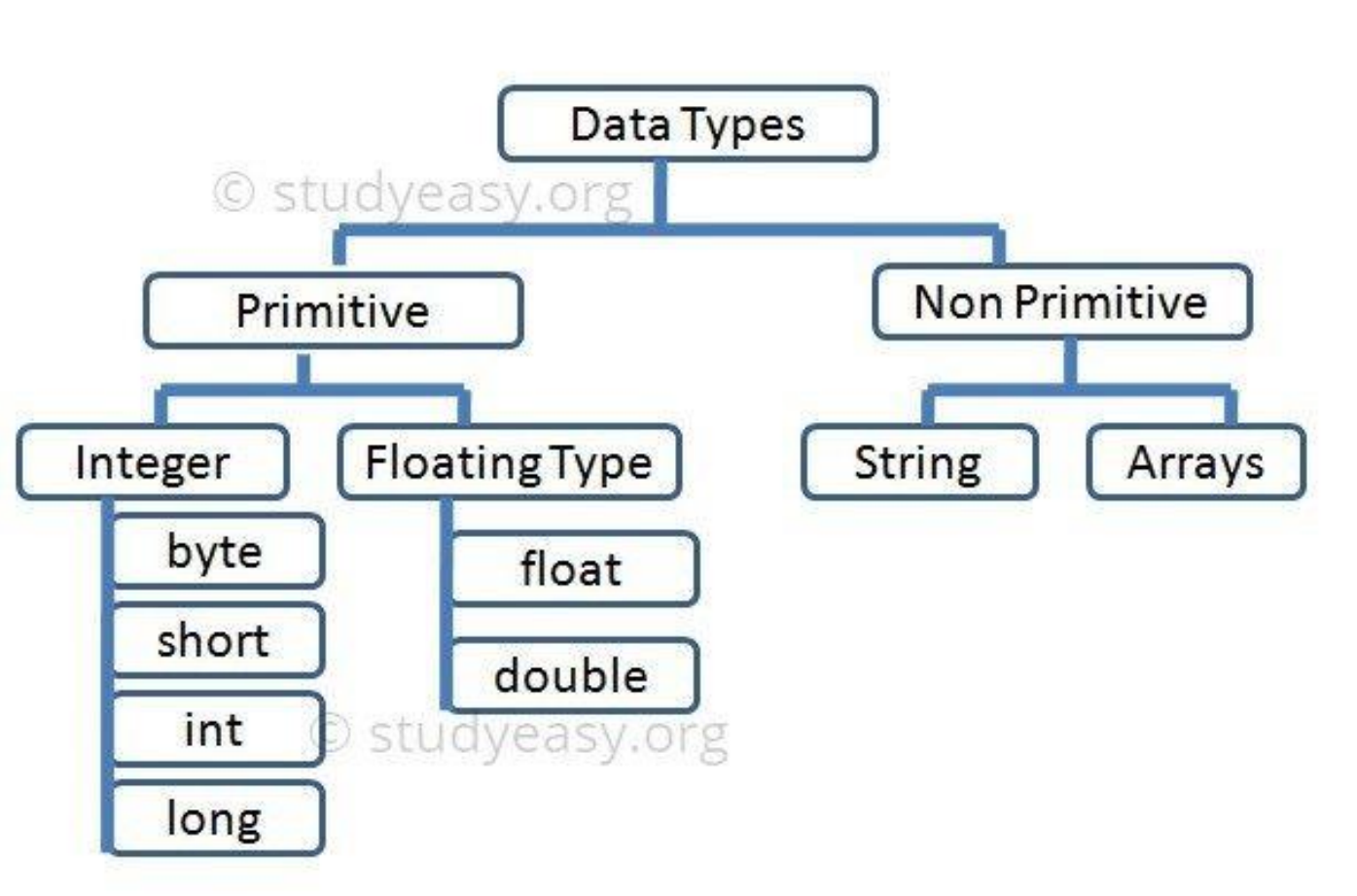
Datatypes and Variables

Datatype

Data types are a fundamental part of computer programming. They specify what kind of data can be stored in a variable and what operations can be performed on that data.A data type is a collection of data values.

