Web Scripting using PHP

Server side scripting

So what is a Server Side Scripting Language?

- Programming language code embedded into a web page

PERL
PHP
PYTHON
ASP

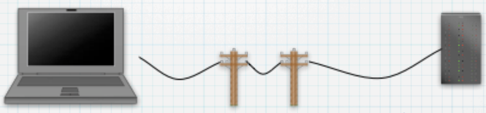
Different ways of scripting the Web

- Programming language code embedded into a web page

No scripting (plain markup)
Client Side scripting
Server Side scripting
Combination of the above (AJAX)

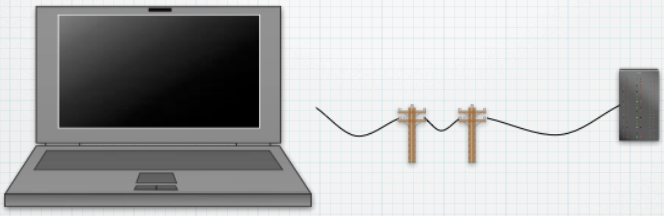
No Scripting example - how it works...

User on a machine somewhere

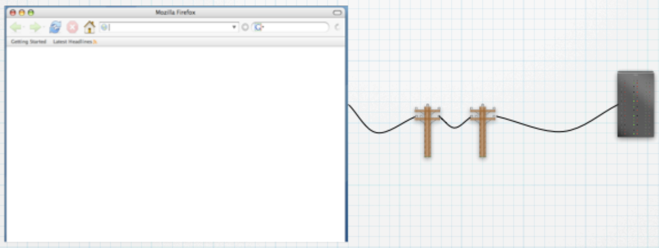


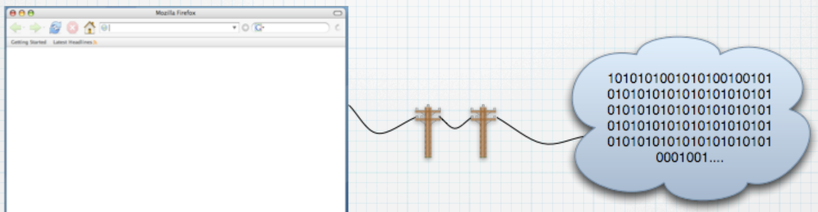
Server machine

Being more specific...



