Java Variables & Data Types – Notes and Interview Questions

Includes definitions, theory, sizes, ranges, examples, and interview questions.

1. Variable – Definition

A variable is a named memory location used to store data. The value stored in a variable can change during program execution.

Example: int age = 20;

Types of Variables in Java

• Local Variable – Declared inside a method and accessible only within it.
• Instance Variable – Declared inside a class but outside methods; belongs to each object.
• Static Variable – Declared using the static keyword; shared among all objects.

2. Data Type – Definition

A data type specifies what type of value a variable can hold, how much memory it occupies, and the range of values it can store.

Java data types are classified into Primitive and Non■Primitive data types.

3. Primitive Data Types – Size and Range

Data Type	Size	Range / Description
byte	1 byte	-128 to 127
short	2 bytes	-32,768 to 32,767
int	4 bytes	-2^31 to 2^31 - 1
long	8 bytes	-2^63 to 2^63 - 1
float	4 bytes	Up to 7 decimal digits
double	8 bytes	Up to 15 decimal digits
char	2 bytes	0 to 65,535 (Unicode characters)
boolean	1 bit	true or false

4. Non■Primitive Data Types

Non■primitive data types store references to objects rather than actual values. They do not have fixed sizes. Examples include: String, Arrays, Classes, Interfaces, and Objects.

5. Interview Questions – Variables & Data Types

Q: What is a variable in Java?

A: A variable is a container that stores data values in memory during program execution.

Q: What is the difference between int and long?

A: int occupies 4 bytes while long occupies 8 bytes and can store larger values.

Q: Why is char 2 bytes in Java?

A: Java uses Unicode, which requires 2 bytes to represent characters.

Q: Difference between float and double?

A: double provides higher precision and is preferred for decimal calculations.

Q: Is Java a strongly typed language?

A: Yes, Java requires every variable to be declared with a data type.

Q: What is the default value of int?

A: The default value of an int variable is 0.

Q: Can we change the data type of a variable?

A: No, once a variable is declared, its data type cannot be changed.

Q: What happens when a value exceeds data type range?

A: It results in overflow or a compilation error depending on context.