

Structured Programming Guidelines

Session 3



Mathematical Expressions in C++

➤ Precedence rules

Operator	Associativity	Type
()	left to right	parentheses
! -	right to left	unary
* / %	left to right	multiplicative
+ -	left to right	additive
< <= > >=	left to right	relational
== !=	left to right	equality
&&	left to right	logical AND
	left to right	logical OR
=	right to left	assignment

Mathematical Expressions in C++

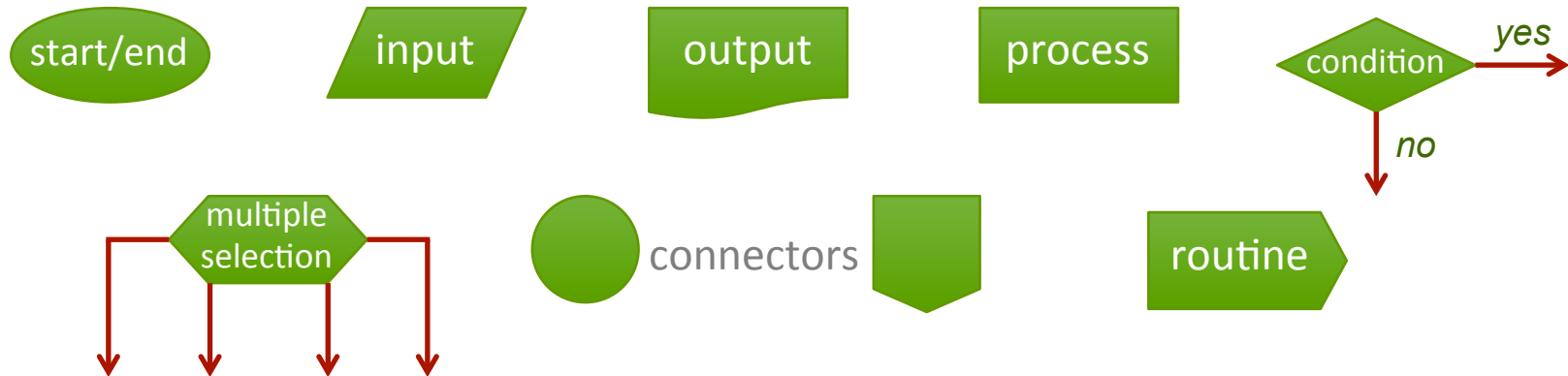
```
int x = 7 * 8 % ( 21 % 9 ) / 2 * 3 - 28;  
      = 7 * 8 % 3 / 2 * 3 - 28;  
      = 56 % 3 / 2 * 3 - 28;  
      = 2 / 2 * 3 - 28;  
      = 1 * 3 - 28;  
      = 3 - 28;  
      = -25 ;
```

Mathematical Expressions in C++

```
bool x = 15 % 6 * (2 - 7) > 7 + 8 * 3 && 15 * 2 > 60 / 4;  
      = 15 % 6 * -5 > 7 + 8 * 3 && 15 * 2 > 60 / 4;  
      = 3 * -5 > 7 + 8 * 3 && 15 * 2 > 60 / 4;  
      = -15 > 7 + 8 * 3 && 15 * 2 > 60 / 4;  
      = -15 > 7 + 24 && 15 * 2 > 60 / 4;  
      = -15 > 31 && 15 * 2 > 60 / 4;  
      = false && 15 * 2 > 60 / 4;  
      = false && 30 > 60 / 4;  
      = false && 30 > 15 ;  
      = false && true ;  
      = false ;
```

Flow Charts

- Help us solve a problem before coding.
- Are one way to model algorithms.



Practice 1

- Write a program where the user inputs two integers A and B , and it computes and outputs the result of the following expression:

$$\frac{(A + B)^2}{3}$$

Practice 2

- Write a program such that, given a worker's salary, adds 15% to it if his salary is less than \$1,000. Print, on this case, the new worker's salary.

Practice 3

- Write a program that reads the salary of 10 workers and prints the average salary in the group.
- We use a *while* loop in this case.

Practice 4

- Write a program that *keeps* reading an integer from the user, until he inputs a number that is a multiple of 2.
- We use a *do-while* loop in this case.
- Can you solve the problem by using a *while* loop?

Practice 5

- Write a program that computes and prints the product of the odd integers between 1 and 15, inclusive.
- Try with a *while* loop.
- We can also solve the problem by using a *for* loop.

Try It Yourself

- Write a program that obtains and prints the sum of the terms in the following series:

2, 5, 7, 10, 12, 15, 17, ..., 1800

A Challenge

- Write a program that finds and outputs the first number in a free-style string that the user inputs.
- For example:
 - *“His son is 20, and his daughter is 15 years old”*
 - You should output: **20**