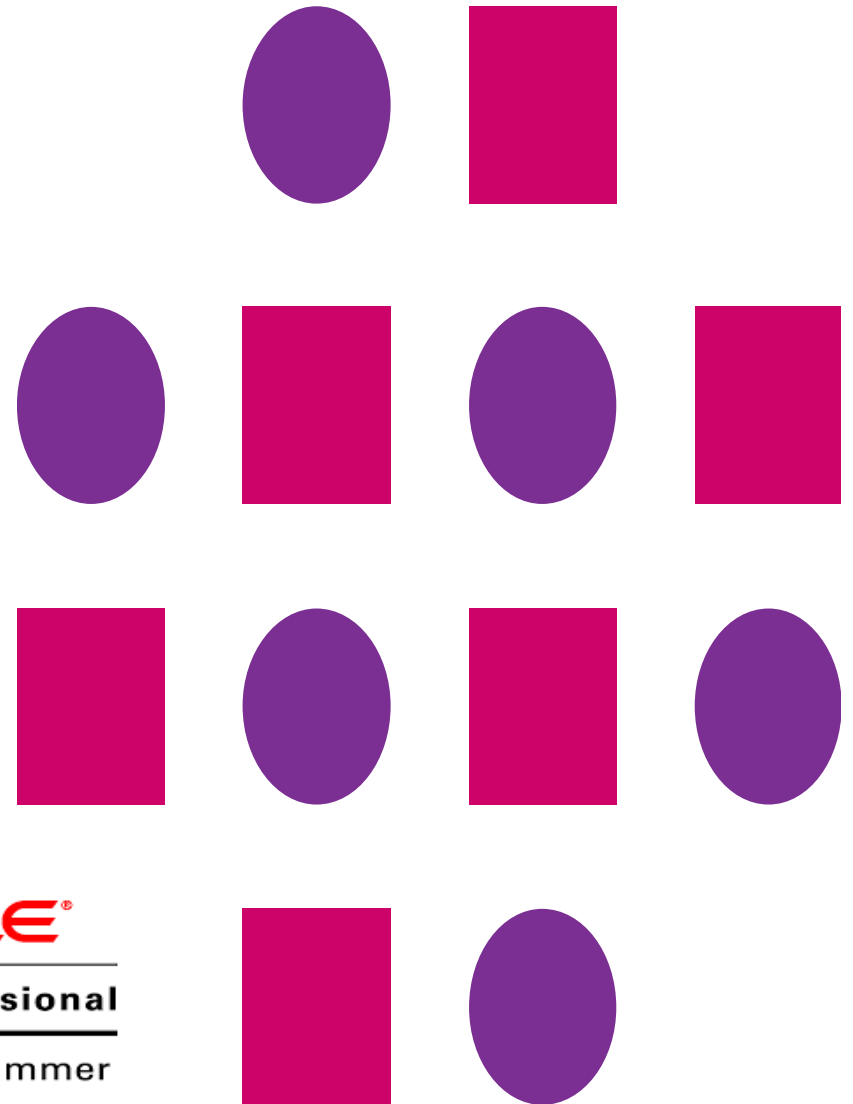


Java Programming Language SE – 6

Module 1: Getting Started



ORACLE®
Certified Professional
Java SE 6 Programmer

Objectives

Upon completion of this module, you should be able to:

- Describe the key features of Java technology
- Write, compile and run simple java application
- Describe the function of the Java virtual machine
- Define garbage collection
- List the three task perform by Java that handle code security

Relevance

- Is the Java programming language a complete language or is it useful only for writing programs for the Web?
- Why do you need another programming language?

What is Java Technology?

- Java technology is:
 - A programming language
 - A development environment
 - An application environment
 - A deployment environment
- It is similar in syntax to C++.
- It is used for developing the applications.

Primary Goals of the Java Technology

- Provides an easy-to-use language by:
 - Avoiding many pitfalls of other languages
 - Being object-oriented
 - Enabling users to create streamlined and clear code
- Provides an interpreted environment for:
 - Improved speed of development
 - Code portability

Primary Goals of the Java Technology

- Enables users to run more than one thread of activity
- Loads classes dynamically; that is, at the time they are actually needed
- Supports changing programs dynamically during runtime by loading classes from disparate sources
- Furnishes better security

Primary Goals of the Java Technology

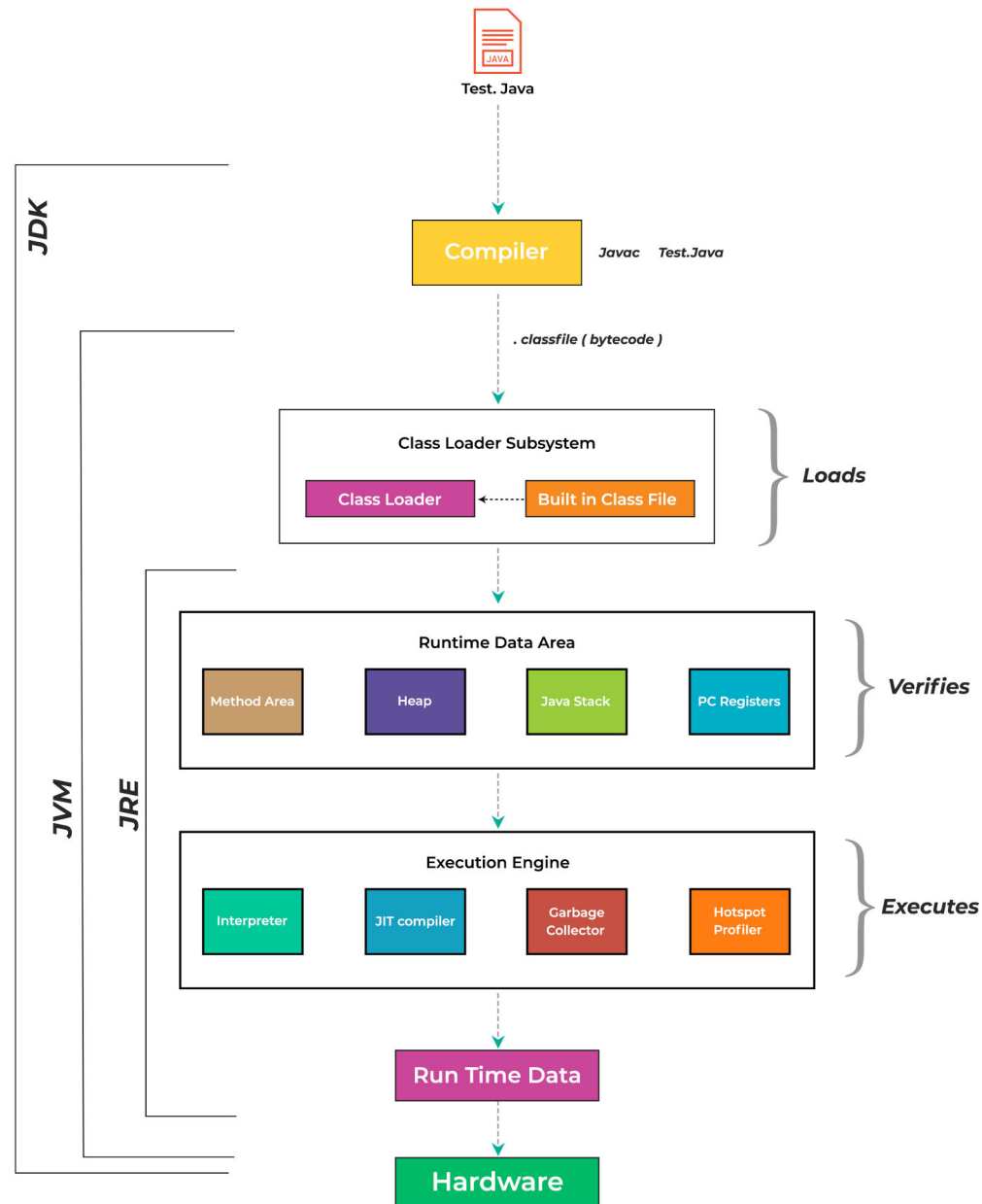
The following features fulfill these goals:

- The Java Virtual Machine (JVM) 1
- Garbage collection
- The Java Runtime Environment (JRE)
- JVM tool interface

The Java Virtual Machine

- Provides hardware platform specifications
- Reads compiled byte codes that are platform-independent
- Is implemented as software or hardware
- Is implemented in a Java technology development tool or a Web browser

Architecture of Java Virtual Machine



The Java Virtual Machine

JVM provides definitions for the:

- Instruction set (central processing unit [CPU])
- Register set
- Class file format
- Stack
- Garbage-collected heap
- Memory area
- Fatal error reporting
- High-precision timing support

The Java Virtual Machine

- The majority of type checking is done when the code is compiled.
- Implementation of the JVM approved by Sun Microsystems must be able to run any compliant class file.
- The JVM executes on multiple operating environments.

