

## Chapter 2 - operators and Expressions

Operators are used to perform operations on variables and values.

$$\begin{array}{ccccccc} 7 & + & 11 & = & 18 \\ \swarrow & \downarrow & \searrow & & \downarrow \\ \text{operand} & \text{operator} & \text{operand} & & \text{Result} \end{array}$$

### Types of operators

- Arithmetic Operators →  $+, -, *, /, \%, ++, --$
- Assignment operators →  $=, +=$
- Comparison operators →  $==, >=, <=$
- Logical operators →  $\&\&, \|\|, !$
- Bitwise Operators →  $\&, \|$  (operates bitwise)

Arithmetic operators cannot work with booleans  
 $\%$  operator can work on floats & doubles

### Precedence of operators

The operators are applied and evaluated based on precedence. For example  $(+, -)$  has less precedence compared to  $(*, /)$ . Hence  $* \& /$  are evaluated first.

In case we like to change this order, we use parenthesis

### Associativity

Associativity tells the direction of execution of operators. It can either be Left to Right or Right to left.

$* / \rightarrow$  L to R

$+ - \rightarrow$  L to R

$++, = \rightarrow$  R to L



Quick Quiz: How will you write the following expressions in Java?

$$\frac{x-y}{2}, \frac{b^2-4ac}{2a}, v^2-u^2, a*b-d$$

Resulting data type after arithmetic operation  
Following table summarizes the resulting data types after arithmetic operation on them

$R = b + s \rightarrow \text{int}$	$b \rightarrow \text{byte}$	$f \rightarrow \text{float}$
$R = s + i \rightarrow \text{int}$	$s \rightarrow \text{short}$	$d \rightarrow \text{double}$
$R = l + f \rightarrow \text{float}$	$i \rightarrow \text{integer}$	$c \rightarrow \text{character}$
$R = i + f \rightarrow \text{float}$	$l \rightarrow \text{long}$	
$R = c + i \rightarrow \text{int}$		
$R = c + s \rightarrow \text{int}$		
$R = l + d \rightarrow \text{double}$		
$R = f + d \rightarrow \text{double}$		

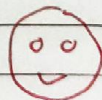
Increment and Decrement Operators

$a++$ ,  $++a \rightarrow$  Increment operators  $\rightarrow$  Data type remains same  
 $a--$ ,  $--a \rightarrow$  Decrement operators  $\rightarrow$  remains same

These will operate on all data types except booleans

Quick Quiz: Try increment and decrement operators on a Java variable

$a++ \rightarrow$  first use the value and then increment  
 $++a \rightarrow$  first increment the value then use it





Quick Quiz: What will be the value of the following expression (x).

int y = 7;

int x = ++y \* 8;

Value of x?

Char a = 'B';

a++; → a is now 'C'



## Chapter 2 - Practice Set

1 What will be the result of the following expression

`float a = 7/4 * 9/2`

2 Write a java program to encrypt a grade by adding 8 to it. Decrypt it to show the correct grade.

3 Use comparison operators to find out whether a given number is greater than the user entered number or not.

4 Write the following expression in a java program:

$$\frac{v^2 - u^2}{2as}$$

5 find the value of the following expression:

`int x = 7`  
`int a = 7 * 49 / 7 + 35 / 7`

Value of a ?