



# Topic 9: JavaScript

Arithmetic and Assignment Operators



# Lecture Contents

- Operator Types
- Arithmetic Operators
- Modulus
- Operator Precedence
- Increment / Decrement

# Operator Types

- *Arithmetic*
- *Assignment*
- *Comparison*
- *Logical*
- *Bitwise*



# JavaScript Arithmetic Operators

- We should know the word “***operator***” from mathematics
- JavaScript ***arithmetic operators***:
  - Add:  $x + y$
  - Subtract:  $x - y$
  - Multiply:  $x * y$
  - Divide:  $x / y$
  - Modulus:  $x \% y$
  - Exponent:  $x ** y$  // ES2016; not in Java or C



# Modulus

- Modulus (%) gives the remainder:
  - $17 \% 3 == ?$



# Modulus

- Modulus (%) gives the remainder:
  - $17 \% 3 == 2$



# Modulus

- Modulus (%) gives the remainder:
  - $17 \% 3 == 2$
- How to determine if a number is even or odd?



# Modulus

- Modulus (%) gives the remainder:
  - $17 \% 3 == 2$
- How to determine if a number is even or odd?
  - $n \% 2 \rightarrow 0$  if *even*, 1 if *odd*



# JavaScript Operator Precedence

Level	Description	Operators
18	parentheses	( )
13	exponentiation	**
12	multiplicative	* / %
11	additive	+ -



# Assignment Operators

- An **assignment operator** is used to set the value of a variable.
- We first **declare** a variable:

```
var name;
```

- The first time we set a value, we **initialize** the variable

```
name = "Chris";
```

or: 

```
var name = "Chris";
```

- Any time we set a value, we **assign** a value  
(initialization is a subset of assignment)

```
var name = "Chris";
```

```
name = name.toUpperCase();
```

← declaration and initialization

← assignment



# Arithmetic Assignment Operators

- Type the following in a console:

```
> num = 5;  
> num += 3;
```



# Arithmetic Assignment Operators

- Type the following in a console:

```
> num = 5;  
> num += 3;
```

- The result should be 8.
  - These show equivalent statements using the basic *assignment* operator, `=`, and the *addition assignment* operator, `+=`, is

```
num = num + 3;
```

```
num += 3;
```



# Assignment Operators

- The basic assignment operator is the equal sign, `=`
- All other arithmetic, logical, and bitwise operators have an assignment equivalent.

## Arithmetic

`+=`

`-=`

`*=`

`/=`

`%=`

`**=`

## Logical

`&&=`

`||=`

`??=`

## Bitwise

`&=`

`|=`

`^=`

`<<=`

`>>=`

`>>>=`



# Increment / Decrement Operators

- Increment: ++    Decrement: --
- These are equivalent statements:

Increment	Decrement
$x = x + 1;$	$x = x - 1;$
$x += 1;$	$x -= 1;$
$x++;$	$x--;$





# Topic 9: JavaScript

## Variables