

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 $2^{63}-1$. Default value is 0L
6. **short** - Stores a smaller range integers than int. Minimum value of -215. Maximum value of $2^{15}-1$. Default value is 0
7. **byte** - Stores 1 byte of data. Minimum value of -128 . 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)
2. TutorialsPoint (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)
4. Java Programming - WikiBooks (en.wikibooks.org/wiki/Java_Programming/Primitive_Types)
5. w3Resource (www.w3resource.com/java-tutorial/java-primitive-data-type.php)
6. CMU (www.cs.cmu.edu/~mrmiller/15-110/Handouts/primitiveData.pdf)
7. TutorialsCollection (www.tutorialscollection.com/java-data-types-primitive-data-types-in-java)
8. ZetCode (zetcode.com/lang/java/datatypes)