SNS COLLEGE OF TECHNOLOGY

Coimbatore-35.

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Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
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DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

COURSE CODE & NAME : 23CST205 - Object Oriented Programming Using Java

II YEAR/ III SEMESTER

UNIT – I INTRODUCTION TO OOP

Topic: JVM

Java Virtual Machine

What is JVM?

JVM (Java Virtual Machine) is an abstract machine that enables your computer to run a Java program.

When you run the Java program, Java compiler first compiles your Java code to bytecode. Then, the JVM translates bytecode into native machine code (set of instructions that a computer's CPU executes directly).

Java is a platform-independent language. It's because when you write Java code, it's ultimately written for JVM but not your physical machine (computer). Since JVM executes the Java bytecode which is platform-independent, Java is platform-independent.

Java Virtual Machine

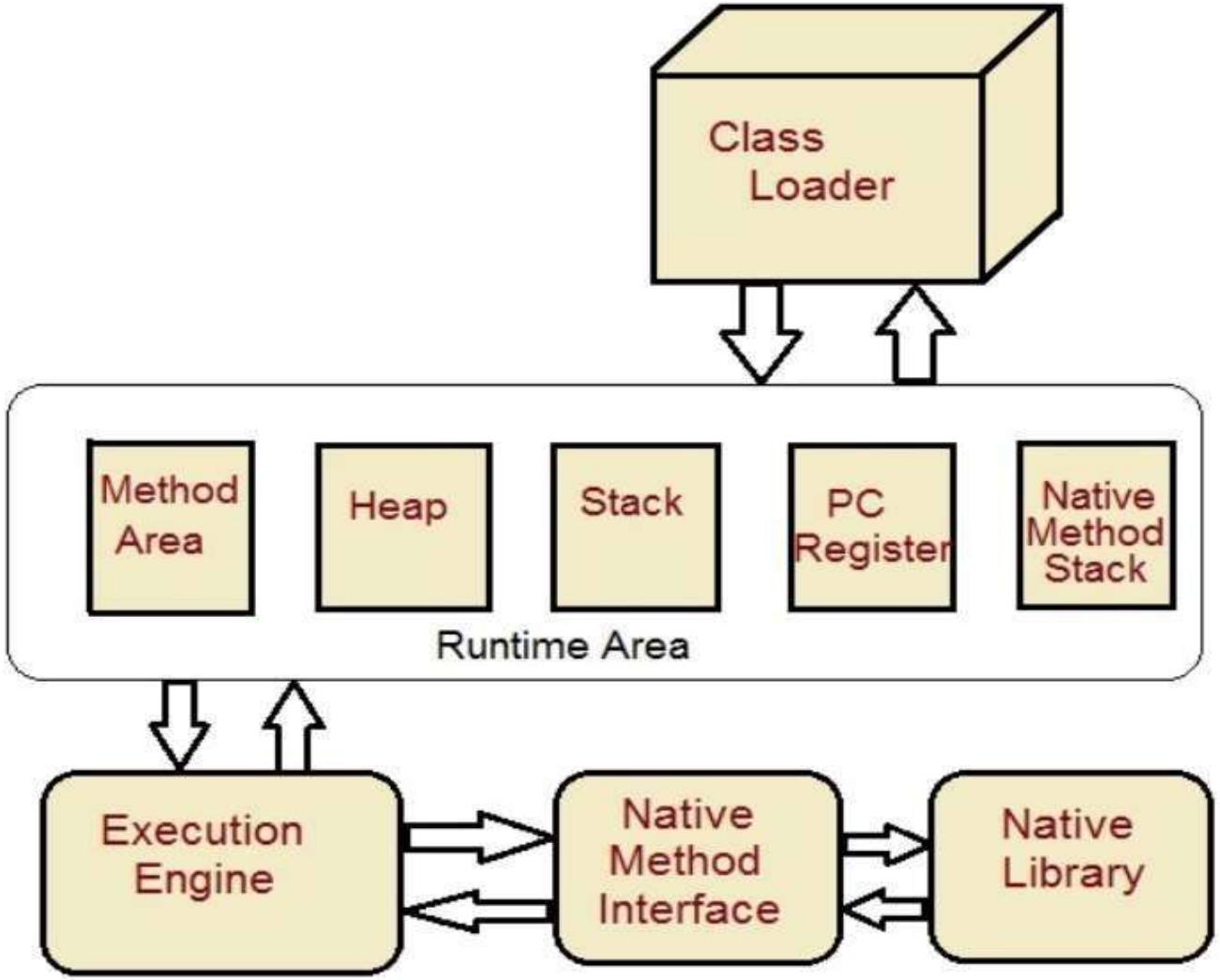
What is JVM?

