

WEB APPLICATIONS



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Aims for this Semester

To **reinforce** and **extend** the students' existing skills in **web application development** and **databases.!!!**

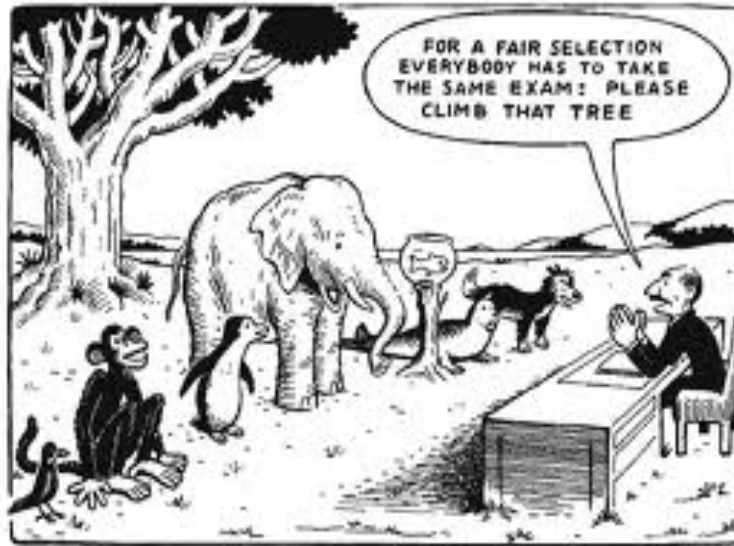
Students will develop a knowledge which will enable them to **create dynamic web applications**, which incorporate database or XML content, using a server-side scripting language(PHP). 😊



LEARNING OUTCOMES

Sessions
Cookies

Server-side
Web Applications



Content Mgt.
System / Shopping
Cart

Application
CRUD

Database Access

HOUSE KEEPING

**Bring pen
and paper to class
every week**

Make
note taking
FUN!



Recommended Books



Recommended Books

- PHP5 in Easy Steps – Mike Mc Grath
- Developing Web Applications – Ralph Moseley
- Web Programming – Chris Bates
- Web Server Programming – Neil Gray

WEB SITES AND VIDEOS

• Web Sites

- <http://www.php.net/>
- <http://www.php.net/manual/en/>
- <http://www.w3schools.com>
- <http://devzone.zend.com/node/view/id/627>

• Videos:

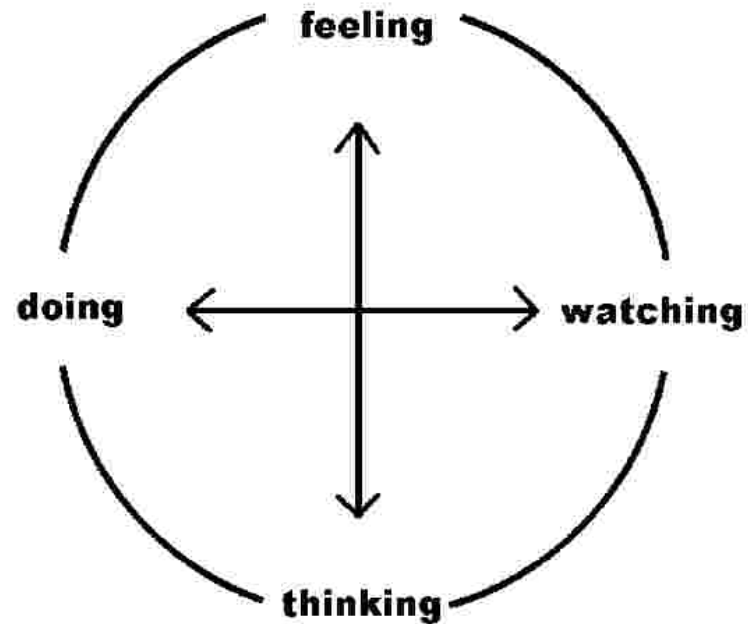
- <http://wally.cs.iupui.edu/n342/>
- Lots of tutorials / examples on youtube

Weekly Hours

2 Hour Lecture (includes Active Learning)

2 Hour Practical

Independent Learning



Some Ground Rules

- Course will have **project assignments**.
 - Everything on the course is examinable.
 - **Marks** from the assignment will count towards your **final mark**.
 - All assignment work must be **word-processed** and printed
 - use the college computer laboratories for this.
- (Exceptions are active learning exercises in Lectures)
- Hand written work will **not be accepted** for your assignments.
- Ask questions and give feedback on course.
 - All mobile phones must be turned off in class.

This Week

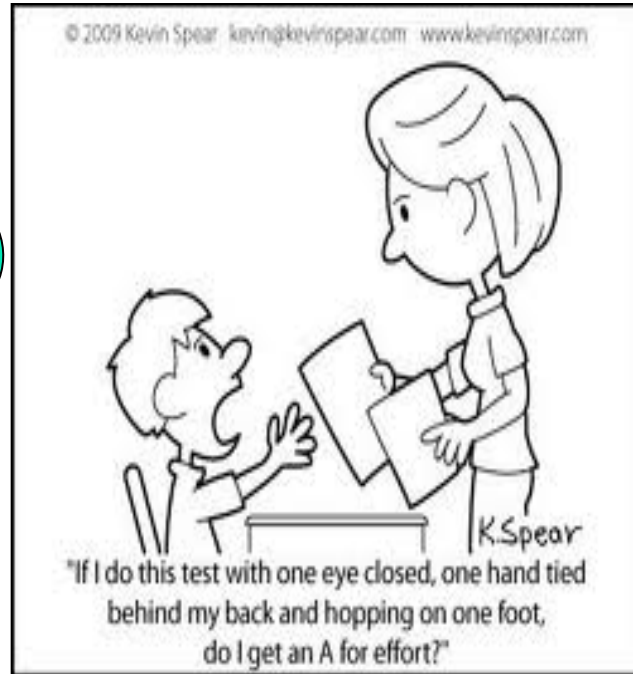
**Data Types
/Strings
Operators**

What is PHP?

**Important Features
in PHP**

**How Does
PHP
Work**

**PHP
Installation**



WHAT IS PHP?

- **Server-side Scripting language**
- **Designed for use with HTML**
- **Provides more flexibility than HTML alone**
- **Syntax is similar to C, Java**

WHAT IS A SCRIPTING LANGUAGE

- A scripted language is one where we simply write the code and the code is interpreted as it is run.
- Traditional languages (JAVA, C++ etc), require that you compile code into machine code which can be executed on the server.
- Scripted code allows us to simply write the code and test without the need for compiling!

CLIENT SIDE VS SERVER SIDE SCRIPTING

- **Usually done in Javascript (or VBScript).**
- **Often used for form validation.**
- **Allows us to make changes to a page without requiring a page refresh.**
- **They can be easily modified on the client side and as such they are never used for anything security related.**
- **They also require that the client side browser supports the embedded script.**

A SIMPLE JAVASCRIPT EXAMPLE

```
<html>
```

```
<body>
```

```
<h1>My First Web Page</h1>
```

```
<script type="text/javascript">
```

```
    document.write("<p>" + Date() + "</p>");
```

```
</script>
```

```
</body>
```

```
</html>
```

A SIMPLE JAVASCRIPT EXAMPLE - RESULT

My First Web Page

Fri Aug 05 2011 16:37:23 GMT+0100 (IST)

EMBEDDING THE JAVASCRIPT

- When using simple inline scripts, we embed the script in a script TAG

```
<script type="text/javascript">  
    document.write("<p>" + Date() + "</  
p>");  
</script>
```

- This lets the browser know that it needs to process a script on the client side (in the browser)

SERVERS AND JAVASCRIPT

- **Because our JavaScript is in a HTML file, the server does nothing with it but send it to the client.**
- **As the clients browser parses the HTML, it recognises JavaScript and executes it on the client side. Such scripts can be used for**
 - Changing the appearance of behavior of a page
 - Form or simple data validation
 - Adding interaction to page elements
 - Control and display page elements (flash etc)

WHAT IS PHP?

