Introduction to php

Bird’s eye view

- A short history of php
- Parsing
- Variables
- Arrays
- Operators
- Functions
- Control Structures
- External Data Files

Background

- PHP is server side scripting system
  - PHP stands for "PHP: Hypertext Preprocessor"
  - Syntax based on Perl, Java, and C
  - Very good for creating dynamic content
  - Powerful.
  - For dynamic content, this is a good one to choose.

History

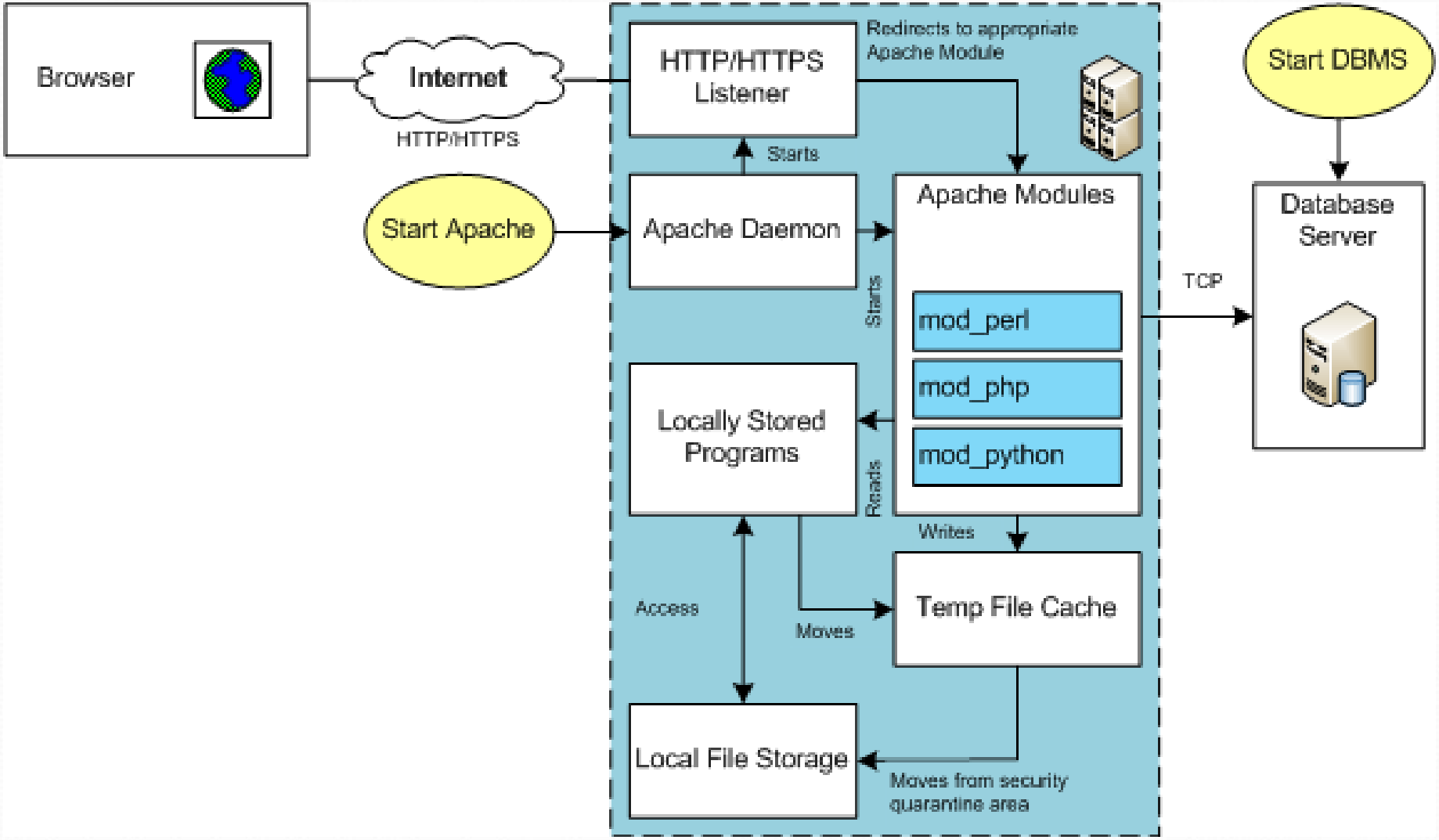
- Started as a Perl hack in 1994 by **Rasmus** Lerdorf (to handle his **resume**), developed to PHP/FI 2.0
- By 1997 up to **PHP 3.0** with a new parser engine by **Zeev Suraski** and **Andi Gutmans**
- Version 5.2.4 is **rewritten** by **Zend** (www.zend.com) to include a number of features, such as an object model
- Current is version 7.1
- php is one of the premier examples of what an **open source** project can be