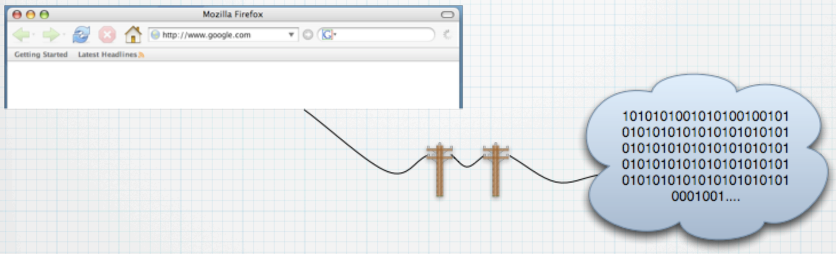
Web Browser software





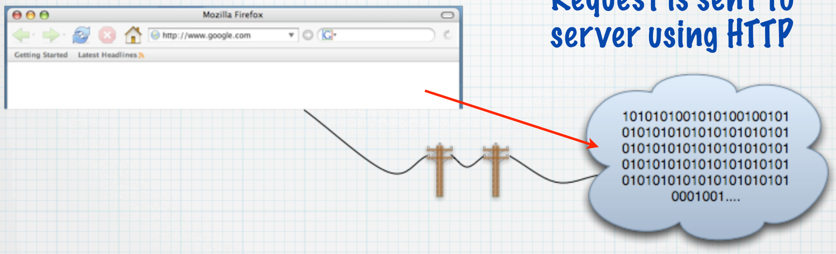
Web server software

User types in a URL for a page with **no programming code inside**

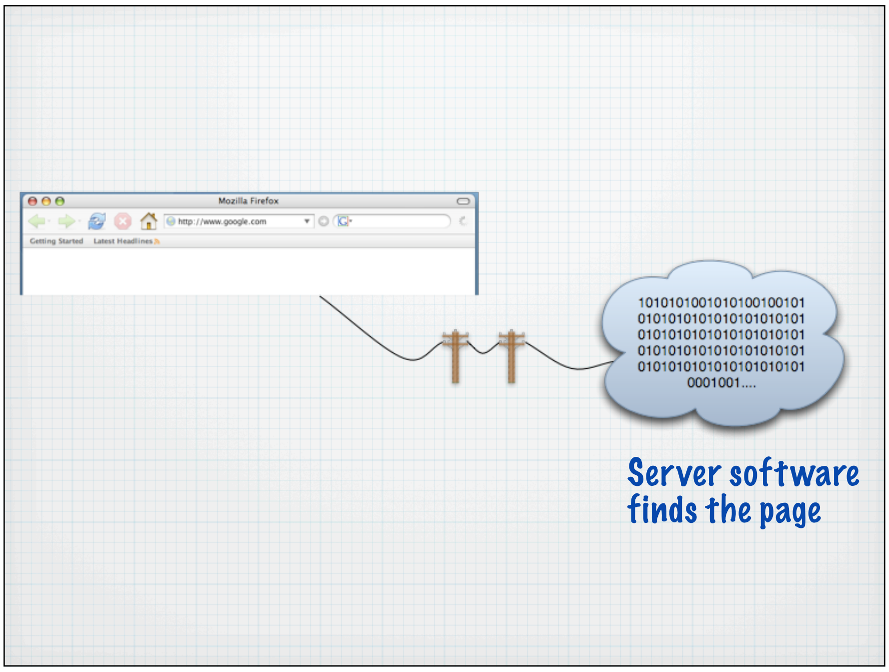


Uniform Resource Locator

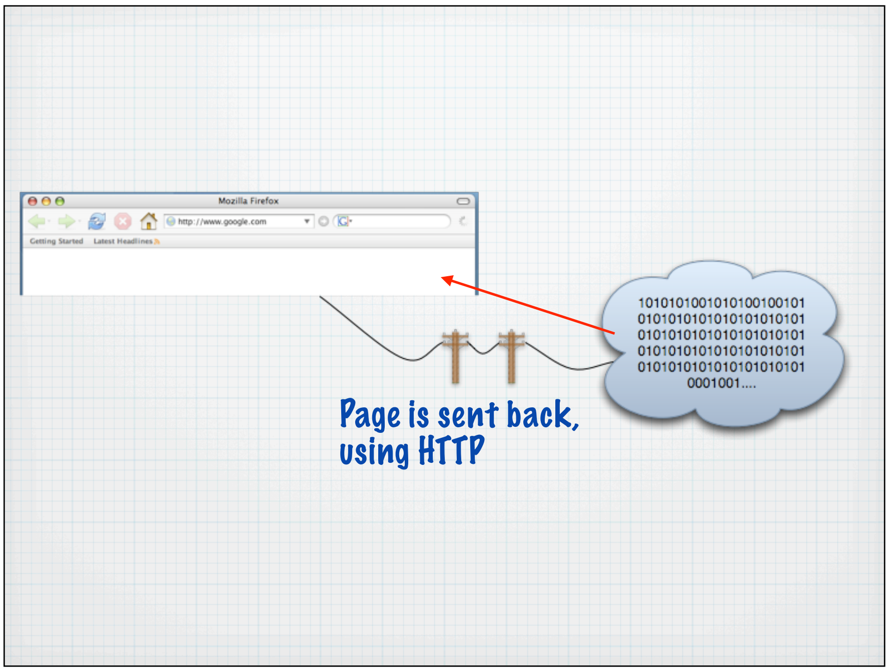
Request is sent to server using HTTP



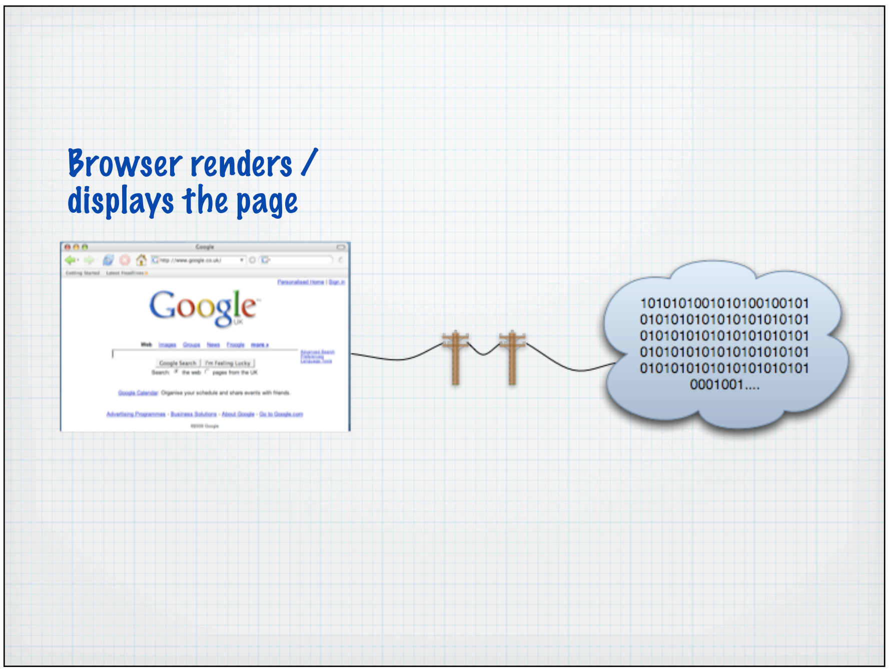
Hypertext Transfer Protocol



Server software finds the page

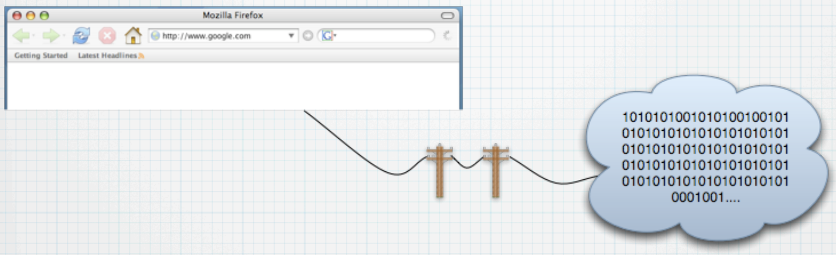


Page is sent back, using HTTP

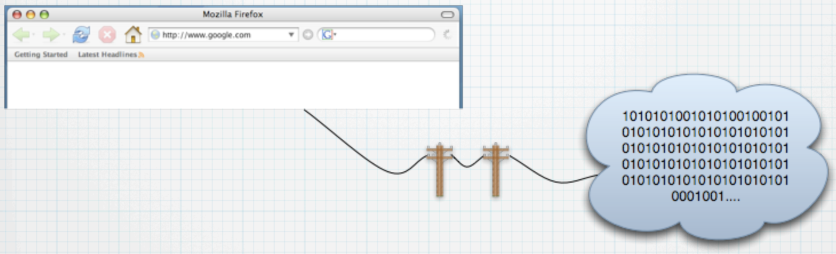


Browser renders / displays the page

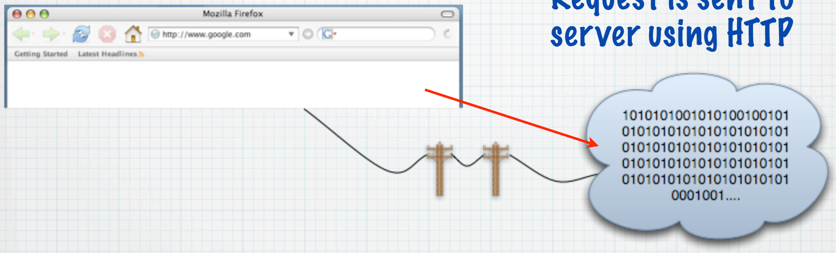
Server Side scripting

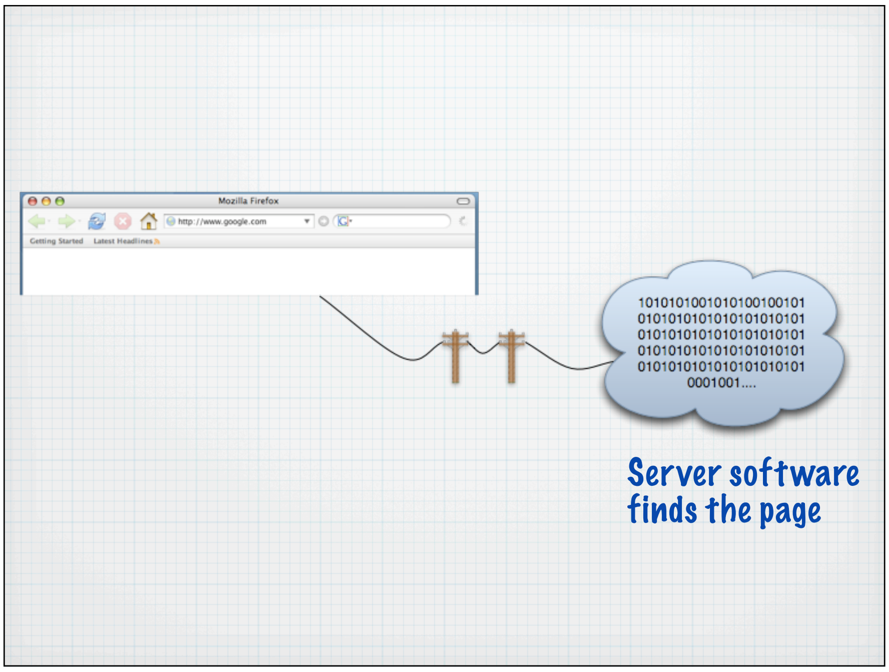