- PHP is a server side scripting language.
- Stands for *PHP: Hypertext Preprocessor*
- Used to be called Personal Home Page
- Very popular open source scripting language
- Much of its syntax is borrowed from C, Java and Perl with some unique features thrown in.

WHAT IS PHP?

- Acronym for **PHP Hypertext Processor**
- Evolved from Rasmus Lerdorf's Personal Home Page tools, 1994
- We are using PHP version 5
- Goal: *to allow web developers to write dynamically generated pages quickly*
 - can read & write files,
 - gather & process form data via email,
 - access & manipulate databases,
 - read & write cookies,
 - maintain data in session variables,
 - authenticate users and more....

WHAT IS A SERVER SIDE LANGUAGE

- A server side language is one whose code runs on the server rather than the client.
- When a client requests a resource which contains a script, the code for the script is stored and run on the server and a result is often returned to the client.

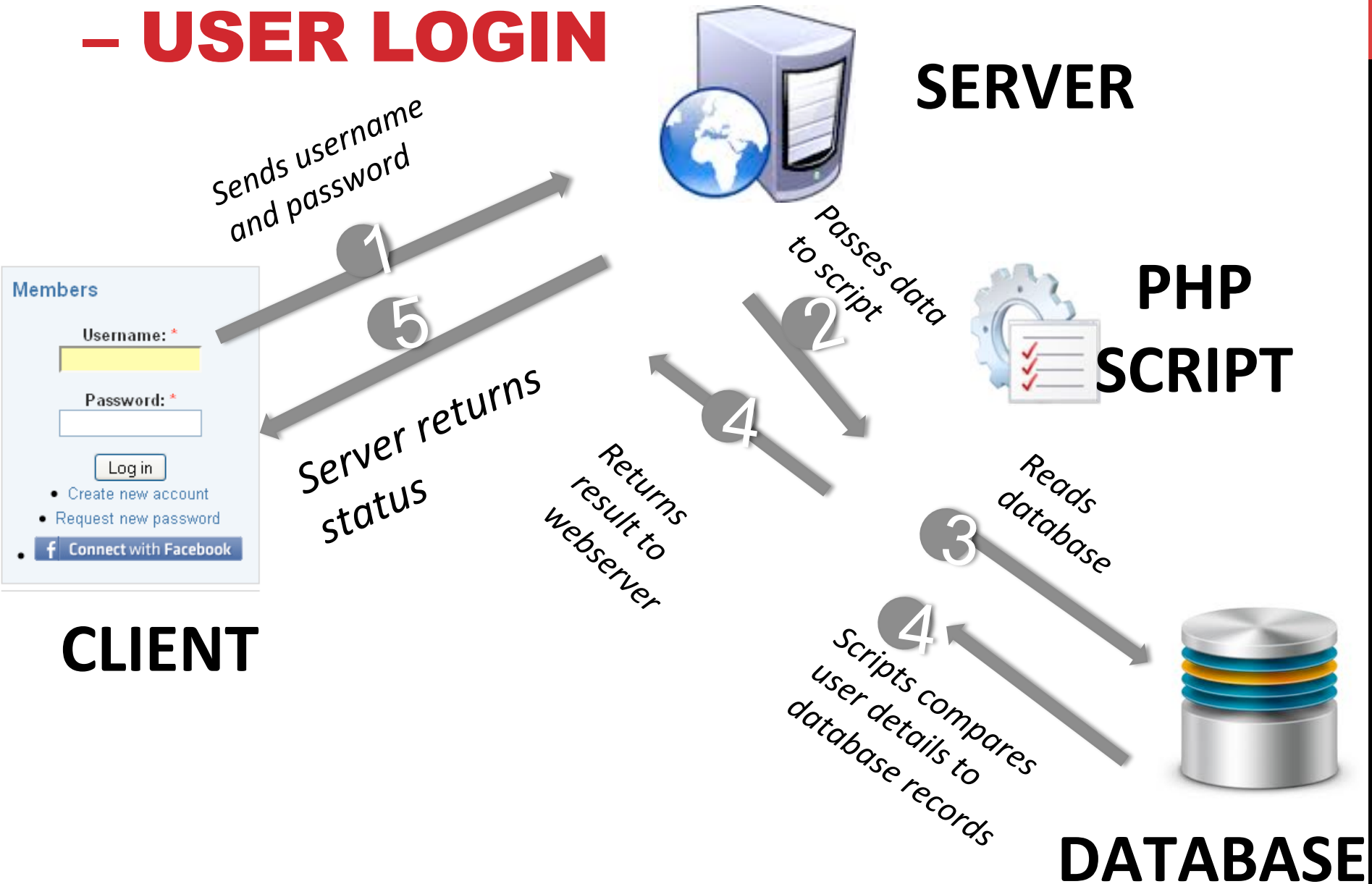


WHAT IS A SERVER SIDE LANGUAGE

- Typically these scripts do the following
 - Dynamically edit, change or add any content to a Web page
 - Respond to user queries or data submitted from HTML forms
 - Access any data or databases and return the results to a browser
 - Customize a Web page to make it more useful for individual users
 - Provide security since your server code cannot be viewed from a browser

A TYPICAL SCENARIO

– USER LOGIN



IMPORTANT PHP FEATURES (1)

- Designed from beginning as a **server-side web scripting** language.
- Runs on all major operating systems.
- Built-in support for several relational databases such as MySQL(☺)_
- Built-in support for session management using cookies and / or URL rewriting.
- Can also be used for command-line scripting

IMPORTANT PHP FEATURES (2)

- **Interpreted language**
- **Loosely typed language**
 - a variable can hold a value of any type at different stages in its lifetime
- **Hybrid language**
 - can be used in a non object-oriented style or an object-oriented style or a mixture of both.
- **Currently one of the most popular web scripting language**

IMPORTANT PHP FEATURES (3)

- **Simplicity** – can **integrate** PHP into existing HTML documents
- **PHP programs can be extended to interface with different libraries e.g. encryption, graphics, XML**

YOUR DEVELOPMENT ENVIRONMENT

One option is to install all three components on your system and configure them separately.



PHP INSTALLATION

USE XAMPP

OR

USBWEBSERVER8.5V

XAMPP / USBWEBSERVER

**Both XAMPP and USBWeberver 8
are on the studentshare.**

XAMPP

- **Download**
 - XAMPP - version for USB keys
 - Web reference on Moodle
- **See handout on how to install XAMPP on your PC / USB key**
- **Use XAMPP from your USB key or X drive in the labs**

XAMPP

Store your WWW documents in the xampp\htdocs directory.

Test your php

Create a file called "test.php" in Textpad.

