Introduction to PHP

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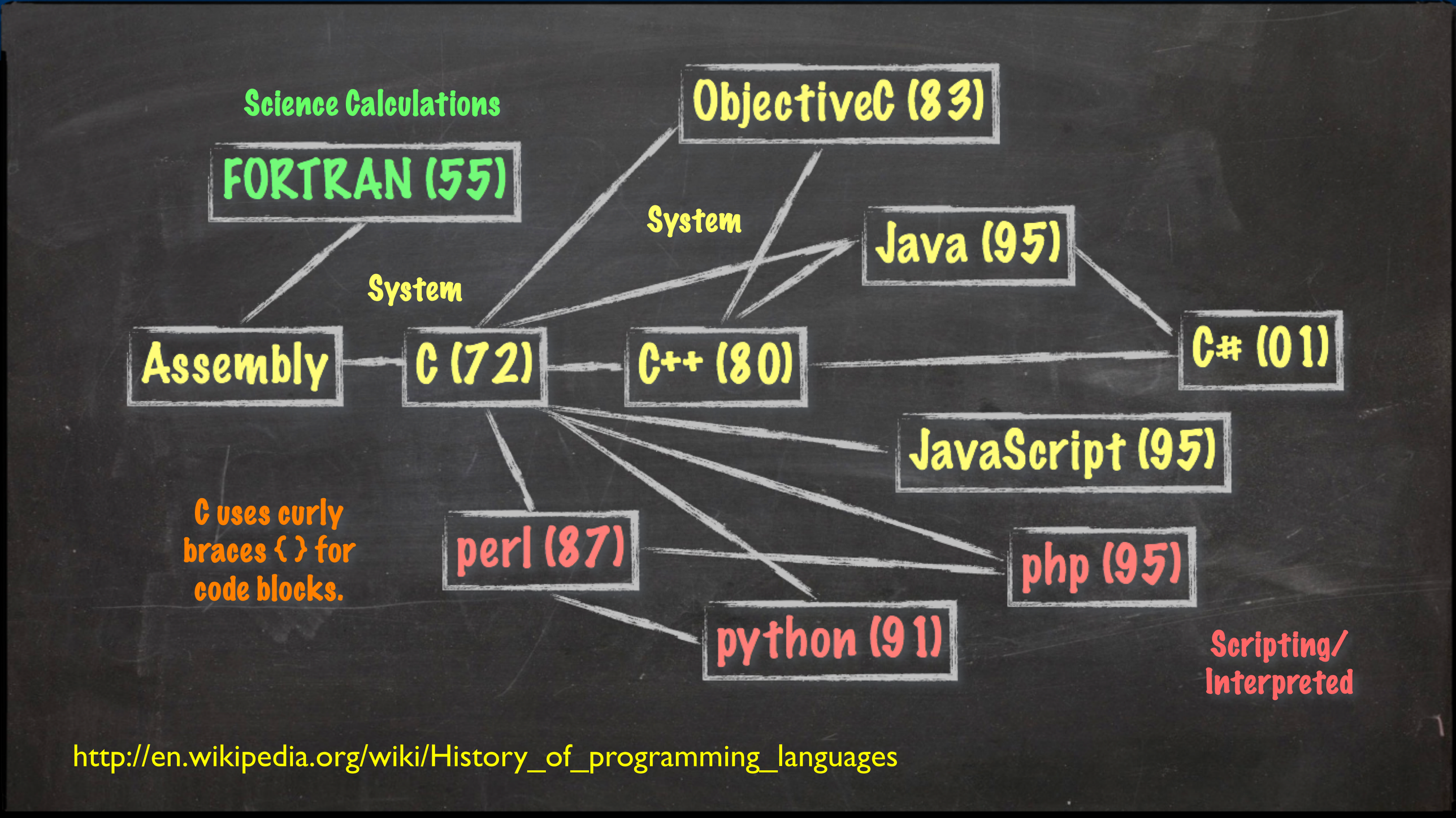


http://en.wikipedia.org/wiki/History_of_programming_languages

About the PHP Language

- Syntax inspired by C
  - Curly braces, semicolons, no signficant whitespace
- Syntax inspired by perl
  - Dollar signs to start variable names, associative arrays
- Extends HTML to add segments of PHP within an HTML file