Garbage Collection

- Allocated memory that is no longer needed should be deallocated.
- In other languages, deallocation is the programmer's responsibility.
- The Java programming language provides a system-level thread to track memory allocation.

Garbage Collection

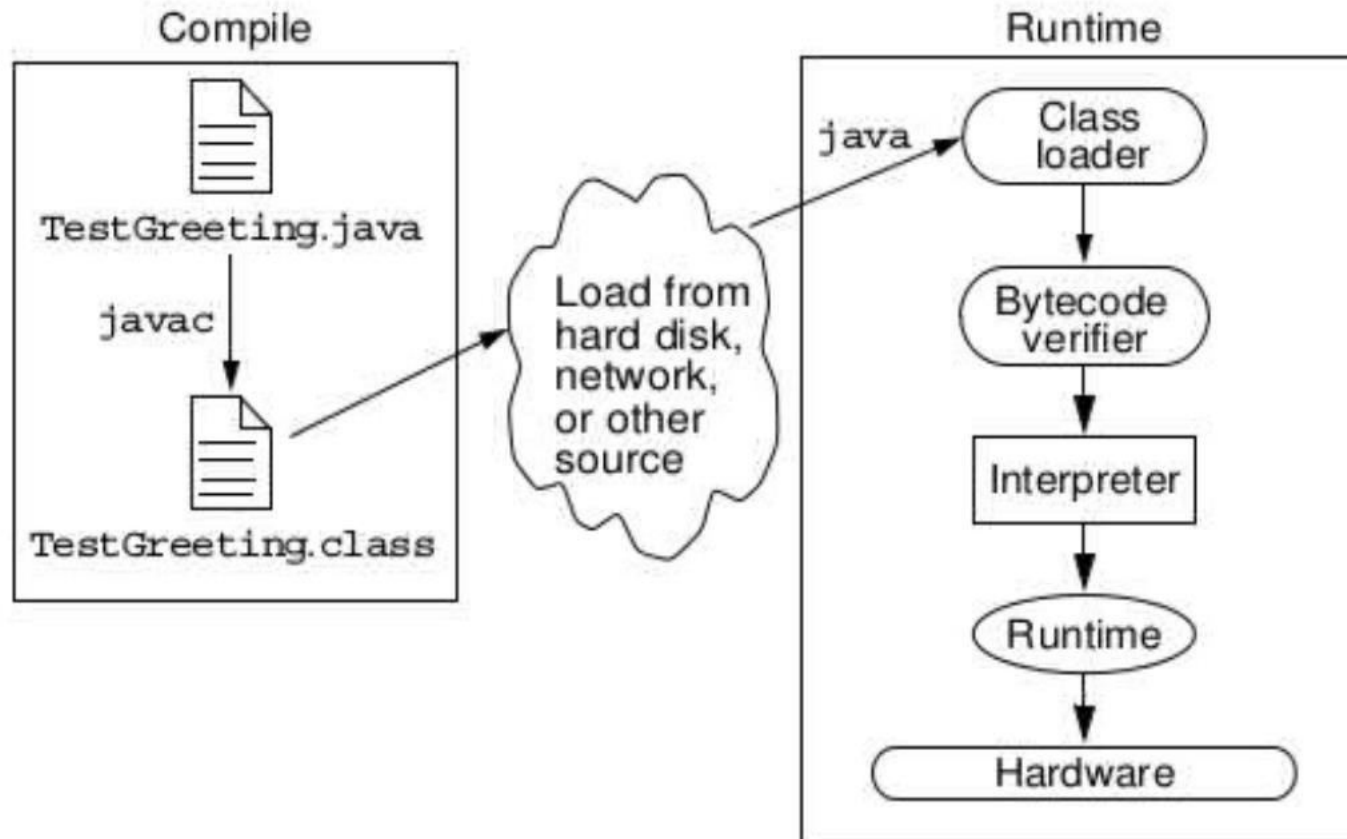
- Allocated memory that is no longer needed should be deallocated.
- In other languages, deallocation is the programmer's responsibility.
- The Java programming language provides a system-level thread to track memory allocation.

Garbage Collection

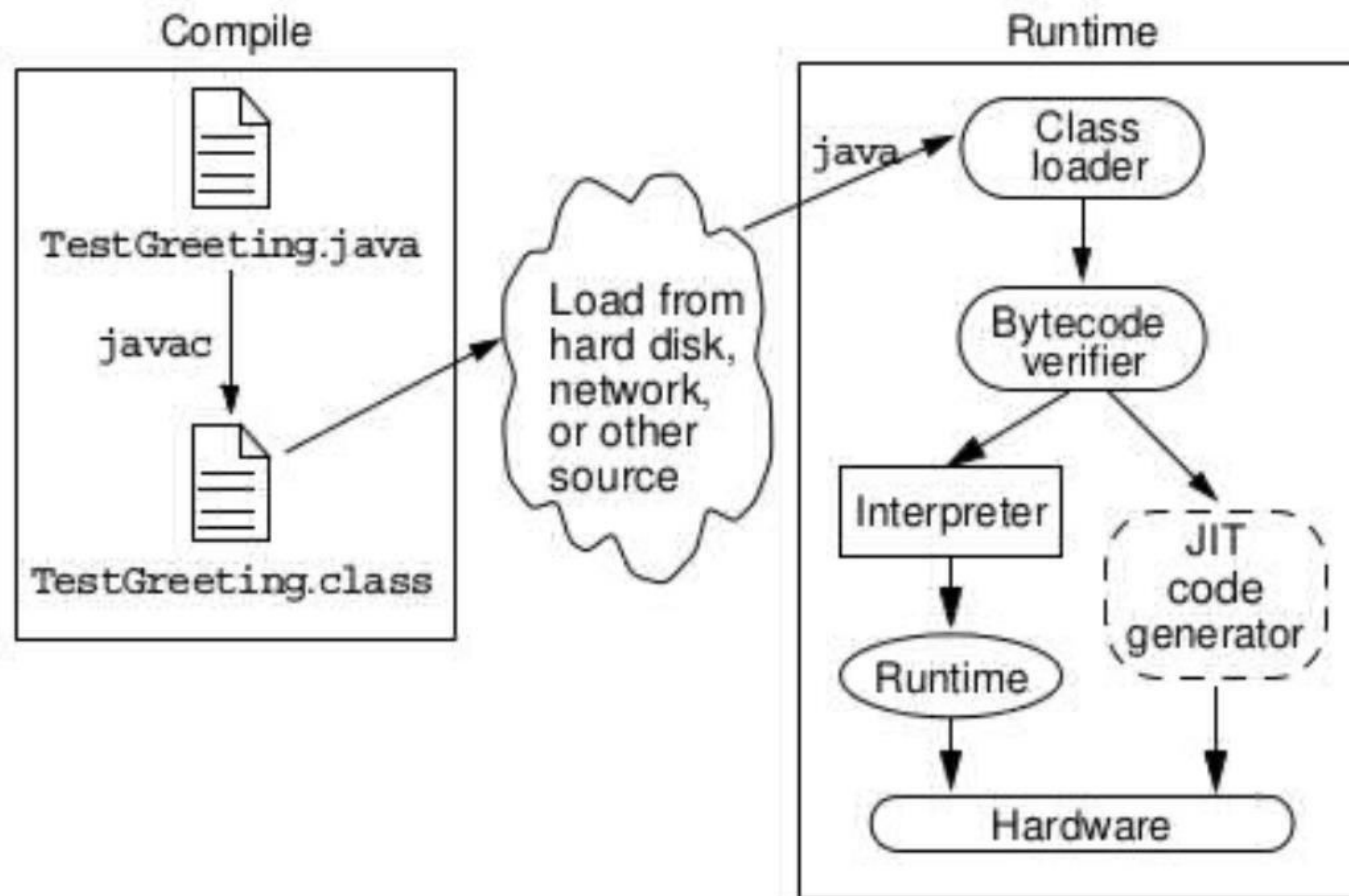
Garbage collection has the following characteristics:

- Checks for and frees memory no longer needed
- Is done automatically
- Can vary dramatically across JVM implementations

The Java Runtime Environment



JRE With a Just-In-Time (JIT) Compiler



JVM Tasks

The JVM performs three main tasks:

- Loads code
- Verifies code
- Executes code

The Class Loader

- Loads all classes necessary for the execution of a program
- Maintains classes of the local file system in separate namespaces
- Prevents spoofing

The Bytecode Verifier

- The code adheres to the JVM specification.
- The code does not violate system integrity.
- The code causes no operand stack overflows or underflows.
- The parameter types for all operational code are correct.
- No illegal data conversions (the conversion of integers to pointers) have occurred.

