

How Java code executes

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.java file (human readable)	compiler (entire file)	.class file (byte code)	interpreter (line by line)	machine code (0 and 1)
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this is the source code

- this code will not directly run on a system.
- we need JVM to run this
- Reason why java is platform independent.

STEP-1 :- code likha → app (.java file) me code likhte he.

Ex :- Hello.java me Hello World! ka code likha.

STEP-2 :- compilation → java compiler
terminal → javac (Hello.java)

source code compile karega byte code me
(Hello.class) file me.

STEP-3 → Execution using JVM
terminal → java Hello

① JDK (Java Development Kit) :-

- Ye developer ke liye hota hai.
- isme ye sab tools hote hai :-
 - compiler (javac).
 - debugger.

→ JRE (Java runtime environment) bhi iske andar hota hai.

★ yeh aapko java program likhne aur compile karne ke liye JDK chahiye.

(2) JRE (Java Runtime Environment) :-

- Ye sirf run karne ke liye hota hai
- isme hota hai :-
 - JVM
 - libraries (like rt.jar)
 - class loaders

★ agar aap sirf program run करना चाहते हो, बिना likhe, toh JRE काफी hai.

(3) JVM (Java Virtual Machine) :-

- ye java ka heart hai.
- JVM ka kaam hai :-
 - byte code ko read करना
 - machine code में convert करना
 - program ko run करना

★ JVM platform independent hoti hai matlab ek hi class file windows, mac, linux sab pe chal sakti hai.

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④ JIT (Just - in - time compiler) :-

- Ye JVM ke andar bata hai.
 - jab koi code baar-baar execute ho raha ho, toh JIT uske machine code mein convert karke speed badhata hai.
- ★ isse program fast run hota hai, runtime pe optimization hoti hai.