User types in a URL for a page with PHP code inside

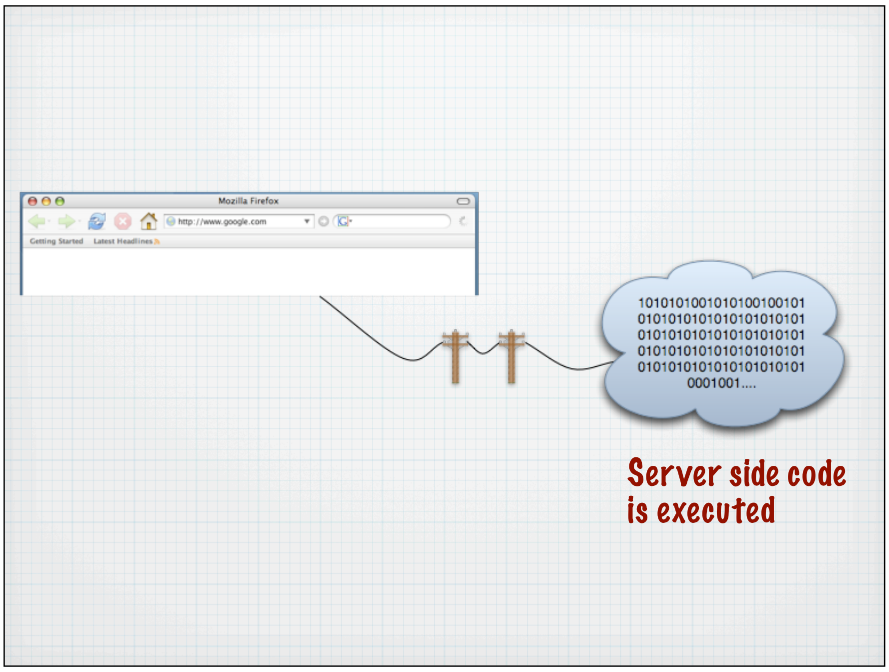


Request is sent to server using HTTP

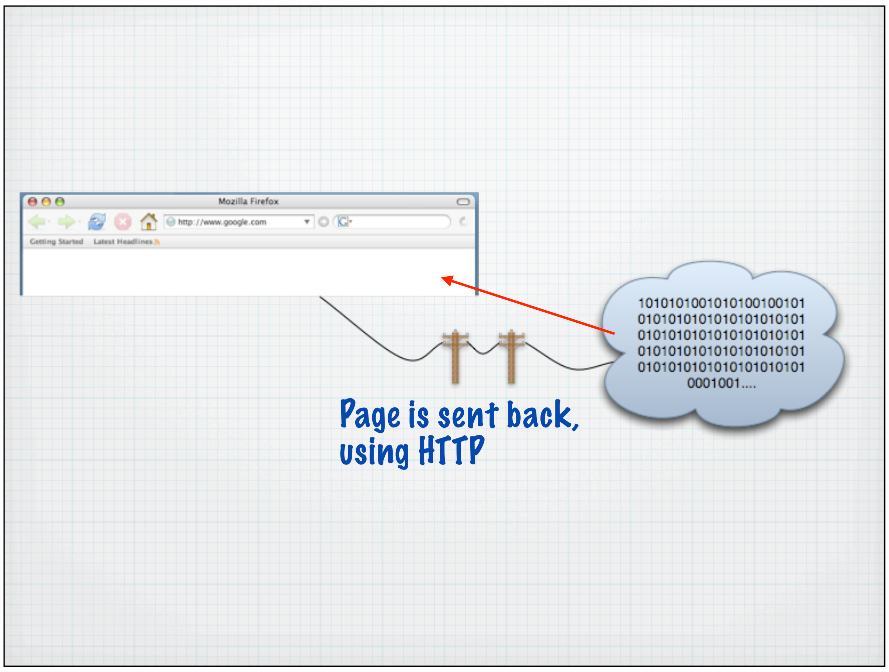




Server software finds the page

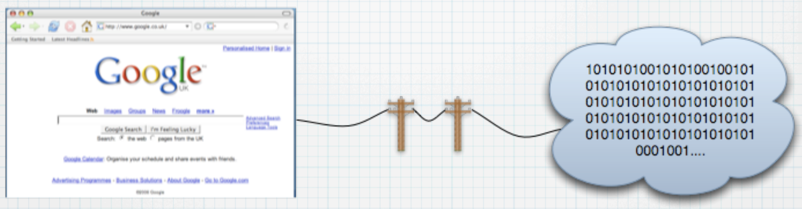


Server side code is executed



Page is sent back, using HTTP

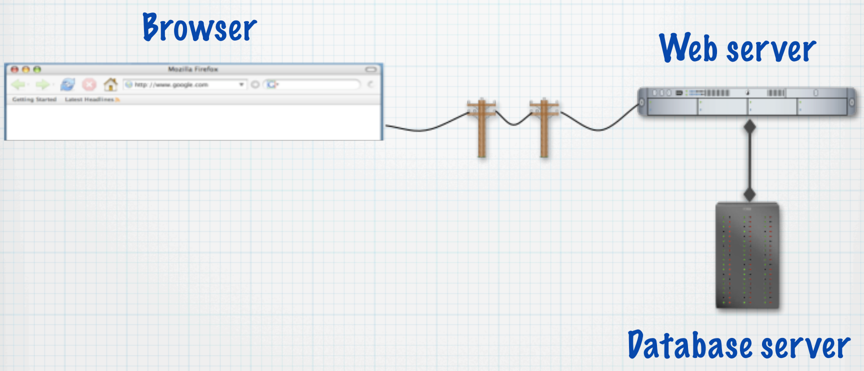
Browser renders / displays the page

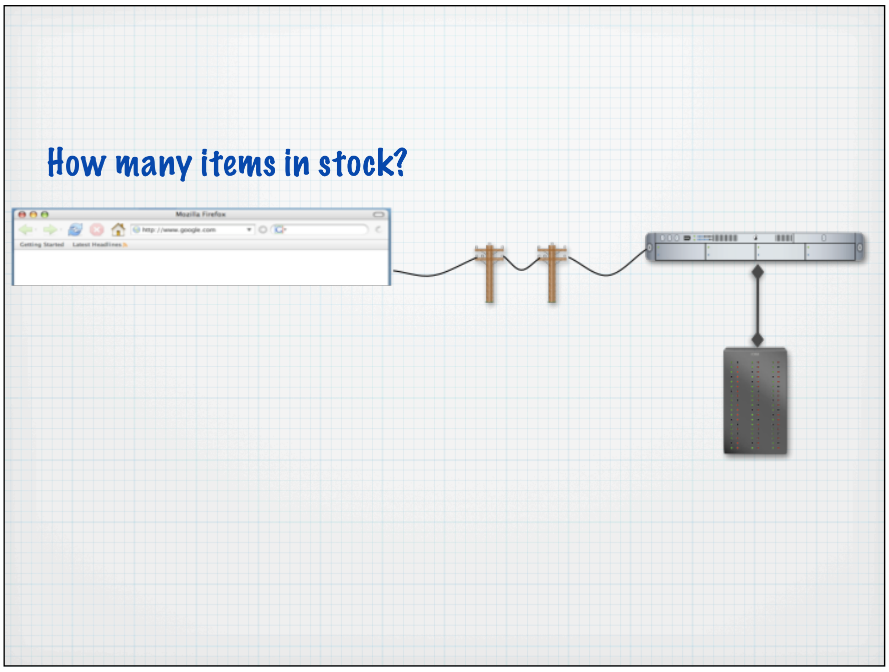


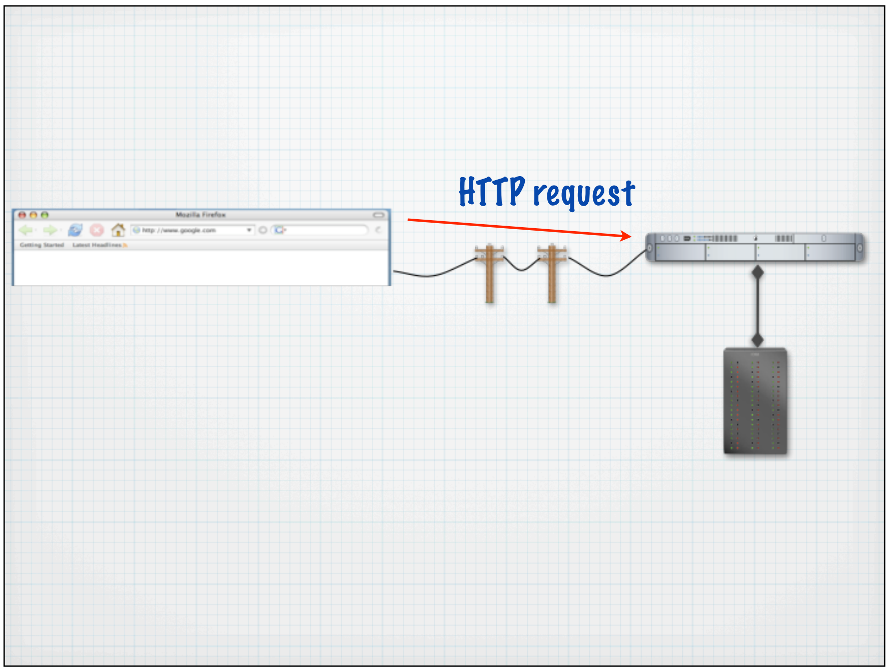
Server side scripting languages

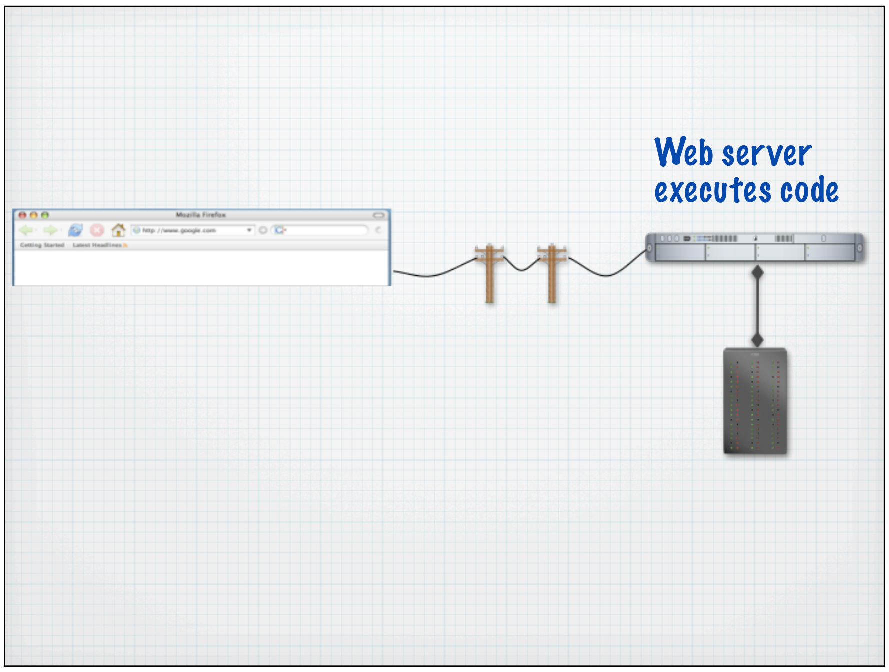
- Executes in the server
- Before the page is sent from server to browser
- Server side code is not visible in the client