There are two main categories of datatype primitive and non-primitive which classified the various datatypes

Data Types


Data Types
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Primitive
Non Primitive
Integer
Floating Type
String
Arrays
byte
short
int
long
float
double
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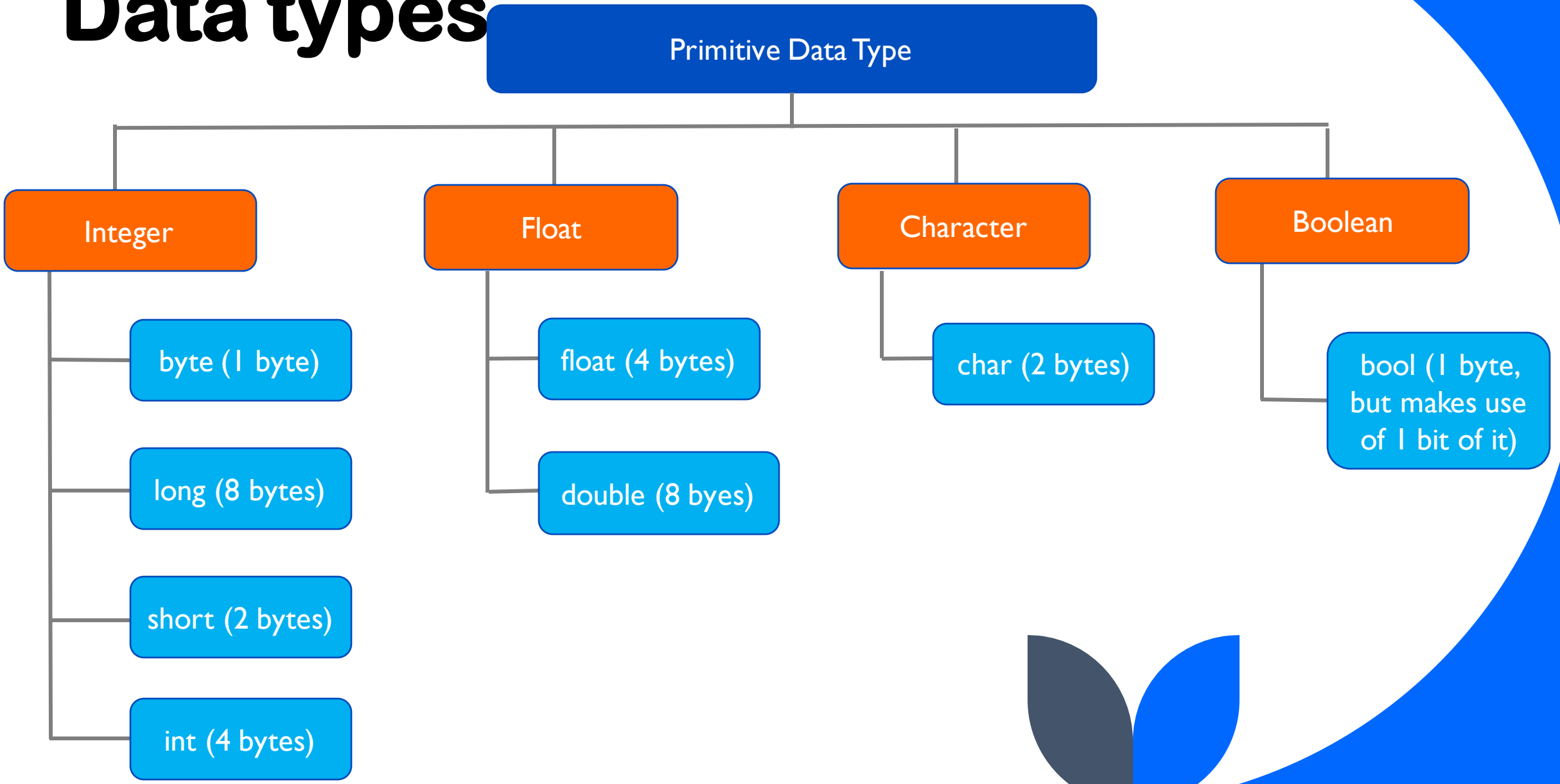
Primitive data types

Primitive data types are built into a programming language and are considered the most basic data types. They are called primitive because they are not composed of any other data types.

