

Java for beginners

Operators in Java



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Agenda

- ① Classification of operators
- ② Unary operators
- ③ Arithmetic operators
- ④ Bitwise Operators
- ⑤ Relational operators
- ⑥ Logical operators
- ⑦ conditional Operator
- ⑧ Assignment operators
- ⑨ instance of operators

Classification of Operators

Operators are used to manipulate data to produce useful information

$3 + 4$

↑
operator

← Operands / data

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Unary Operators

$+, -, ++, --$

unary + unary -

+5

-7

Decrement

--

$\text{int } x = 5;$

post decrement $x--;$ $\rightarrow x = x - 1$
predecrement $--x;$ $\rightarrow x = x - 1$

Increment

++

$\text{int } x = 5;$

post increment $\rightarrow x++; \rightarrow x = x + 1$

$\nearrow ++x; \rightarrow x = x + 1$

preincrement

increment & decrement operators will work
only on variables and not constants.

Arithmetic Operators

* , / , %,

$a * b / c$

\downarrow
5%2 1

+ , -

$a / b * c$

-5%2 -1

$a + b * c$

5% -2 1

-5% -2 -1

Unlike C, java allows real constants with modulo operator

Bitwise Operators

&, |, ^, ~, >>, <<
AND OR XOR NOT Right Shift Left Shift
Bit \rightarrow 0 or 1

$$0 \& 0 \rightarrow 0$$

$$0 \& 1 \rightarrow 0$$

$$1 \& 0 \rightarrow 0$$

$$1 \& 1 \rightarrow 1$$

$$35 \& 12$$

$$\begin{array}{r} 100011 \\ 001100 \\ \hline \end{array}$$

| | | |
|---------------------|----------------------------|------------------------|
| $0 0 \rightarrow 0$ | $0 \wedge 0 \rightarrow 0$ | $\sim 0 \rightarrow 1$ |
| $0 1 \rightarrow 1$ | $0 \wedge 1 \rightarrow 1$ | $\sim 1 \rightarrow 0$ |
| $1 0 \rightarrow 1$ | $1 \wedge 0 \rightarrow 1$ | |
| $1 1 \rightarrow 1$ | $1 \wedge 1 \rightarrow 0$ | |

$>>$

$<<$

$$79 >> 2 \rightarrow 19$$

0 0001001111

 32 bits

$$12 << 3 \rightarrow 96$$

1100000

Relational Operators

<, >, <=, >=

==, !=

- Always give boolean type result

int cannot be converted to boolean

Logical Operators

! NOT
&& AND
|| OR
! boolean

! true → false

! false → true

| | |
|-----------------------|------------------------|
| boolean && boolean | boolean boolean |
| true && true → true | false false → false |
| true && false → false | false true → true |
| false && X → false | true X → true |

Conditional Operator

? :

Ternary operator

Next class

Assignment Operators

=, +=, -=, *=, /=, %=

$x = 4;$ ✓

$4 = 3;$ } error
 $4 = x;$

$x += 4 \rightarrow x = x + 4$

$x -= 7 \rightarrow x = x - 7$

$x *= 5 \rightarrow x = x * 5$

int $x = 5;$

$x = x + 7;$

↑
Container content

Instance of Operator

Object instanceof ClamName/SubClass/interface

Result will be either True or False or Error

Si instanceof String → true
false/Error