GSET - Programming with Mr. Hill

Tristan Hill

Tennessee Technological University

Summer 2021

Module 2 - Operators and Expressions

Module 2 - Operators and Expressions

- 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

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
		`?:`	conditional operator	
16	Sequencing	`,`	comma separator	Left-to-right

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.

Tutorial 2 - Quadratic Equation - Solution