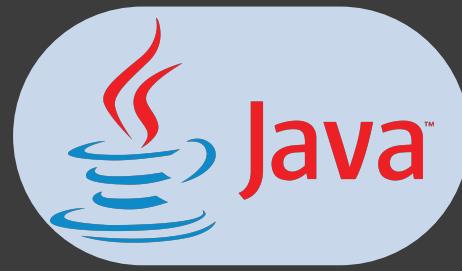
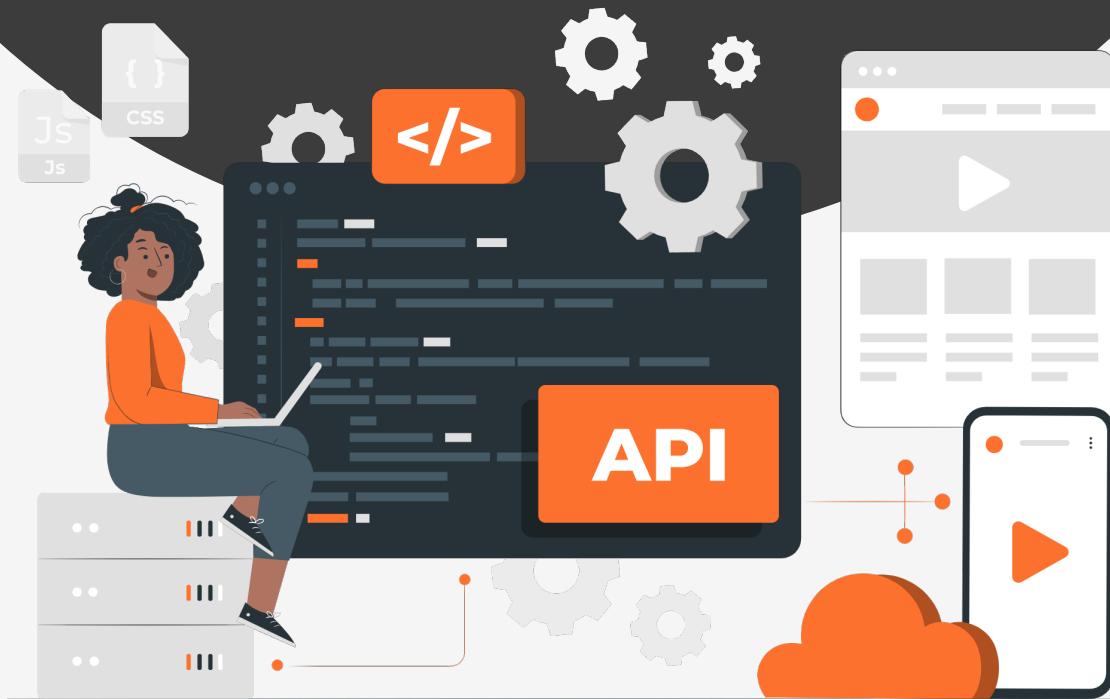


# Lesson:



## Data Types, Casting, Keywords



# List of Concepts Involved:

- Java Identifiers
- Java Data Types
- Java Reserved words
- TypeCasting in primitive types

## Identifiers

An identifier is a name given to a package, class, interface, method, or variable. All identifiers must have different names.

In Java, there are a few points to remember while dealing with identifiers :

- **Rule 1** – All identifiers should begin with a letter (A to Z or a to z), \$ and \_ and must be unique.
- **Rule 2** – After the first character/letter, identifiers can have any combination of characters.
- **Rule 3** – A keyword cannot be used as an identifier.
- **Rule 4** – The identifiers are case-sensitive.
- **Rule 5** – Whitespaces are not permitted.
- **Examples of legal identifiers:** rank, \$name, \_rate, \_\_2\_mark.
- **Examples of illegal identifiers:** 102pqr, -name.

These variables, identifiers etc. consume memory units. Before proceeding ahead, let us have a look at the memory unit concept too. Here, we will only focus on the relevant concept of memory.

### Basic Memory units:

It refers to the amount of memory or storage used to measure data.

Basic memory units are:

#### 1.Bit

A bit (binary digit 0 or 1) is the smallest unit of data that a computer can process and store. Symbols 0 and 1 are known as bits. Here, 0 indicates the passive state of signal and 1 indicates the active state of signal.

At a time, a bit can store only one value i.e 0 or 1. To have a greater range of value, we combine multiple bits.

#### 2.Byte

A byte is a unit of memory/data that is equal to 8 bits.

You may think of a byte as one letter. For example, the letter 'f' is one byte or eight bits.

The bigger units are :

#### 3.Kilobyte

A Kilobyte is a unit of memory data equal to 1024 bytes.

#### 4.Megabyte

A Megabyte is a unit of memory data equal to 1024 kilobytes.

## 5.Gigabyte

A Gigabyte is a unit of memory data equal to 1024 Megabytes.