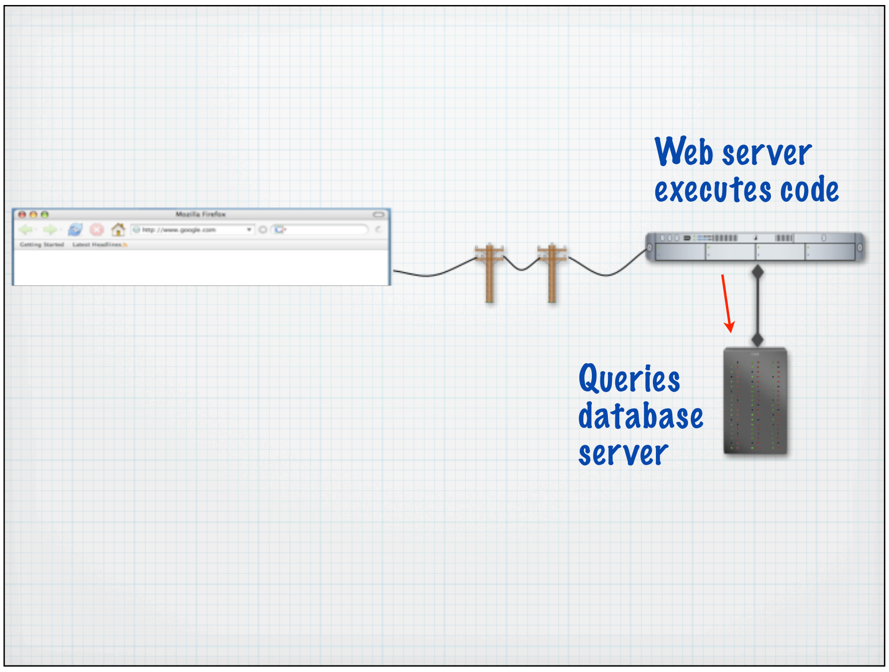
- Server side code can access resources on the server side

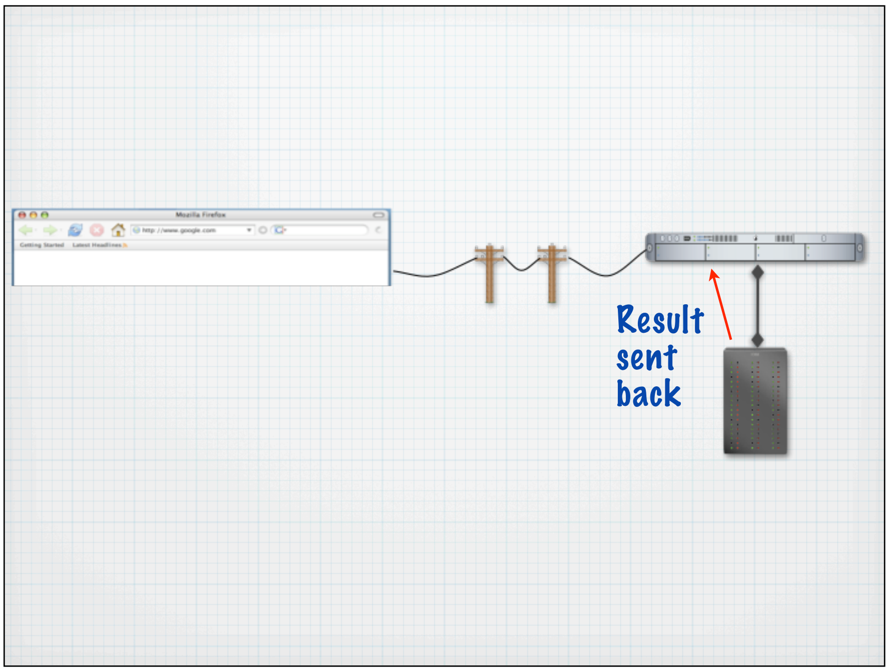


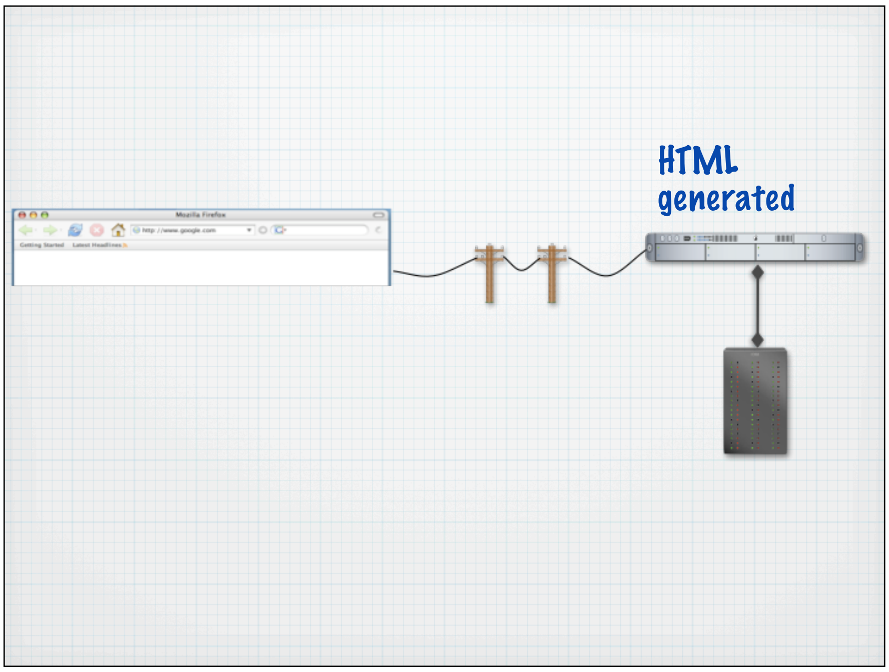

How many items in stock?
Mozilla Firefox
http://www.google.com


HTTP request
Mozilla Firefox
http://www.google.com

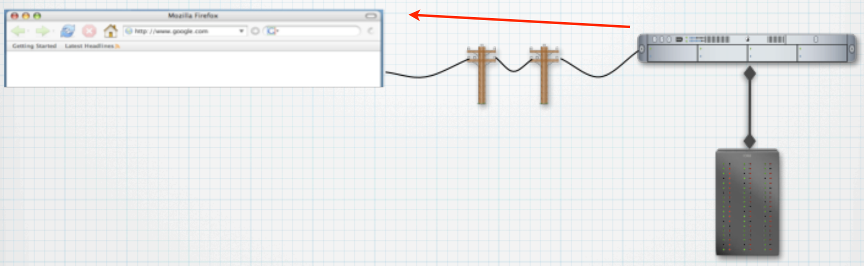

Web server
executes code
Mozilla Firefox
http://www.google.com


Web server executes code
Queries database server
Mozilla Firefox
http://www.google.com

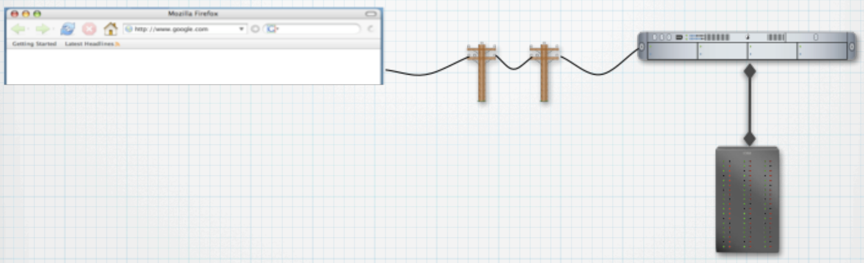

Result sent back
Mozilla Firefox
http://www.google.com


HTML generated
Mozilla Firefox
http://www.google.com

HTTP response



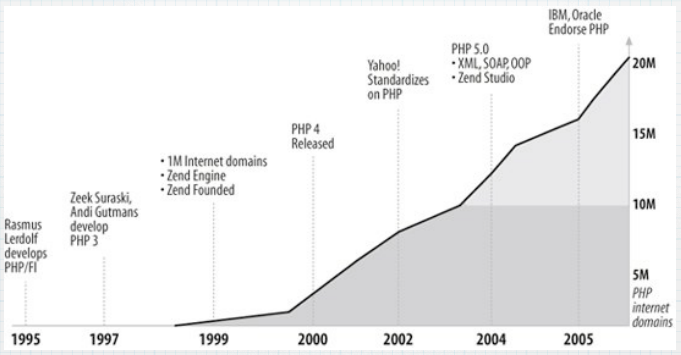
Answer displayed



So why PHP?