Data types


Primitive Data Type
Integer
Float
Character
Boolean
byte (1 byte)
long (8 bytes)
short (2 bytes)
int (4 bytes)
float (4 bytes)
double (8 byes)
char (2 bytes)
bool (1 byte, but makes use of 1 bit of it)

Type	Bit/Bytes	Range
boolean	1 bit	True or false
char	16 bit/ 2 bytes	0 to 65535
byte	8 bit/ 1 byte	-128 to 127
short	16 bit/ 2bytes	-32768 to 32767
int	32 bits/4 bytes	-2147483648 to 2147483647
long	64 bits/ 8 bytes	Huge To huge
float	32 bits/ 4 bytes	varies
double	64 bits /8 bytes	varies

Integer type

It is further divided into subcategories of datatypes.

- byte
- boolean
- short
- int
- long

- Byte

The byte data type holds an 8-bit signed two's complement integer. It is also one of the reserved words in Java. byte stores whole numbers ranges in between -128 to 127. As it is allocated limited memory space, it can be used as a replacement of int datatype.

- Boolean

This datatype is used to store two possible values: either True or False.

- Short

It stores whole numbers and the range lies in between -32768 to 32767.

- int

When creating variables consisting of numeric values, Java gives preference to int datatype as it has a higher precedence order. So in a program, if you have not defined the datatype, by default java assumes it as int. It stores whole numbers from -2147483648 to 2147483647. Negative numbers are also permissible here. It has a wider range compared to short and byte.

- long

This datatype can store whole numbers from -9223372036854775808 to 9223372036854775807. For storing a large amount of data, long datatype is preferred over int. In Java, the value of long datatype must end with literal "L". Otherwise, Java considers it as int type.

Floating-point type

Floating-point datatypes are used for calculating simple to complex fractional data. It is further subcategorized into two parts:

- float
- double

Float

For storing fractional numbers, float datatype is used. It has a 7-decimal digit precision in memory. Float datatype should be avoided when calculating financial figures or numbers.

Double

Another floating-point datatype used to store a huge amount of data in memory. It has a 15-decimal digit precision in memory. Storing decimal values this data type is generally the default choice.

Non-Primitive types

String: A collection of characters stored in memory is called a String.

Array: Collection of a homogenous datatype is known as Array.(homogeneous data type is a data type that can only store elements of the same type. For example, an array of integers can only store integers, and an array of strings can only store strings.)

Data types in JAVA

Mary owns a Retail Department store. Mary needs to create a bill with the following fields present:

- Invoice ID: Integer
- Product ID: Integer
- Product Cost: Double
- Quantity : Integer
- Discount: Double
- Total Price: Double
- Feedback Provided ? : Boolean

How will you declare them in JAVA??

retail_shop.java

- Invoice ID: Integer
- Product ID: Integer
- Product Cost: Double
- Quantity : Integer
- Discount: Double
- Total Price: Double
- Feedback Provided ? : Boolean

```
public class retail_shop {
    public static void main(String[] args) {
        int invoice_num, product_id, quant;
        double cost, discount, price;
        boolean feedback;
    }
}
```

Variables

A variable is a name given to a computer memory location that stores data in a program. The value in a variable may change during the life of the program—hence the name “variable.”

For example, a variable that holds text strings has the data type String and is called a string variable. A variable that holds integers (whole numbers) has the data type Integer and is called an integer variable

Thank you