

Data Types in Java

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What is Data Type ?

- Specifies

- Size

- Type

of Values that can be stored in Memory

- Classified into

- Primitive - Built-in

- Non – Primitive - Derived

Categories of Data Types

- Primitive Data Types
 - Numeric
 - Integer
 - Floating Point
 - Non - Numeric
 - Character
 - Boolean

Categories of Data Types

- Non – Primitive Data Types
 - Classes
 - Arrays
 - Interfaces

Integer Data Types

- byte
 - short
 - int
 - Long
-
- Can hold Whole Numbers
 - All are treated as signed values

Integer Data Types

- Use Smaller Data Types, wherever possible
 - More Memory, More Time for Manipulation

Type	Size	Minimum Value	Maximum Value
byte	1 Byte	-128	127
short	2 Bytes	-32,768	32,767
int	4 Bytes	-2,147,483,648	2,147,483,647
long	8 Bytes	-9,223,372,036,854,775,808	9,223,372,036,854,775,807

Integer Data Types

Data Types	Example Values		
byte	-123	0	111
short	- 713		9394
int	-17371283		9872878
long	-13871873173718L		

Example - Compute distance light travels using long variables

```
class Light
{
    public static void main(String args[])
    {
        int lightspeed; long days; long seconds; long distance;
        lightspeed = 186000; // approximate speed of light in miles per second
        days = 1000; // specify number of days here
        seconds = days * 24 * 60 * 60; // convert to seconds
        distance = lightspeed * seconds; // compute distance
        System.out.print("In " + days);
        System.out.print(" days light will travel about ");
        System.out.println(distance + " miles.");
    }
}
```

In 1000 days light will travel about 160704000000000 miles.
Clearly, the result could not have been held in an int variable.

Floating Point Data Types

- float
- Double

- Can hold Fractional Values
 - Single Precision Numbers - **float**
 - Double Precision Numbers – **double** (Default)

Floating Point Types

Type	Size	Minimum Value	Maximum Value
float	4 Byte	3.4e-038	3.4e+037
double	8 Bytes	1.7e-308	1.7e+308

Type	Example Values
float	1.23F 7.56923e56
Double	All Mathematical functions such as sin , cos , tan , sqrt return double precision values NaN – Divison by Zero

Example - Compute the area of a circle

```
class Area
{
    public static void main(String args[])
    {
        double pi, r, a;
        r = 10.8; // radius of circle
        pi = 3.1416; // pi, approximately
        a = pi * r * r; // compute area
        System.out.println("Area of circle is " + a);
    }
}
```

Character and Boolean Data Types

Character

Type	Size	Value
char	2 Byte	Any Single Character such as 'a', '%'

Boolean

Type	Size	Value
boolean	1 Bit	Can hold either true or false

Example - Compute the area of a circle

```
class BoolTest
{
    public static void main(String args[])
    {
        boolean b;
        b = false;
        System.out.println("b is " + b);
        // outcome of a relational operator is a boolean value
        System.out.println("10 > 9 is " + (10 > 9));    }
}
```

b is false

10 > 9 is true

Thank you