Types of Data Types in Java

Variable?

A variable is a storage container for storing the data.

- A variable is like a jar in your kitchen.
- You write a name on the jar (like Sugar).
- You **put something inside** (like 2 kg sugar).
- Later, you can **change it** (remove sugar and put *rice*).



int sugar = 2

int = in there represent type of jar (it can hold only sugar/rice/pulse).

sugar = label of the jar.

2 = thing stored inside the jar (now it sugar).



Bit?

A bit is like a tiny light bulb.

It can only be either OFF (0) or ON (1).

That's 1 bit.

If we put 8 bulbs (bits) together, that becomes 1 byte.



Example: 1 0 1 0 1 0 1 0

→ this is 8 bits = 1 bytes.



Data Type?

Data types are the kinds of containers for storing different kinds of things.



Glass Jar Bucket Container

Data type tells the kind of data we can store in a variable.

Similarly in java we have these kinds of container to hold the value.

Java, there are 8 primitive data types

Java has two main types:

- 1. Primitive Data Types → small, basic types (like int, float, char).
- 2. Non-Primitive Data Types → bigger/custom types (like String, Arrays).

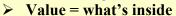
Primitive Data Types

byte, sort, int, long, float, double, char and boolean

String

- \rightarrow If you want to store whole numbers \rightarrow use int.
- \rightarrow If you want to store decimals \rightarrow use float or double.
- \rightarrow If you want to store letters \rightarrow use char.
- \rightarrow If you want to store yes/no \rightarrow use boolean.
- ightharpoonup If you want to store words or sentences \rightarrow use String.
 - \triangleright byte \rightarrow very tiny jar (only holds small numbers).
 - \rightarrow int \rightarrow medium jar (big numbers like population).
 - \triangleright **long** \rightarrow huge jar (very big numbers like stars).
 - Float/double → liquid jar (can hold numbers with decimals).
 - **> char** → jar for a **single alphabet**.
 - \triangleright boolean → a jar with only two options → Yes/No (True/False).
 - \triangleright **String** \rightarrow a jar full of words/sentences.

- \triangleright Data type = type of jar
- ➤ Variable = jar's name





Primitive Data Types with Size & Range

Data Type	e Size (Memory)	Range (Values It Can Hold)	Example
byte	1 byte (8 bits)	-128 to 127	byte age = 12;
short	2 bytes (16 bits)	-32,768 to 32,767	short rooms = 500;
int	4 bytes (32 bits)	-2,147,483,648 to 2,147,483,647	int population = 1400000000;
long	8 bytes (64 bits)	very large numbers	long stars = 9223372036854775807L;
float	4 bytes	Stores up to 6–7 decimal digits	float price = 99.99f;
double	8 bytes	Stores up to 15–16 decimal digits	double pi = 3.141592653589793;
char	2 bytes	Stores single letter/character	<pre>char grade = 'A';</pre>
boolean	1 bit	Only true or false	boolean isOn = true;

Formula for Range (Applicable only for byte, sort, int, long, char)

For a box with **n** bits, the computer can count numbers in this way:

Range =
$$-2^{(n-1)}$$
 to $2^{(n-1)} - 1$

byte (8 bits) \rightarrow 1 byte

Formula:

$$=-2^{(8-1)}$$
 to $2^{(8-1)}-1 \rightarrow -2^7$ to $2^7-1 \rightarrow -128$ to 127

Why char data type has 0 to 65,535 range even though it used to contain only one character?

Mini Quiz

- ➤ Can byte store your age? (Yes, because age < 127)
- > Can int store India's population? (No, need long)
- ➤ What data type should I use for your exam grade 'A'? (char)
- ➤ What data type should I use for petrol price 98.56? (float/double)
- ➤ If I want to store the number of your toys, which box should I use? (byte or short)
- ➤ If I want to check if you are wearing a school uniform, which data type? (boolean)
- ➤ If I want to store your name? (String non-primitive)

Thankyou!