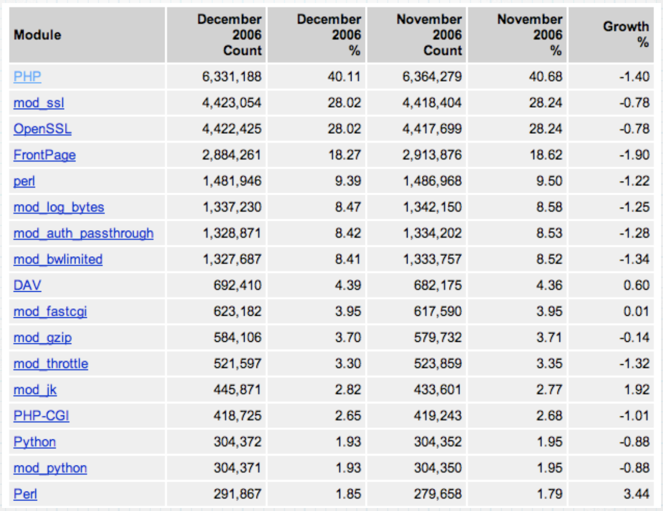
PERL
PHP
PYTHON
ASP

PHP usage ...



- Source: PHP programming 2nd Ed.

PHP compared to others ...



Module	December 2006 Count	December 2006 %	November 2006 Count	November 2006 %	Growth %
PHP	6,331,188	40.11	6,364,279	40.68	-1.40
mod_ssl	4,423,054	28.02	4,418,404	28.24	-0.78
OpenSSL	4,422,425	28.02	4,417,699	28.24	-0.78
FrontPage	2,884,261	18.27	2,913,876	18.62	-1.90
perl	1,481,946	9.39	1,486,968	9.50	-1.22
mod_log_bytes	1,337,230	8.47	1,342,150	8.58	-1.25
mod_auth_passthrough	1,328,871	8.42	1,334,202	8.53	-1.28
mod_bwlimited	1,327,687	8.41	1,333,757	8.52	-1.34
DAV	692,410	4.39	682,175	4.36	0.60
mod_fastcgi	623,182	3.95	617,590	3.95	0.01
mod_gzip	584,106	3.70	579,732	3.71	-0.14
mod_throttle	521,597	3.30	523,859	3.35	-1.32
mod_jk	445,871	2.82	433,601	2.77	1.92
PHP-CGI	418,725	2.65	419,243	2.68	-1.01
Python	304,372	1.93	304,352	1.95	-0.88
mod_python	304,371	1.93	304,350	1.95	-0.88
Perl	291,867	1.85	279,658	1.79	3.44

- Source: www.securityspace.com

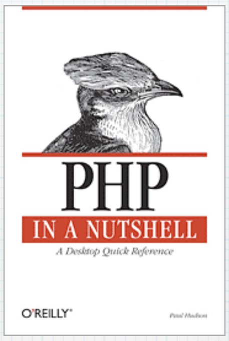
Books - core syntax

Creating Dynamic Web Pages
2nd Edition
Programming
PHP
O'REILLY
Rasmus Lerdorf, Kevin Tatroe & Peter MacIntyre

Programming PHP, Second Edition

By Kevin Tatroe, Rasmus Lerdorf, Peter MacIntyre
Second Edition April 2006

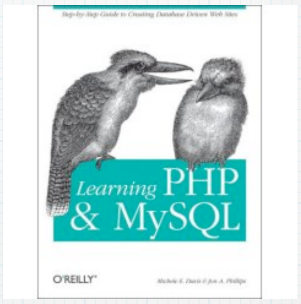
** Recommended



PHP in a Nutshell

By Paul Hudson
First Edition October 2005

Books - learning / tutorial based



Learning PHP 5

By David Sklar
First Edition June 2004

Learning PHP and MySQL

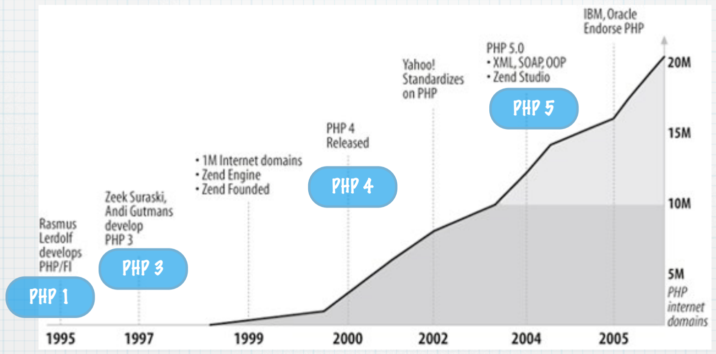
By Michele Davis, Jon Phillips
First Edition June 2006

Other texts..

- There are other publishers / texts (trade books)
- Look for books that cover PHP 5

- Open source, server side languages can rapidly develop
- Features added or deprecated rapidly

PHP development



- 5 versions in 10 years

Language basics

- Embedding PHP in Web pages
- Whitespace and Line breaks
- Statements and semicolons
- Case sensitivity
- Comments
- Literals
- Identifiers
- Keywords
- Data types

Much of this material is explained in PHP programming 2nd Ed. Chap 1 & 2

Embedding PHP in web pages

```
<?php
statement;
statement;
statement
?>
```

Use <?php and ?> to surround the php code

Embedding PHP in web pages

```
<?php
statement;statement;   statement;
             statement;
   statement;statement;
?>
```

In general whitespace doesn't matter

Use indenting and separate lines to create readable code

The legendary Hello World program

```
<!DOCTYPE HTML PUBLIC "-//W3C/DTD HTML 4.01
   Transitional//EN"
 "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<title>This is the first PHP program</title>
</head>
<body>
<p>
<?php
print "Hello World!";
?>
</p>
</body>
</html>
```

The legendary Hello World program

```
<!DOCTYPE HTML PUBLIC "-//W3C/DTD HTML 4.01
   Transitional//EN"
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<html>
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<body>
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<?php
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?>
</p>
</body>
</html>
```

The legendary Hello World program

```
<!DOCTYPE HTML PUBLIC "-//W3C/DTD HTML 4.01
   Transitional//EN"
 "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<title>This is the first PHP program</title>
</head>
<body>
<p>
<?php
print "Hello World!";
?>
</p>
</body>
</html>
```

print sends a sequence of characters to the output

The sequence here is indicated by start and end quotes

Other ways to embed PHP

<? and ?>	SGML style	Some older text books use this - deprecated
<% and %>	Microsoft ASP style	Some HTML editors use this for color syntax hints
<script language ="php"> and </script>	Echoes client side scripting embedding	Some strict HTML editors may respect this

The preferred method is <?php and ?>

PHP can be put 'anywhere'..