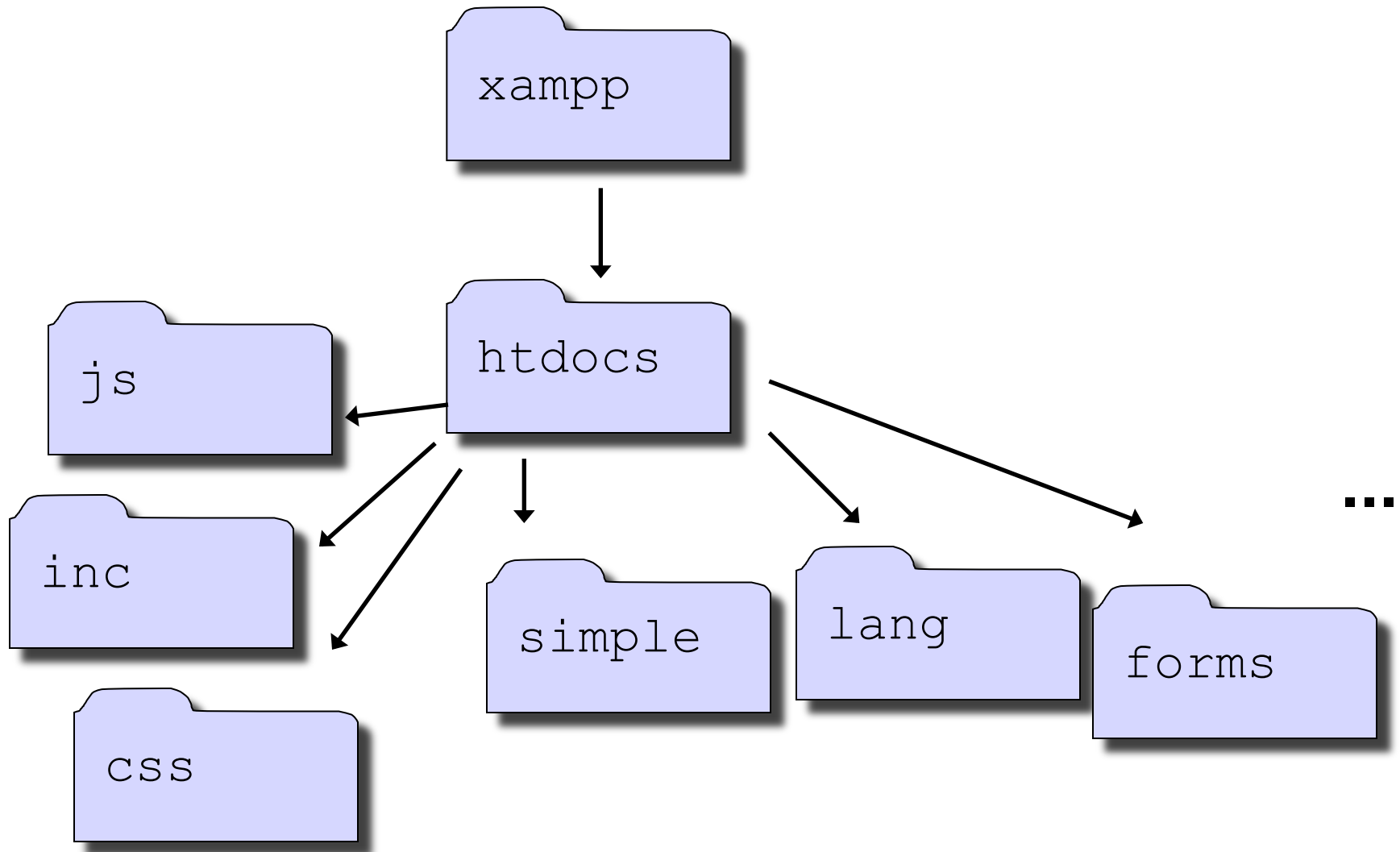
```
<?php  
    echo 'Hello World';  
?>
```

Access it with the URI "<http://localhost/test.php>".

XAMPP

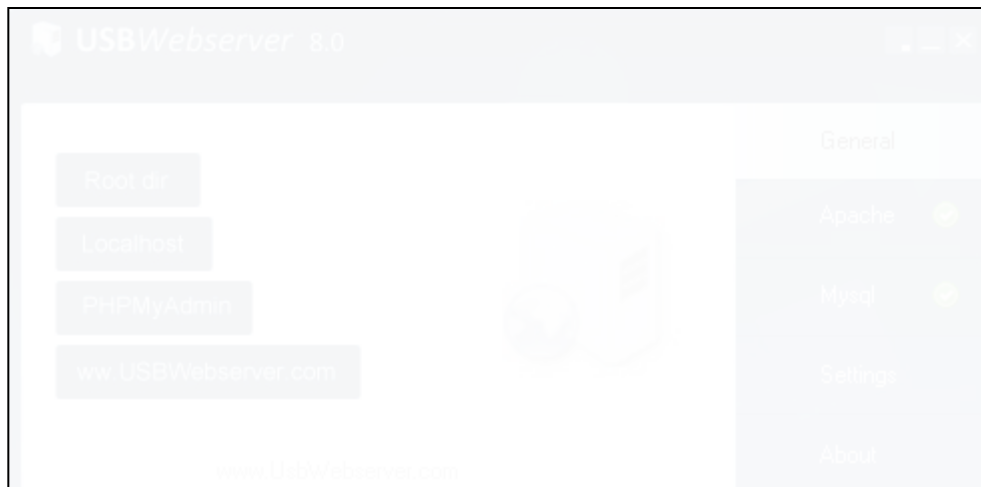
- If you want to store the file (test.php) inside a new directory (e.g. "new"), create a folder in "**\xampp\htdocs**"
- Create a test file in this directory and access it with "**http://localhost/new/test.php**".

