional programming paradigms. It was designed to be concise, expressive, and scalable, hence the name "Scala," which stands for "scalable language." Scala runs on the Java Virtual Machine (JVM), making it interoperable with Java and allowing developers to leverage existing Java libraries and tools.

Key features of Scala include:

1. **Object-Oriented and Functional:** Scala seamlessly integrates object-oriented and functional programming concepts. It supports both imperative and functional programming styles, enabling developers to write code in a concise and expressive manner.
2. **Static Typing:** Scala is statically typed, which means that type checking is done at compile-time, leading to better performance and reliability. However, Scala's type inference system reduces the need for explicit type annotations, making code more concise.
3. **Concurrency:** Scala provides built-in support for concurrent and parallel programming through features like actors and futures. It offers libraries such as Akka for building scalable, distributed systems with ease.
4. **Immutable Data Structures:** Scala encourages the use of immutable data structures, which helps in writing safe and thread-safe code. Immutable collections are provided in the standard library, making it easy to work with immutable data.
5. **Pattern Matching:** Scala includes powerful pattern matching capabilities, allowing developers to match complex data structures and perform various operations based on patterns.
6. **Interoperability with Java:** Scala can seamlessly interact with Java code. Developers can use Java libraries and frameworks within Scala projects and vice versa, making it easy to leverage existing Java ecosystem tools and resources.
7. **Functional Libraries:** Scala provides rich functional libraries, such as Scala collections library, ScalaTest for testing, and frameworks like Play Framework for web development, making it suitable for building a wide range of applications.

Scala is widely used in various domains, including web development, data engineering, distributed systems, and scientific computing. Its expressive syntax, strong type system, and interoperability with Java make it a popular choice for building scalable and maintainable applications.

## Use cases of Scala:

Scala is a versatile programming language used in various domains and for diverse use cases. Here are some common scenarios where Scala is applied:

1. **Web Development:** Scala, along with frameworks like Play Framework and Akka HTTP, is used to build high-performance and scalable web applications. These frameworks

provide features like asynchronous I/O, actor-based concurrency, and routing, making them suitable for handling heavy traffic and real-time interactions.

2. **Data Engineering and Big Data:** Scala is widely used in data engineering for building data pipelines, processing large datasets, and implementing distributed computing solutions. Libraries like Apache Spark leverage Scala's functional programming capabilities for data manipulation, transformation, and analysis at scale.
3. **Functional Programming:** Scala's functional programming features, such as first-class functions, immutability, and pattern matching, make it well-suited for developing functional programming applications. It is used in domains where functional programming paradigms are preferred, such as financial modeling, scientific computing, and algorithmic trading.
4. **Concurrency and Parallelism:** Scala's actor-based concurrency model and support for parallel collections enable developers to build highly concurrent and parallel applications. It is used in scenarios requiring efficient utilization of multi-core processors, such as real-time systems, gaming, and high-frequency trading.
5. **Microservices and Reactive Systems:** Scala, along with frameworks like Akka, is used to build microservices and reactive systems. These systems are designed to be resilient, responsive, and elastic, making them suitable for building scalable and fault-tolerant distributed applications.
6. **Machine Learning and Data Science:** Scala, combined with libraries like Breeze and Apache Mahout, is used for machine learning and data science applications. Scala's interoperability with Java and its functional programming capabilities make it a preferred choice for building machine learning algorithms, data preprocessing pipelines, and predictive analytics models.
7. **Domain-Specific Languages (DSLs):** Scala's expressive syntax and powerful features make it suitable for creating domain-specific languages (DSLs). It is used to define DSLs tailored to specific application domains, such as finance, telecommunications, and scientific computing, for expressing domain concepts more concisely and intuitively.

**In this lab, we're setting up the development environment for Scala by installing Java and Scala on a local machine. The end goal is to enable developers to write, compile, and run Scala code locally, facilitating the development of Scala applications. We ensure that both Java and Scala are installed correctly and configure the environmental variables to include Scala's installation path, ensuring seamless integration with the system. This setup prepares developers for Scala development, allowing them to leverage the language's features and build scalable and maintainable applications.**



## **To begin with the Lab:**

1. Now first we need to install Java on our local machine for that visit the website mentioned below and download JDK 17.
2. Visit the website choose JDK 17 and then select Windows if your OS is this choose the x64 MSI installer and download it.
3. Once it is downloaded then you need to install it too.