All the php blocks are processed before the page is sent

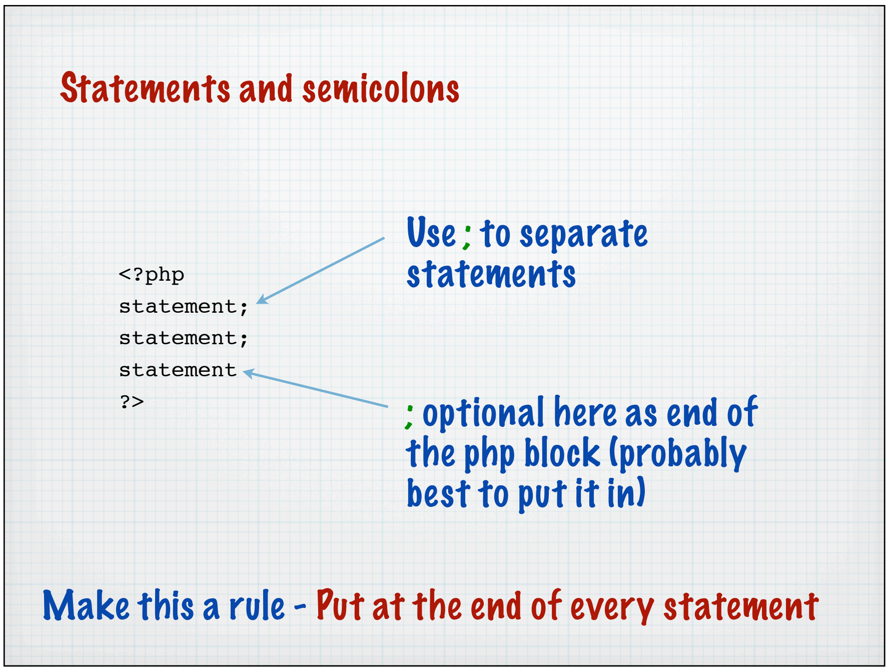
```
<html>
<?php ... ?>
<head>
<?php ... ?>
<title>... <?php ... ?> ...</title>
</head>
<body>
<p>
<?php ... ?>
</p>
</body>
</html>
```

PHP can be put 'anywhere'.. but works in sequence

```
<html>
<?php ... ?>
<head>
<?php ... ?>
<title>... <?php ... ?> ...</title>
</head>
<body>
<p>
<?php ... ?>
</p>
</body>
</html>
```

Starting at the top

Working down to the bottom



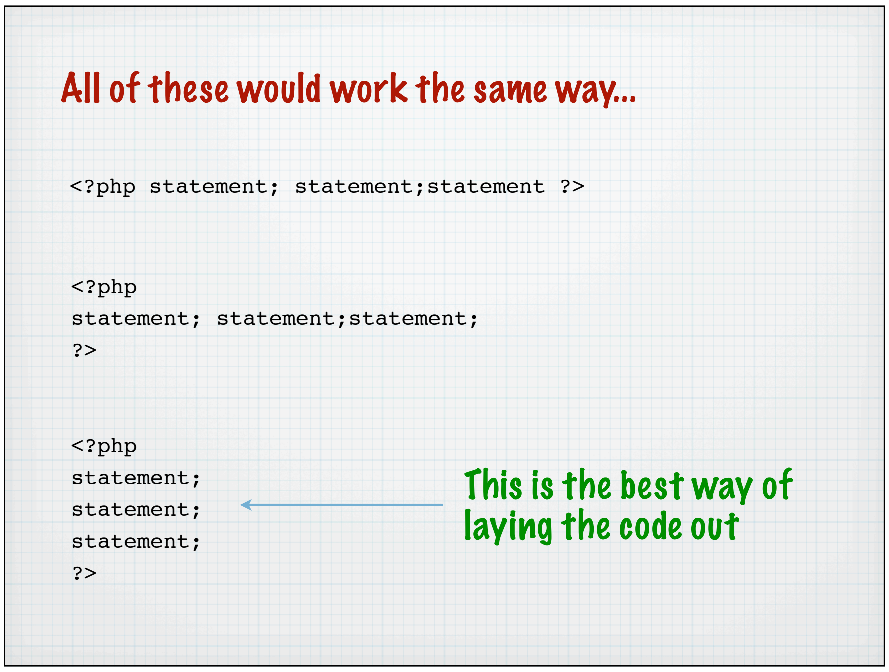
Statements and semicolons

```
<?php
statement;
statement;
statement
?>
```

Use ; to separate statements

; optional here as end of the php block (probably best to put it in)

Make this a rule - Put at the end of every statement



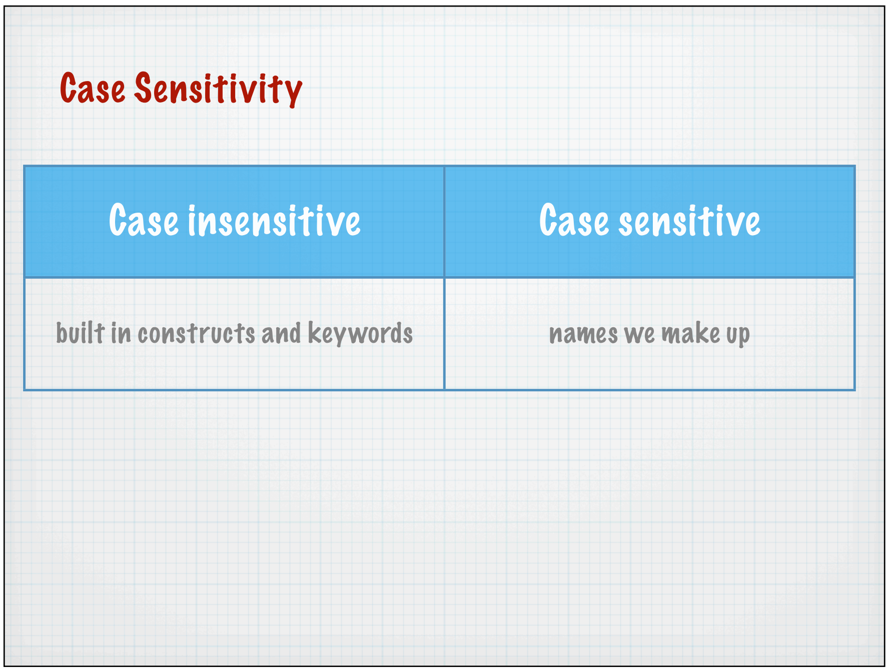
All of these would work the same way...

```
<?php statement; statement;statement ?>
```

```
<?php
statement; statement;statement;
?>
```

```
<?php
statement;
statement;
statement;
?>
```

This is the best way of laying the code out



Case Sensitivity

Case insensitive	Case sensitive
built in constructs and keywords	names we make up

Case insensitivity

```
<!DOCTYPE HTML PUBLIC "-//W3C/DTD HTML 4.01
   Transitional//EN"
 "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<title>This is the second PHP program</title>
</head>
<body>
<?php
print "<h1>Welcome to my website</h1>";
PRINT "<p>This is my web site, which is constructed";
prINT " from some HTML and PHP</p>";
?>
</body>
</html>
```

The same built in command

Case insensitivity

```
<!DOCTYPE HTML PUBLIC "-//W3C/DTD HTML 4.01
   Transitional//EN"
 "http://www.w3.org/TR/html4/loose.dtd">
<html>
<head>
<title>This is the second PHP program</title>
</head>
<body>
<?php
print "<h1>Welcome to my website</h1>";
PRINT "<p>This is my web site, which is constructed";
prINT " from some HTML and PHP</p>";
?>
</body>
</html>
```

Case sensitivity - names we define are case sensitive

```
$value
$VALUE
$vaLUE
```

Three different names

PHP requires a $ before names we define - more on this in a minute ...

