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Web Technologies

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Lecture 19

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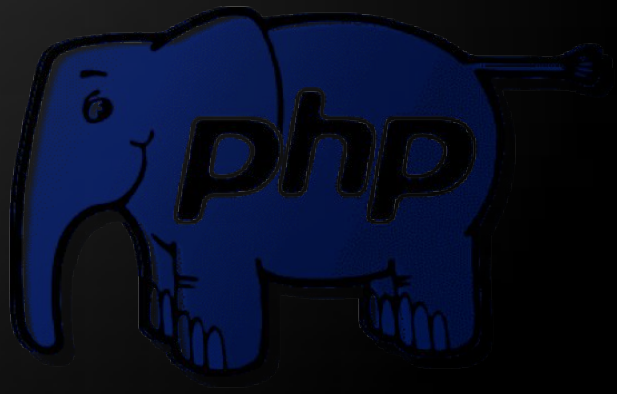
PHP Basics

Web Applications in Hatch



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1. What are PHP, CGI and Web Server?
2. Web applications
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4. Variables, variable types
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8. PHP – advantages and disadvantages

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What are PHP, CGI and Web Server?

What is PHP?

- "PHP Hypertext Preprocessor"
  - Scripting language
  - Creation of dynamic content – i.e. HTML and JSON
  - Interaction with databases (CRUDs)
  - Server side, or via command line (CLI)
  - Can be embedded in HTML
  - First introduced in 1995 as module for Apache
  - Open source, written in C
  - Similar to Perl and C

What is CGI?

- "Common Gateway Interface"
  - Unified specification for interaction between web server and a CGI program
  - The CGI program accepts data from the web server and usually returns generated HTML content
  - CGI programs are used to generate also XML files, images, video streams and any other content, understandable by the browser
  - The very code of the CGI program is not visible for the client, only it's output

What is web server?

- Computer program that is responsible for handling HTTP requests and returning responses
  - Receives HTTP request
  - Finds the requested resource or executes CGI program
  - Returns the resource or program output to the browser
  - Most common web servers are Apache, IIS, NodeJS, nginx, ligHttpd and others
- "LAMP" – Linux, Apache, MySQL, PHP/Perl – the most common software on a web server

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Web applications

Web applications

- Application that can be accessed over the web
  - Relies on web servers
  - Usually written in server-side scripting languages like PHP, Perl, Java, ASP
  - Has dynamically generated content
  - Commonly structured as three-tier application - web server, CGI Program (s) and database
  - Not just web pages

Web applications - Examples

- Gmail
- SkyDrive / Live.com
- Google Office / Windows Office
- Prezi
- Creately
- Slideshare
- Almost everything that can be accessed via web browsers ☺

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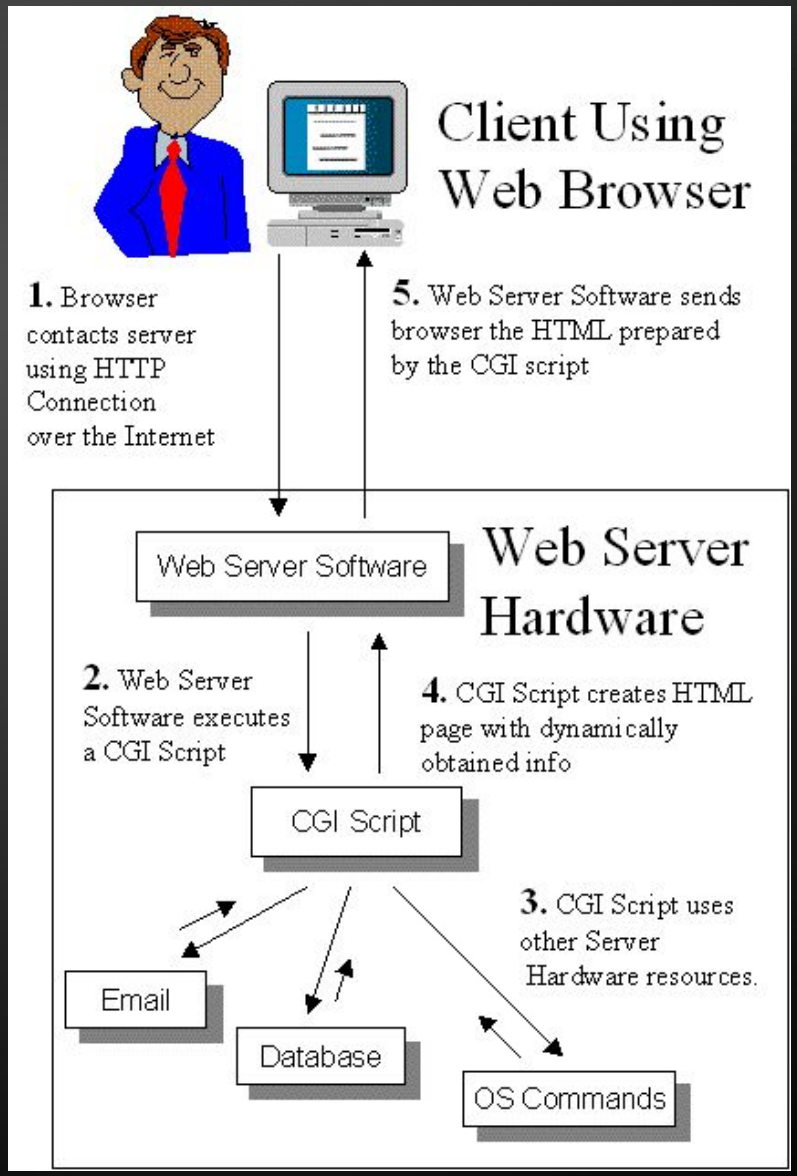
Web application lifecycle



