Course : CSE 105

Structured Computer Programming

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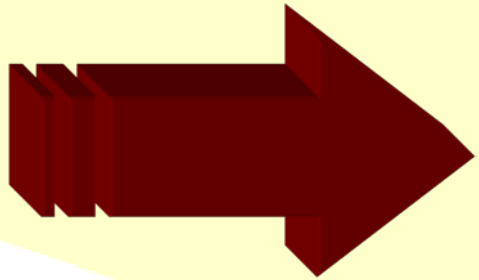
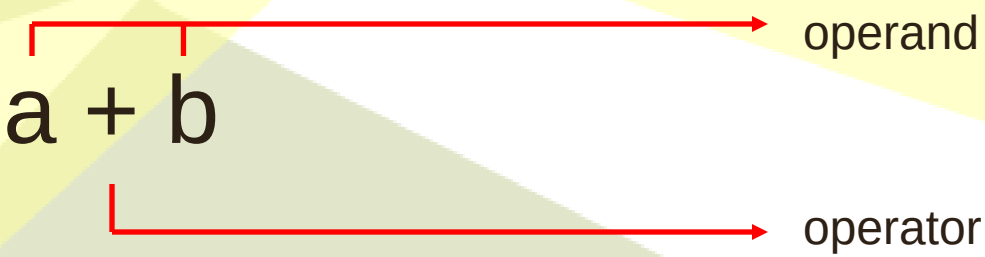
Operators & Expressions



Operators & Operands

- Operands – An operand is a data item (object) in a statement on which an operation is performed.

- Operator – The syntactical token representing an action on data (operands).



The five arithmetic operators in C -

Operator	***Function***
+	Addition
-	Substraction
*****	Multiplication
/	Division
%	Modulus - **remainder** after integer division (only for ***int*** operands)

Operator Precedence

In the absence of parentheses that explicitly state the order of operations, the ***order of precedence*** (also known as the ***order of priority***) is:

- **First**: multiplication and division, left to right, and then

- **Second**: addition, subtraction, identity and negation, left to right.

- `1 - 2 - 3 = -1 - 3 =` **`-4`** but
  `1 - (2 - 3) = 1 - (-1) =` **`2`**
- `1 + 2 * 3 + 4 = 1 + 6 + 4 = 7 + 4 =` **`11`** but
  `(1 + 2) * 3 + 4 = 3 * 3 + 4 = 9 + 4 =` **`13`**
- `24 / 2 * 4 = 12 * 4 =` **`48`** but
  `24 / (2 * 4) = 24 / 8 =` **`3`**
- `5 + 4 % 6 / 2 = 5 + 4 / 2 = 5 + 2 =` **`7`** but
  `5 + 4 % (6 / 2) = 5 + 4 % 3 = 5 + 1 =` **`6`** but
  `(5 + 4) % (6 / 2) = 9 % (6 / 2) = 9 % 3 =` **`0`**

Rule of Thumb: *If you can't remember the precedence order of the operations, use lots of parentheses.*

The Relational Operators in C -

Operator	***Function***
<	Less than
>	Greater than
<=	Less than or equal
>=	Greater than or equal
==	Equal
!=	Not equal

The Logical Operators in C -

Operator	***Function***
&&	And
||	OR
!	Not

Increment & Decrement Operators

One of the most common addition assignments is:

```
x = x + 1;
```

This statement increases the value of x by 1.

That is, the statement takes the old value of x, adds 1 to it, then assigns the resulting sum to x.

For this statement, we could also use the addition assignment operator:

```
x += 1;
```

The C language has another special operator, called the ***increment operator***:

```
x++;
```

Increment & Decrement Operators

Code Fragment # 1

```
int x;
x = 5;
x++;
printf("The value of x is %d",x);
```

Code Fragment # 2

```
int x;
x = 5;
++x;
printf("The value of x is %d",x);
```

Code Fragment # 3

```
int x;
x = 5;
printf("The value of x is %d",x++);
```

Code Fragment # 4

```
int x;
x = 5;
printf("The value of x is %d",++x);
```

Increment & Decrement Operators

Increment operator:

x = x + 1;

x += 1;

x++;

++x;

Decrement operator.

x = x – 1;

x -= 1;

X--;

--x;