<https://www.oracle.com/ae/java/technologies/downloads/#jdk17-windows>

JDK 22   JDK 21   **JDK 17**   GraalVM for JDK 22   GraalVM for JDK 21   GraalVM for JDK 17

#### JDK Development Kit 17.0.11 downloads

JDK 17 binaries are free to use in production and free to redistribute, at no cost, under the [Oracle No-Fee Terms and Conditions \(NFTC\)](#).

JDK 17 will receive updates under the NFTC, until September 2024. Subsequent JDK 17 updates will be licensed under the [Java SE OTN License \(OTN\)](#) and production use beyond the [limited free grants](#) of the OTN license will [require a fee](#).

Linux   macOS   **Windows**

Product/file description	File size	Download
x64 Compressed Archive	172.83 MB	<a href="https://download.oracle.com/java/17/latest/jdk-17_windows-x64_bin.zip">https://download.oracle.com/java/17/latest/jdk-17_windows-x64_bin.zip</a> ( sha256)
x64 Installer	153.91 MB	<a href="https://download.oracle.com/java/17/latest/jdk-17_windows-x64_bin.exe">https://download.oracle.com/java/17/latest/jdk-17_windows-x64_bin.exe</a> ( sha256)
<b>x64 MSI Installer</b>	152.66 MB	<a href="https://download.oracle.com/java/17/latest/jdk-17_windows-x64_bin.msi">https://download.oracle.com/java/17/latest/jdk-17_windows-x64_bin.msi</a> ( sha256)

- Once it is installed go to PowerShell or CMD and then write this as shown below to check the version of your java.

#### java -version

```
Administrator: Windows PowerShell
Copyright (C) Microsoft Corporation. All rights reserved.
Install the latest PowerShell for new features and improvements! https://aka.ms/PSWindows

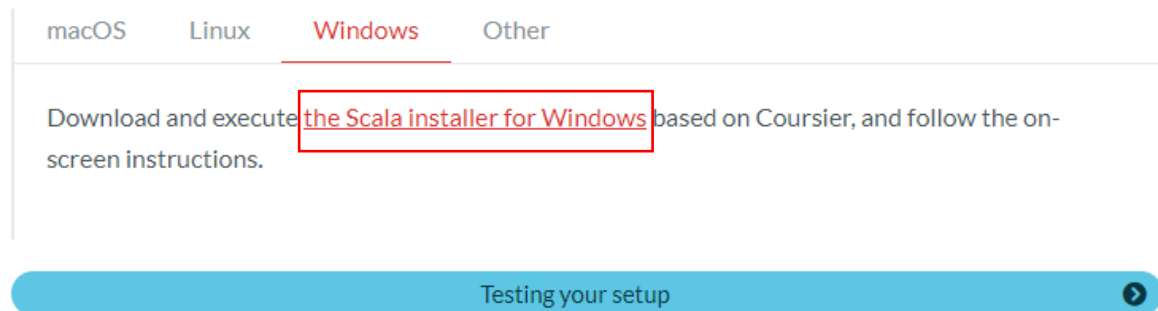
PS C:\Windows\system32> java -version
java version "17.0.11" 2024-04-16 LTS
Java(TM) SE Runtime Environment (build 17.0.11+7-LTS-207)
Java HotSpot(TM) 64-Bit Server VM (build 17.0.11+7-LTS-207, mixed mode, sharing)
PS C:\Windows\system32>
```

- Now we'll go and install Scala, click on the link below to directly jump to the download page.
- On this website you just need to click on the highlighted part and it will start downloading.