Rasmus, Gutmans, Zeev

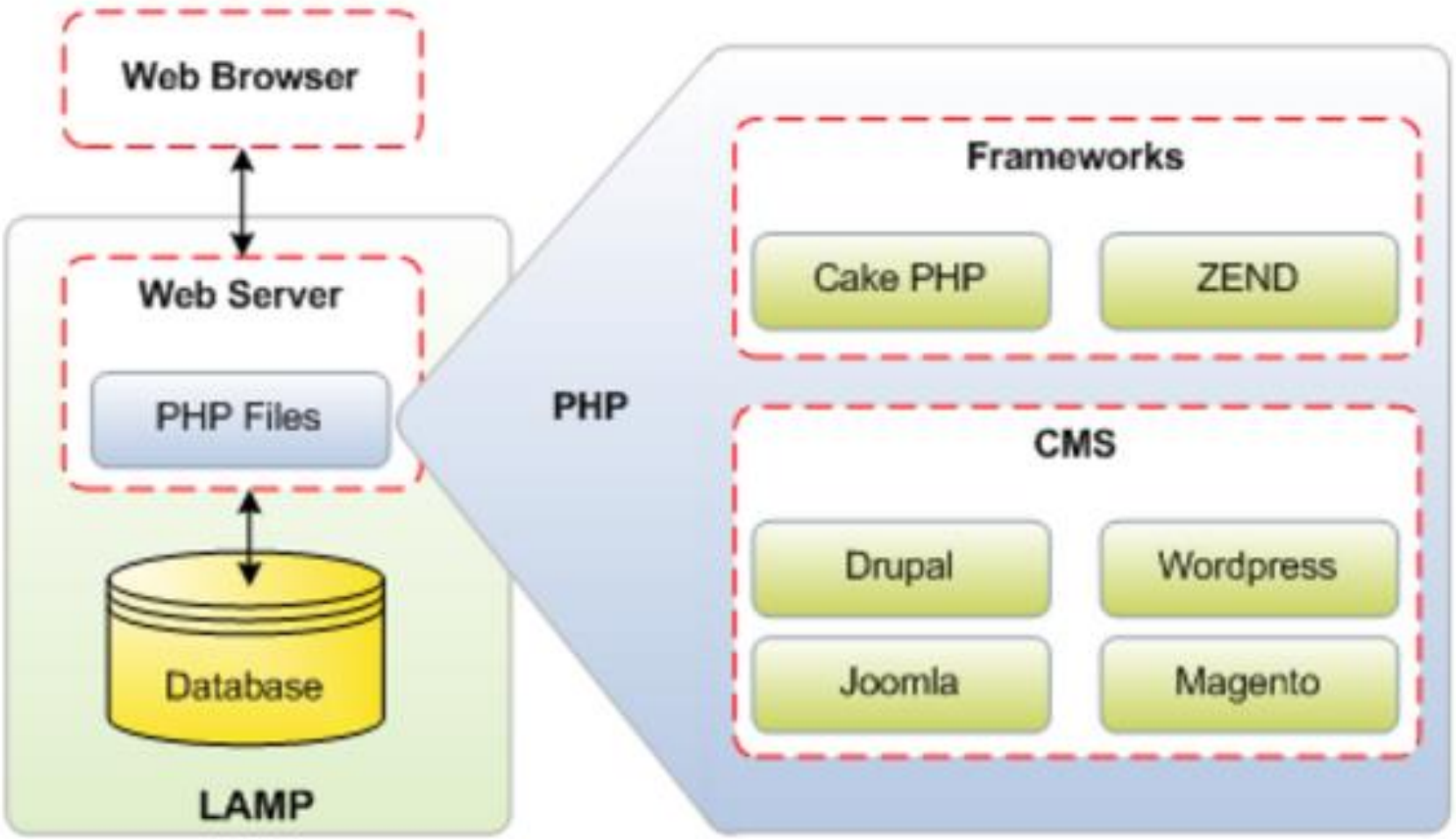


Rasmus Lerdorf (left), who wrote the original CGI component, together with Andi Gutmans (middle) and Zeev Suraski (right), who rewrote the parser that formed PHP 3.