Steps to install JDK for windows

Step

The screenshot shows the Oracle Java SE Development Kit 10 Downloads page. The page layout includes a header with the Oracle logo, a navigation menu, and a search bar. The main content area is titled "Java SE Development Kit 10 Downloads" and contains a description of the JDK, a list of download links, and a table of download links for various operating systems. The Windows download link is highlighted.

Oracle Technology Network / Java / Java SE / Downloads

Overview Downloads Documentation Community Technologies Training

Java SE Development Kit 10 Downloads

Thank you for downloading this release of the Java™ Platform, Standard Edition Development Kit (JDK™). The JDK is a development environment for building applications, and components using the Java programming language.

The JDK includes tools useful for developing and testing programs written in the Java programming language and running on the Java platform.

See also:

- Java Developer Newsletter: From your Oracle account, select **Subscriptions**, expand **Technology**, and subscribe to **Java**.
- Java Developer Day hands-on workshops (free) and other events
- Java Magazine

JDK 10.0.2 checksum

Java SE Development Kit 10.0.2

You must accept the [Oracle Binary Code License Agreement for Java SE](#) to download this software.

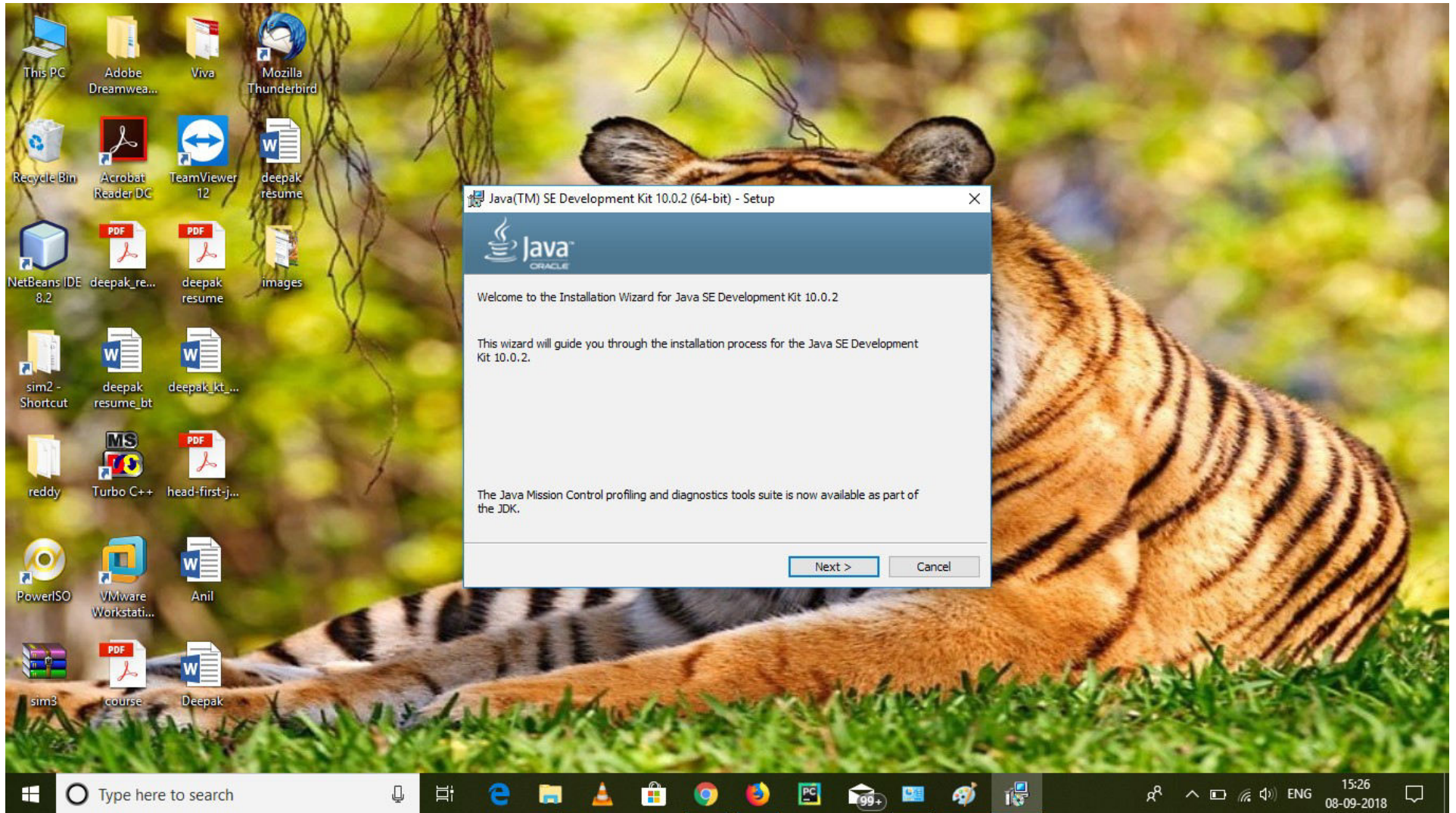
Thank you for accepting the Oracle Binary Code License Agreement for Java SE; you may now download this software.

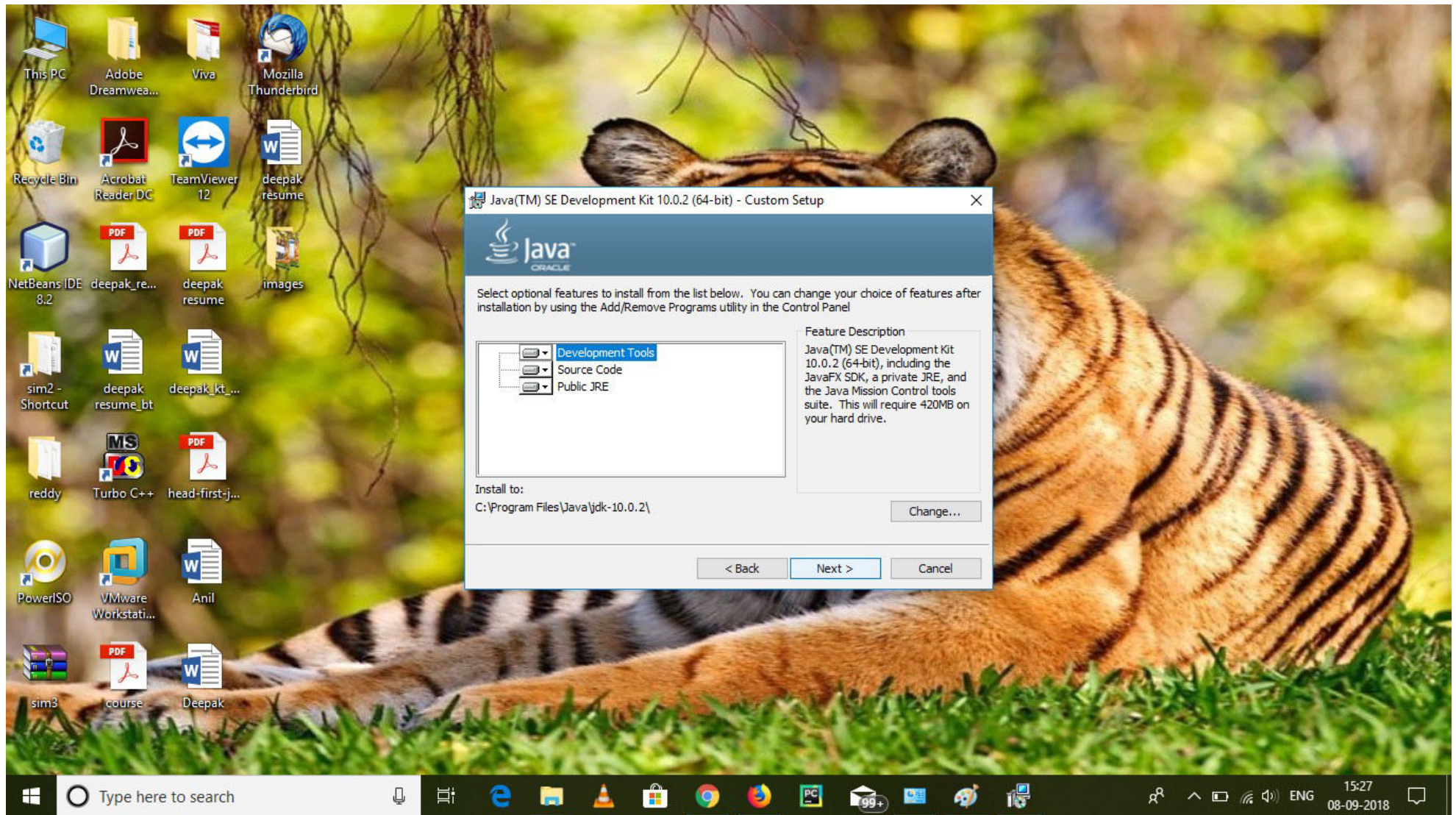
Product / File Description	File Size	Download
Linux	306 MB	jdk-10.0.2_linux-x64_bin.rpm
Linux	338.43 MB	jdk-10.0.2_linux-x64_bin.tar.gz
macOS	395.46 MB	jdk-10.0.2_osx-x64_bin.dmg
Solaris SPARC	207.07 MB	jdk-10.0.2_solaris-sparcv9_bin.tar.gz
Windows	390.25 MB	jdk-10.0.2_windows-x64_bin.exe