Hello PHP

- The PHP code is usually in files with extension ".php"
  - Can be configured
- Th… be r… …y HTML doc… …t

<?php denotes start of PHP code

?> denotes end of PHP code

```
<htm…
<hea…><title>Hello world p…age</title></head>
<body>
<?php print ("Hello PHP!"); ?>
</body>
</html>
```

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Hello PHP – Where to place it ?

- In the webroot directory
  - XAMMP – htdocs/
  - WAMP – www/
- Webroot directory can be configured
- Can be accessed via http://localhost/path/to/scriptName.php

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Hello PHP

Live Demo – Web and CLI

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Syntax

PHP Syntax

- The PHP code starts with <?php and ends with ?>
  - Depending on server configuration may also start with <? (Short style) – but this is bad practice!
  - In terms of XML the <?php - ?> part is called "processing instruction"
- PHP follows the Perl syntax
  - Simplified
  - Procedural (Now has OOP too)
  - Similar to C and Java

PHP Syntax

- PHP Script contains one or more statements
  - Statement are handed to the PHP Preprocessor one by one
  - Each statement ends in semicolon ";"
- Our first script contains only one statement:

```
<?php
print ("Hello PHP!"); // this is the statement
?>
```

  - call of the function `print`

PHP Syntax

- PHP script can contain unlimited number of statements

```
<?php
print "<div>";
print "Hello PHP!";
print "</div>";
?>
```

- Some function can be called without brackets
- You can add comments to the code
  - Starting with "//", "#" or block in "/*" and "*/"
  - Only "/*" – "*/" can be used over several lines
  - Comments are NOT executed

PHP Syntax

- Short opening tag <?=

```
<html>
<head><title>Hello world page</title></head>
<body>
<?="Hello PHP!" ?>
</body>
</html>
```

- Forces the result of the expression to be printed to the browser
- Similar to print
- Allowed to omit ending ";"

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Shorttags

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Variables

PHP Variables

- All variables in PHP start with $ (Perl style)

```
<?php   // declare string variable $output
$output = "<div>Hello PHP!</div>";
print $output;
?>
```

- PHP is "type-less" language
  - Variables are not linked with type – they can store value with different types
  - No int a = 5; Just $a = 5;
- Each variable is declared when it's first assigned value
  - This leads to problems due to typing mistakes!
  - The type of the value determines the type of the variable

PHP Variable Types

- Possible PHP Variable Types are:
  - Numeric (real or integer)
    - The decimal separator is dot ".", not comma ","
  - Boolean (true or false)
    - PHP defines the constants as true, TRUE, True and false, FALSE, False
    - Empty string, zero and some other values are implicitly converted to "false" in boolean expressions
      - May cause problems when boolean not used properly

PHP Strings

- String values
  - Strings may be in single or double quotes

```
<?
$output1 = "Hello PHP!";
$output2 = 'Hello again!';
?>
```