Comments

Many different ways to add comments

Comment	Source	Action
//	C++	Comments to EOL
#	Unix shell scripting	Comments to EOL
/* and */	C	Comments out a block

Comments

```
<?php
php statement; // A comment here
php statement; # Another comment here

/* A series of lines
with comments ignored by the PHP processor
*/
php statement;
?>
```

Comments

```
<?php
php statement; // A comment here
php statement; # Another comment here

/* A series of lines
with comments ignored by the PHP processor
*/
php statement;
?>
```

Everything in red is ignored by the PHP interpreter

Language basics

- Embedding PHP in Web pages ✔
- Whitespace and Line breaks ✔
- Statements and semicolons ✔
- Case sensitivity ✔
- Comments ✔
- Literals
- Identifiers
- Keywords
- Data types

Literals

A data value that appears directly in the program

`2001`	An integer
`0xFE`	Hexadecimal number
`1.4142`	Float
`“Hello World”`	String
`‘Hi’`	String
`true`	Bool
`null`	built in ‘no value’ symbol

Identifiers

Identifiers (or names) in PHP must -

Begin with an ASCII letter (uppercase or lowercase)

or begin with the underscore character _

or any character between ASCII 0x7F to 0xFF

followed by any of these characters and the digits 0-9

Variables

Variables in PHP are identifiers prefixed by $

```
$bill
$value_count
$anothervalue3
$THIS_IS_NOT_A_GOOD_IDEA
$_underscore
```

Valid

Invalid

```
$not   valid
$[
$3wa
```

Variables

We use variables for items of data that will change as the program runs

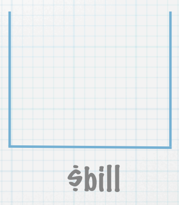
Choose a sensible name and have as many as you like

```
                    $total_income
$bill
          $salary             $month
$total
                  $percentage_increase
```

Variables

When we declare a variable, a space is reserved and labelled for that item (in memory)

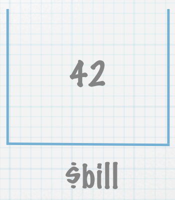
$bill



Variables

To give it a value, use the equals sign

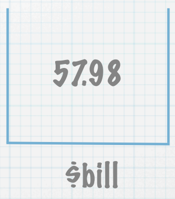
$bill = 42



Variables

To give it a value, use the equals sign

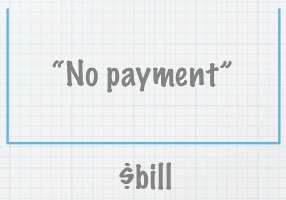
$bill = 57.98



Variables

To give it a value, use the equals sign

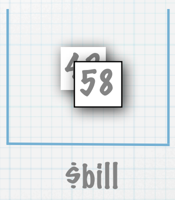
$bill = "No payment"



Variables

If a value is changed, the old value is overwritten

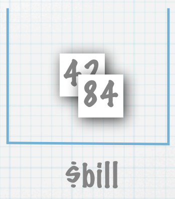
```
$bill = 42;
$bill = 58;
```



Variables

Sometimes we use the old value to recalculate the new value

```
$bill = 42;
$bill = $bill*2 ;
```



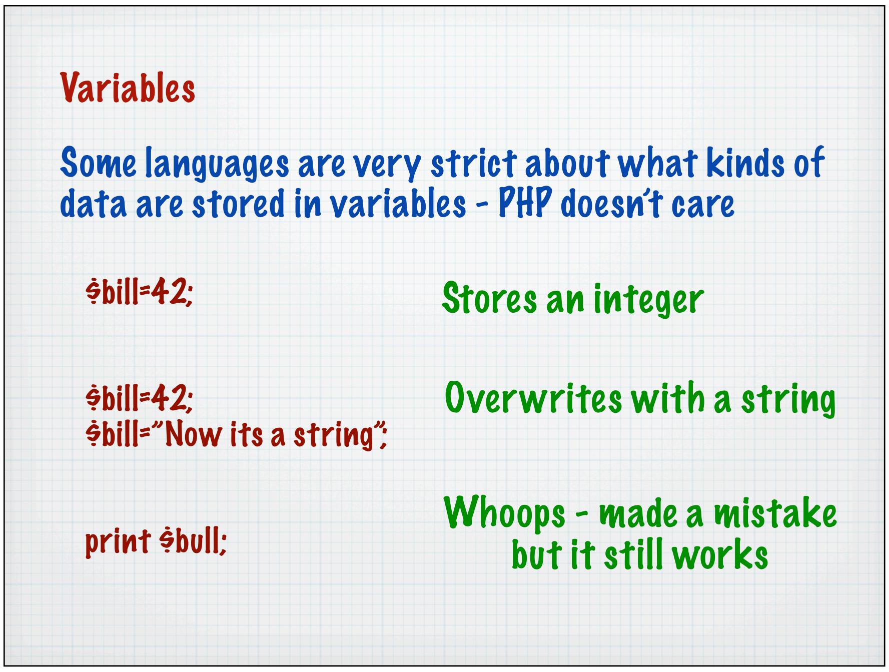
Variables

Some languages are very strict about what kinds of data are stored in variables - PHP doesn't care

`$bill=42;`	Stores an integer

`$bill=42;`
`$bill="Now its a string";`
	Overwrites with a string

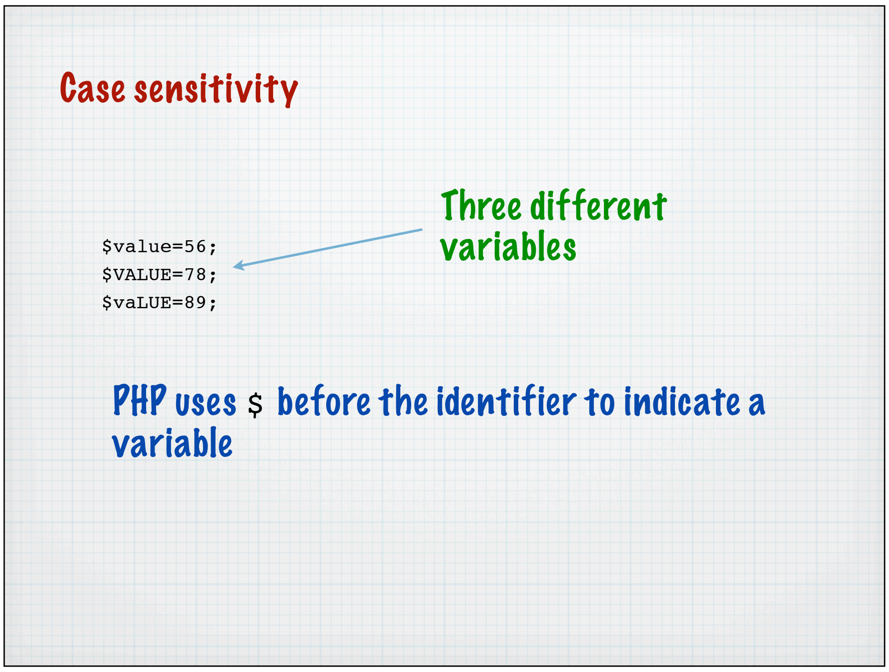
`print $bull;`	Whoops - made a mistake but it still works



Variables

Some languages are very strict about what kinds of data are stored in variables - PHP doesn't care

$bill=42;	Stores an integer
$bill=42; $bill="Now its a string";	Overwrites with a string
print $bull;	Whoops - made a mistake but it still works

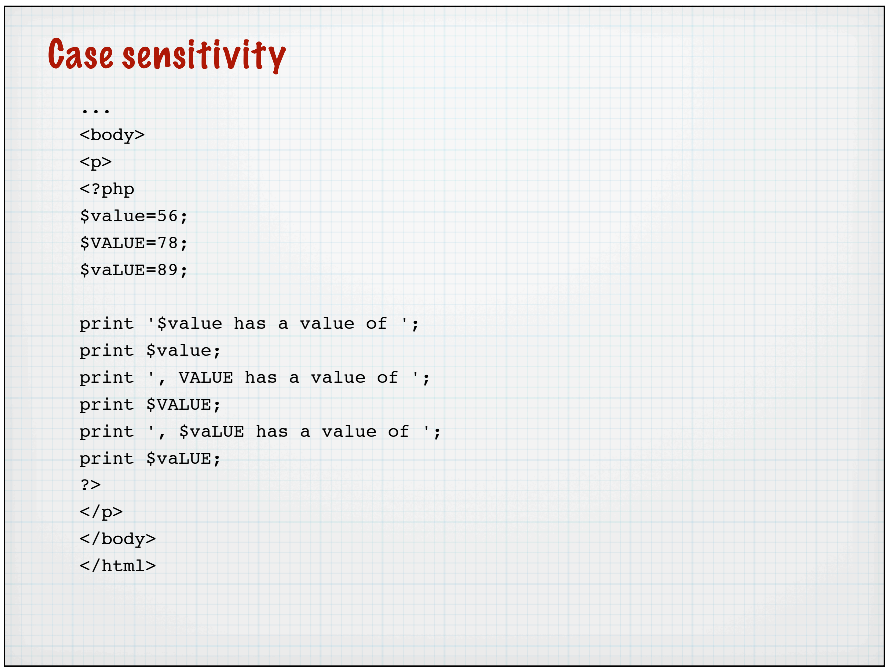


Case sensitivity

```
$value=56;
$VALUE=78;
$vaLUE=89;
```

Three different variables

PHP uses $ before the identifier to indicate a variable



Case sensitivity

```
...
<body>
<p>
<?php
$value=56;
$VALUE=78;
$vaLUE=89;

print '$value has a value of ';
print $value;
print ', VALUE has a value of ';
print $VALUE;
print ', $vaLUE has a value of ';
print $vaLUE;
?>
</p>
</body>
</html>
```