Web Directory Structure - XAMPP



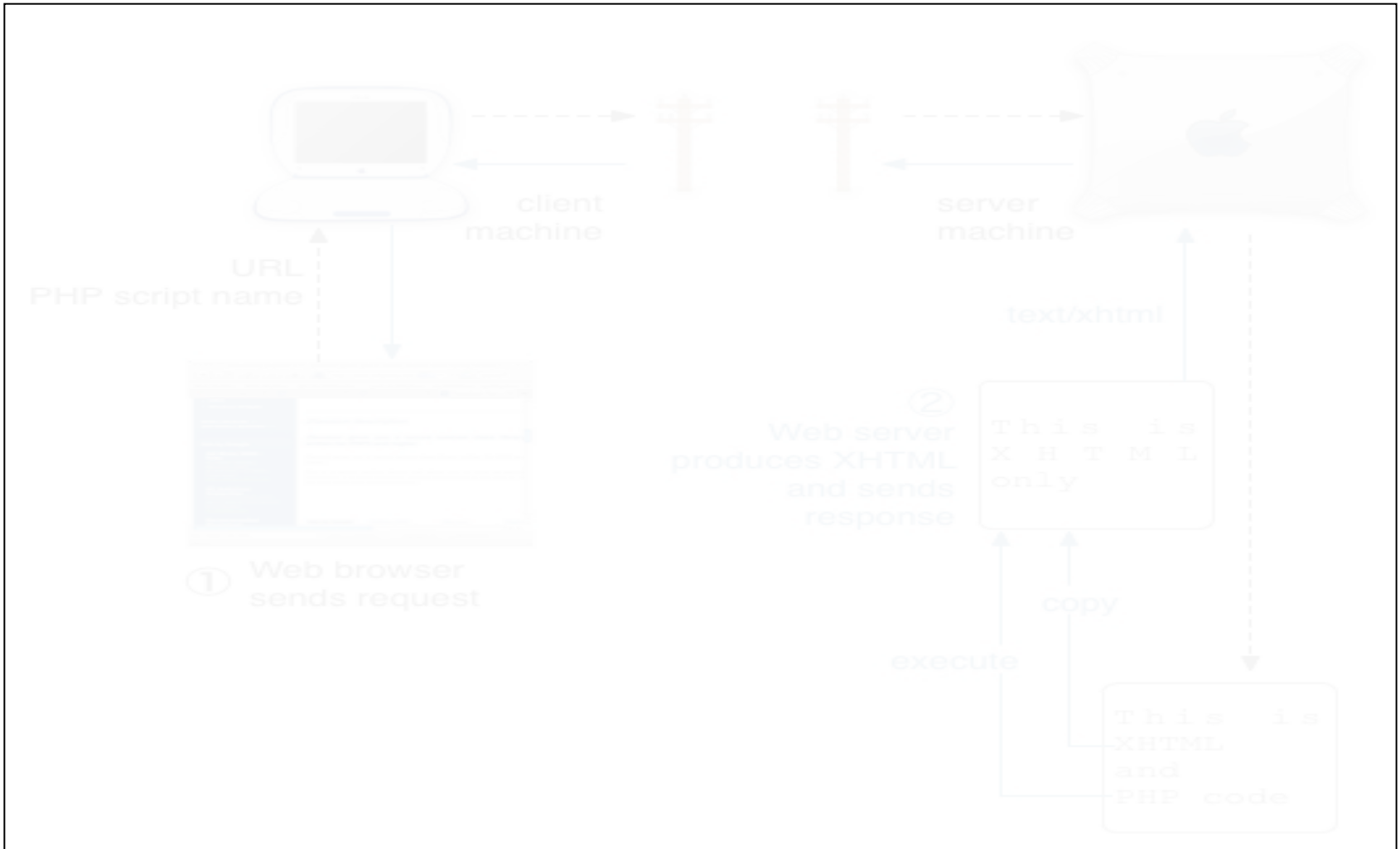
USBWEBSERVER8

- Copy usbwebserver v8 to your X Drive
- Click on usbwebserver to run the application
- You should get the following:



- Click on localhost to see a list of your files which should be stored in the root directory:
 - **usbwebserver v8root**

HOW DOES PHP WORK ?



How Does PHP Work ?

- **PHP code is embedded in XHTML documents (like JavaScript)**
- **PHP is interpreted by the server (*unlike* JavaScript... it is not seen by the client)**
 - A server recognises a request for an XHTML document that contains PHP (often identified by file extension .php, .php3 or .phtml).
 - The PHP processor is called to interpret the code.
 - The processor sees XHTML (or JavaScript) in the file and *copies* it directly to the output file to send to the client.
 - The processor sees PHP in the file and *executes* it to create XHTML source or embedded client-side scripts and *copies* this to the output file to send to the client.
 - The **result is always that XHTML** (possibly with embedded client-side scripts) is sent back to the client that made the request. So...
 - If a surfer does "view source" on a page that contained PHP... they will not see the PHP source.

LANGUAGE SUMMARY

- **WHERE DOES PHP CODE GO?**
- **DATA TYPES**

WHERE DOES PHP CODE GO?

PHP code can be standalone or embedded in HTML code

PHP script tags are used to distinguish PHP code from HTML code:

`<?php`

`PHP code goes here`

`?>`

Start PHP
mode

End PHP
mode

These tags should always be used

8 DATA TYPES

4 are scalar types

- integer, floating point (double),
- string,
- boolean

2 are structured types

- array and object

2 are special types

- resource, NULL

DECLARING VARIABLES

- Variable types are not declared
- Type is type of value currently assigned
- All **variables** begin with a **dollar sign**
 - next character is a letter or underscore
 - remaining are letters, underscore or digits

```
$count = 0;  
$name = "Fred";  
$price = 45.50;  
$big_num = 1.2345E23;  
$success = TRUE;
```

NAMING CONVENTIONS

- The convention in PHP (coming from C) is that the underscore character is used to simulate a space in variable names:
- Example:
 - `$number_of_files = 3;`
- This is different from the uppercase convention that is used in Java
 - `numberOfFiles = 3;`

CONSTANTS

- Constants are defined using the **define** function and **do not begin with a dollar sign**
- The convention is to use all uppercase letters and **_** for names of constants
- Examples:

```
define ( 'COURSE' , "Internet Tools" ) ;
```

```
define ( 'CM_TO_INCH' , 2.54 ) ;
```

- Now use **COURSE** and **CM_TO_INCH** to refer to these constants

CASE SENSITIVITY

- PHP is a weird mixture of case sensitivity and case insensitivity
- **variable and constant names** are **case sensitive**
- **boolean values** TRUE and FALSE are not **case sensitive**.
- **function names** are **not case sensitive**
- Maybe they will fix this in a future version

THREE KINDS OF COMMENTS

C, Java style multi-line comments

```
/* This is a multi-line  
   comment  
*/
```

C++, Java single line comments

```
// a single line comment
```

Unix shell script and Perl comments

```
# a single line comment
```

LITERALS AND STRINGS

- Integer literals
 - -1, 1, 2, 3
- Floating point literals
 - 1.234, -4.56, 1.34E-12
- There are two kinds of string literal
 - single quotes: 'hello'
 - double quotes: "hello"
- There are two boolean literals
 - TRUE, FALSE

VARIABLE INTERPOLATION (1)

Interpolation takes place inside double quoted strings.

This means that **variables** get converted to **their values** and special **control sequences** such as **\n** take effect.

Interpolation does not take place inside single quoted strings so **\n** are just two characters

VARIABLE INTERPOLATION (2)

- If `$name` has the value **"Fred"** then
- **"Hello \$name"** has the value
Hello Fred
- **'Hello \$name'** has the value
Hello \$name
- **"\ \$name = \$name"** has the value
\$name = Fred
- In the last case the **escape character ** is used to specify that the first **\$** is a literal character.

DISPLAYING STRINGS

(1)

The **echo** function displays text on the standard output.

Echo can be used with or without parentheses

- **echo** "Hello World
";
- **echo**("Hello World
");

If you use **echo** without parentheses, then there can be several arguments **separated by commas**

- **echo** "
", "Hello ", \$name ;

The **print** function displays text on the standard output, but it can have only one argument

- **print**("Hello \$name\n") ;

DISPLAYING STRINGS

(2)

`print_r(expression)`

- function which displays a string representation of a variable such as an array.

`var_dump(expression)`

- similar output as `print_r`

PROGRAMMING EXAMPLE

```
<html>
<head><title>Using echo and print</title></head>
<body>
<h1>Using echo and print</h1>
<?php

// Echo can be used with or without
// parentheses

echo "Hello World<br>";
echo("Hello World<br>");

// If you use it without parentheses
// then there can be several arguments
// separated by commas

echo "Hello ", "World", "<br>";

// print can be used with or without
// parentheses but can only have one
// argument

print "Hello World<br>";
print("Hello World<br>");

// HERE DOCUMENTS are also available in PHP.
// Can put a number of lines with html tags in an echo statement

echo <<<END_DOC
<p>
A bullet list
<ul>
<li>Item 1</li>
<li>Item 2</li>
<li>Item 3</li>
</ul>
</p>
END_DOC;
```

Result

Using echo and print

Hello World
Hello World
Hello World
Hello World
Hello World

A bullet list

- Item 1
- Item 2
- Item 3

Quiz



- 1.How do you write “Welcome to ITB” in PHP?**
- 2.What is the correct way to end a PHP statement?**
- 3.What symbol do all variables in PHP start with?**
- 4.What is a correct way to add a comment in PHP?**

Quiz

```
body{ background-color:yellow; }
#u{ text-decoration:underline;}
#c{ text-align: center;}
```

```
<html><title> </title>
```

```
<style>@import "stylePHP.css"; </style>
```

```
<body>
```

```
<h1><?php echo "PHP Programming!" ?></h1><br>
```

```
<p><em><?php echo "PHP Programming!" ?>!</em></p>
```

```
<p><strong><?php echo "PHP Programming!" ?></strong></p>
```

```
<p><span id = "u">
```

```
    <?php echo "PHP Programming!" ?></span></p>
```

```
<p><div id = "c">
```

```
    <?php echo "PHP Programming!" ?></span></p>
```

```
</body></html>
```

What output do you expect from this program?

