Operator Precedence

Operator:

An operator is a special symbol that is used to perform particular mathematical or logical computations like addition, multiplication, comparison and so on. The value of operator is applied to be called operands. For e.g., in the expression 4 + 5, 4 and 5 are operands and + is an operator. The following tokens are operators in Python:

```
    +       -       *      **      /       //      %

    <<      >>      &      |       ^       ~       <>

    <       >       <=     >=      ==      !=
```

Operator precedence:

When an expression contains more than one operator, precedence is used to determine the order of evaluation. The order of evaluation depends on rules of precedence.

Rules of precedence

Parenthesis has the highest precedence.

Example: *5*(9-3)*

Here expression in parenthesis is evaluated first.

5*(9-3) = 5 * (6) = 30

Exponentiation has next highest precedence.

Example: *1+2**3*

1+2**3 = 1 + 8 = 9

Multiplication and division have next higher precedence than addition and subtraction.

Example: *3*2-1*

3*2-1 = 6 − 1 = 5

Operators with same precedence are evaluated from left to right (Except exponentiation). The following table summarizes the operator precedence in Python, from the highest

precedence to the lowest precedence. Operators in the same box have the same precedence and group from left to right (except for comparisons statements).

Operator	Description	Associativity
(expressions...) [expressions...] { key: value...} 'expressions...'	Binding or tuple display list display dictionary display string conversion	left to right
x[index] x[index:index] x(arguments...) x.attribute	Subscription Slicing Call Attribute reference	left to right
**	Exponentiation	right-to-left
+x , -x ~x	Unary plus and Unary minus Bitwise NOT	left to right
* / // %	Multiplication Division Floor division Remainder	left to right
+, -	Addition and Subtraction	left to right
<<, >>	Bitwise Left Shift and Right Shift	left to right
&	Bitwise AND	left to right
^	Bitwise XOR	left to right
|	Bitwise OR	left to right
in, not in is, is not <,<=,>,>=,<>,!=,==	Membership tests Identity tests Comparisons	Chain from left to right
not	Boolean NOT	left to right

and	Boolean AND	left to right
or	Boolean OR	left to right

→The acronym **PEMDAS** is useful way to remember the rules. That is,P (parenthesis first)

E (Exponent) MD (multiplication and division)AS (addition and subtraction)

➔ Arithmetic evaluation is carried out using two phases from left to right. During the first phase highest priority operators are evaluated. The second phase lowest priority operators are evaluated.

Example:

6+4/2 is 8, not 5.

Example:

>>>X, Y, Z=2, 3, 4

>>>value=X-Y/3+Z*3-1

>>>print("Result=",value)

Result=12