

## **What is the difference between JDK (Java development kit, JRE (Java runtime environment ), and JVM (Java virtual machine?)**

Let's consider you have three objects that do different things. The first one contains the second, which includes the third. Depending on what you want, you can use one object that you think will provide you with the best environment for that specific thing you wanted. If you're going to make changes and see those changes inside the first object, you will need the second object alongside some tools to help make those changes. But if you only want to see the changes, you will only need the second object, which will provide you an environment where you can only see the changes.

I know you ask how this analogy is somehow connected to JDK, JRE, and JVM. And that's what I will clarify in a bit :)

Consider the first object as the JDK, the second as the JRE, and the third as the JVM. So in the java world, when you want to develop and run java programs or applications, you will need JDK (in our above analogy, making and seeing changes), but you only want to run the program will just need the JRE. If you are a java developer, you will need to install the JDK, but if you are an end-user or a client, you will only need the JRE for you to be able to run the program since you do not need to develop it. Now the JVM is essential for both JDK and JRE cause it is contained or inbuilt in both. Either you are a java developer or an end-user, whatever program you run using JDK (developer) or JRE(end-user) goes into JVM, and JVM is responsible for executing the program line by line. It is also known as an interpreter cause it converts Java bytecode into machine language. The JVM is like a bathroom that you can access from two rooms inside your house. The JDK and JRE being the two rooms tho :)

By now, you understand how the analogy above is connected to our three concepts and what those three concepts are, and what's the difference

between them. But it is still a bit unclear somehow, right? Let's clear it for you then.

We talked earlier in our analogy about the environment that fits your needs, if you remember. When you are a java developer, you only need to install JDK, and this JDK will provide you with an environment that will help you develop and run your java programs. There is also something that you need to know. Inside the JDK, there is the JRE and some development tools that will help better develop your programs. Some of them are java compiler, debugger, and core classes. Now we can say that **JDK = JRE + Development Tool**. Maybe you are also wondering how you can develop and run your programs with only JDK. Well, I have an answer to that :) Remember our analogy? Yes, the JVM is inside the JRE, which by installing the JDK, you will have access to it, and you will be able to run your programs. This also brings us to the composition of JRE. It doesn't only contains the JVM but also java class libraries that are required to run your programs. This being said, we can conclude that **JRE = JVM + Library Classes**.

That's it about the difference between JDK(Java Development Kit), JRE(Java Runtime Environment), and JVM(Java Virtual Machine). I hope you enjoyed reading this, and by now, you can differentiate the three concepts. Dive in and have fun learning more about them and java in general.