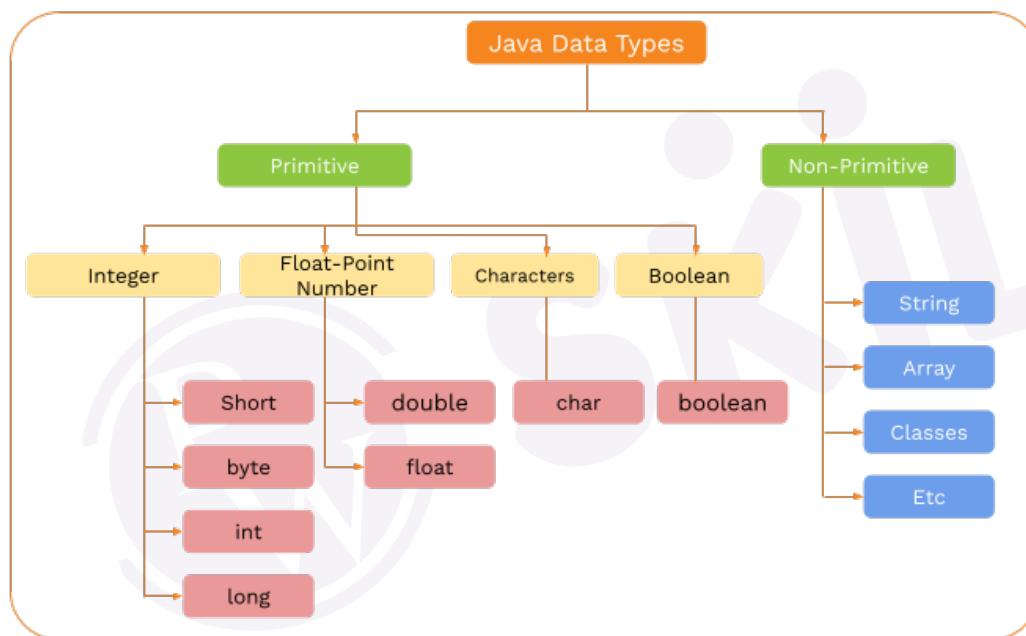
Lets us now move to the most important concept - data type

# Data Types

Data types specify the different sizes and values that can be stored in the variable. Based on the data type of a variable, the operating system allocates memory and decides what can be stored in the reserved memory. Hence, by assigning different data types to variables, we can store integers, decimals, or characters in these variables.

There are two types of data types in Java:

1. **Primitive data types:** The primitive data types include boolean, char, byte, short, int, long, float and double.
2. **Non-primitive data types:** Classes, Strings, Interfaces, and Arrays are examples of non-primitive data types.



## Primitive data types

A primitive type is predefined by the language and is named by a reserved keyword.

### 1. Boolean Type

- The Boolean data type can have two values – true or false and hence are typically used in true/false situations.

**For example,**

Boolean flag=true;

### 2. Byte Type

- Values for the byte data type range from -128 to 127 (8-bit signed two's complement integer, you will know more about it once we move to programs and applications).
- A byte type is used in place of an int to save memory when it is certain that the value of a variable will be

between -128 and 127.

**For example,**

byte range=105;

### 3. Short Type

- The short data type can have values ranging from -32768 to 32767 (16-bit signed two's complement integer).
- If the value of a variable is certain to be between -32768 and 32767, short is used in place of other integer data types (int, long).

**For example,**

short loss=-50;

### 4. Int Type

- Values for the int data type range from 231 to 231-1 (32-bit signed two's complement integer, you will know about it as we move to programs)
- In Java SE 8 and later, you can use the int data type to represent an unsigned 32-bit integer, which has a minimum value of 0 and a maximum value of 232-1.

**For example,**

int profit=5000;

### 5. Long Type

- Values for the long data type range from - 263 to 263-1 (64-bit signed two's complement integer).
- You can use an unsigned 64-bit integer with a minimum value of 0 and a maximum value of 264-1 if you're using Java 8 or later.

**For example:**

long profit=455559990;

### 6. Double Type

- The double data type is a 64-bit floating-point data type with double precision.
- It should never be used for exact values like currency.

**For example:**

double height=12.5;

### 7. Float Type

- The float data type is a 32-bit single-precision floating-point value. If you're curious, you can learn more about single-precision and double-precision floating-point.
- It should never be used for precise values like money.

**For example:**

float depth=-32.3f;

### 8. Char Type

- It's a Unicode (an international character encoding standard that provides a unique number for every character across languages and scripts) 16-bit characters.
- The char data type has a minimum value of 'u0000' (0) and a maximum value of 'uffff'.

**For example:**

char temp='a';

The **non-primitive** data types are a little advanced concepts which we will cover once we have mastered the primitives and are well versed with the programming principles of Java.

## Java Reserved Words

Reserved words are words that cannot be used as **object** or **variable** names in a **Java** program because they're already used by the syntax of the Java programming language.

boolean	byte	char	double	float
short	void	int	long	while
for	do	switch	break	continue
case	default	if	else	try
catch	finally	class	abstract	extends
final	import	new	instance of	private
interface	native	public	package	implements
protected	return	static	super	synchronized
this	throw	throws	transient	volatile

## TypeCasting in primitive types

- Changing a value from one data type to another data type is called data type conversion.
- Assigning a value of one type of a variable of another type is known as type casting.

### Types of type Casting:

1. Implicit Type Casting
2. Explicit Type Casting

### Automatic Type Conversion