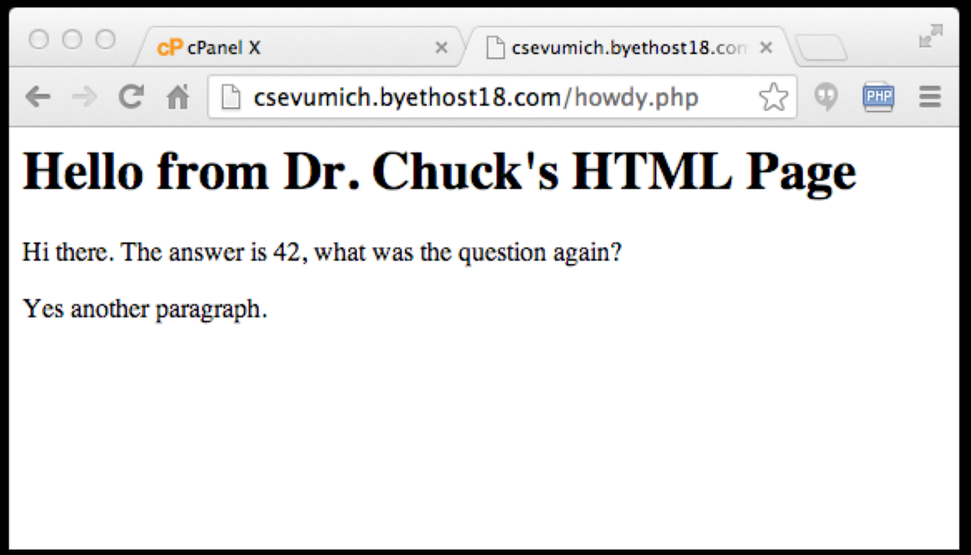
The Basics

Philosophy of PHP

- You are a responsible and intelligent programmer.
- You know what you want to do.
- Some flexibility in syntax is OK - style choices are OK.
- Let's make this as convenient as possible.
- Sometimes errors fail silently.

```
<h1>Hello from Dr. Chuck's HTML Page</h1>
<p>
<?php
    echo "Hi there.\n";
    $answer = 6 * 7;
    echo "The answer is $answer, what ";
    echo "was the question again?\n";
?>
</p>
<p>Yes another paragraph.</p>
```

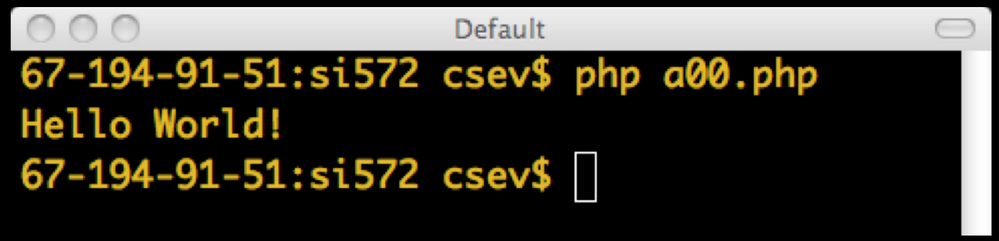
```
<h1>Hello from Dr. Chuck's HTML Page</h1>
<p>
<?php
    echo "Hi there.\n";
    $answer = 6 * 7;
    echo "The answer is $answer, what ";
    echo "was the question again?\n";
?>
</p>
<p>Yes another paragraph.</p>
```



PHP from the Command Line

- You can run PHP from the command line - the output simply comes out on the terminal.
- It does not have to be part of a request-response cycle.

```
<?php
    echo("Hello World!");
    echo("\n");
?>
```



Keywords

Keywords

abstract and array() as break case catch class clone const continue declare default do else elseif end declare endfor endforeach endif endswitch endwhile extends final for foreach function global goto if implements interface instanceof namespace new or private protected public static switch $this throw try use var while xor

http://php.net/manual/en/reserved.php

Variable Names

- Start with a dollar sign ($) followed by a letter or underscore, followed by any number of letters, numbers, or underscores
- Case matters

```
$abc = 12;
$total = 0;
$largest_so_far = 0;
```

```
abc = 12;
$2php = 0;
$bad-punc = 0;
```

http://php.net/manual/en/language.variables.basics.php

Variable Name Weirdness

Things that look like variables but are missing a dollar sign can be confusing.

```
$x = 2;
$y = x + 5;
print $y;
```

```
5
```

```
$x = 2;
y = $x + 5;
print $x;
```

```
Parse error
```