LAMP Architecture



PHP Architecture



PHP Scripts

- Typically file ends in .php--this is set by the web server configuration
- Separated in files with the **<?php ?>** tag
- You can separate php commands in file, or can be contained in html – user choice.
- Program lines end in **";"** or you get an error
- Server recognizes embedded script & executes, Result is passed to browser, source isn't visible

```
<P>
<?php $var1 = "Hello World!";
echo $var1;
?>
</P>
```

Parsing

- We've talk about how the browser can read a text file and process it, that's a basic parsing method
- Parsing involves acting on relevant portions of a file and ignoring others
- Browsers parse web pages as they load
- Web servers with server side technologies like php parse web pages as they are being passed out to the browser
- Parsing does represent work, so there is a cost

Two Ways

- You can embed sections of php inside html:

```
<BODY>
<P>
<?php $myvar = "Hello World!";
echo $myvar;
</BODY>
```

- Or you can call html from php:

```
<?php
echo "<html><head><title>Howdy</title>
…
?>
```

What do we know already?

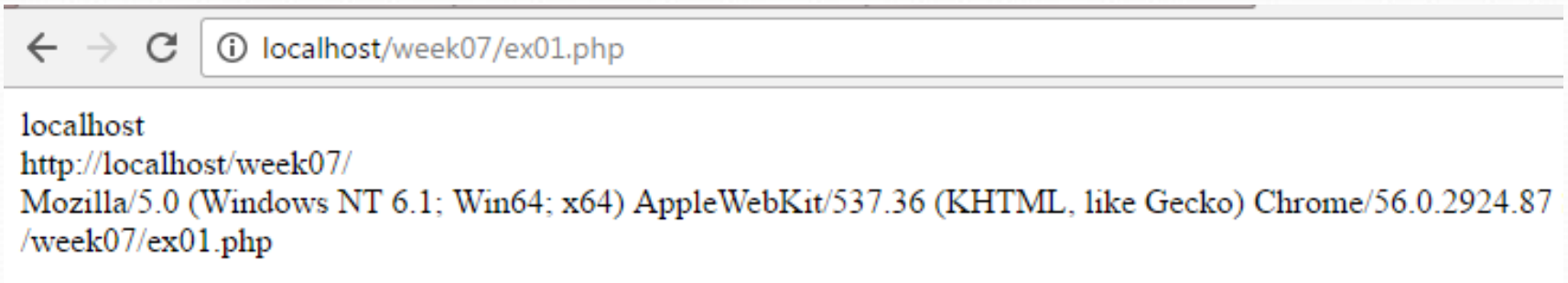
- Much of what we learned about javascript holds true in php (but not all!), and other languages as well

```
$name = “Abdul Rahman";
echo "Howdy, my name is $name";
echo "What will $name be in this line?";
echo 'What will $name be in this line?';
echo 'What's wrong with this line?';
if ($name == " Abdul Rahman")
   {
   // Hey, what's this?
   echo "got a match!";
   }
```

Variables

- Typed by context (but one can force type), so it's loose
- Begin with "$" (unlike javascript!)
- Assigned by value
  - `$foo = "Bob"; $bar = $foo;`
- Assigned by reference, this links vars
  - `$bar = &$foo;`
- Some are preassigned, server and env vars
  - For example, there are PHP vars, eg. `SERVER_NAME, HTTP_USER_AGENT`

```php
<?php
echo $_SERVER['SERVER_NAME'];
echo "<br>";
echo $_SERVER['HTTP_REFERER'];
echo "<br>";
echo $_SERVER['HTTP_USER_AGENT'];
echo "<br>";
echo $_SERVER['SCRIPT_NAME'];
?>
```



phpinfo()

- The phpinfo() function shows the php environment
- Use this to read system and server variables, setting stored in php.ini, versions, and modules
- Notice that many of these data are in arrays
- This is the first script you should write…

```
<?php
phpinfo();
?>
```

localhost/week07/ex02.php

PHP Version 5.5.11

System	Windows NT CSFCSPC-73 6.1 build 7601 (Windows 7 Ultimate Edition Service Pack 1) i586
Build Date	Apr 8 2014 15:01:59
Compiler	MSVC11 (Visual C++ 2012)
Architecture	x86
Configure Command	cscript /nologo configure.js "--enable-snapshot-build" "--disable-isapi" "--enable-debug-pack" "--without-mssql" "--without-pdo-mssql" "--without-pi3web" "--with-pdo-oci=C:\php-sdk\oracle\x86\instantclient10\sdk,shared" "--with-oci8=C:\php-sdk\oracle\x86\instantclient10\sdk,shared" "--with-oci8-11g=C:\php-sdk\oracle\x86\instantclient11\sdk,shared" "--enable-object-out-dir=../obj/" "--enable-com-dotnet=shared" "--with-mcrypt=static" "--disable-static-analyze" "--with-pgo"
Server API	Apache 2.0 Handler
Virtual Directory Support	enabled
Configuration File (php.ini) Path	C:\Windows
Loaded Configuration File	D:\xampp\php\php.ini
Scan this dir for additional .ini files	(none)
Additional .ini files parsed	(none)
PHP API	20121113
PHP Extension	20121212
Zend	220121212

Variable Variables

- Using the value of a variable as the **name** of a second variable)

```
$a = “welcome";
$$a = “mama";
```

- Thus:

```
echo "$a ${$a}";
```

- Is the same as:

```
echo "$a $welcome";
```

- But $$a echoes as "$welcome"….