<https://www.scala-lang.org/download/>

## Install Scala with **cs setup** (recommended)

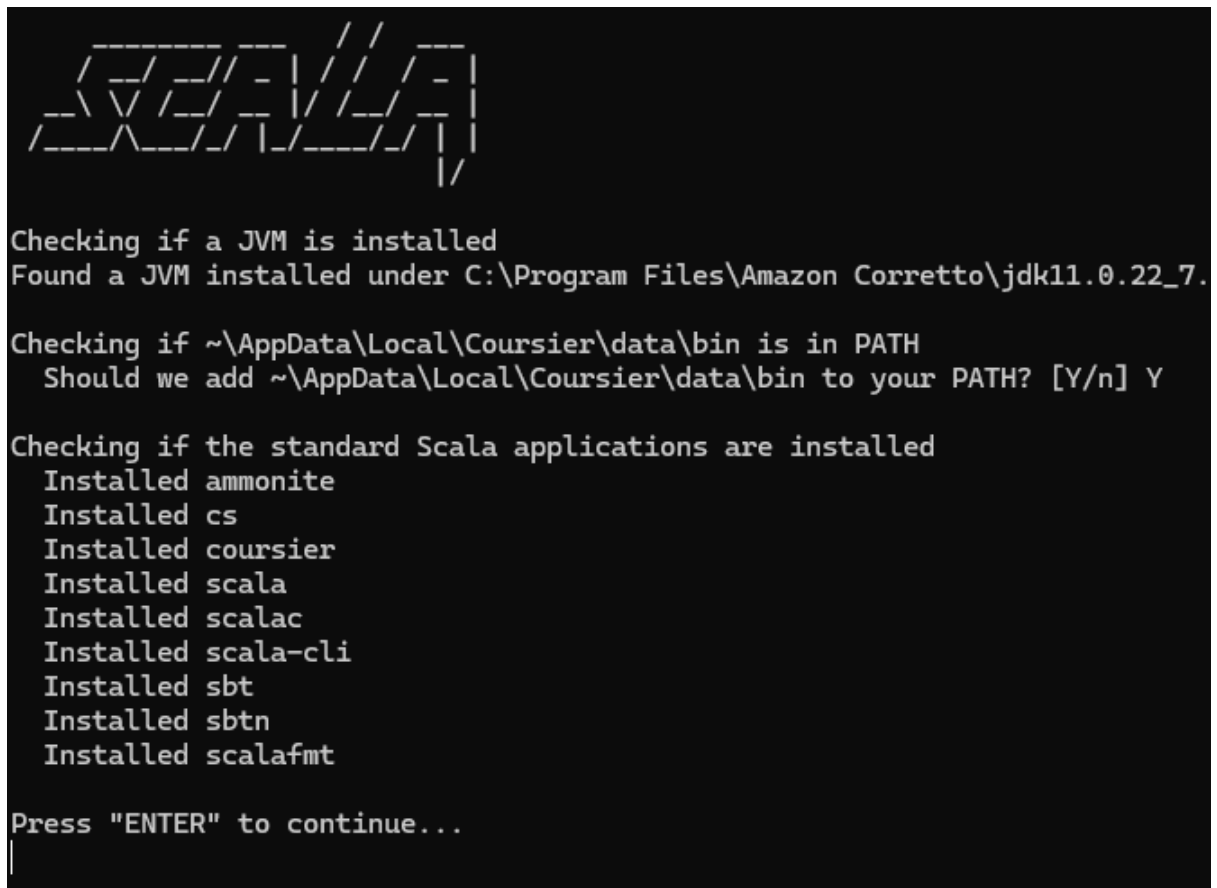
To install Scala, it is recommended to use `cs setup`, the Scala installer powered by Coursier. It installs everything necessary to use the latest Scala release from a command line:



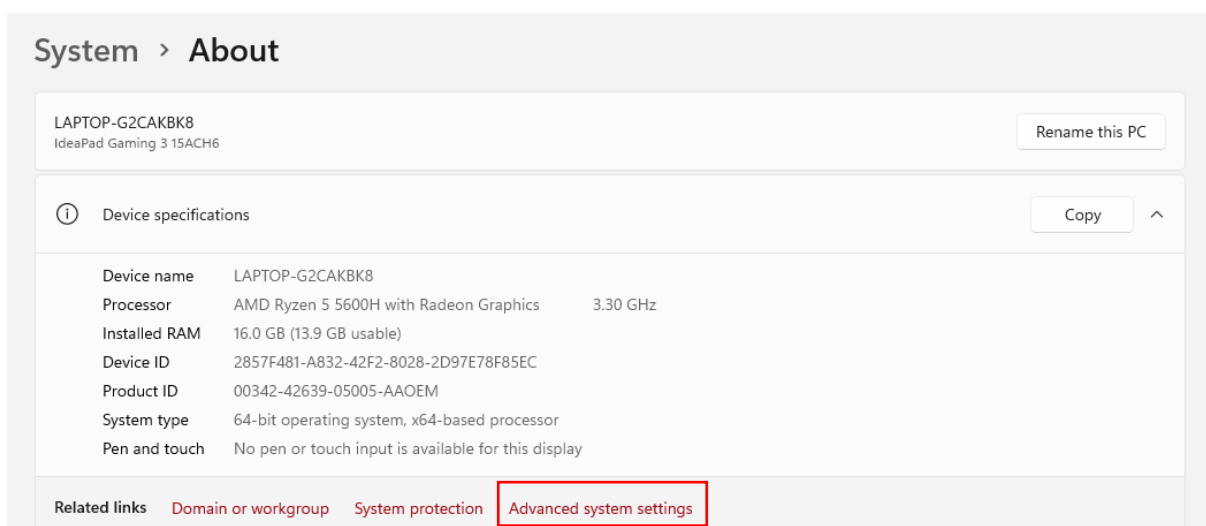
7. Once it has been downloaded then you need to install it. Then it will open CMD for you, type Y and hit enter to move forward.

A screenshot of a Windows Command Prompt window. The title bar shows the path 'C:\Users\PULKIT\AppData\Local\...' and a search icon. The window has a dark background with white text. At the top, there is a large, stylized 'Scala' logo made of dashed lines. Below the logo, the text reads: 'Checking if a JVM is installed', 'Found a JVM installed under C:\Program Files\Amazon Corretto\jdk11.0.22\_7.', 'Checking if ~\AppData\Local\Coursier\data\bin is in PATH', and 'Should we add ~\AppData\Local\Coursier\data\bin to your PATH? [Y/n] Y'. The 'Y' at the end is the user's input.

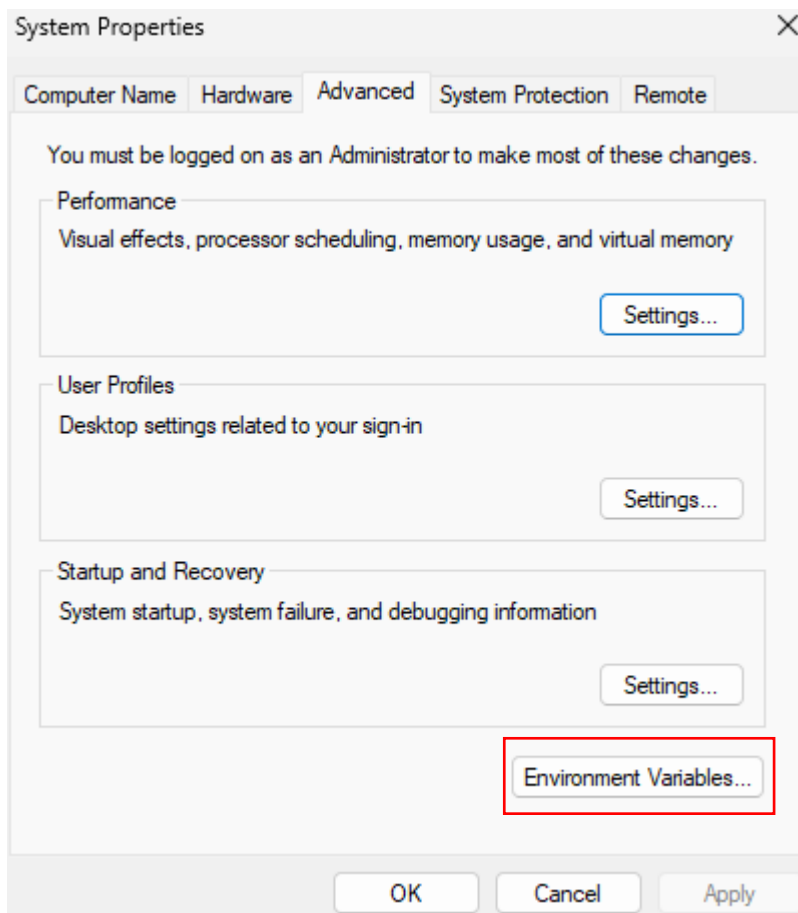
8. Now here Scala will take some time because it will installing some dependencies.
9. Below you can see that Scala has been installed successfully.