Case sensitivity

```
...
<body>
<p>
<?php
$value=56;
$VALUE=78;
$vaLUE=89;

print '$value has a value of ';
print $value;
print ', VALUE has a value of ';
print $VALUE;
print ', $vaLUE has a value of ';
print $vaLUE;
?>
</p>
</body>
</html>
```

Constants

Referred to by their identifier and set using define()

```
define ('BESTLANGUAGE', "PHP");
print BESTLANGUAGE;
```

Traditionally constants have UPPER CASE IDENTIFIERS

Keywords

Reserved by the language for core functionality

Also - can't use a built in function name as a variable

__CLASS__	Declare	extends	print( )
__FILE__	Default	final	private
__FUNCTION__	die( )	for	protected
__LINE__	Do	foreach	public
__METHOD__	echo( )	function	require( )
Abstract	Else	global	require_once( )
And	elseif	if	return( )
array( )	empty( )	implements	static
As	enddeclare	include( )	switch
Break	endfor	include_once( )	tHRow
Case	endforeach	interface	TRy
catch	endif	isset( )	unset( )
cfunction	endswitch	list( )	use
Class	endwhile	new	var
clone	eval( )	old_function	while
Const	exception	Or	xor
Continue	exit( )	php_user_filter	

Data types

PHP provides 8 types

scalar (single-value)	compound
integers	arrays
floating-point	objects
string	
booleans	

Two are special - resource and NULL

Integers

Whole numbers - range depends on the C compiler that PHP was made in (compiled in)

Typically	`+2,147,483,647 to -2,147,483,647`
Octal	`0755`
Hexadecimal	`0xFF`

Larger integers get converted to floats automatically

Floating-Point Numbers

Real numbers - again range is implementation specific

Typically	`1.7E-308 to 1.7E+308 with 15 digits of accuracy`
Examples	`3.14, 0.017, -7.1, 0.314E1, 17.0E-3`

Strings

Delimited by either single or double quotes

```
‘here is a string’
“here is another string”
```

Strings - single quotes

You can use single quotes to enclose double quotes

```
$outputstring=‘He then said “Goodbye” and left’;
```

Useful for easily printing HTML attributes

```
$outputstring=‘<a href=”http:/www.bbc.co.uk”>BBC</a>’;
```

Strings - double quotes

You can use double quotes to enclose single quotes

```
$outputstring=”He then said ‘Goodbye’ and left”;
```

Variable are expanded within double quotes

```
$name="Barry";
print "<p>We can use variable expansion when we print using double quotes - hello $name.</p>";
print '<p>But it does not work with single quotes - hello $name</p>';
```

Strings - double quotes

You can use double quotes to enclose single quotes

```
    $outputstring=”He then said ‘Goodbye’ and left”;
```

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```

Strings - double quotes

Double quotes also support a variety of string escapes

\"	Double quotes
\n	Newline
\r	Carriage return
\t	Tab
\\	Backslash
\$	Dollar sign
\{	Left brace
\}	Right brace
\[	Left bracket
\]	Right bracket
\0 through \777	ASCII character represented by octal value
\x0 through \xFF	ASCII character represented by hex value

Strings - double quotes

Remember that the HTML source is manipulated by the PHP

```
    print ”He then said ‘Goodbye’ and left \n”;
    print “leaving in a hurry”;
```

Produces 1 line not 2 in the rendered HTML

So where is the \n ?

Strings - double quotes

Remember that the HTML source is manipulated by the PHP

```
print ”He then said ‘Goodbye’ and left \n”;
print “leaving in a hurry”;
```

Produces 1 line not 2 in the rendered HTML

So where is the \n ?

Strings - HTML

Its HTML that must be used to change the display

```
print "<p>He then said 'Goodbye' and left
  </p><p>driving off in a hurry.</p>";
```

Strings - HTML

Its HTML that must be used to change the display

```
print "<p>He then said 'Goodbye' and left
  </p><p>driving off in a hurry.</p>";
```

Boolean

PHP has special reserved words for true and false

```
$sunIsShining=true;
$needACoat=false;
```

No quotes required - more on this later

Operator precedence

Heavily borrowed from C / Perl

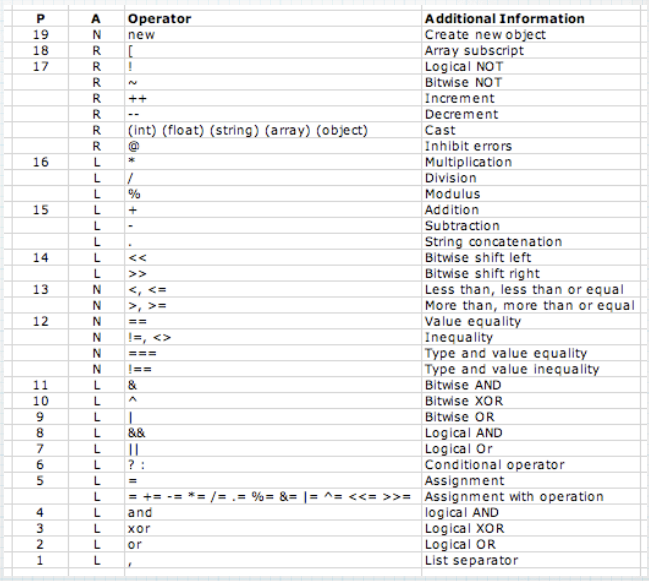
p - precedence

a - associativity

N - non-associative

R - Right to Left

L - Left to Left



P	A	Operator	Additional Information
19	N	new	Create new object
18	R	[	Array subscript
17	R	!	Logical NOT
	R	~	Bitwise NOT
	R	++	Increment
	R	--	Decrement
	R	(int) (float) (string) (array) (object)	Cast
	R	@	Inhibit errors
16	L	*	Multiplication
	L	/	Division
	L	%	Modulus
15	L	+	Addition
	L	-	Subtraction
	L	.	String concatenation
14	L	<<	Bitwise shift left
	L	>>	Bitwise shift right
13	N	<, <=	Less than, less than or equal
	N	>, >=	More than, more than or equal
12	N	==	Value equality
	N	!=, <>	Inequality
	N	===	Type and value equality
	N	!==	Type and value inequality
11	L	&	Bitwise AND
10	L	^	Bitwise XOR
9	L	|	Bitwise OR
8	L	&&	Logical AND
7	L	||	Logical Or
6	L	? :	Conditional operator
5	L	=	Assignment
	L	= += -= *= /= .= %= &= |= ^= <<= >>=	Assignment with operation
4	L	and	logical AND
3	L	xor	Logical XOR
2	L	or	Logical OR
1	L	,	List separator

Operators

Standard arithmetic operators: +, -, *, /, % ..

Concatenation operator: .

```
$outputstring="He then said ".$quote;
```

Any non-string value is converted to a string before the concatenation.

Operators

```
$aBool=true;
$anInt=156;
$aFloat=12.56;
$anotherFloat=12.2E6;
$massiveFloat=12.2E-78;
print "The bool printed looks like this: ".$aBool."<br />";
print "The int printed looks like this: ".$anInt."<br />";
print "The (smaller) float printed looks like this: ".$aFloat."<br />";
print "The larger float printed looks like this: ".$anotherFloat."<br />";
print "The even larger float printed looks like this: ".$massiveFloat."<br />";
```

Operators

```
$aBool=true;
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