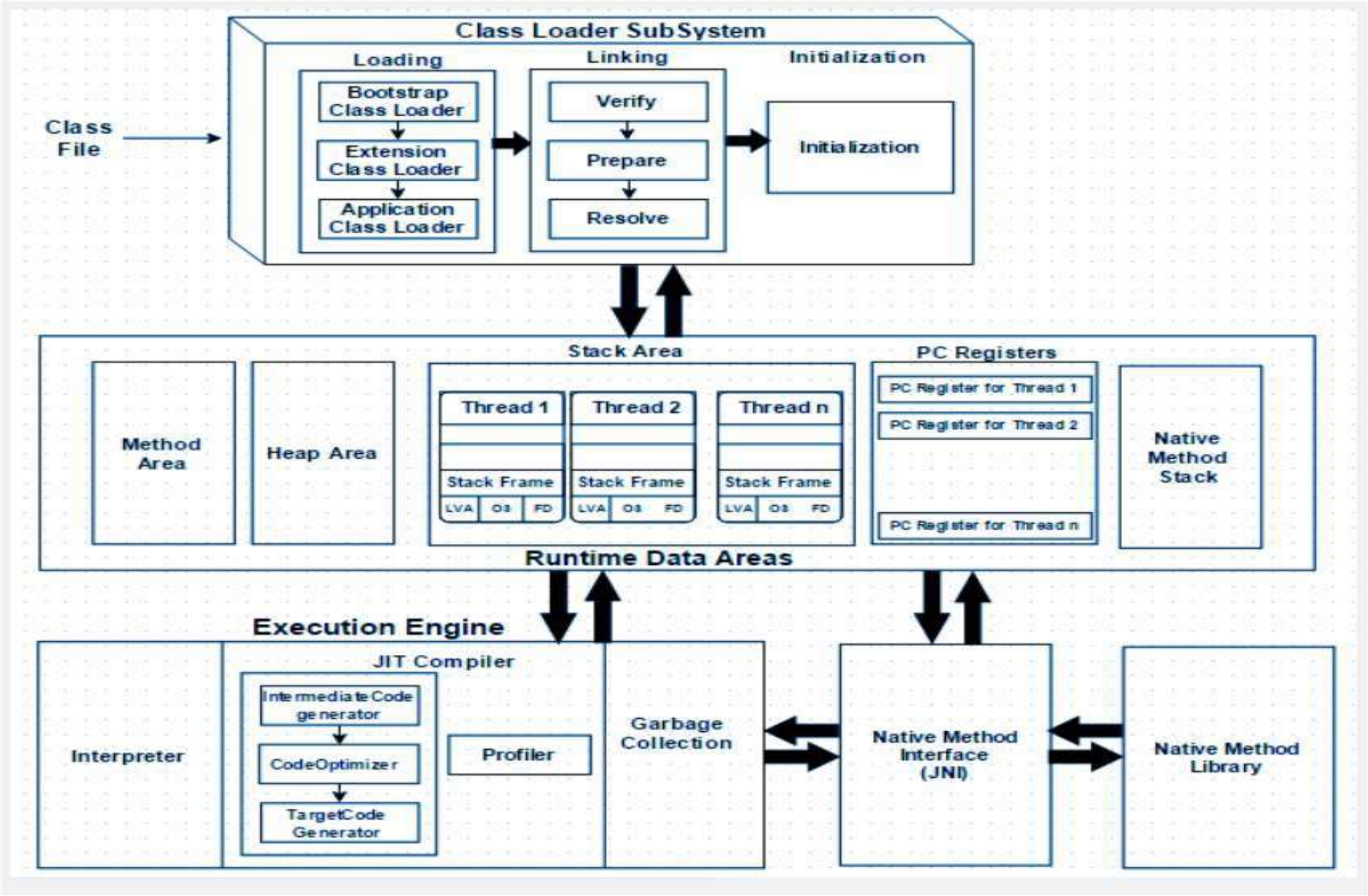
- JVM, i.e., Java Virtual Machine.
- JVM is the engine that drives the Java code.
- Mostly in other Programming Languages, compiler produce code for a particular system but Java compiler produce Bytecode for a Java Virtual Machine.
- When we compile a Java program, then bytecode is generated. Bytecode is the source code that can be used to run on any platform.
- Bytecode is an intermediary language between Java source and the host system.
- It is the medium which compiles Java code to bytecode which gets interpreted on a different machine and hence it makes it Platform/Operating system independent.

JVM's work can be explained in the following manner

- Reading Bytecode.
- Verifying bytecode.
- Linking the code with the library.

JVM Architecture




Class Loader SubSystem
Loading
Linking
Initialization
Bootstrap Class Loader
Extension Class Loader
Application Class Loader
Verify
Prepare
Resolve
Initialization
Class File
Stack Area
PC Registers
Method Area
Heap Area
Thread 1
Thread 2
Thread n
Stack Frame
LVA
OS
FD
PC Register for Thread 1
PC Register for Thread 2
PC Register for Thread n
Native Method Stack
Runtime Data Areas
Execution Engine
JIT Compiler
Intermediate Code generator
CodeOptimizer
Target Code Generator
Profiler
Interpreter
Garbage Collection
Native Method Interface (JNI)
Native Method Library

Java Runtime Environment

What is JRE?

