

① WHAT IS JAVA PROGRAMMING LANGUAGE? DISCUSS ITS KEY FEATURES AND ADVANTAGES.

JAVA IS A HIGH-LEVEL, GENERAL PURPOSE, MEMORY-SAFE, OBJECT-ORIENTED PROGRAMMING LANGUAGE. IT ALLOWS DEVELOPERS TO WRITE CODE THAT CAN RUN ON ANY DEVICE WITH A JVM, WHICH MAKES IT HIGHLY PORTABLE. IT IS WIDELY USED FOR BUILDING APPLICATIONS, SUCH AS MOBILE APPS, WEB APPLICATIONS, AND SOFTWARE APPLICATIONS.

② EXPLAIN THE CONCEPT OF PLATFORM INDEPENDENCE IN JAVA. HOW DOES JAVA ACHIEVE PLATFORM INDEPENDENCE?

THE CONCEPT OF "WRITE ONCE, RUN ANYWHERE" (WORA), WHICH IS MADE POSSIBLE BY THE JVM THAT INTERPRETS COMPILED CODE (BYTECODE) INTO MACHINE-SPECIFIC INSTRUCTIONS, REGARDLESS OF THE COMPUTER'S OPERATING SYSTEM AND HARDWARE.

③ DISCUSS THE MAIN COMPONENTS OF A JAVA PROGRAM AND THEIR ROLES.

- PACKAGE - GROUP OF CLASSES AND INTERFACES THAT ORGANIZES THE CODE
- VARIABLE - A NAMED MEMORY LOCATION USED TO STORE AND MANIPULATE DATA
- CLASS - DEFINES VARIABLES AND METHODS
- STATEMENT - AN INSTRUCTION THAT PERFORMS AN ACTION
- METHOD - A BLOCK OF CODE THAT PERFORMS A SPECIFIC TASK

④ WHAT ARE THE DIFFERENCES BETWEEN JDK, JRE, AND JVM IN JAVA?

- JAVA DEVELOPMENT KIT (JDK) - IT CONTAINS ALL THE TOOLS THAT ARE REQUIRED TO COMPILE, BUG, AND RUN A PROGRAM USING THE JAVA PLATFORM. IT IS THE FOUNDATIONAL COMPONENT THAT ENABLES JAVA APPLICATION AND JAVA APPLLET DEVELOPMENT.
- JAVA RUNTIME ENVIRONMENT (JRE) - A SET OF SOFTWARE TOOLS RESPONSIBLE FOR EXECUTION OF THE JAVA PROGRAM OR APPLICATION
- JAVA VIRTUAL MACHINE (JVM) - IT LOADS, VERIFIES AND RUNS JAVA BYTECODE AND IS NECESSARY IN BOTH JDK AND JRE. IT CAN ALSO RUN PROGRAMS THAT ARE WRITTEN IN OTHER PROGRAMMING LANGUAGES THAT HAVE BEEN CONVERTED TO JAVA BYTE CODE.

⑤ EXPLAIN THE DIFFERENCE BETWEEN INTERPRETED AND COMPILED LANGUAGES. IS JAVA AN INTERPRETED OR COMPILED LANGUAGE?

INTERPRETED LANGUAGES EXECUTE CODE FIRST WITHOUT COMPILING WHILE COMPILED

LANGUAGES REQUIRE THE CODE TO BE TRANSLATED INTO MACHINE CODE BEFORE EXECUTING. JAVA IS CONSIDERED A HYBRID LANGUAGE BECAUSE IT IS BOTH COMPILED AND INTERPRETED. THE SOURCE CODE IS COMPILED INTO BYTECODE AND THEN INTERPRETED BY THE JVM.

REFERENCES

- WIKIPEDIA
- GEEKS FOR GEEKS
- IBM