Operators

- Arithmetic (+, -, *, /, %) and String (.)
- Assignment (=) and combined assignment

```
$a = 3;
$a += 5; // sets $a to 8;
$b = "Hello ";
$b .= "There!"; // sets $b to "Hello There!";
```

- Bitwise (&, |, ^, ~, <<, >>)
  - *$a ^ $b (Xor: Bits that are set in $a or $b but not both are set.)*
  - *~ $a (Not: Bits that are set in $a are not set, and vice versa.)*
- Comparison (==, ===, !=, !==, <, >, <=, >=)

Coercion

- Just like javascript, php is loosely typed
- Coercion occurs the same way
- If you concatenate a number and string, the number becomes a string.

Operators:

- Error Control Operator(@)
  - Suppress error messages associated with the line it is used. Can be used in the begging of a line or directly in front of the function / command.

```
<?php
@include("file.php")
?>
```

```
<?php
/* Intentional file error */
$my_file = @file ('non_existent_file') or
    die ("Failed opening file");
```

- Execution
  - You can pass a string to the shell for execution:

```
$output = `ls -al`;
$output = shell_exec("ls -al");
```

  - This is one reason to be careful about user set variables!
- Incrementing/Decrementing

```
++$a (Increments by one, then returns $a.)
$a++ (Returns $a, then increments $a by one.)
--$a  (Decrements $a by one, then returns $a.)
$a--  (Returns $a, then decrements $a by one.)
```

Operators

- Logical

```
$a and $b     And     True if both $a and $b are true.
$a or $b      Or      True if either $a or $b is true.
$a xor $b     Xor     True if either $a or $b is true,
                      but not both.
! $a          Not     True if $a is not true.
$a && $b      And     True if both $a and $b are true.
$a || $b      Or      True if either $a or $b is true.
```

- The two ands and ors have different precedence rules, "and" and "or" are lower precedence than "&&" and "||"
- Use parentheses to resolve precedence problems or just to be clearer

Control Structures

- Wide Variety available
  - if, else, elseif
  - while, do-while
  - for, foreach
  - break, continue, switch
  - require, include, require_once, include_once

Control Structures

- Mostly parallel to what we've covered already in javascript
- if, elseif, else, while, for, foreach, break and continue

Switch

- Switch, which we've seen, is very useful
- These two do the same things….

```
if ($i == 0) {
    echo "i equals 0";
} elseif ($i == 1) {
    echo "i equals 1";
} elseif ($i == 2) {
    echo "i equals 2";
}
```

```
switch ($i) {
case 0:
    echo "i equals 0";
    break;
case 1:
    echo "i equals 1";
    break;
case 2:
    echo "i equals 2";
    break;
}
```

Nesting Files

- require(), include(), include_once(), require_once() are used to bring in an external file
- This lets you use the same chunk of code in a number of pages, or read other kinds of files into your program
- **Be VERY careful of using these anywhere close to user input** — if a hacker can specify the file to be included, that file will execute within your script, with whatever rights your script has (readfile is a good alternative if you just want the file, but don't need to execute it)
- Yes, remote files can be specified

Arrays

- You can create an array with the array function, or use the explode function (this is very useful when reading files into web programs…)

```
$my_array = array(1, 2, 3, 4, 5);

$pizza  = "piece1 piece2 piece3 piece4 piece5 piece6";
$pieces = explode(" ", $pizza);
```

- An array is simply a variable representing a keyed list
  - A list of values or variables
  - If a variable, that var can also be an array
  - Each variable in the list has a key
  - The key can be a number or a text label