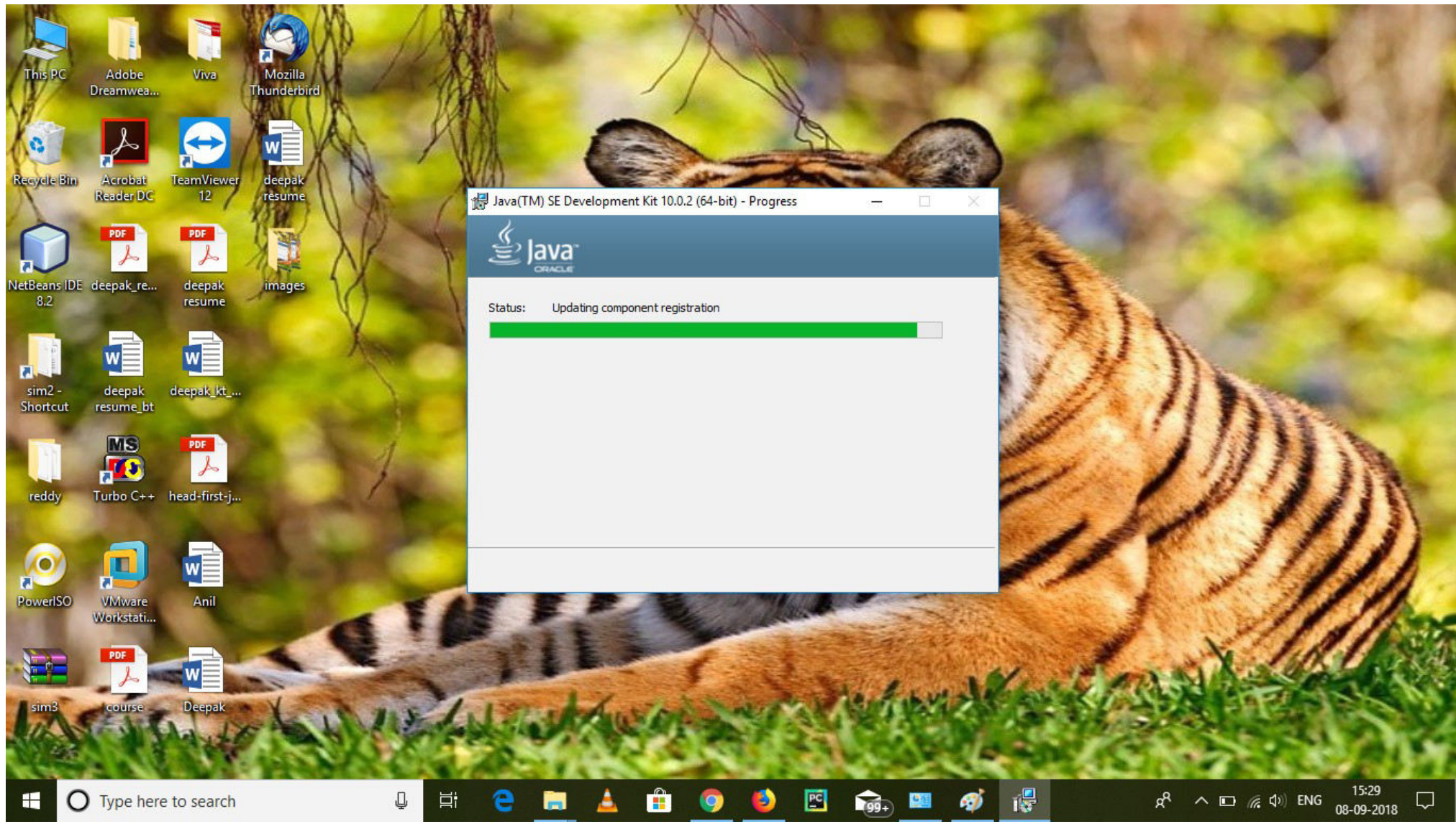
download.oracle.com/otn-pub/java/jdk/10.0.2+13/19aef61b38124481863b1413dce1855f/jdk-10.0.2_windows-x64_bin.exe

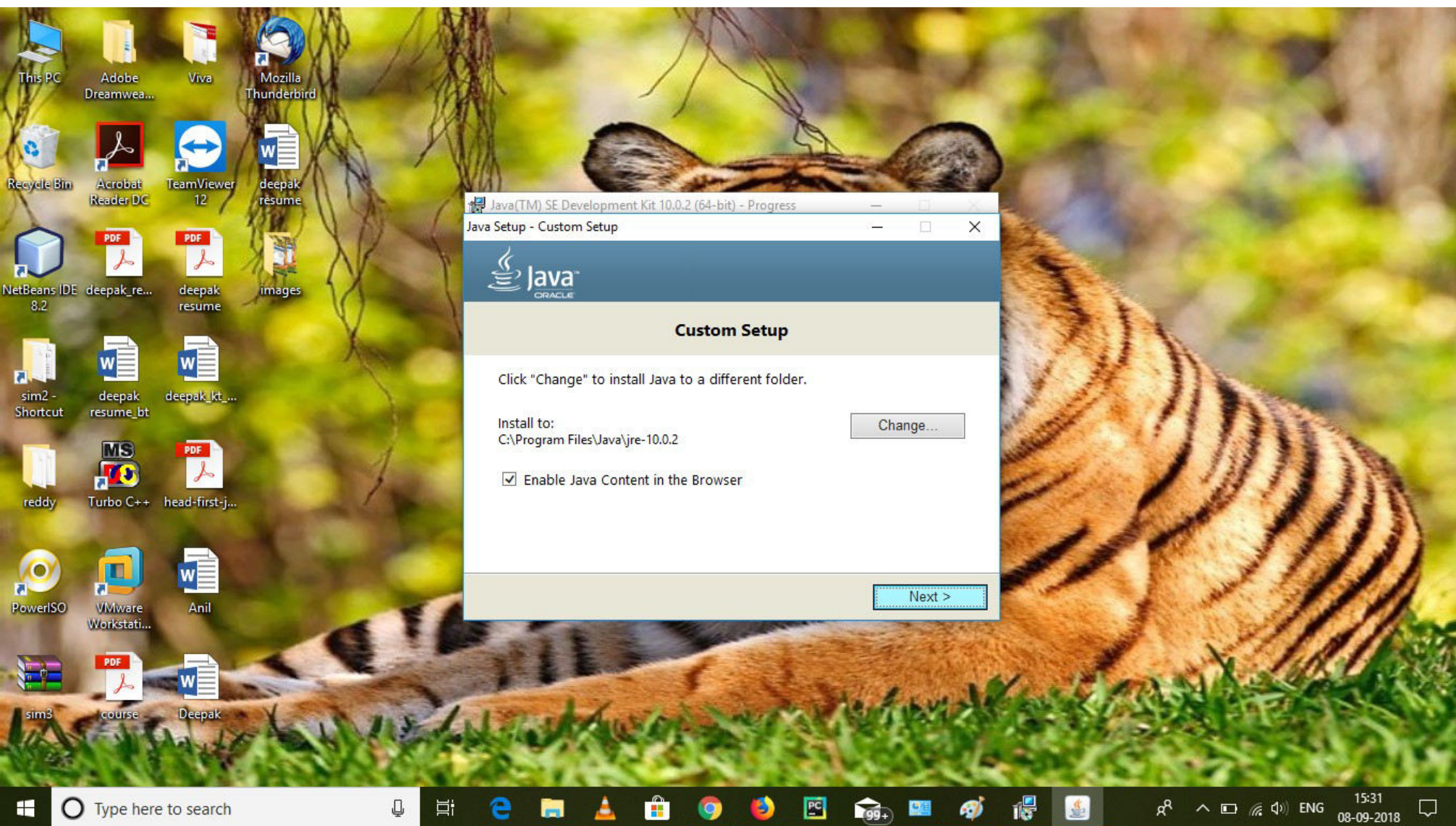
Windows taskbar: Type here to search, 15:18, 08-09-2018

