

# Variables and Data Types

Java Fundamentals

Libre Education



## Variables

A variable is place set aside in your computer's memory to store a data value. The variable has a data type assigned to it to show what kind of data is being stored in the variable.

## Data Types

Data types represent the type of data that is being stored in a variable. They can be defined by the user or built into the language, these are called primitive data types.

e.g. String is a data type that stores a string of characters, for example a sentence.

## Primitive Data Types

A primitive data type is a data type that is predefined or 'built-into' the language. There are eight primitive data types in Java:

1. **int** - Stores integers. Minimum value of  $-2^{31}$ . Maximum value of  $2^{31} - 1$ . Default value is 0
2. **double** - Stores decimals. Minimum value of  $2^{-1074}$ . Maximum value of  $(2 \text{ to } 2^{-52})\Delta 2^{1023}$ . Default value is 0.0d
3. **char** - Stores all unicode characters. Minimum value of 0 ('\u0000'). Maximum value of 65,535 ('\uffff'). Default value is 0 ('\u0000')
4. **boolean** - Stores either a 'true' or 'false' value. Represents 1 bit of information. Default value is 'false'
5. **long** - Stores a wider range of integers than int. Minimum value of -263. Maximum value of  $263^{-1}$ . Default value is 0L
6. **short** - Stores a smaller range integers than int. Minimum value of -215. Maximum value of 215-1. Default value is 0
7. **byte** - Stores 1 byte of data. Minimum value of  $-128^1$ . Maximum value of 127. Default value is 0
8. **float** - Stores floating point decimal. Minimum value of  $2^{-149}$ . Maximum value of  $(2 \text{ to } 2^{-23})\Delta 2^{127}$ . Default value is 0f

# Declaring a Variable

## Syntax

```
1 data_type variable_name = value;
```

## Example

```
1 public class Main {  
2  
3     public static void main(String[] args) {  
4  
5         String st = "Hello World";  
6         System.out.println(st);  
7  
8         //Eight Primitive Data Types  
9         int i = 62;  
10  
11         double d = 3.14159d;  
12         double d2 = 4.20341;  
13  
14         char c1 = 'A';  
15         char c2 = 65;  
16         char c3 = '\u0041';  
17  
18         boolean bo = true;  
19  
20         long L = 68364278382738L;  
21  
22         short sh = 82;  
23  
24         byte b1 = 3;  
25         byte b2 = 'A';  
26  
27         float f = 2.4f;  
28  
29     }  
30 }
```

## Other Resources

1. The Java Tutorials ([docs.oracle.com/javase/tutorial/java/nutsandbolts/datatypes.html](https://docs.oracle.com/javase/tutorial/java/nutsandbolts/datatypes.html))
2. TutorialsPoint ([www.tutorialspoint.com/java/java\\_basic\\_datatypes.htm](http://www.tutorialspoint.com/java/java_basic_datatypes.htm))
3. Java For Dummies ([www.dummies.com/how-to/content/the-eight-data-types-of-java.html](http://www.dummies.com/how-to/content/the-eight-data-types-of-java.html))
4. Java Programming - WikiBooks ([en.wikibooks.org/wiki/Java\\_Programming/Primitive\\_Types](https://en.wikibooks.org/wiki/Java_Programming/Primitive_Types))
5. w3Resource ([www.w3resource.com/java-tutorial/java-primitive-data-type.php](http://www.w3resource.com/java-tutorial/java-primitive-data-type.php))
6. CMU ([www.cs.cmu.edu/~mrmiller/15-110/Handouts/primitiveData.pdf](http://www.cs.cmu.edu/~mrmiller/15-110/Handouts/primitiveData.pdf))
7. TutorialsCollection ([www.tutorialscollection.com/java-data-types-primitive-data-types-in-java](http://www.tutorialscollection.com/java-data-types-primitive-data-types-in-java))
8. ZetCode ([zetcode.com/lang/java/datatypes](http://zetcode.com/lang/java/datatypes))