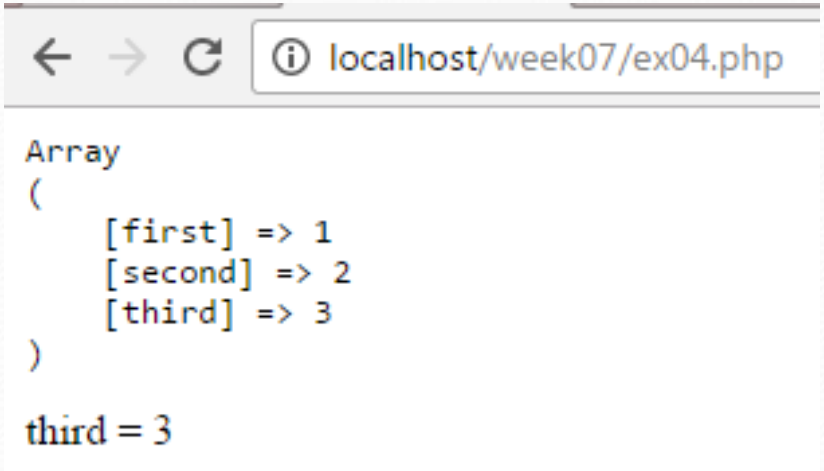
Arrays

- Arrays are lists, or lists of lists, or list of lists of lists, you get the idea--Arrays can be multi-dimensional
- Array elements can be addressed by either by number or by name (strings)
- If you want to see the structure of an array, use the print_r function to recursively print an array inside of pre tags

Text versus Keys

- Text keys work like number keys (well, really, it's the other way around--number keys are just labels)
- You assign and call them the same way, except you have to assign the label to the value or variables, eg: echo "$my_text_array[third]";

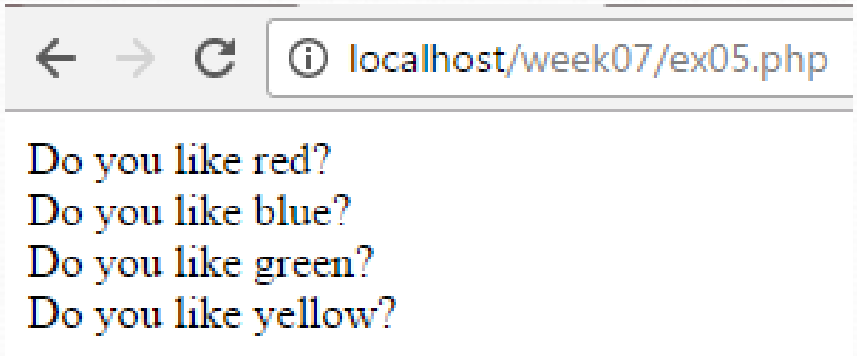
```
$my_text_array = array("first"=>1, "second"=>2, "third"=>3);
echo "<pre>";
print_r($my_text_array);
echo "</pre>";
echo "third = ".$my_text_array["third"];
```



Walking Arrays

- Use a loop, eg a foreach loop to walk through an array
- while loops also work for arrays with numeric keys--just set a variable for the loop, and make sure to increment that variable within the loop

```
$colors = array('red', 'blue', 'green', 'yellow');
foreach ($colors as $color) {
    echo "Do you like $color?"."<BR>";
}
```



Walking Arrays

- You can walk through an echo or print() line by line
- You can use print_r(), this will show you the structure of complex arrays--that output is to the right, and it's handy for learning the structure of an array

localhost/week07/ex06.php

```
Array
(
    [1] => Array
        (
            [Name] => Kamran
            [RollNo] => 110
            [subject] => Web Programming
            [fee] => 500
        )

    [2] => Array
        (
            [Name] => Fatima
            [RollNo] => 134
            [subject] => Applied Programming
            [fee] => 400.5
        )

)
```

```
<?php
$multiD = array(
        1  => array("Name" => "Kamran", "RollNo" => 110, "subject" => “OOP", "fee" => 500),
        2  => array("Name" => "Fahad", "RollNo" => 112, "subject" => "OOAD", "fee" => 300.5),
        2  => array("Name" => "Fatima", "RollNo" => 134, "subject" => “Databases", "fee" => 400.5)
        );
echo "<pre>";
print_r($multiD);
echo "</pre>";
?>
```

