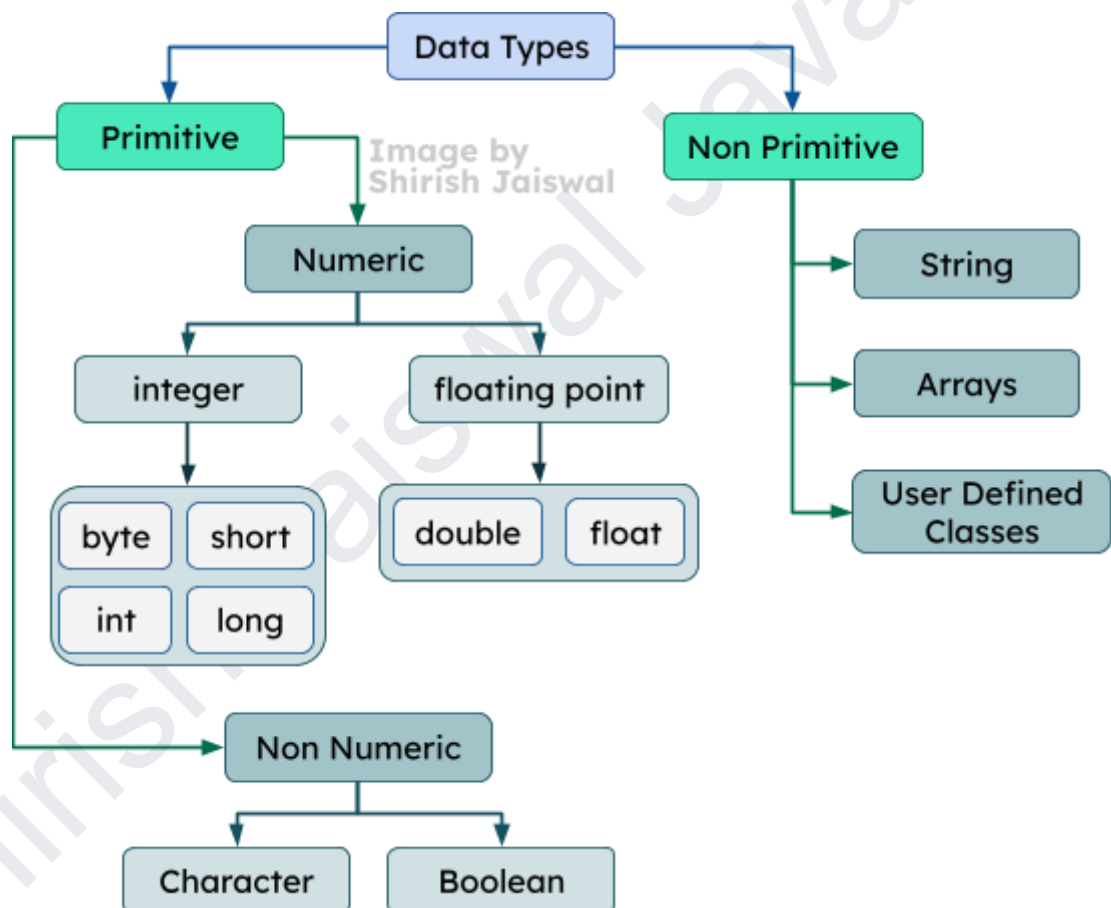


Data Types and Variables

Types of Data Types

Primitive	Reference (Non-Primitive)
<ul style="list-style-type: none">Integer - (<i>int</i>)Floating-point numbers - (<i>float</i>)Booleans - (<i>boolean</i>)Characters - (<i>char</i>)	<ul style="list-style-type: none">ClassesAnnotationsInterfacesEnumerationsArrays



Primitive Data Types

Primitive data types specify the size and type of value that should be stored in value and it has no additional methods. In Java there are eight primitive data types.

Types	Size	Min Value	Max Value	Wrapper Type
Integer				
byte	1 byte	-2^7 (-128)	$2^7 - 1$ (127)	Byte
short	2 bytes	-2^{15} (-32 768)	$2^{15} - 1$ (32 767)	Short
int	4 bytes	-2^{31}	$2^{31} - 1$	Integer
long	8 bytes	-2^{63}	$2^{63} - 1$	Long
Floating – Point Number / Decimal numbers				
float	4 bytes	Approx. $\pm 3.40282347\text{E}+38\text{F}$ (significant decimal digits) Java implementation IEEE 754 standard Float		Float
double	8 bytes	Approx. $\pm 1.79769313486231570\text{E}+308$ (15 significant decimal digits)		Double
Boolean				
boolean	Virtual machine dependent		true / false	Boolean
Characters				
char	2 bytes	0	65 535	Character

Calculate range of Data Type

To find the range of any datatype we have a formula. Let's use it on int data type

1 byte = 8 bits

Int size is 4 bytes

So, 4 bytes = 8×4 bits i.e., 32 bits

Formula is -2^{n-1} to $2^{n-1} - 1$ where n is the number of bits.

So range of int is -2^{32-1} to $2^{32-1} - 1$

Signed and Unsigned

There are **signed** and **unsigned** types only for numeric data types.

Signed data types range start from negative -2^{n-1} to positive $2^{n-1} - 1$

Unsigned data types range start from zero (0) to $2^n - 1$.

n is the number of bits.

Java is strongly typed language

- Every variable has a type
- Every expression has a type
- Each type is strictly defined

Variable

- A variable is a piece of memory that can contain a data value
- Java is strongly typed language: each variable has a type
- A variable is defined by the combination of identifier and a type
- All variable has a scope, which defines their visibility
- You can't give a name to variable (*identifier*) which are keyword in java

(https://en.wikipedia.org/wiki/List_of_Java_keywords)

Datatype	variable	assignment operator	Literal
byte	b	=	1;
short	s	=	2;
int	i	=	12;
put l or L after the value if it's out of range			
long	L	=	12_000_000_000L;
put f or F after the value in float variable			
float	f	=	1.2f;
double	d	=	1.324;
use single inverted ' ' around character			
char	c	=	'c';

Non-Primitive Data Types

These are also called **reference data types** Because they refer to the object. Some non-primitive data types are Classes, Array, String.

Difference between **Primitive** and **non-Primitive** data type

Primitive	Non-Primitive
Predefined in java	Created by programmer and not defined by java
Its default value is not null. Based on the data type for int it is 0.	Its default value is null
Does not contain any methods	Contains methods to perform certain operation