  - Start and end quote type should match
  - Difference between two types of quotes is the escape sequences

PHP Arrays

- Arrays are aggregate values – combination of values, each assigned a key in the array
  - PHP supports associative arrays – keys may be numeric, strings or any other scalar data types
  - Keys must be unique across the array
  - Values in the array may be with different types
  - PHP Arrays are dynamic – they don't require explicit size when created

PHP Arrays

- PHP Array is declared with keyword `array`

```
<?
// simple array
$arr = array ("a", "b", 7);
// this produces $arr[0], $arr[1] and $arr[2]
// whit values respectively "a", "b" and 7
$arr2 = array ("one" => 1, "two" => 2);
// this produces $arr2["one"] and $arr2["two"]
// whit values respectively 1 and 2
?>
```

- "=>" means "points to"
- If keys are not supplied they are assigned automatically, starting from 0

PHP Arrays

- We access value in the array with "[" and "]" containing the key
- Arrays are flexible and types of values and keys may be mixed

```
<?
$arr = array ("a", "b", 7, "one" => 1, "two" =>
2, "other" => array(1,2,3));
// keys types may be mixed:
// $arr[0] will be "a" and $arr["one"] will be 1
// $arr["other"] is also array
// $arr["other"][0]" is 1
print $arr["other"][2]; // will output 3
?>
```

PHP NULL Value

- In PHP there is special value (null) that means that the variable has no value
  - It is used to express the absence of any data type
  - Different from "undefined" variable!
  - Different from empty string or zero

```
<?
$null_variable = null;
?>
```

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Variables

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PHP Types

- PHP supports "object" variable type
  - Will be explained further in the OOP lecture
- "Resource" variable type
  - The resource type means the variable is holding reference to resource or data, external to your script
    - Example – opened file, database connection, etc

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PHP Basic Expressions

- PHP expressions are similar to C
  - "=" - assigning value to variable
  - +, -, /, *, % - arithmetic operations
  - ==, <=, >=, !=, <, > - comparison
  - +=, -=, /=, *=, %=, ++, --, etc – prefix/postfix operators
  - (and) – for expressions combining
  - &, |, >>, <<, ^, ~ - bitwise operators

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PHP Basic Expressions 2

- String operators
  - "." (period) – string concatenating
- ===, !== comparison
  - different from ==, !=
  - `"10"==10` will produce true, while `"10"===10` will produce false
  - Strict comparison – `$a === $b` :
  - **TRUE** if *$a* is equal to *$b*, and they are of the same type.
  - Note: Assignment of value to variable returns as result the value being assigned
  - We can have `$a = $b = $c = 7;`

PHP Constants

- In PHP constants are defined with the `define` function

```
<?
define ('CONSTANT_NAME', 123);
// from here on CONSTANT_NAME will have value 123
print CONSTANT_NAME; // will output 123
?>
```

  - Cannot change value
  - Doesn't start with $
  - Can hold any scalar value

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PHP Constants

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Basic Functions

Phpinfo

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Some Basic Functions

- We already know `print`
  - Similar to print is `echo`

```
<?
echo "123"; // will output 123 to the browser
?>
```

  - `print_r(array)` – pints array with keys and values detailed
- `phpinfo()` – Produces complete page containing information for the server, PHP settings, installed modules, etc

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Basic Functions

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Predefined Variables

Predefined Variables

- PHP provides a lot predefined variables and constants
  - `__FILE__`, `__LINE__`, `__FUNCTION__`, `__METHOD__`, `__CLASS__` - contain debug info
  - `PHP_VERSION`, `PHP_OS`, `PHP_EOL`, `DIRECTORY_SEPARATOR`, `PHP_INT_SIZE` and others are provided for easy creating cross-platform applications

Predefined Variables

- `$_SERVER` – array, holding information from the web server – headers, paths and script locations
  - `DOCUMENT_ROOT` – the root directory of the site in the web server configuration
  - `SERVER_ADDRESS`, `SERVER_NAME`, `SERVER_SOFTWARE`, `SERVER_PROTOCOL`
  - `REMOTE_ADDR`, `REMOTE_HOST`, `REMOTE_PORT`
  - `PHP_AUTH_USER`, `PHP_AUTH_PW`, `PHP_AUTH_DIGEST`
  - And others