Variable Name Weirdness

Things that look like variables but are missing a dollar sign as an array index are unpredictable....

```
$x = 5;
$y = array("x" => "Hello");
print $y[x];
```

```
Hello
```

Strings / Different + Awesome

- String literals can use single quotes or double quotes.
- The backslash (\) is used as an “escape” character.
- Strings can span multiple lines - the newline is part of the string.
- In double-quoted strings, variable values are expanded.
- Concatenation is the "." not "+" (more later).

http://php.net/manual/en/language.types.string.php

Double Quote

```
<?php
echo "this is a simple string\n";

echo "You can also have embedded newlines in
strings this way as it is
okay to do";

// Outputs: This will expand:
//          a newline
echo "This will expand: \na newline";

// Outputs: Variables do 12
$expand = 12;
echo "Variables do $expand\n";
```

Single Quote

```
<?php
echo 'this is a simple string';

echo 'You can also have embedded newlines in
strings this way as it is
okay to do';

// Outputs: Arnold once said: "I'll be back"
echo 'Arnold once said: "I\'ll be back"';

// Outputs: This will not expand: \n a newline
echo 'This will not expand: \n a newline';

// Outputs: Variables do not $expand $either
echo 'Variables do not $expand $either';
```

Comments in PHP ☺

```
echo 'This is a test'; // This is a c++ style comment
/* This is a multi line comment
   yet another line of comment */
echo 'This is yet another test';
echo 'One Final Test'; # This is a shell-style comment
```

http://php.net/manual/en/language.basic-syntax.comments.php

Output

- echo is a language construct - can be treated like a function with one parameter. Without parentheses, it accepts multiple parameters.
- print is a function - only one parameter, but parentheses are optional so it can look like a language construct.

```
<?php
    $x = "15" + 27;
    echo $x;
    echo("\n");
    echo $x, "\n";
    print $x;
    print "\n";
    print($x);
    print("\n");
?>
```

Expressions

Expressions

- Completely normal like other languages (+ - / *)
- More agressive implicit type conversion

```
<?php
    $x = "15" + 27;
    echo($x);
    echo("\n");
?>
```

```
42
```

Expressions

- Expressions evaluate to a value. The value can be a string, number, boolean, etc.
- Expressions often use operations and function calls. There is an order of evaluation when there is more than one operator in an expression.
- Expressions can also produce objects like arrays.

Operators of Note

- Increment / Decrement (++ --)
- String concatenation (.)
- Equality (== !=)
- Identity (=== !==)
- Ternary (? :)
- Side-effect Assignment (+= -= .= etc.)
- Ignore the rarely-used bitwise operators (>> << ^ | &)

Increment / Decrement

- These operators allow you to both retrieve and increment / decrement a variable.
- They are generally avoided in civilized code.

```
$x = 12;
$y = 15 + $x++;
echo "x is $x and y is $y \n";
```

```
x is 13 and y is 27
```

Increment / Decrement

- These operators allow you to both retrieve and increment / decrement a variable.
- They are generally avoided in civilized code.

```
$x = 12;
$y = 15 + $x;
$x = $x + 1;
echo "x is $x and y is $y \n";
```

```
x is 13 and y is 27
```

String Concatenation

PHP uses the period character for concatenation, because the plus character would instruct PHP to do the best it could to add the two things together, converting if necessary.

```
$a = 'Hello ' . 'World!';
echo $a . "\n";
```

```
Hello World!
```

Ternary

The ternary operator comes from C. It allows conditional expressions. It is like a one-line if-then-else. Like all "contraction" syntaxes, we must use it carefully.

```
$www = 123;
$msg = $www > 100 ? "Large" : "Small" ;
echo "First: $msg \n";
$msg = ( $www % 2 == 0 ) ? "Even" : "Odd";
echo "Second: $msg \n";
$msg = ( $www % 2 ) ? "Odd" : "Even";
echo "Third: $msg \n";
```

```
First: Large
Second: Odd
Third: Odd
```

Side-Effect Assignment

These are pure contractions. Use them sparingly.

```
echo "\n";
$out = "Hello";
$out = $out . " ";
$out .= "World!";
$out .= "\n";
echo $out;
$count = 0;
$count += 1;
echo "Count: $count\n";
```

```
Hello World!
Count: 1
```

Conversion / Casting

As PHP evaluates expressions, sometimes values in the expression need to be converted from one type to another as the computations are done.