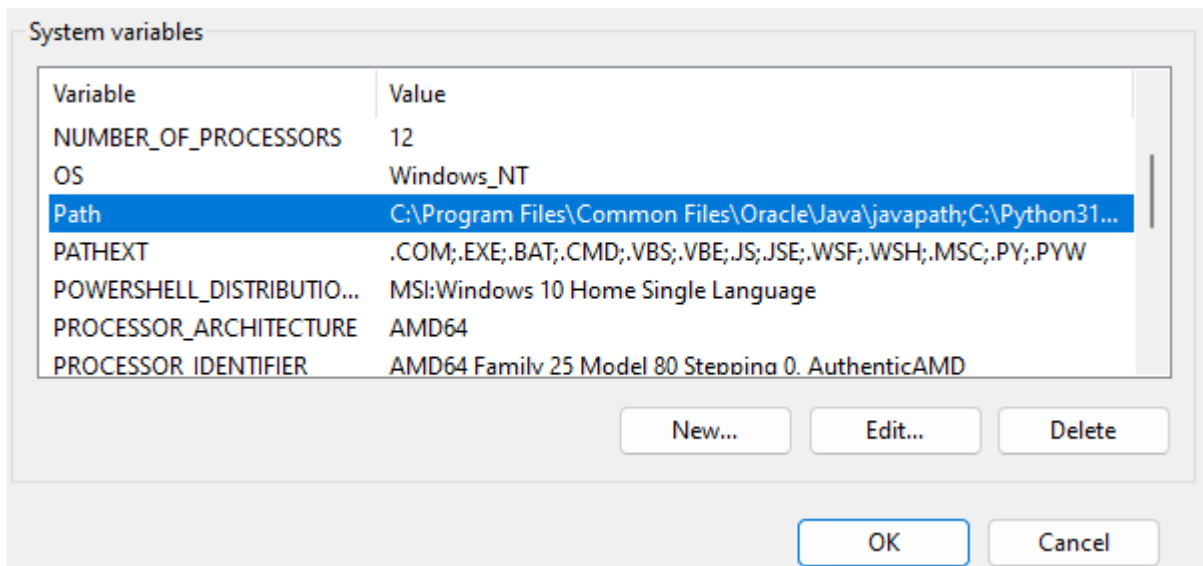
10. After that you need to add its path to the environmental variables. For that first, you need to find its path.
11. Once you have found its path then you need to copy it. After that, you need to open your Windows settings and then go to About.
12. Here you need to click on advanced system settings.



13. Now you have to click on Environment Variables.



14. Then you have to double-click on the path to open the edit section and add a new path.



15. Now you have to click on New and add that here. After that click OK and exit that.

Edit environment variable



C:\Program Files\Common Files\Oracle\Java\javapath  
C:\Python312\Scripts\  
C:\Python312\  
C:\Program Files\Microsoft SDKs\Azure\CLI2\wbin  
C:\Program Files\Amazon Corretto\jdk11.0.22\_7\bin  
C:\Program Files (x86)\Common Files\Oracle\Java\javapath  
C:\Windows\system32  
C:\Windows  
C:\Windows\System32\Wbem  
C:\Windows\System32\WindowsPowerShell\v1.0\  
C:\Windows\System32\OpenSSH\  
C:\Program Files (x86)\NVIDIA Corporation\PhysX\Common  
C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR  
C:\Program Files\PuTTY\  
C:\Program Files (x86)\Microsoft SQL Server\160\DTS\Binn\  
C:\Program Files\Azure Data Studio\bin  
C:\Program Files\nodejs\  
C:\ProgramData\chocolatey\bin  
C:\Program Files\Microsoft SQL Server\150\Tools\Binn\  
C:\Program Files\Microsoft SQL Server\Client SDK\ODBC\170\Tool...

New

Edit

Browse...

Delete

Move Up

Move Down

Edit text...

OK

Cancel