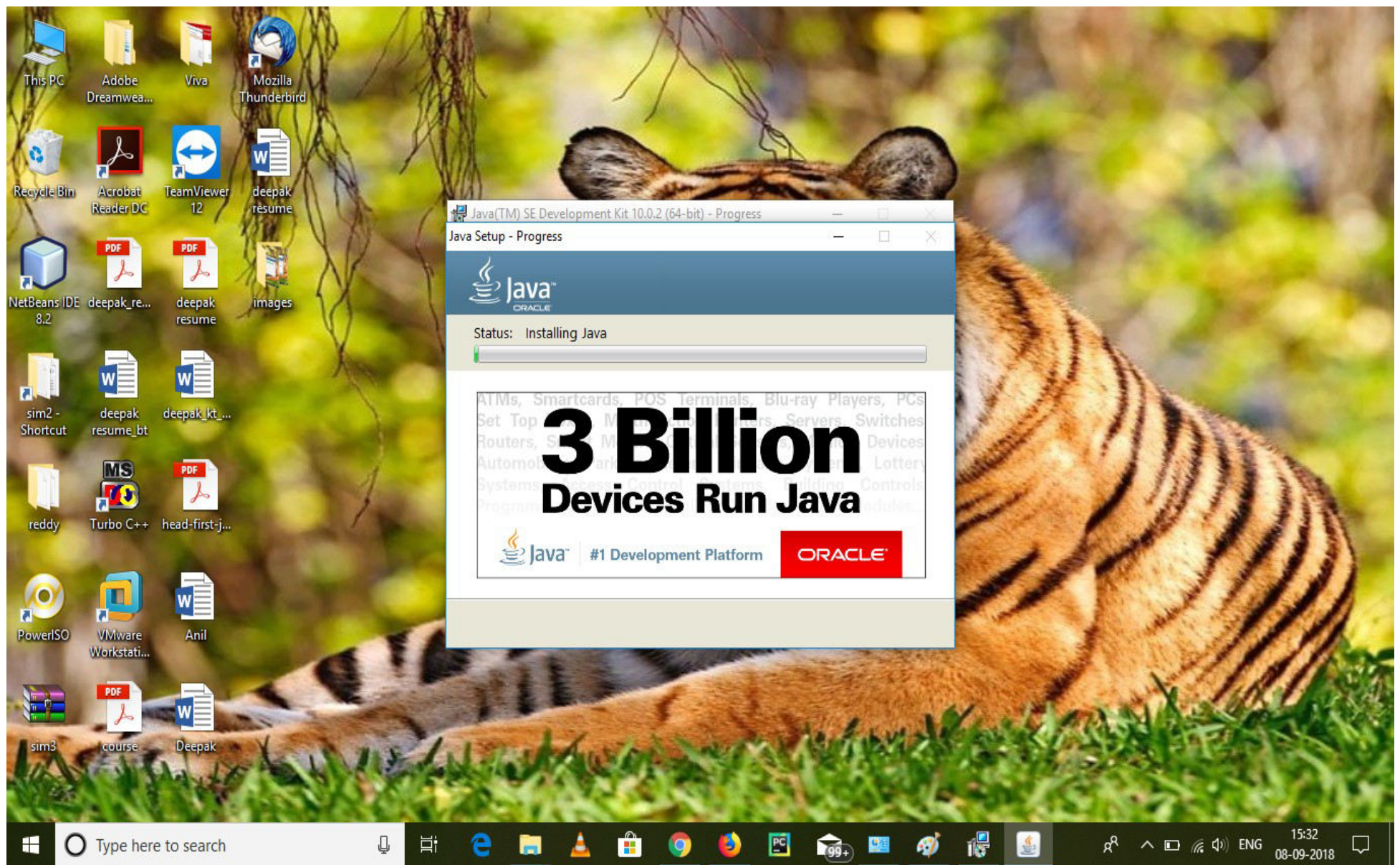
Step 2: Open and Run the file.

