

Chapter-1: Introduction to Java

PART-II: SAMPLE SHORT QUESTIONS & ANSWERS**1. What is OOP (Object-Oriented Programming)?**

- A programming paradigm based on objects and classes.
 - Uses concepts like inheritance, polymorphism, encapsulation, abstraction.
 - Example: Java, C++, Python (object-oriented).
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2. When was Java introduced?

- Java was officially released in **1995** by **Sun Microsystems**.
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3. Who made Java?

- **James Gosling** and his team at Sun Microsystems.
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4. What do you know about the security of Java?

- Java is **secure** because:
 - Programs run inside the JVM (sandbox).
 - No direct memory access (unlike C/C++).
 - Built-in security features like bytecode verification, class loaders, exception handling.
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5. What is JVM (Java Virtual Machine)?

- A software engine that executes Java bytecode.
 - Makes Java **platform independent**.
 - Converts **bytecode** → **machine code** at runtime.
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6. What are program execution phases in Java?

1. Write program → Save as .java.
 2. Compile with javac → creates .class bytecode.
 3. Run with java → JVM executes bytecode.
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7. What is Byte Code?

- The **intermediate code** generated after compilation (.class).
 - Platform-independent, runs on any JVM.
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8. What is JRE (Java Runtime Environment)?

- A package that provides libraries + JVM to run Java programs.

- **Cannot develop** programs, only run them.
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9. State components of JRE?

- JVM
 - Class libraries
 - Supporting files
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10. What is JDK (Java Development Kit)?

- A software development kit (SDK) for Java.
 - Includes JRE + compiler (javac) + debugging tools.
 - Required for **writing and running Java programs**.
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11. What is IDE (Integrated Development Environment)?

- A tool that provides editor, compiler, debugger in one place.
 - Examples: NetBeans, Eclipse, IntelliJ.
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12. How to create a new project in NetBeans (IDE)?

- Open NetBeans → File → New Project → Select "Java Application" → Name project → Finish.
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13. How to add Class or Package in Java program?

- **Class:** Right click → New → Java Class.
 - **Package:** Right click → New → Java Package.
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14. How to build a project in Java?

- In IDE: Click **Build Project** button.
 - In terminal: Use javac filename.java.
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15. What is the structure of a Java program?

```
class ClassName {  
    data members;  
    methods;  
    public static void main(String[] args) {  
        // statements  
    }  
}
```

16. What is package?

- A collection of classes & interfaces grouped together.
 - Example: java.util, java.io.
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17. What is .class?

- File generated after compilation.
 - Contains bytecode.
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18. Define class name?

- The identifier used to declare a class.
 - Must start with uppercase letter.
 - Example: class Student {}
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19. What are data members?

- Variables declared inside a class.
 - Represent the properties/attributes of objects.
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20. Define methods?

- Functions inside a class.
- Define object behavior.
- Example:

```
void display() { }
```

21. What are comments?

- Notes for programmers ignored by compiler.
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22. Define single-line comment?

- Starts with //
 - Example: // This is a comment
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23. Define multiline comment?

- Starts with /* and ends with */
- Example:

```
/* This is  
a multiline comment */
```

24. Define documentation?

- Special comments used for generating documentation.
- Starts with `/**` and ends with `*/`.
- Example:

```
/** This is documentation comment */
```

25. What is machine language?

- The **lowest-level language** consisting of **binary code (0s and 1s)**.
 - Directly understood by the computer.
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PART-III: SAMPLE LONG QUESTIONS & ANSWERS

1. Describe Java Virtual Machine (JVM).

- JVM is the **engine** that runs Java programs.
 - Functions:
 1. Loads bytecode.
 2. Verifies security.
 3. Executes code with Just-In-Time (JIT) compiler.
 - Provides **platform independence**.
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2. Describe Java Development Kit (JDK).

- Complete package for Java development.
 - Contains:
 - JRE (to run programs).
 - Compiler (javac).
 - Tools (debugger, documentation tool).
 - Essential for **developers**.
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3. Describe Setup Environment Variable.

- Environment variable PATH allows running javac and java from anywhere.
 - Steps:
 1. Install JDK.
 2. Copy JDK bin path (e.g., C:\Program Files\Java\jdk\bin).
 3. Add it to **System Environment Variables → PATH**.
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4. Explain Java Program Structure.

- **Basic structure:**

```
package mypackage; // optional
```

```
import java.util.*; // optional
```

```
class MyClass {
```

```
    data members;
```

```
    methods;
```

```
    public static void main(String[] args) {
```

```
        // program statements
```

```
    }
```

```
}
```

- Sections: Package, Import, Class, Main method.

5. Explain Life Cycle of Java Program.

1. **Write code** → save as .java.
2. **Compile** with javac → generates .class.
3. **Load class** → JVM loads bytecode.
4. **Verify** → Bytecode verifier checks security.
5. **Execute** → JIT compiler converts bytecode into native machine code.
6. **Output produced.**