PHP Programming!

PHP Programming!

PHP Programming!

PHP Programming!

PHP Programming!

WHAT DOES THE FOLLOWING PRINT OUT?

<?PHP

\$MYVAR1 = "JENNIFER";

\$MYVAR2 = "LOPEZ";

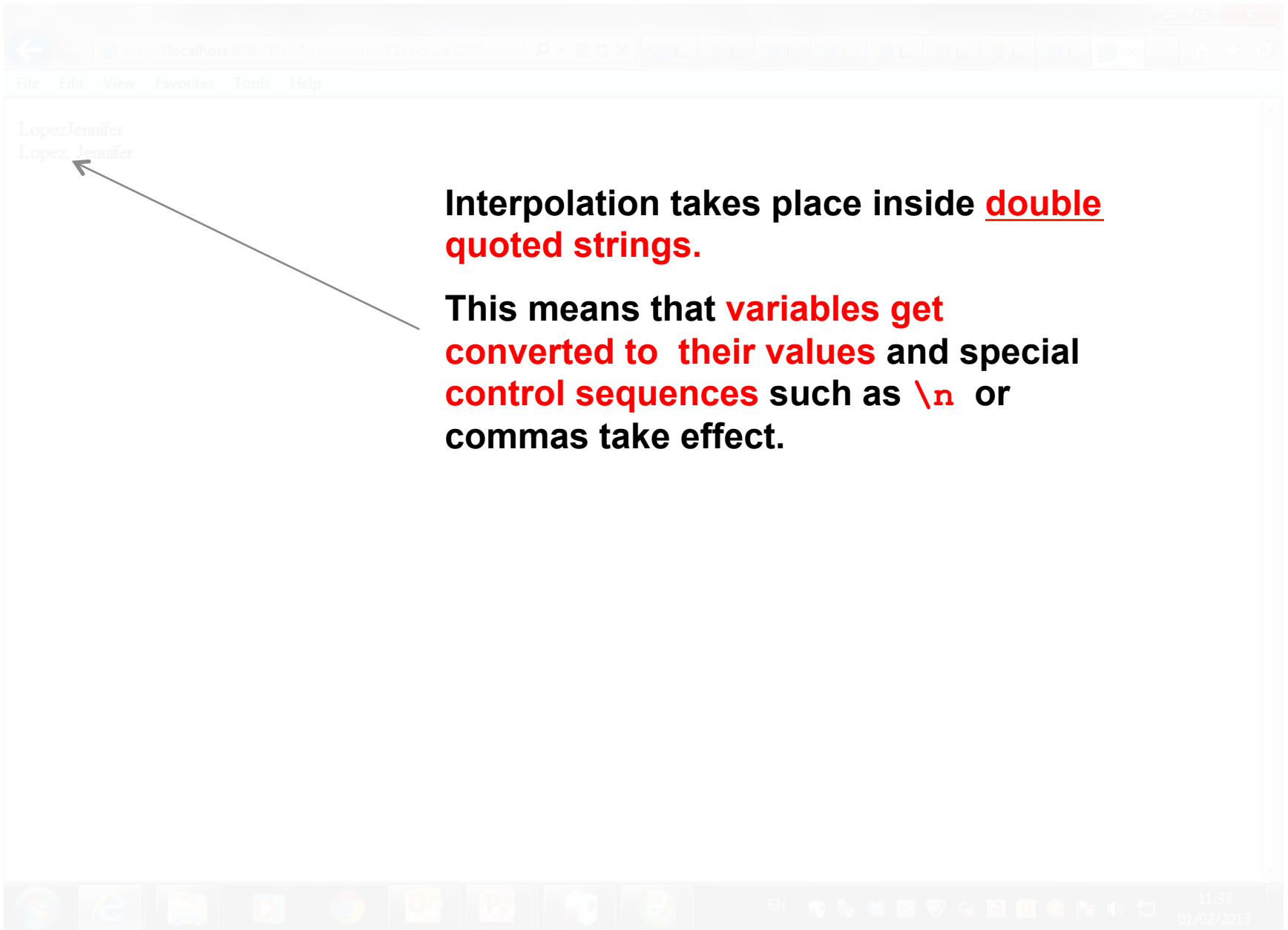
ECHO \$MYVAR2, \$MYVAR1;

?>



```
<?php  
$myvar = "Jennifer";  
$Myvar = "Lopez";  
echo "$Myvar, $myvar";  
?>
```

What is the output?



Interpolation takes place inside double quoted strings.

This means that **variables** get **converted to their values** and special **control sequences** such as **\n** or **commas** take effect.



Quiz

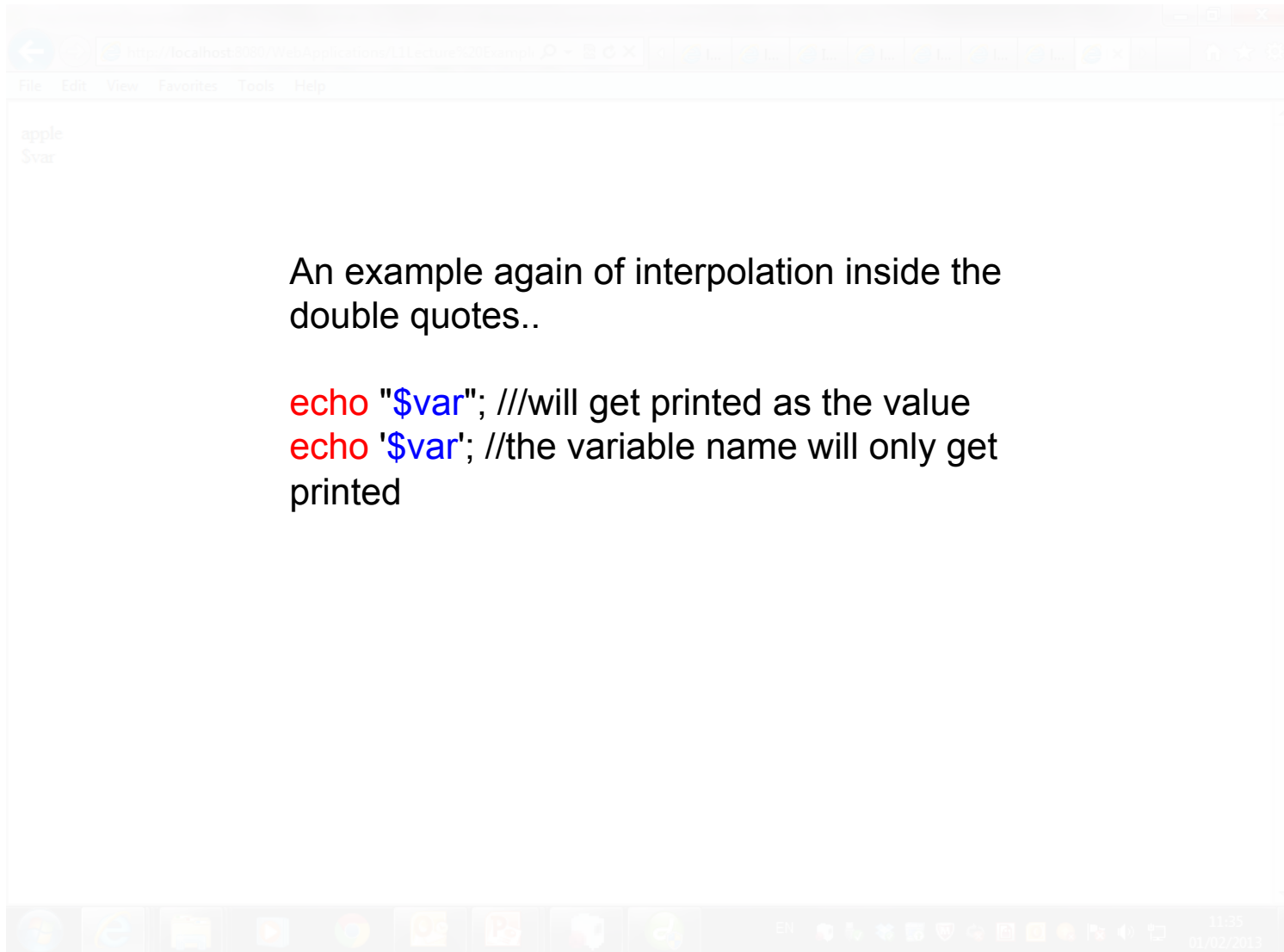
```
<?php
$dog_age=10;
$human_age = $dog_age * 7;
echo "Your dog is $human_age year olds in human age.";
?>
```