Multidimensional Arrays

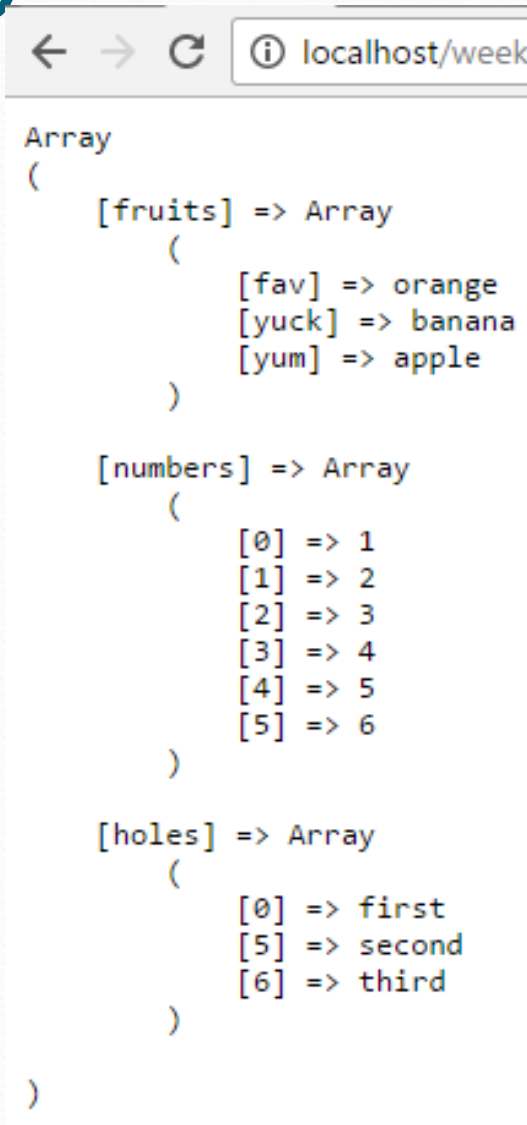
- A one dimensional array is a list, a spreadsheet or other columnar data is two dimensional…
- Basically, you can make an array of arrays

```
$multiD = array (
        "fruits"  => array("fav" => "orange", "yuck" => "banana", "yum" => "apple"),
        "numbers" => array(1, 2, 3, 4, 5, 6),
        "holes"   => array("first", 5 => "second", "third") );
```

- The structure can be built array by array, or declared with a single statement
- You can reference individual elements by nesting:

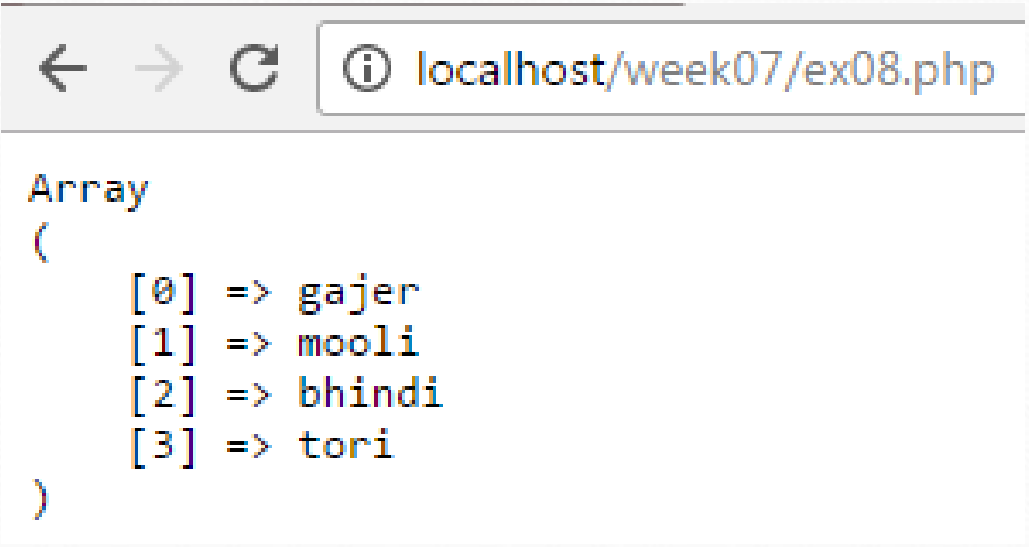
```
echo "<p>Yes, we have no " . $multiD["fruits"]["yuck"] .
" (ok by me).</p>";
```

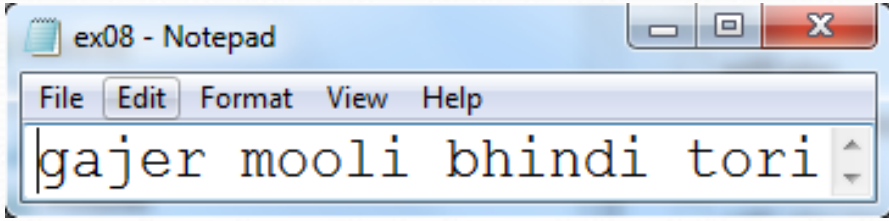
- print_r() will show the entire structure, but don't forget the pre tags



Getting Data into arrays

- You can directly read data into individual array slots via a direct assignment:
  $pieces[5] = “Chicken Tikka";
- From a file:
  - Use the file command to read a delimited file (the delimiter can be any unique char):
    $myfile = fopen("ex08.txt", "r")
  - Use explode to create array from line within loop:
    $multiD = explode(" ", $myVar01);