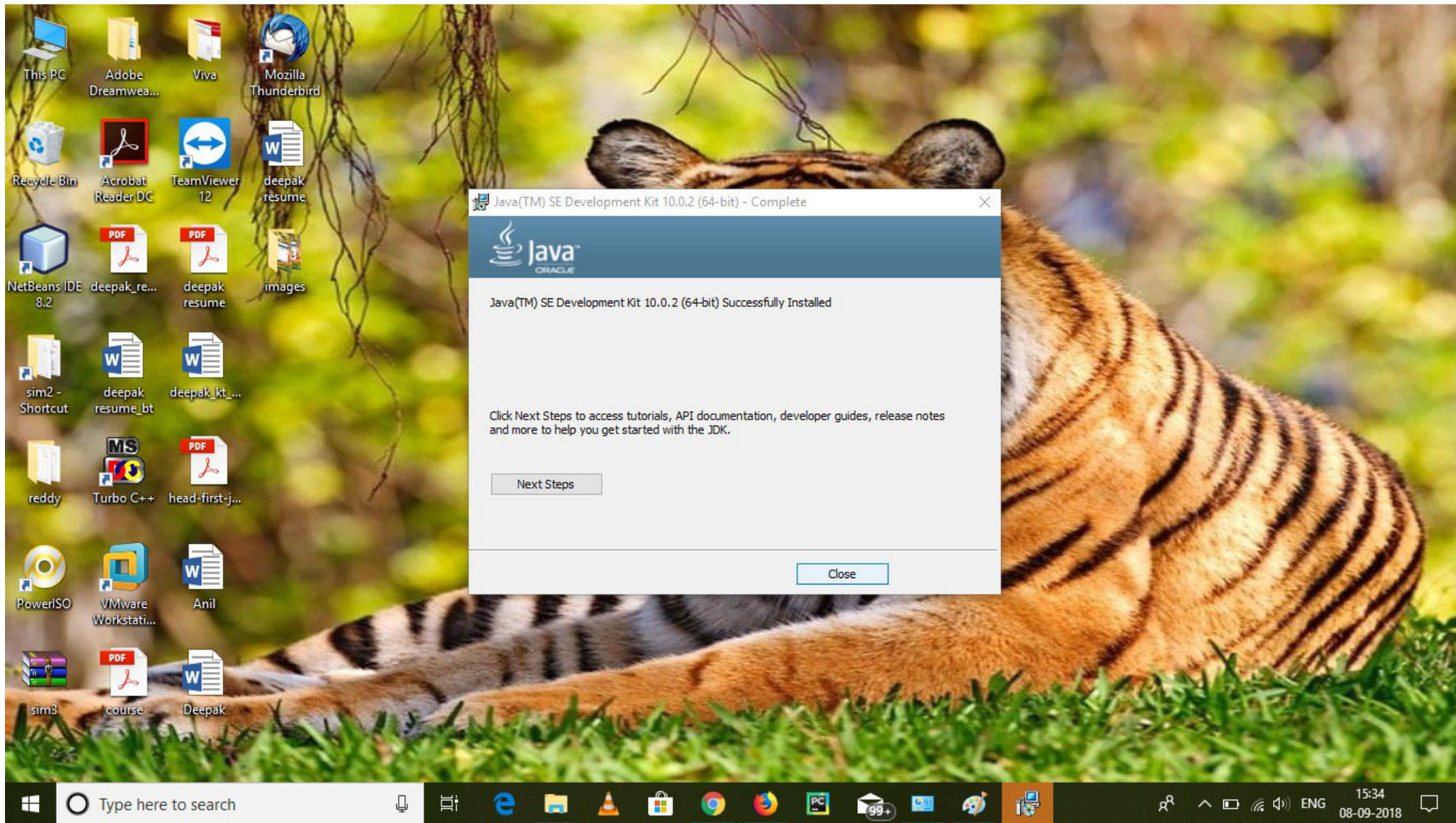




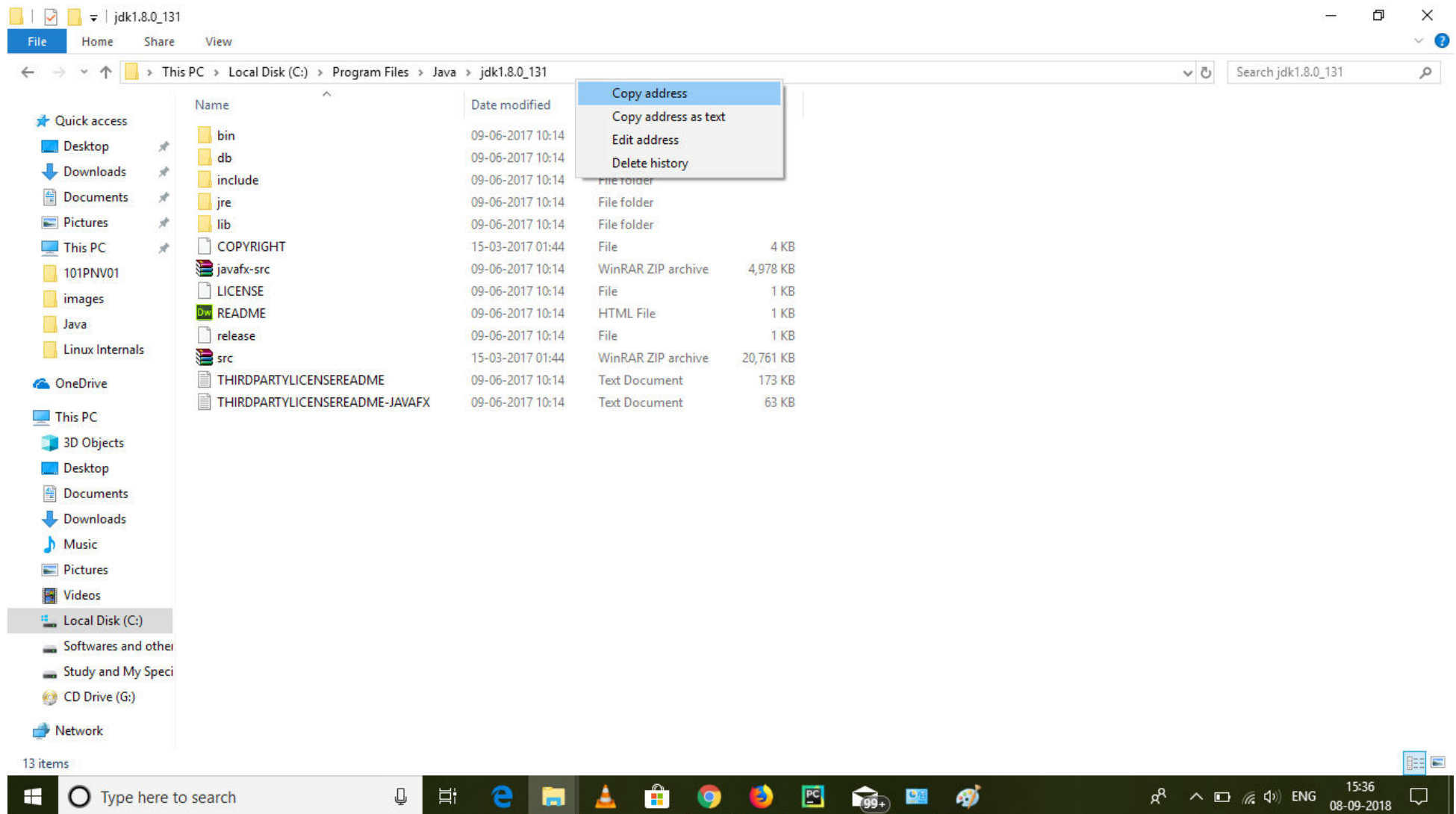


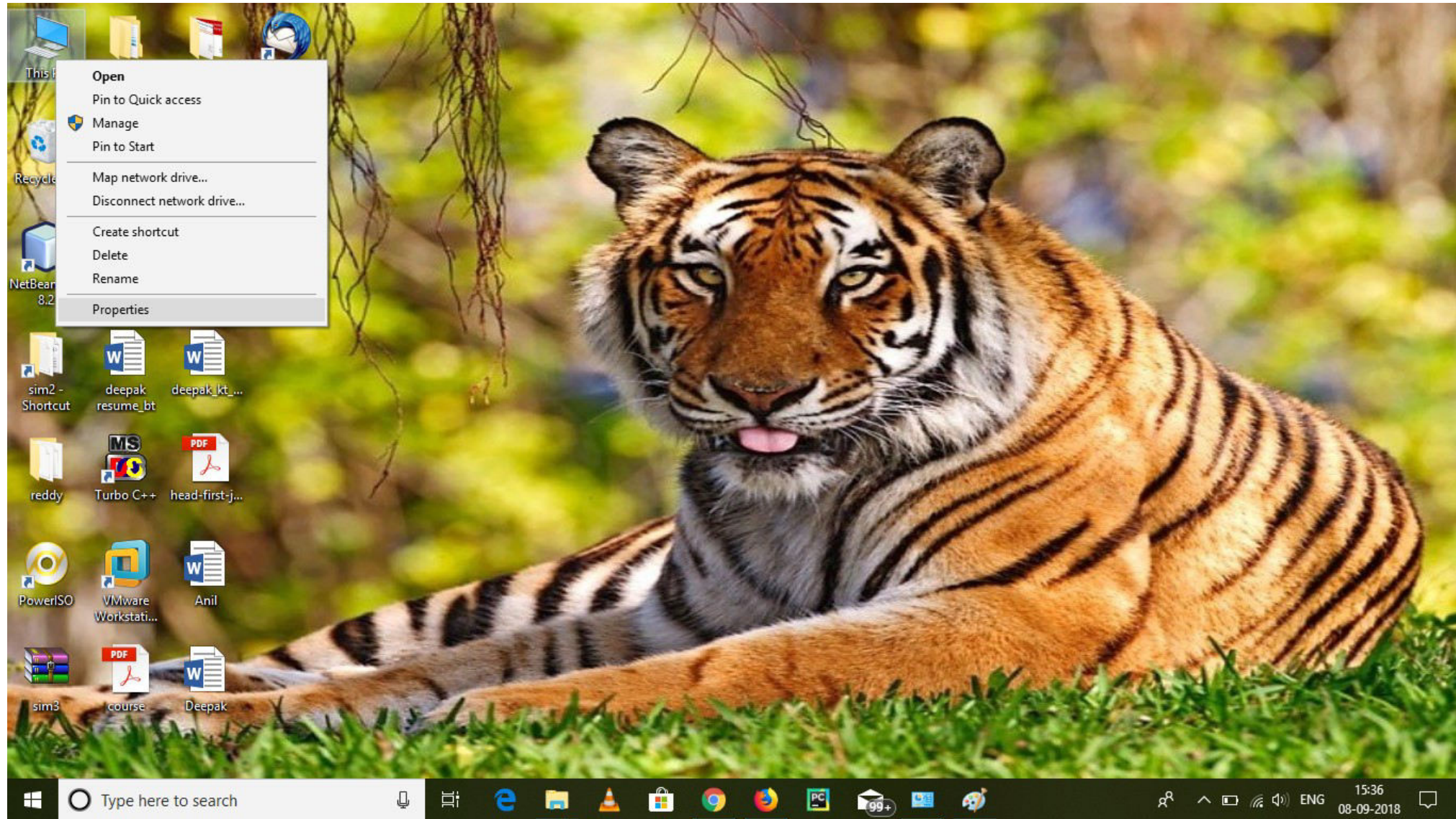






Step 3: How to set Environment Variables?