What age is the dog?

Quiz

```
<?php  
$var = 'apple<br>';  
echo "$var";  
echo '$var';  
?>
```

What is the output from the two echo statements?



TYPE CASTING

The type of a variable can be changed using the typecasting operators

- `(int)` or `(integer)`
- `(float)` or `(double)` or `(real)`
- `(bool)` or `(boolean)`
- `(string)` or `"....."`
- `(array)`
- `(object)`

PERFORMING OPERATIONS

- **Arithmetical Operations**
- **Logical Operations**
- **Comparison Operations**
- **Conditional Operations**
- **Maths functions**
- **Testing Variables – `isset()`, `empty()`, `is_null()`**

ARITHMETIC OPERATORS

Operator	Description	Example	Result
+	Addition	x=2 x+2	4
-	Subtraction	x=2 5-x	3
*	Multiplication	x=4 x*5	20
/	Division	15/5 5/2	3 2.5
%	Modulus (division remainder)	5%2 10%8 10%2	1 2 0
++	Increment	x=5 x++	x=6
--	Decrement	x=5 x--	x=4



Select the correct answer that is the output of the following code?

```
<?php  
$age = "24";  
$age = $age + 1;  
echo $age;  
?>
```

- A. 25**
- B. 24 + 1**
- C. \$age + 1**
- D. 241**

LOGICAL OPERATORS

PHP has the usual C and Java style operators

- `||` for logical **or**
- `&&` for logical **and**
- `!` for **negation**

Operator	Description	Example
<code>&&</code>	and	<code>x=6</code> <code>y=3</code> <code>(x < 10 && y > 1)</code> returns true
<code> </code>	or	<code>x=6</code> <code>y=3</code> <code>(x==5 y==5)</code> returns false
<code>!</code>	not	<code>x=6</code> <code>y=3</code> <code>!(x==y)</code> returns true

COMPARISON OPERATORS

PHP has the usual C and Java style operators

- **<, <=, ==, !=, >, >=**

These operators **perform type conversions** if necessary before the comparison

There are also the operators

- **===, and !==**

These operators **compare value and type** so no type conversion is done

These **operators are also used for strings**

COMPARISON OF == AND ===

Suppose `$a` has the value `"0"` as a string

Suppose `$b` has the value `0` as an integer

Then

- `$a == $b` is true since both `"0"` and `0` are the same with type conversion
- `$a === $b` is false since `$a` and `$b` have different types

CONDITIONAL STATEMENTS

The **if** statement is similar to C and Java except **elseif** can be used instead of **else if >>**

```
if ( booleanExpression1 )
{
    ...
}
elseif ( booleanExpression2 )
{
    ...
}
else
{
    ...
}
```

CONDITIONAL STATEMENTS

Example

The following example will output "Have a nice weekend!" if the current day is Friday, otherwise it will output "Have a nice day!":

```
<html>
<body>

<?php
$d=date("D");
if ($d=="Fri")
    echo "Have a nice weekend!";
else
    echo "Have a nice day!";
?>

</body>
</html>
```

Example taken from www.w3schools.com

ARITHMETIC CODE EXAMPLE

ARITHMETIC.PHP

```
<html>
<head><title>Arithmetic in PHP</title></head>
<body>
<h1>Arithmetic in PHP</h1>
<?php

// Arithmetic is similar to Perl

$a = 5;
$b = 3;

// Division is done using floating
// point arithmetic

echo "<pre>";
echo "$a + $b = ", $a + $b, "\n";
echo "$a - $b = ", $a - $b, "\n";
echo "$a * $b = ", $a * $b, "\n";
echo "$a / $b = ", $a / $b, "\n\n";

// Type casting must be uses to get an
// integer division

echo "(int) ($a / $b) = ", (int)($a / $b), "\n";
echo "$a % $b = ", $a % $b, "\n\n";

// There are also the arithmetic assignment
// operators such as +=, and *= and the
// increment ++ and decrement -- operators.

// Conversions among string and numeric types

$a = 123;
$b = '345Hello';
$c = 456;

$sum = $a + $b; // this gives 123 + 345 = 468
$str = $a . $c; // integer converted to string

echo "The sum of $a and '$b' is $sum\n";
echo "The concatenation of '$a' and $c is $str\n";
echo "</pre>";
?>
</body>
</html>
```

Arithmetic in PHP

```
5 + 3 = 8
5 - 3 = 2
5 * 3 = 15
5 / 3 = 1.6666666666667
```

```
(int) (5 / 3) = 1
5 % 3 = 2
```

```
The sum of 123 and '345Hello' is 468
The concatenation of '123' and 456 is 123456
```

STRINGS AND STRING FUNCTIONS IN PHP

STRING OPERATIONS

(1)

The dot operator is used to **concatenate** strings

- `"Hello " . "World"` is the same as `"Hello World"`

The length of a string `$s` is **`strlen`** (`$s`)

The `$i`-th character of string `$s` is `$s[$i]`

STRING OPERATIONS (2)

Removing whitespace from strings

Trim whitespace at left end

- `$trimmed_string = ltrim($s) ;`

Trim whitespace at right end

- `$trimmed_string = rtrim($s) ;`

Trim whitespace at both ends

- `$trimmed_string = trim($s) ;`

STRING OPERATIONS

(3)