JRE (Java Runtime Environment) is a software package that provides Java class libraries, Java Virtual Machine (JVM), and other components that are required to run Java applications.

JRE is the superset of JVM.

If you need to run Java programs, but not develop them, JRE is what you need. You can download JRE from Java SE Runtime Environment 8 Downloads page.

Java Development Kit

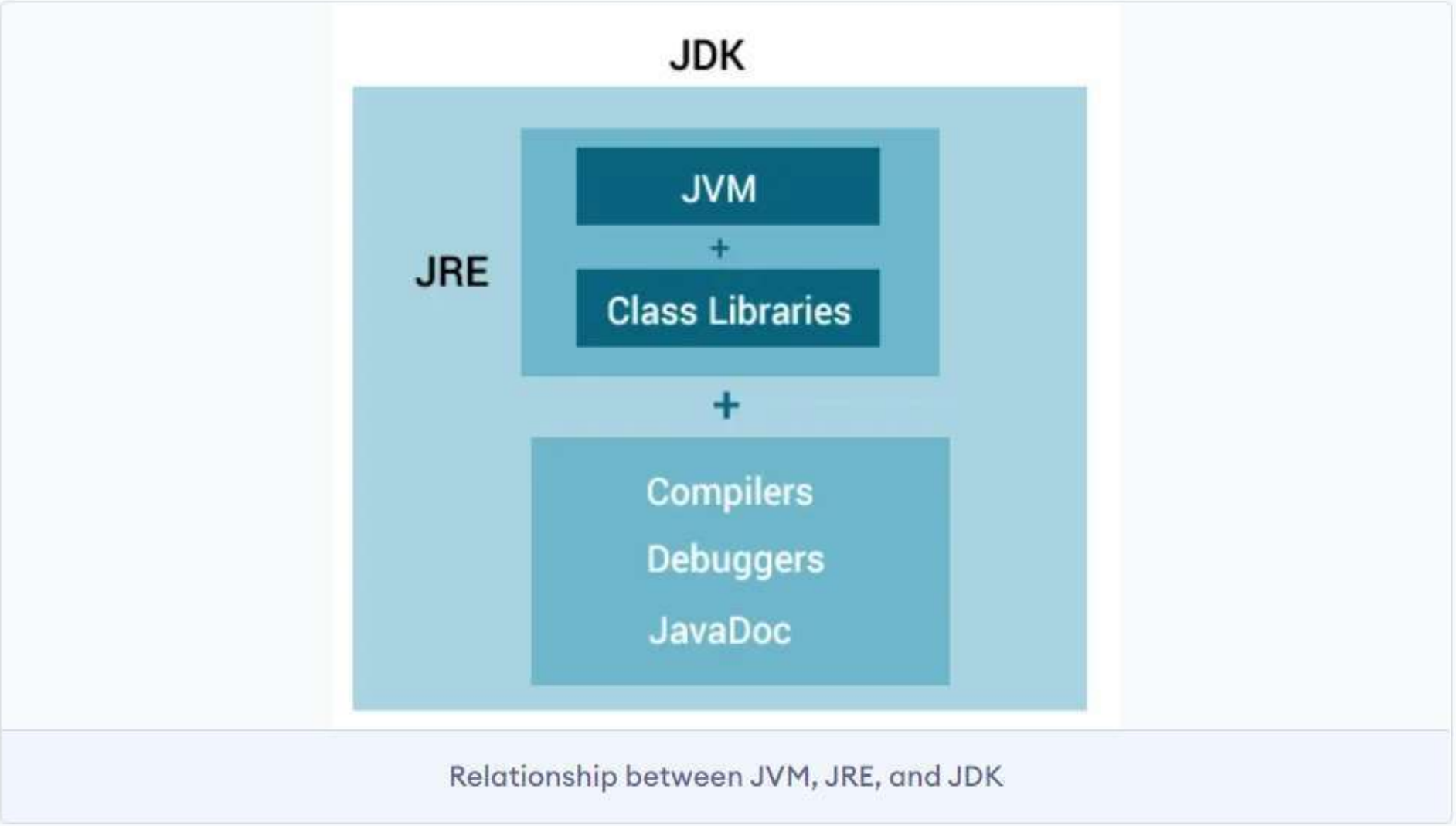
What is JDK?

JDK (Java Development Kit) is a software development kit required to develop applications in Java. When you download JDK, JRE is also downloaded with it.

In addition to JRE, JDK also contains a number of development tools (compilers, JavaDoc, Java Debugger, etc).

If you want to develop Java applications, download JDK.

Relationship between JVM, JRE, and JDK.



Relationship between JVM, JRE, and JDK


THANK
YOU!