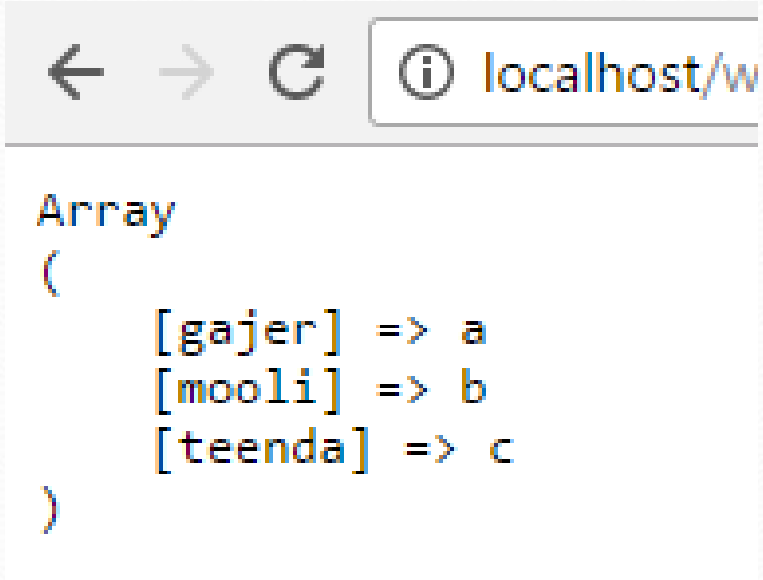


The Surface

- The power of php lies partially in the wealth of functions---for example, the 40+ array functions
  - array_flip() swaps keys for values
  - array_count_values() returns an associative array of all values in an array, and their frequency
  - array_rand() pulls a random element
  - array_unique() removes duppies
  - array_walk() applies a user defined function to each element of an array (so you can dice all of a dataset)
  - count() returns the number of elements in an array
  - array_search() returns the key for the first match in an array

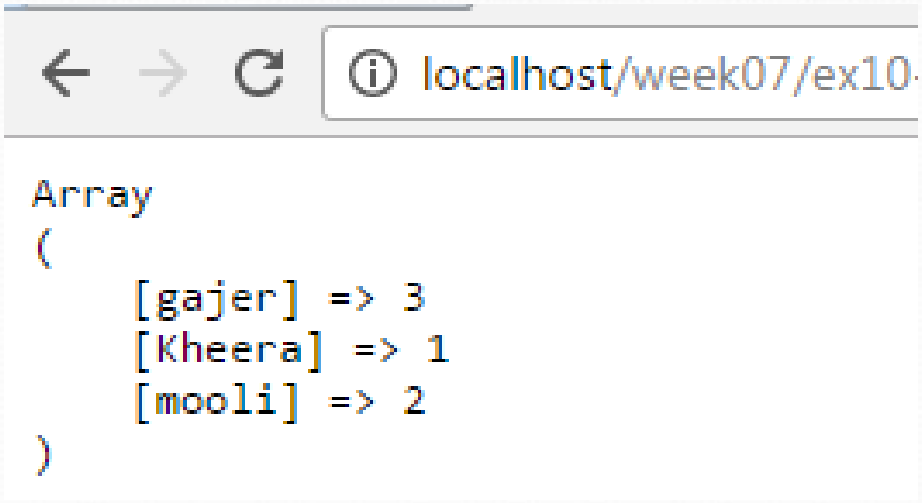
array_flip

```
<?php
$a1=array("a"=>"gajer","b"=>"mooli","c"=>"teenda");
$result=array_flip($a1);
echo "<pre>";
print_r($result);
echo "</pre>";
?>
```



array_count_values

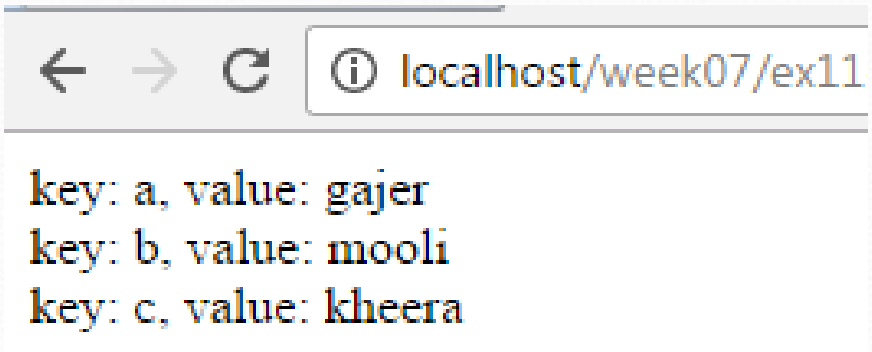
```
<?php
$arr01=array("gajer","Kheera","mooli","gajer","mooli","gajer");
echo "<pre>";
print_r(array_count_values($arr01));
echo "</pre>";
?>
```



array_walk

```
function fun1($value,$key) {
        echo "key: $key, value: $value<br>";
}

$arr01=array("a"=>"gajer","b"=>"mooli","c"=>"kheera");
array_walk($arr01,"fun1");
```



Using External Data

- You can build dynamic pages with just the information in a php script
- But where php shines is in building pages out of external data sources, so that the web pages change when the data does
- Most of the time, people think of a database like MySQL as the backend, but you can also use text or other files, LDAP, pretty much anything….

