

# UNUSUAL OPERATORS

Useful, but no analog in mathematics

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# AUTO INCREMENT & AUTO DECREMENT

- Unary operators; each operand must be a variable
- Four operators:
  - pre-increment (++v) post-increment (v++)
  - pre-decrement (--v) post-decrement (v--)
- Order of operation only important when auto the operation is embedded in a more complex expression
  - v++; is the same as ++v;
  - x = v + +; is different than x = + + v;
- The difference is order in which we "use the stored value" compared to when the increment or decrement takes place

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#### AUTO OPERATORS CONTINUED

x = 10;

Operator	Meaning	Result
a = x++;	a = x; x = x + 1;	a == 10 x == 11
a = ++x;	x = x + 1; a = x;	a == 11 x == 11
a = x;	a = x; x = x - 1;	a == 10 x == 9
a =x;	x = x - 1; a = x;	a == 9 x == 9

#### **OPERATION WITH ASSIGNMENT**

• Just a shortcut

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- Left hand operand must be a variable
- op= (+=, -=, \*=, /=, %=, ~=, <<=, and >>=+)
- x += 10; x = x + 10;
- i =- 10; i = i 10;
- a /= b; a = a / b;
- x \*= 2; x = x \* 2;
- index %= size; index = index % size;

### CONDITIONAL OPERATOR

- Behaves much like an if-else statement, but forms an expression (i.e., has a value)
- exl ? ex2 : ex3
  - if exl is true (i.e., not 0), the value of the expression is ex2
  - if exl is false (i.e., 0), the value of the expression is ex3
- Examples

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- min = (x < y) ? x : y
- max = (x > y) ? x : y;
- z = (x > y) ? (x + 10) : (y 10);

# sizeof

- Calculates the size, measured in bytes, of a constant, a variable or a data type
  - type must be enclosed in parentheses
  - constants and variables may be in parentheses or not
  - easiest for me to remember to just us parentheses
  - sizeof(int)

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- sizeof(double)
- sizeof(5) sizeof 5
- sizeof(x) sizeof x