- PHP does aggressive implicit type conversion (casting).
- You can also make type conversion (casting) explicit with casting operators.

Casting

```
$a = 56; $b = 12;
$c = $a / $b;
echo "C: $c\n";
$d = "100" + 36.25 + TRUE;
echo "D: ". $d . "\n";
echo "D2: ". (string) $d . "\n";
$e = (int) 9.9 - 1;
echo "E: $e\n";
$f = "sam" + 25;
echo "F: $f\n";
$g = "sam" . 25;
echo "G: $g\n";
```

In PHP, division forces operands to be floating point. PHP converts expression values silently and aggressively.

```
C: 4.66666666667
D: 137.25
D2: 137.25
E: 8
F: 25
G: sam25
```

PHP vs. Python

```
$x = "100" + 25;
echo "X: $x\n";
$y = "100" . 25;
echo "Y: $y\n";
$z = "sam" + 25;
echo "Z: $z\n";
```

```
X: 125
Y: 10025
Z: 25
```

```
x = int("100") + 25
print "X:", x
y = "100" + str(25)
print "Y:", y
z = int("sam") + 25
print "Z:", z
```

```
X: 125
Y: 10025
Traceback:"cast.py", line 5
    z = int("sam") + 25;
ValueError: invalid literal
```

Casting

```
echo "A".FALSE."B\n";
echo "X".TRUE."Y\n";
```

```
AB
X1Y
```

The concatenation operator tries to convert its operands to strings. TRUE becomes an integer 1 and then becomes a string. FALSE is "not there" - it is even "smaller" than zero, at least when it comes to width.

Equality versus Identity

The equality operator (==) in PHP is far more agressive than in most other languages when it comes to data conversion during expression evaluation.

```
if ( 123 == "123" ) print ("Equality 1\n");
if ( 123 == "100"+23 ) print ("Equality 2\n");
if ( FALSE == "0" ) print ("Equality 3\n");
if ( (5 < 6) == "2"-"1" ) print ("Equality 4\n");
if ( (5 < 6) === TRUE ) print ("Equality 5\n");
```

Description

Report a bug

int **strpos** (string *$haystack* , mixed *$needle* [, int *$offset* = *0*])

Returns the numeric position of the first occurrence of *needle* in the *haystack* string.

Parameters

Return Values

Report a bug

Returns the position as an integer. If *needle* is not found, **strpos()** will return boolean **FALSE**.

Warning

This function may return Boolean **FALSE**, but may also return a non-Boolean value which evaluates to **FALSE**, such as *0* or "". Please read the section on Booleans for more information. Use the === operator for testing the return value of this function.

http://php.net/manual/en/function.strpos.php

```
$vv = "Hello World!";
echo "First:" . strpos($vv, "Wo") . "\n";
echo "Second: " . strpos($vv, "He") . "\n";
echo "Third: " . strpos($vv, "ZZ") . "\n";
if (strpos($vv, "He") == FALSE ) echo "Wrong A\n";
if (strpos($vv, "ZZ") == FALSE ) echo "Right B\n";
if (strpos($vv, "He") !== FALSE ) echo "Right C\n";
if (strpos($vv, "ZZ") === FALSE ) echo "Right D\n";
print_r(FALSE); print FALSE;
echo "Where were they?\n";
```

```
First:6
Second: 0
Third:
Wrong A
Right B
Right C
Right D
Where were they?
```

Beware FALSE variables.
They are detectable but not visible...

Control Structures

Conditional - if

- Logical operators (== != < > <= >= && || !)
- Curly braces

```
<?php
    $ans = 42;
    if ( $ans == 42 ) {
       print "Hello world!\n";
    } else {
       print "Wrong answer\n";
    }
?>
```

→ Hello World!

