

Precedence and Associativity

In this lesson, we will discuss the precedence and associativity of arithmetic operators.

We'll cover the following ^

- Precedence
 - Example program
- Associativity
 - Example program

Precedence

In case there is more than one operator in an expression, **precedence** determines the order in which the operators should be evaluated. The operator with higher precedence will be evaluated first in an expression. For example, multiplication $*$ has higher precedence than addition $+$. Therefore, we first evaluate multiplication in an expression.

Note: In case of paranthesis $()$, we first evaluate the expression inside the parenthesis.

Example program

Let's write a program that will evaluate an expression according to its operator precedence.

Run the code below and see the output!

```
#include <iostream>
using namespace std;

int main() {
    cout << 4-(8+10)*3;
}
```



The illustration given below shows the order in which operators are evaluated.

1 of 4

2 of 4

3 of 4

Operator precedence

4 of 4

—



Associativity #

Associativity

Associativity determines the order in which the operators with the same precedence should be evaluated.

In left associativity, we evaluate the expression from left to right if two or more operators have the same precedence. For example, addition **+** and subtraction **-** have the same precedence. So, if they both appear in an expression, we evaluate them from left to right.

In right associativity, we evaluate the expression from right to left if two or more operators have the same precedence.

Example program

Let's write a program that will evaluate an expression according to its operator associativity.

Run the code below and see the output!

```
#include <iostream>
using namespace std;

int main() {
    cout << 4-8+10+3;
}
```



Addition **+** and subtraction **-** have left associativity. The illustration given below shows the order in which operators are evaluated.

3 of 4

Left associativity

4 of 4

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Operators are listed below in the order of their precedence from highest to lowest.

The operators that are listed in the same row have the same precedence.

Category	Operators	Associativity
Multiplicative	* / %	Left to right
Additive	+ -	Left to right
Shift	<< >>	Left to right
Equality	== !=	Left to right
Bitwise AND	&	Left to right
Bitwise XOR	^	Left to right
Bitwise OR		Left to right
Logical AND	&&	Left to right
Logical OR		Left to right
Conditional	?:	Right to left
Assignment	= += -= *= /= %= >>= <<= &= ^= =	Right to left

We have covered the operators from soup to nuts.

Fasten up your seat belts for an exciting challenge in the upcoming lesson.

See you there!