Standard data files

- Normally you'd use a tab delimited file, but you can use pretty much anything as a delimiter
- Files get read as arrays, one line per slot
- Remember each line ends in \n, you should clean this up, and be careful about white space
- Once the file is read, you can use explode to break the lines into fields, one at a time, in a loop….

Standard data files

- You can use trim() to clean white space and returns instead of str_replace()
- Notice that this is building an array of arrays

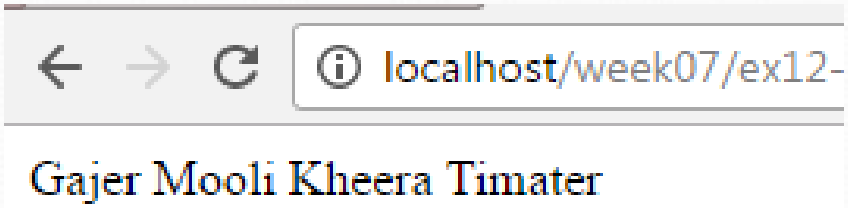
```
$items=file("./mydata.txt");
foreach ($items as $line)
  {
  $line = str_replace("\n", "", $line);
  $line = explode("\t", $line);
  // do something with $line array
  }
```

Useful string functions

- str_replace()
- trim(), ltrim(), rtrim()
- implode(), explode()
- addslashes(), stripslashes()
- htmlentities(), html_entity_decode(), htmlspecialchars()
- striptags()

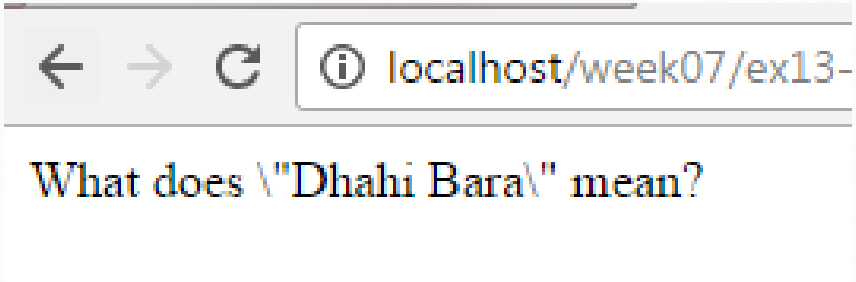
implode

```
<?php
$arr01 =
array('Gajer','Mooli','Kheera','Timater');
echo implode(" ",$arr01);
?>
```

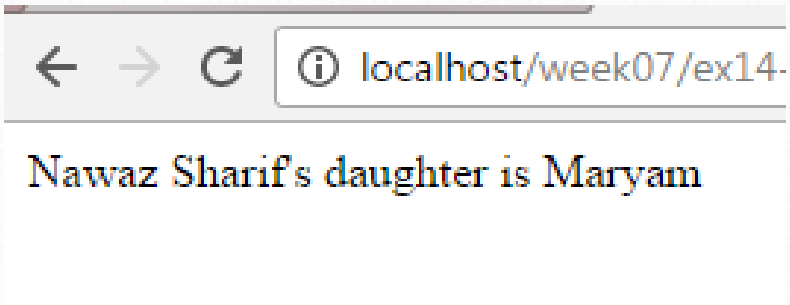


addslashes / stripslashes

```
<?php
$str01 =
addslashes('What does
"Dhahi Bara" mean?');
echo($str01);
?>
```




```
<?php
echo stripslashes("Nawaz
Sharif\'s daughter is Maryam");
?>
```



htmlentities()

- $str = 'Go to sf.net'; echo htmlentities($str);
- The HTML output of the code above will be (View Source):
- Go to sf.net
- The browser output of the code above will be:
- Go to sf.net

Alternative syntax

- Applies to if, while, for, foreach, and switch
- Change the opening brace to a colon
- Change the closing brace to an endxxx statement

```
<?php if ($a == 5): ?>
A is equal to 5
<?php endif; ?>
```

```
<?php
if ($a == 5):
    echo "a equals 5";
    echo "...";
else:
    echo "a is not 5";
endif;
?>
```