Whitespace Does Not Matter

```
<?php
    $ans = 42;
    if ( $ans == 42 ) {
       print "Hello world!\n";
    } else {
       print "Wrong answer\n";
    }
?>
```

```
<?php $ans = 42; if ( $ans == 42 ) { print
"Hello world!\n"; } else { print "Wrong answer\n"; }
?>
```

Which Style do You Prefer?

```
<?php
    $ans = 42;
    if ( $ans == 42 ) {
       print "Hello world!\n";
    } else {
       print "Wrong answer\n";
    }
?>
```

Aesthetics

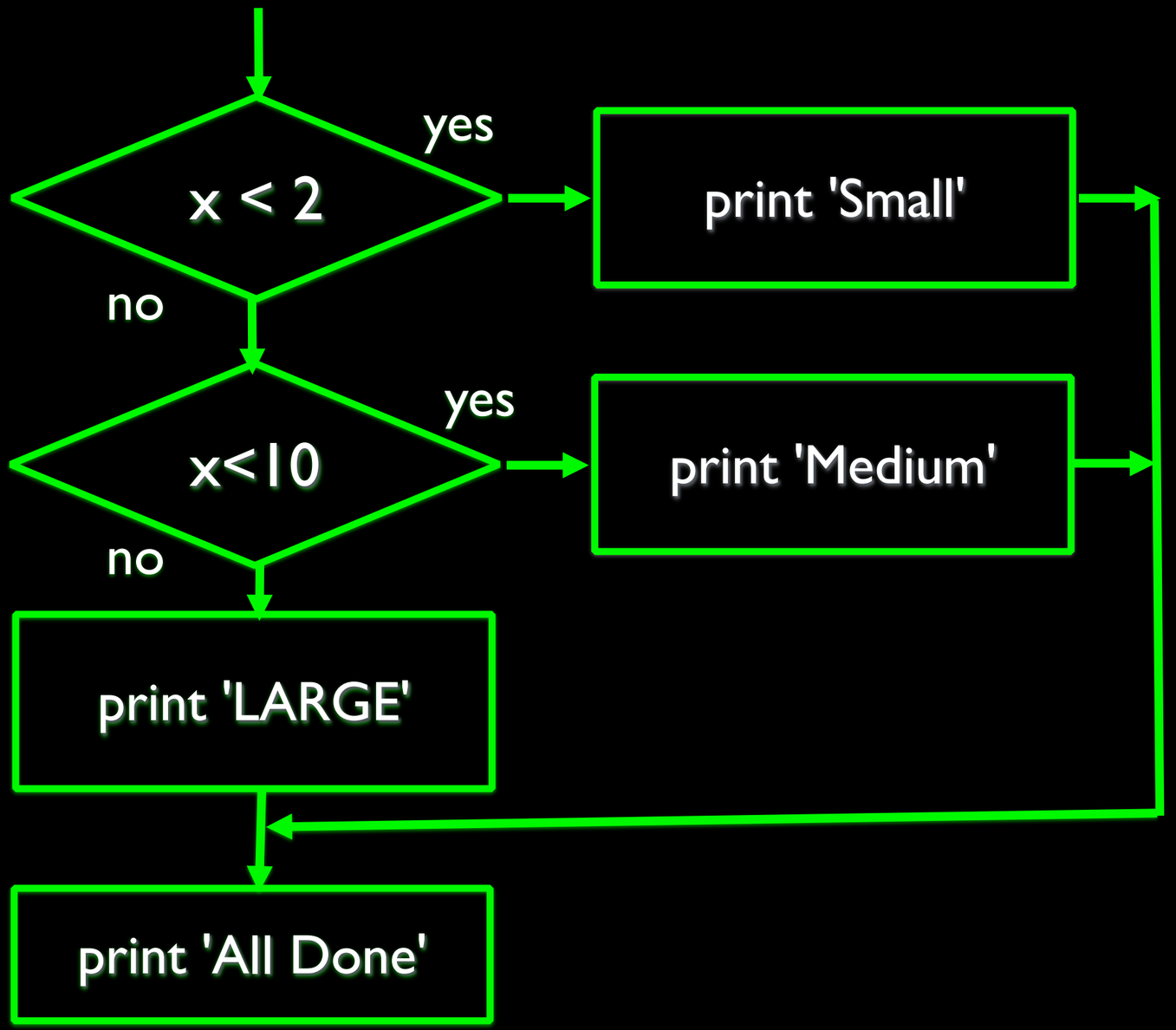
```
<?php
    $ans = 42;
    if ( $ans == 42 )
    {
       print "Hello world!\n";
    }
    else
    {
       print "Wrong answer\n";
    }
?>
```