System

Control Panel > System and Security > System

Control Panel Home

- Device Manager
- Remote settings
- System protection
- [Advanced system settings](#)

View basic information about your computer

Windows edition

Windows 10 Pro

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System

Manufacturer:	Dell
Processor:	Intel(R) Core(TM) i3-4030U CPU @ 1.90GHz 1.90 GHz
Installed memory (RAM):	4.00 GB
System type:	64-bit Operating System, x64-based processor
Pen and Touch:	No Pen or Touch Input is available for this Display

Dell support

Website: [Online support](#)

Computer name, domain, and workgroup settings

Computer name:	Deepu
Full computer name:	Deepu
Computer description:	
Workgroup:	WORKGROUP

[Change settings](#)

Windows activation

Windows is activated [Read the Microsoft Software License Terms](#)

Product ID: 00331-10000-00001-AA153

[Change product key](#)

See also

[Security and Maintenance](#)

Type here to search

15:37 08-09-2018

System

Control Panel > System and Security > System

Search Control Panel

System Properties

Computer Name | Hardware | **Advanced** | System Protection | Remote

You must be logged on as an Administrator to make most of these changes.

Performance
Visual effects, processor scheduling, memory usage, and virtual memory
[Settings...](#)

User Profiles
Desktop settings related to your sign-in
[Settings...](#)

Startup and Recovery
System startup, system failure, and debugging information
[Settings...](#)

[Environment Variables...](#)

OK Cancel Apply

Windows 10

Computer

Reserved.

Intel(R) Core(TM) i3-4030U CPU @ 1.90GHz 1.90 GHz

64-bit operating system, x64-based processor

Mouse Input is available for this Display

[Change settings](#)

Windows activation

Windows is activated [Read the Microsoft Software License Terms](#)

Product ID: 00331-10000-00001-AA153 [Change product key](#)

See also

[Security and Maintenance](#)

Type here to search

15:37 08-09-2018

System

Control Panel > System and Security > System

System Properties

Computer Name Hardware Advanced System Protection

You must be logged on as an Administrator to make most of the changes.

Performance
Visual effects, processor scheduling, memory usage, and virtual memory.

User Profiles
Desktop settings related to your sign-in.

Startup and Recovery
System startup, system failure, and debugging information.

OK Cancel

Windows activation
Windows is activated. See [Windows activation](#) for more information.

Product ID: 00331-10000-00000-00000-00000-00000-00000

Environment Variables

User variables for Deepak Reddy K T

Variable	Value
OneDrive	C:\Users\Deepak Reddy K T\OneDrive
Path	C:\Users\Deepak Reddy K T\AppData\Local\Microsoft\WindowsApp
TEMP	C:\Users\Deepak Reddy K T\AppData\Local\Temp
TMP	C:\Users\Deepak Reddy K T\AppData\Local\Temp

New... Edit... Delete

System variables

Variable	Value
ComSpec	C:\WINDOWS\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
NUMBER_OF_PROCESSORS	4
OS	Windows_NT
Path	C:\Program Files (x86)\Common Files\Oracle\Java\javapath;C:\Pro...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC;.PY
PROCESSOR_ARCHITECTURE	AMD64

New... Edit... Delete

OK Cancel

Windows 10

[Change settings](#)

[Change product key](#)

See also
[Security and Maintenance](#)

Type here to search

15:38
08-09-2018

System

Control Panel > System and Security > System

System Properties

Computer Name Hardware Advanced System Protection

You must be logged on as an Administrator to make most of the changes to the system.

Performance
Visual effects, processor scheduling, memory usage, and virtual memory.

User Profiles
Desktop settings related to your sign-in.

Startup and Recovery
System startup, system failure, and debugging information.

Environment Variables

User variables for Deepak Reddy K T

Variable	Value
OneDrive	C:\Users\Deepak Reddy K T\OneDrive
Path	C:\Users\Deepak Reddy K T\AppData\Local\Microsoft\WindowsApp
TEMP	C:\Users\Deepak Reddy K T\AppData\Local\Temp
TMP	C:\Users\Deepak Reddy K T\AppData\Local\Temp

New System Variable

Variable name: JAVA_HOME

Variable value: C:\Program Files\Java\jdk1.8.0_131

Browse Directory... Browse File... OK Cancel

Environment Variables

Variable	Value
NUMBER_OF_PROCESSORS	4
OS	Windows_NT
Path	C:\Program Files (x86)\Common Files\Oracle\Java\javapath;C:\Pro...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC;.PY
PROCESSOR_ARCHITECTURE	AMD64

New... Edit... Delete

OK Cancel

Windows activation

Windows is activated. Product ID: 00331-10000-...

See also

Security and Maintenance

Windows 10

Change settings

Change product key

Type here to search

15:44 08-09-2018

System

Control Panel > System and Security > System

System Properties

Computer Name Hardware Advanced System Protection

You must be logged on as an Administrator to make most of the changes to the system.

Performance
Visual effects, processor scheduling, memory usage, and virtual memory.

User Profiles
Desktop settings related to your sign-in.

Startup and Recovery
System startup, system failure, and debugging information.

OK Cancel

Windows activation
Windows is activated. Product ID: 00331-10000

See also
Security and Maintenance

Environment Variables

User variables for Deepak Reddy K T

Variable	Value
OneDrive	C:\Users\Deepak Reddy K T\OneDrive
Path	C:\Users\Deepak Reddy K T\AppData\Local\Microsoft\WindowsApp
TEMP	C:\Users\Deepak Reddy K T\AppData\Local\Temp
TMP	C:\Users\Deepak Reddy K T\AppData\Local\Temp

New... Edit... Delete

System variables

Variable	Value
ComSpec	C:\WINDOWS\system32\cmd.exe
DriverData	C:\Windows\System32\Drivers\DriverData
JAVA_HOME	C:\Program Files\Java\jdk1.8.0_131
NUMBER_OF_PROCESSORS	4
OS	Windows_NT
Path	C:\Program Files (x86)\Common Files\Oracle\Java\javapath;C:\Pro...
PATHEXT	.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH;.MSC;.PY

New... Edit... Delete

OK Cancel

Windows 10

Change settings

Change product key

Type here to search

15:46 08-09-2018

File Explorer window showing the contents of the directory `C:\Program Files\Java\jdk1.8.0_131\bin`.

The left sidebar shows the navigation pane with 'Local Disk (C:)' selected. The main pane displays a list of files and folders.

A context menu is open over the file list, showing options such as 'Copy', 'Paste', 'Delete', 'Select All', 'Right to left Reading order', 'Show Unicode control characters', 'Insert Unicode control character', 'Open IME', and 'Reconversion'.

Name	Date modified	Type	Size
appletviewer	09-06-2017 10:14	Application	16 KB
extcheck	09-06-2017 10:14	Application	131 KB
idlj	09-06-2017 10:14	Application	16 KB
jabswitch	09-06-2017 10:14	Application	203 KB
jar	09-06-2017 10:14	Application	312 KB
jarsigner	09-06-2017 10:14	Application	16 KB
java	09-06-2017 10:14	Application	17 KB
javac	09-06-2017 10:14	Application	16 KB
javadoc	09-06-2017 10:14	Application	17 KB
javafxpackager	09-06-2017 10:14	Application	16 KB
javah	09-06-2017 10:14	Application	17 KB
javap	09-06-2017 10:14	Application	16 KB
javapackager	09-06-2017 10:14	Application	17 KB
java-rmi	09-06-2017 10:14	Application	16 KB
javaw	09-06-2017 10:14	Application	315 KB
javaws	09-06-2017 10:14	Application	1 KB
jcmd	09-06-2017 10:14	Application	16 KB
jconsole	09-06-2017 10:14	Application	16 KB
jdb	09-06-2017 10:14	Application	16 KB
jdeps	09-06-2017 10:14	Application	16 KB
jhat	09-06-2017 10:14	Application	16 KB
jinfo	09-06-2017 10:14	Application	16 KB
jjs	09-06-2017 10:14	Application	16 KB
jli.dll	09-06-2017 10:14	Application extens	171 KB
jmap	09-06-2017 10:14	Application	17 KB
jmc	09-06-2017 10:14	Application	315 KB
jmc	09-06-2017 10:14	Configuration sett...	1 KB
jps	09-06-2017 10:14	Application	16 KB

54 items

Taskbar: Type here to search, File Explorer, Google Chrome, PC, 99+, ENG, 15:47, 08-09-2018.

bin

File Home Share View

System Properties

Computer Name Hardware Advanced System Protection

You must be logged on as an Administrator to make most of the changes in this window.

