

Operators & Expressions

Operators are used to perform operations on variables & values

Types of operators

Returns remainder
↓

- 1) Arithmetic operators: $+$, $-$, $*$, $/$, $\%$, $++$, $--$
- 2) Assignment operators $\rightarrow =, +=$

→ Comparison operators: $==$, $>$, $<$

→ Logical operators: $\&\&$, $\|\$, $!$

→ Bitwise operators: $\&$, $\|$ (operate bitwise)

Arithmetic operators cannot work with booleans.
% operator can work on float & doubles.

Precedence of Operators

~~(*, /)~~ $(*, /)$ have higher precedence than $(+, -)$

Associativity

It tells the direction of execution of operators.

$* / \rightarrow L \text{ to } R$ $+ - \rightarrow L \text{ to } R$

$++$ or $-- \rightarrow R \text{ to } L$

Operator	Associativity	Precedence
()	L to R	Highest
[]		
.		
→		
!	R to L	13
-		
-		
++		
--		
&		
*		
(type)		
Cast		
*	L to R	12
/		
%		
+	L to R	11
-		
<<	L to R	10
>>		
Relational Operators		
<	L to R	9
<=		
>		
>=		

==	Equal to	L to R	8
!=	Not equal to		
&	Bitwise AND		7
^	Bitwise XOR	L to R	6
	Bitwise OR		5
&&	Logical AND		4
	Logical OR		3
?:	Conditional		2
=, +=, *= etc.	Assignment operators	R to L	1
,	Comma	L to R	0

Resulting data type after arithmetic operation

$R = b + S \rightarrow \text{int}$
 $= S + i \rightarrow \text{int}$
 $= l + f \rightarrow \text{float}$
 $= i + f \rightarrow \text{float}$
 $= c + i \rightarrow \text{int}$
 $= c + S \rightarrow \text{int}$
 $= l + d \rightarrow \text{double}$
 $= f + d \rightarrow \text{double}$

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

Increment & Decrement Operators

$a++$, $++a \rightarrow$ Increment operators

$a--$, $--a \rightarrow$ Decrement operators

These will operate on all data types except booleans

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

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

For eg.

Find value of x

$\text{int } y = 7;$

$\text{int } x = ++y * 8$

$\therefore x = 64$

char $a = 'b'$

$a++;$

$a \rightarrow$ now $'c'$

Practice set 2

1) What will be the result of the foll. expression

$\text{float } a = 7/4 * 9/2$

By Associativity

$$= 1 * 9/2 = 1.75 * 9/2$$

$$= 9/2 = 15.75/2$$

$$= 4 = 7.875$$

$$= 1 * 9/2$$

$$= 9/2$$

$$= 4.5$$

if float a = 7/4.0 * 9/2.0;

$$= 1.75 * 9/2$$

$$= 15.75/2$$

$$= 7.875$$

Q2 Write a Java program to encrypt a grade by adding 8 to it. Decrypt it to show the correct grade

```
package com.company
```

```
public class Encryption
```

```
    public static void main (String[] args) {  
        // Encryption
```

```
        char grade = 'B';
```

```
        grade = grade;
```

```
        grade = (char)(grade + 8);
```

```
        System.out.println(grade);
```

```
        // Decryption
```

```
        grade = (char)(grade - 8);
```

```
        System.out.println(grade);
```

Q
P
J
B