

# GSET - Programming with Mr. Hill

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## Module 2 - Operators and Expressions

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- Operators in C++
- Arithmetic Operators
- Operator Precedence
- What is an Expression?
- Tutorial 2 - Quadratic Equation - Solution

## Operators in C++

There are *many different* **operators** used in computer programming.

Category	Operators	Example
Assignment	=	
Arithmetic	+ - * / % ^	
Relational	== != > < >= <=	
Logical	! &&	
Bitwise	&   ^ ~ << >>	

See the link below for a complete list of C++ operators.

reference: [cplusplus.com](http://cplusplus.com)

# Operators in C++

There are more. What else could there be?

# Arithmetic Operators

Operator	Description	Example
+	Addition	
-	Subtraction	
*	Multiplication	
/	Division	
%	Modulo	

# Arithmetic Operators

Which one of these is not like the other?

=      +      -      \*      /      %      ^

Why?

# Operator Precedence

From greatest to smallest priority, C++ operators are evaluated in the following order:

Level	Precedence group	Operator	Description	Grouping
1	Scope	::	scope qualifier	Left-to-right
2	Postfix (unary)	++ --	postfix increment / decrement	Left-to-right
		()	functional forms	
		[]	subscript	
		. ->	member access	
3	Prefix (unary)	++ --	prefix increment / decrement	Right-to-left
		~ !	bitwise NOT / logical NOT	
		+ -	unary prefix	
		& *	reference / dereference	
		new delete	allocation / deallocation	
		sizeof	parameter pack	
		(type)	C-style type-casting	
4	Pointer-to-member	. * ->*	access pointer	Left-to-right
5	Arithmetic: scaling	* / %	multiply, divide, modulo	Left-to-right
6	Arithmetic: addition	+ -	addition, subtraction	Left-to-right
7	Bitwise shift	<< >>	shift left, shift right	Left-to-right
8	Relational	< > <= >=	comparison operators	Left-to-right
9	Equality	== !=	equality / inequality	Left-to-right
10	And	&	bitwise AND	Left-to-right
11	Exclusive or	^	bitwise XOR	Left-to-right
12	Inclusive or		bitwise OR	Left-to-right
13	Conjunction	&&	logical AND	Left-to-right
14	Disjunction		logical OR	Left-to-right
15	Assignment-level expressions	= *= /= %= += -=	assignment / compound assignment	Right-to-left
		>>= <<= &= ^=  =		
16	Sequencing	?:	conditional operator	Left-to-right
		,	comma separator	

# Operator Precedence

Question: What was the concept of operator precedence called in mathematics class?

Answer:



# What is an Expression?

*An expression is a sequence of operators and their operands, that specifies a computation.*