Multi-way

```
$x = 7;

if ( $x < 2 ) {
    print "Small\n";
} elseif ( $x < 10 ) {
    print "Medium\n";
} else {
    print "LARGE\n";
}

print "All done\n";
```



Curly Braces are Not Required

```
if     ($page == "Home")  echo "You selected Home";
elseif ($page == "About") echo "You selected About";
elseif ($page == "News")  echo "You selected News";
elseif ($page == "Login") echo "You selected Login";
elseif ($page == "Links") echo "You selected Links";
```

```
if     ($page == "Home")  { echo "You selected Home"; }
elseif ($page == "About") { echo "You selected About"; }
elseif ($page == "News")  { echo "You selected News"; }
elseif ($page == "Login") { echo "You selected Login"; }
elseif ($page == "Links") { echo "You selected Links"; }
```

```
$fuel = 10;
while ($fuel > 1) {
    print "Vroom vroom\n";
}
```

A while loop is a "zero-trip" loop with the test at the top before the first iteration starts. We hand construct the iteration variable to implement a counted loop.

```
$fuel = 10;
while ($fuel > 1) {
    print "Vroom vroom\n";
    $fuel   $fuel
}
```

```
$count = 1;
do {
  echo "$count times 5 is " . $count * 5;
  echo "\n";
} while (++$count <= 5);
```

A do-while loop is a "one-trip" loop with the test at the bottom after the first iteration completes.

```
1 times 5 is 5
2 times 5 is 10
3 times 5 is 15
4 times 5 is 20
5 times 5 is 25
```

```
for($count=1; $count<=6; $count++ ) {
  echo "$count times 6 is " . $count * 6;
  echo "\n";
}
```

```
1 times 6 is 6
2 times 6 is 12
3 times 6 is 18
4 times 6 is 24
5 times 6 is 30
6 times 6 is 36
```

A for loop is the simplest way to construct a counted loop.

Loop runs while TRUE (top-test)

Before loop starts

Run after each iteration.

```
for($count=1; $count<=6; $count++ ) {
  echo "$count times 6 is " . $count * 6;
  echo "\n";
}
```

```
1 times 6 is 6
2 times 6 is 12
3 times 6 is 18
4 times 6 is 24
5 times 6 is 30
6 times 6 is 36
```

A for loop is the simplest way to construct a counted loop.

Breaking Out of a Loop

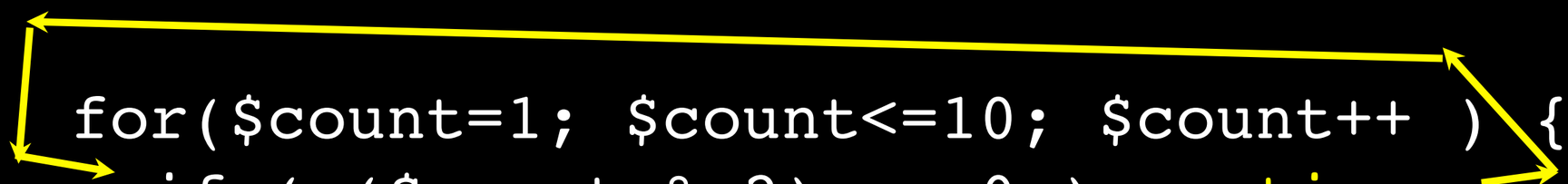
- The break statement ends the current loop and jumps to the statement immediately following the loop.
- It is like a loop test that can happen anywhere in the body of the loop.

```
for($count=1; $count<=600; $count++ ) {
  if ( $count == 5 ) break;
  echo "Count: $count\n";
}
echo "Done\n";
```

```
Count: 1
Count: 2
Count: 3
Count: 4
Done
```

Finishing an Iteration with continue

The continue statement ends the current iteration. jumps to the top of the loop, and starts the next iteration.



```
for($count=1; $count<=10; $count++ ) {
  if ( ($count % 2) == 0 ) continue;
  echo "Count: $count\n";
}
echo "Done\n";
```

```
Count: 1
Count: 3
Count: 5
Count: 7
Count: 9
Done
```

Summary

This is a sprint through some of the unique language features of PHP.

Acknowledgements / Contributions

Initial Development: Charles Severance, University of Michigan School of Information

Insert new Contributors and Translators here including names and dates

Continue new Contributors and Translators here