Converting `$s` to upper case or lower case

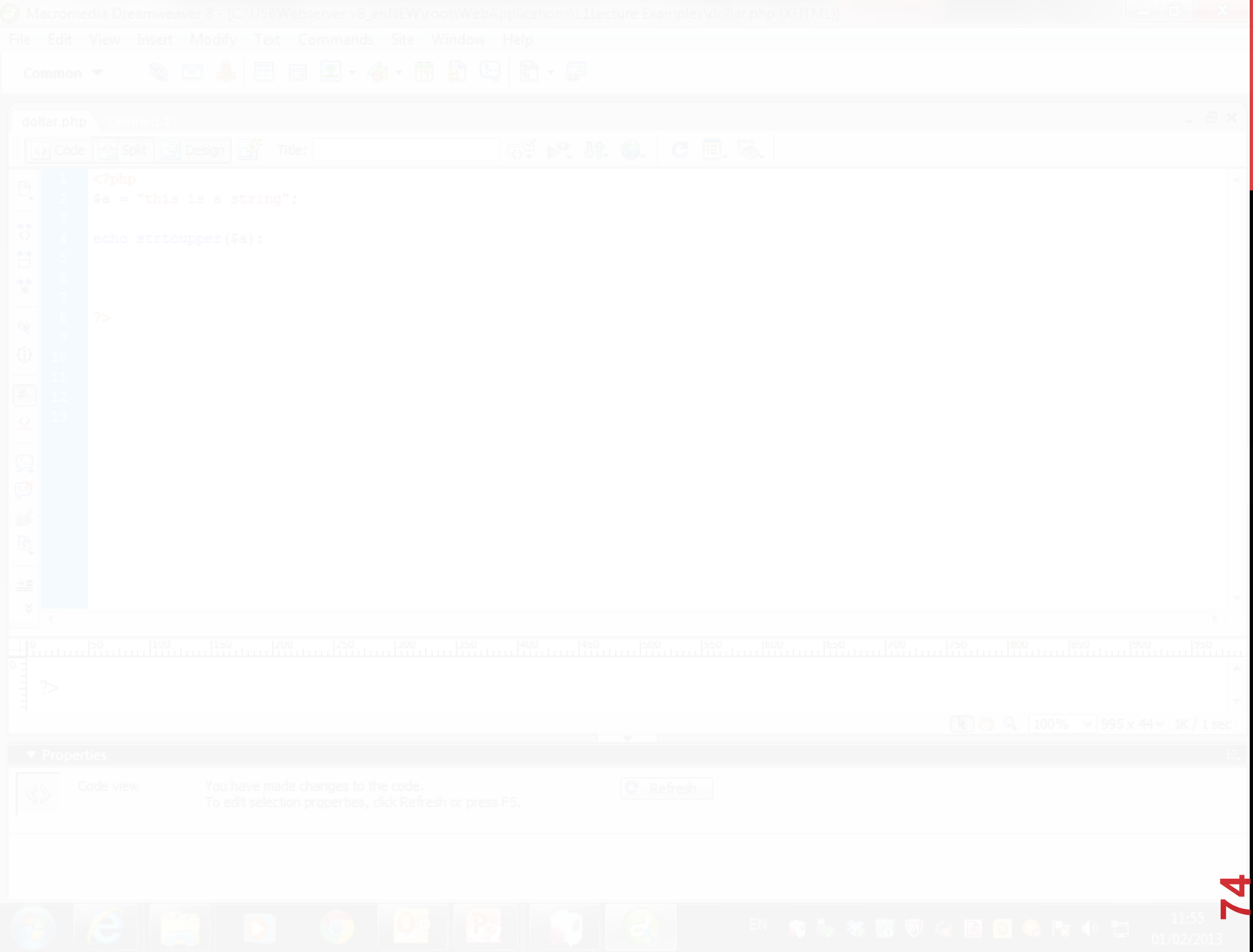
- `$upper = strtoupper($s) ;`
- `$lower = strtolower($s) ;`

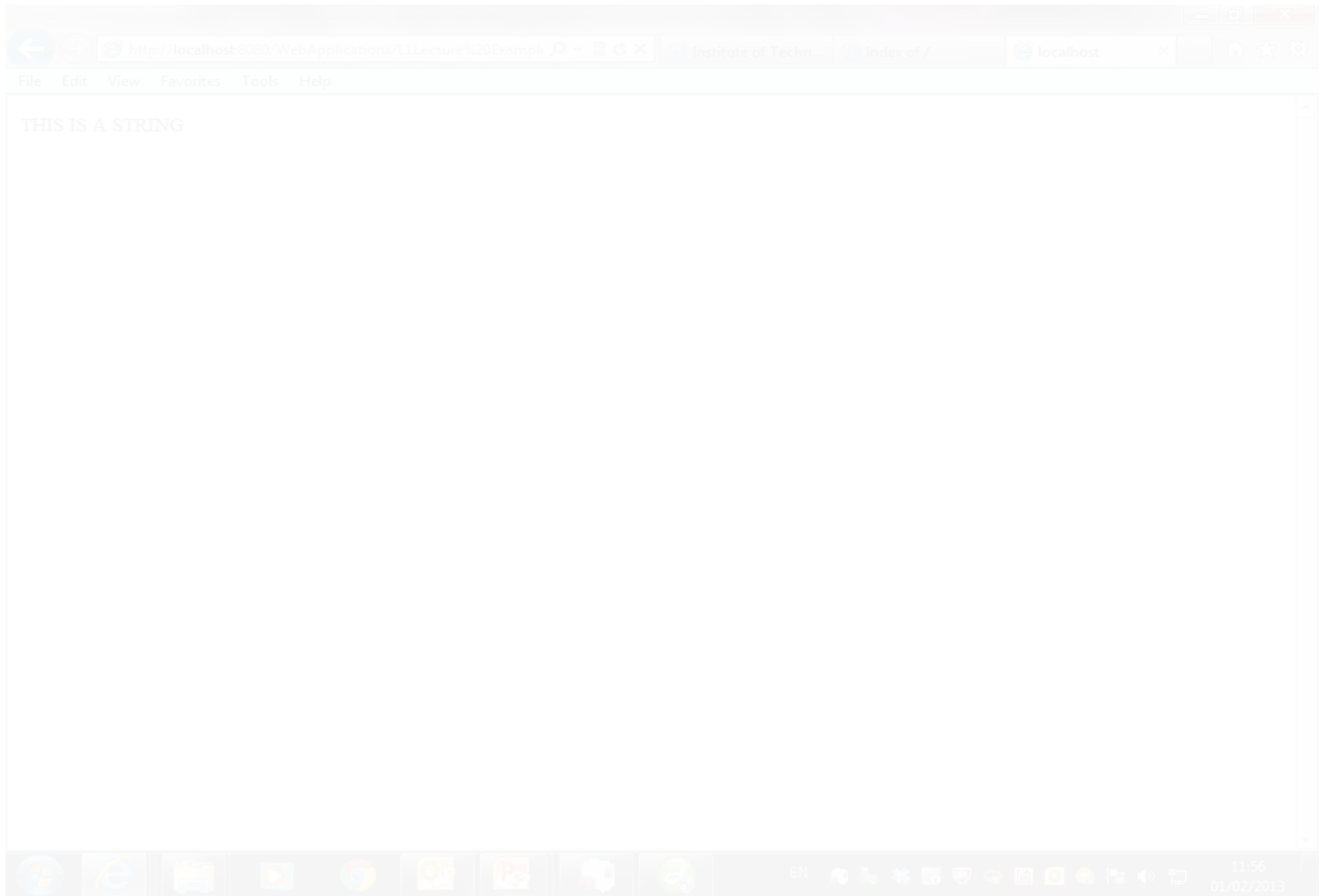
Converting first character of `$s` to uppercase

- `$upper_first = ucfirst($s) ;`

Converting first character of every word in `$s` to uppercase

- `$upper_word = ucwords($s) ;`





STRING COMPARISON

(1)

Can use the operators

- <, <=, >, >=, **===**, **!==**

Don't use == and != as you can get unexpected results for mixed comparisons of numbers and strings.

