

Data Types

Concepts

- Data Types
 - Primitive Data Types
 - Non-Primitive Data Types

Introduction

In this unit, we will learn about the data types that are supported by Java.

1. Data Types

In programming languages, every value or data has an associated type known as data type.

Java supports various data types. These data types are categorized into,

1. Primitive Data Types
2. Non-Primitive Data Types

1.1 Primitive Data Types

Primitive data types are those that are predefined by the programming language (Java)

Below are the primitive data types in Java,

- `boolean`
- `char`
- `byte`
- `short`
- `int`
- `long`
- `float`
- `double`

Data types determine how the value or data can be used in the program. For example, mathematical operations can be done on numbers (i.e.,

`int` , `float` , etc).

1.1.1

`boolean`

In a general, anything that can take one of two possible values is considered a Boolean. Examples include data that can take values like

- True or False
- Yes or No
- 0 or 1
- On or Off, etc.

As per the Java Syntax,

`true` and `false` are considered Boolean values.

► Comparison with Python

Code

```
1 class Main {  
2     public static void  
3         boolean car  
4         System.out.  
5     }  
6 }
```

JAVA

Output

```
true
```

Note: In Java, every program begins with the

`main` method of a class. Use the above code template to practice declaring various types of variables.

1.1.2

`char`

The

`char` data type is used to store a single character. A `char` value must be represented using single quotes, like `'A'` .

Code

```
1 char alphabet = 'A'
```

JAVA

1.1.3

`byte`

The

`byte` data type is used to store integers (positive, negative, and zero) without any fractional part. It is used to store small values. The range of values is -128 to 127.

Code

```
1 byte points = 100;
```

1.1.4

short

The

`short` data type is used to store integers without any fractional part. It is used to store values that are bigger than a `byte`. The range of values is -32,768 to 32,767.

Code

```
1 short number = 2874
```

1.1.5

int

The

`int` data type is used to store integers without any fractional part. It is used to store values that are bigger than `short`. The range of values is -2^{31} to $2^{31}-1$.

Code

```
1 int distance = 2036
```

1.1.6

long

The

`long` data type is used to store large integers without any fractional part. It is used to store values that are bigger than `int`. The range of values is -2^{63} to $2^{63}-1$

The

`long` values should contain the suffix `'l'` or `'L'`

Code

```
1 long area = 2036371
```

JAVA

1.1.7

float

The

`float` data type is used to store any number with a decimal point. The `float` data type stores a value up to 7-point precision (ex: 12.1234567). Hence, it is used when less precision is required.

The

`float` values should contain the suffix `'f'` or `'F'`

Code

JAVA

```
1 float height = 5.1f
```

1.1.8

`double`

The

`double` data type is used to store any number with a decimal point. The `double` data type stores a value up to 16-point precision. Hence, it is used when more precision is required.

The

`double` values may contain the suffix `'d'` or `'D'`

Code

JAVA

```
1 double length = 5.1
2 double breadth = 9.
```

Data Type	Size (in bits)	
boolean	1	

Data Type	Size (in bits)	
byte	8	
char	16	
short	16	
int	32	
long	64	
float	32	
double	64	

1.2 Non-Primitive Data Types

These data types are used to store multiple values. Non-primitive data types are defined by the programmer.

In Java programming, all non-primitive data types are simply called objects.

Some commonly used non-primitive data types are,

- String (`String` is the keyword)
- Class (`class` is the keyword)
- Array

1.2.1

String

The

`String` data type is simply a sequence of characters. For example, `"Rahul"` is a string that consists of the characters `'R'` , `'a'` , `'h'` , `'u'` , and `'l'` .

In Java, double quotes (

`"`) are used to represent a string.

Code

JAVA

```
1 String name = "Rahu
```

► Comparison with Python

Possible Mistake

Double quotes (

`"`) are used to represent a string in Java. Using single quotes (`'`) for strings results in an error.

Incorrect Code

JAVA

```
1 class Main {  
2     public static  
3         String name  
4         System.out  
5     }  
6 }
```

Output

```
file.java:3: error: u
    String name =
    ~~~~~
```

Correct Code

JAVA

```
1 class Main {
2     public static void
3         String name
4         System.out.
5     }
6 }
```

Output

Rahu1

We will learn more about String, Class, and Array later in the course.

Summary

- **Data Types**
 - **Primitive Data Types** are those that are predefined in Java. They are *boolean*, *char*, *byte*, *short*, *int*, *long*, *float*, *double*.
 - **Non-Primitive Data Types** are defined by the programmer. They are *String*, *Array*, *Class*.