Performance
Visual effects, processor scheduling, memory usage, and virtual memory.

User Profiles
Desktop settings related to your sign-in.

Startup and Recovery
System startup, system failure, and debugging information.

OK Cancel

Environment Variables

Edit environment variable

Variable name: Path

Value: C:\Program Files (x86)\Common Files\Oracle\Java\javapath
C:\ProgramData\Oracle\Java\javapath
%SystemRoot%\system32
%SystemRoot%\system32\Wbem
%SYSTEMROOT%\System32\WindowsPowerShell\v1.0\
%SYSTEMROOT%\System32\OpenSSH\
C:\Program Files\Java\jdk1.8.0_131\bin

New Edit Browse... Delete Move Up Move Down Edit text... OK Cancel

09-06-2017 10:14 Configuration sett... 1 KB
09-06-2017 10:14 Application 16 KB

54 items

Type here to search

15:48 08-09-2018 ENG

File Explorer window showing the 'bin' directory. The 'System Properties' dialog box is open, displaying the 'Advanced' tab. The 'Environment Variables...' button is highlighted. The background shows a list of files and folders, including 'jdeps', 'jhat', 'jinfo', 'jjs', 'jli.dll', 'jmap', 'jmc', and 'jps'.

System Properties - Advanced Tab

You must be logged on as an Administrator to make most of these changes.

Performance
Visual effects, processor scheduling, memory usage, and virtual memory
[Settings...]

User Profiles
Desktop settings related to your sign-in
[Settings...]

Startup and Recovery
System startup, system failure, and debugging information
[Settings...]

[Environment Variables...]

[OK] [Cancel] [Apply]

File Explorer - bin

Modified	Type	Size
2017 10:14	Application	16 KB
2017 10:14	Application	17 KB
2017 10:14	Application	17 KB
2017 10:14	Application	34 KB
2017 10:14	Application	16 KB
2017 10:14	Application	17 KB
2017 10:14	Application	203 KB
2017 10:14	Application	16 KB
2017 10:14	Application	17 KB
2017 10:14	Application	131 KB
2017 10:14	Application	16 KB
2017 10:14	Application	16 KB
2017 10:14	Application	131 KB
2017 10:14	Application	16 KB
2017 10:14	Application	203 KB
2017 10:14	Application	312 KB
2017 10:14	Application	16 KB
2017 10:14	Application	17 KB
2017 10:14	Application	17 KB
2017 10:14	Application	16 KB
2017 10:14	Application	16 KB
09-06-2017 10:14	Application	16 KB
09-06-2017 10:14	Application	16 KB
09-06-2017 10:14	Application	17 KB
09-06-2017 10:14	Application	16 KB
09-06-2017 10:14	Application extens	171 KB
09-06-2017 10:14	Application	17 KB
09-06-2017 10:14	Application	315 KB
09-06-2017 10:14	Configuration sett...	1 KB
09-06-2017 10:14	Application	16 KB

A Simple Java Application

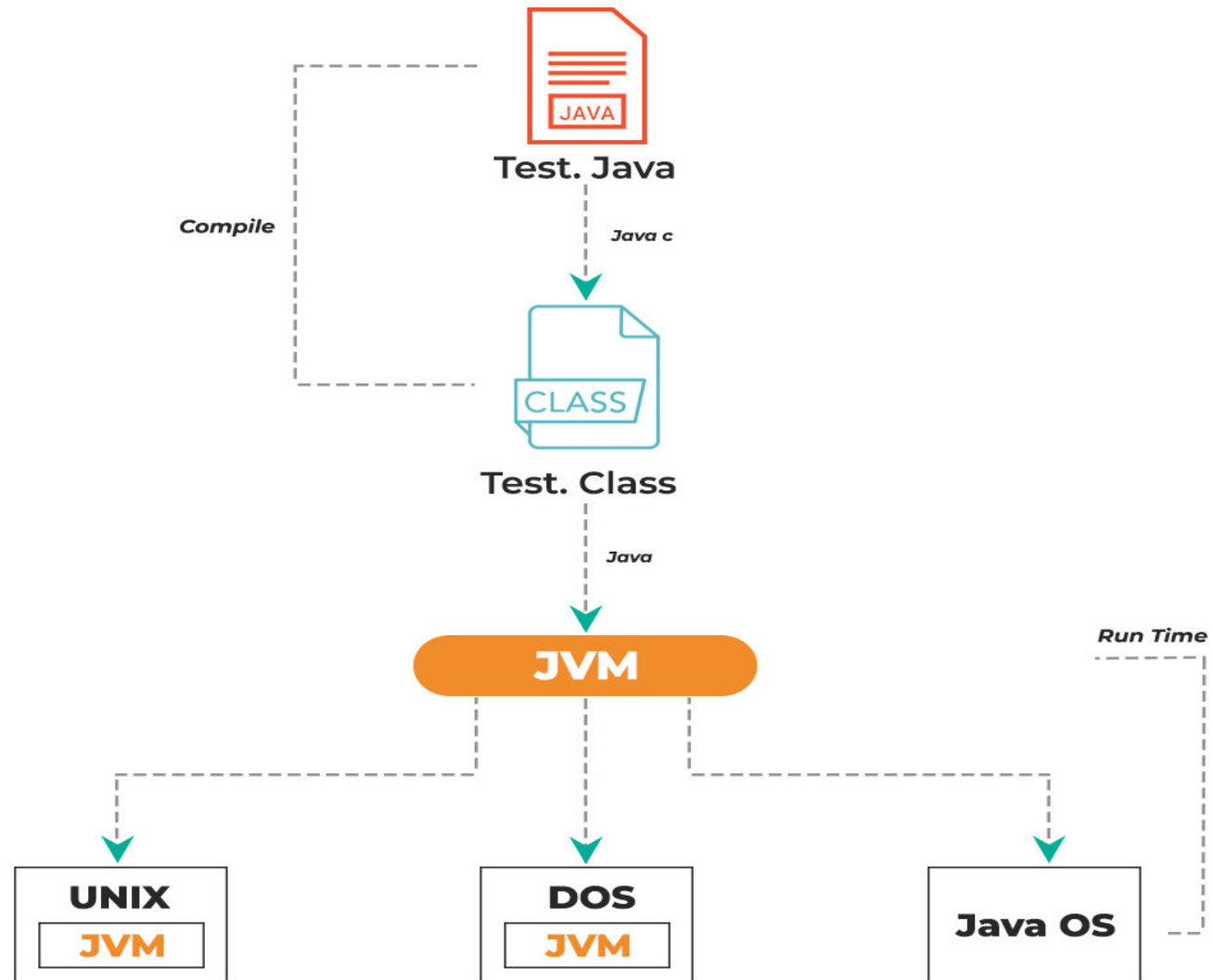
The Test.java Application

```
//  
// Sample "Hello World" application  
//  
public class Test{  
    public static void main (String[] args) {  
        System.out.println("Hello World");  
    }  
}
```

Compiling and Running the TestGreeting Program

- Compile Test.java:
Syntax: `javac filename.java`
`javac Test.java`
- The Test.java is compiled.
- Run the application by using the following command:
Syntax: `java filename`
`java Test`
- Locate common compile and runtime errors.

Java Technology Runtime Environment



A hand in a blue suit sleeve points towards the center of the image. The background is a dark purple digital interface with various elements: a 'DOWNLOAD PROGRESS' bar at the top left, a circular gauge showing '68%', a sidebar menu with categories like 'CUSTOMER', 'PRODUCT', 'CORPORATE', 'ENTERPRISE', and 'SERVICE', and several circular icons with symbols like an envelope, airplane, checkmark, star, heart, and minus sign. There are also line graphs, bar charts, and a network diagram with nodes and connecting lines. The overall aesthetic is high-tech and data-driven.

Thank You