Can use **===** and **!==** to compare 2 strings

```
if ($str1 === $str2)
{
    echo "Strings are equal";
}
```

STRING COMPARISONS (2)

To compare two strings as strings its best to use the **strcmp** function (similar to C, Java)

- **strcmp**(\$s1,\$s2) returns
 - negative integer if \$s1 precedes \$s2
 - zero if \$s1 and \$s2 are the same
 - positive integer if \$s1 follows \$s2

There is also **strcasecmp** to do case insensitive comparison

There are many more string functions.

WHAT WOULD BE THE OUTOUT HERE?

```
<?php
```

```
$s1 = "The Lion King";
```

```
$s2 = "101 Dalmations";
```

```
echo strcmp($s1,$s2);
```

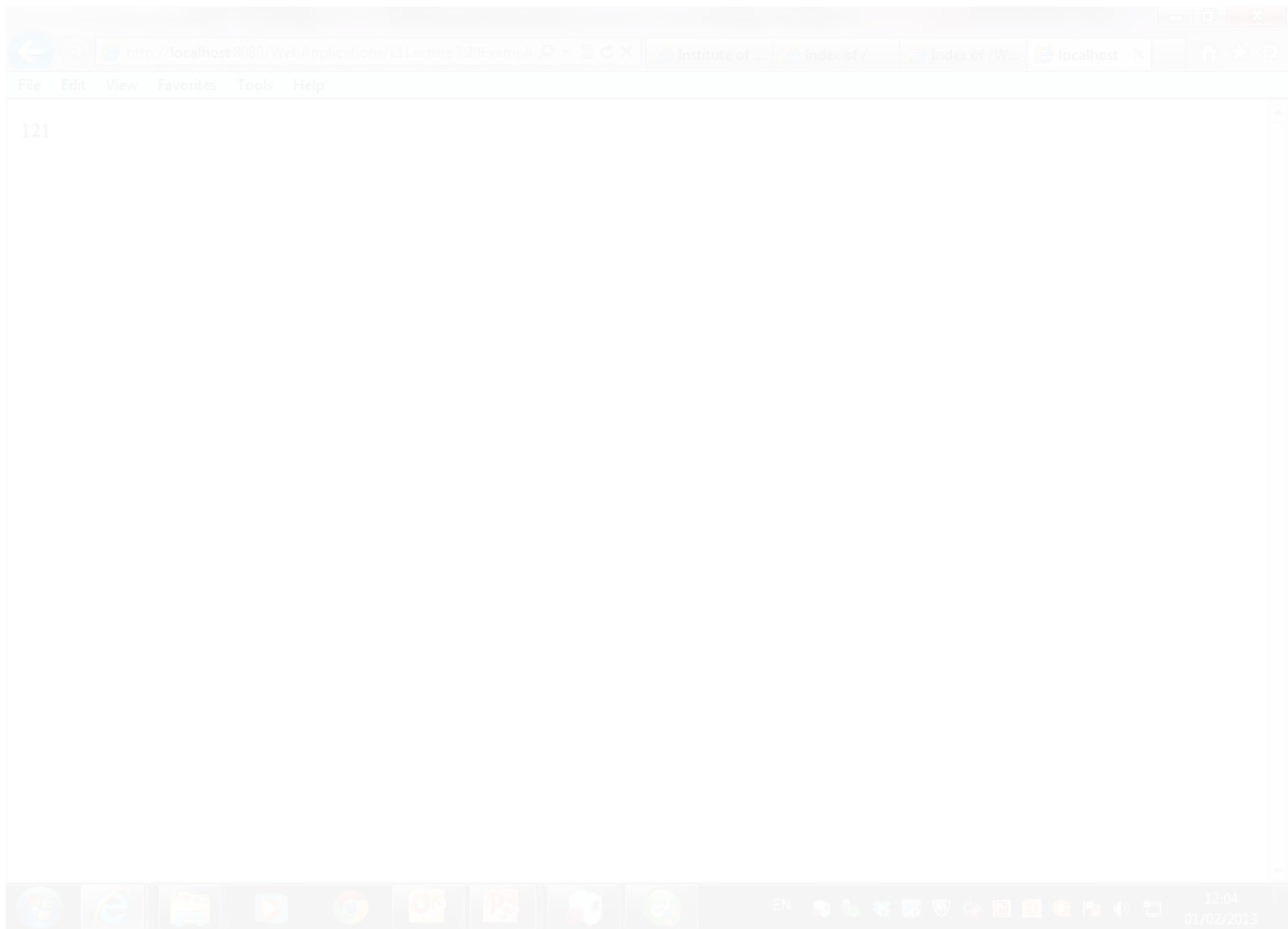
```
?>
```

QUESTIONS – CONCATENATION

What is the output?

```
<?php  
$age = "12";  
$age = $age . "1";  
echo $age;  
?>
```

- a. 12.1
- b. 13
- c. 121
- d. \$age



QUESTIONS – CONCATENATION

What is the output?

```
<?php  
$str1 = "CIS";  
$str2 = "246";  
echo $str1 . $str2;  
?>
```

- a. CIS . 246**
- b. CIS.246**
- c. CIS246**
- d. “CIS””246”**

QUESTIONS – CONCATENATION

What is the output?

```
<?php  
$age=21;  
echo "Your age is " . $age . "!";  
?>
```

- A. "Your age is " 21 "!"**
- B. Your age is 21!**
- C. Your age is " . \$age . "!"**
- D. Your age is21!**



QUESTIONS – CONCATENATION

```
<?php  
$monkeys = 10;  
echo "Number of monkeys: ".$monkeys;  
?>
```

What is the output?

QUESTIONS – CONCATENATION

```
<?php  
$monkeys = 10;  
echo .....  
?>
```

How do you display (using the variable & concatenation)

--- You have 10 monkeys!

ANSWER

```
<?php
```

```
$monkeys = 10;
```

```
echo "You have ".$monkeys. " monkeys";
```

```
?>
```

QUESTIONS – CONCATENATION

Write the code for the following:

Given \$cds = 50 and \$dvds = 60, find the total number of cds & dvds.

Display the following:

You have 50 cds and 60 dvds giving a total of 110 items



```
1  Given $cds = 50 and $dvds = 60, find the total number of cds + dvds.  
2  Display the following:  
3  You have 50 cds and 60 dvds giving a total of 110 items  
4  */  
5  
6  $cds = 50;  
7  $dvds = 60;  
8  $total = $cds + $dvds;  
9  
10 echo "<h2>using Single Quotes + Concatenation in the next statement </h2><br/>";  
11  
12 echo 'You have '.$cds.' cds and '.$dvds.' dvds give a total of '.$total.' items'. '<br/>';  
13  
14 echo '<br/>';  
15 echo '<br/>';  
16 echo "<h2>Using double quotes in the next statement </h2><br/> ";  
17  
18 echo "You have $cds cds and $dvds dvds give a total of $total items";  
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Summary

**Data Types
/Strings
Operators**



What is PHP?

**Important Features
in PHP**

**How Does
PHP
Work**

**PHP
Installation**