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Predefined Variables

- `$_GET`, `$_POST`, `$_COOKIE` arrays hold the parameters from the URL, from the post data and from the cookies accordingly
- `$_FILES` array holds information for successfully uploaded files over multipart post request
- `$_SESSION` array holds the variables, stored in the session

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Variable variables

- PHP supports `$$` syntax- variable variables

```
<?
$str1 = 'test';
$test = 'abc';
echo $$str1; // outputs abc
?>
```

  - The variable `$str1` is evaluated as 'test' and so `$$str1` is evaluated as `$test`

Predefined Variables

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Strings Escaping

Strings escaping

- Special chars in stings are escaped with backslashes (C style)

```
$str1 = "this is \"PHP\"";
```

  - The escape sequences for double quoted string:
    - \n – new line (10 in ASCII)
    - \r – carriage return (13 in ASCII)
    - \t – horizontal tab
    - \v – vertical tab
    - \\ - backslash
    - \$ - dollar sign
    - \" – double quote

String escaping

- Single-quoted strings escape the same way

```
$str1 = 'Arnold once said: "I\'ll be back"';
```

  - Difference is that instead of \" you need \' to escape the closing quotes
  - No other escaping sequences will be expanded
- In both single and double quoted strings, backslash before any other character will be printed too!

Variables in strings

- Double quoted strings offer something more:

```
$saying = "I'll be back!";
$str1 = "Arnold once said: $saying";
// this will output:
// Arnold once said: I'll be back!
```

  - Variables in double-quoted strings are evaluated

- Note on arrays:

```
$sayings = array ('arni' => "I'll be back!");
$str1 = "Arnold once said: ${sayings['arni']}";
```

Heredoc syntax

- Define strings with heredoc syntax ('<<<')

```
$str = <<<EOT
This Is the string content
EOT;
```

- After the <<< we put "ending delimiter" – string goes all the way to this delimiter
  - The delimiter must be followed by new line
  - The ending delimiter must be alone on the last line, starting from first column
- Same escaping behavior as double-quoted string
- In single and double quoted strings you can embed new lines too

Heredoc syntax

- In order to allow people to easily write large amounts of text from within PHP, but without the need to constantly escape things, heredoc syntax was developed. Heredoc might be a little tricky to understand at first, but it's actually a big help. Put simply, it allows you to define your own string limiter so that you can make it something other than a double or single quote. So, for example, we could use the string "EOT" (end of text) for our delimiter, meaning that we can use double quotes and single quotes freely within the body of the text - the string only ends when we type EOT.

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Advantages and Disadvantages

Advantages and disadvantages

- Advantages
  - Easy to learn, open source, multiplatform and database support, extensions, community and commercial driven.
  - Considered to be one of the fastest languages
- Disadvantages
  - Too loose syntax – risk tolerant, poor error handling, poor OOP (before version 6 a lot things are missing!)

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HTML Forms

HTML Forms

- The user sends data to the server only one way – with HTML Forms
  - They are sets of fields that determine the types of data to be sent
  - The server receives the filled-in data and produces new page
  - To handle the submitted data you need CGI script
  - The forms data is similar to arguments to a normal application

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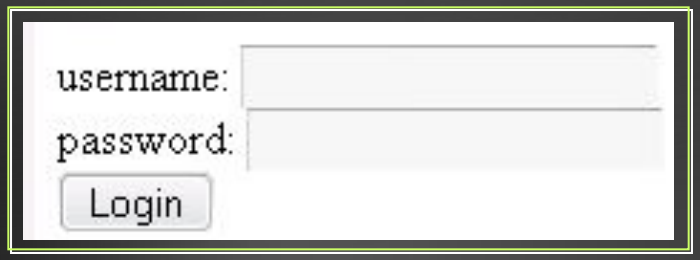
How Does It Work



The user enters data and submits
The form has "action" URL
to send the data to

```
<?
echo "Welcome ".$_POST ['username'] ."!";
?>
```

The PHP script receives
the data as
$_GET and $_POST
arrays and runs

```
...
<body>
Welcome Dimitar!
...
```

Producing HTML that is
result of the user's
posted data

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GET And POST

$_POST and $_GET

- PHP receives the data in the `$_GET` and `$_POST` arrays
  - URL parameters go into the `$_GET` array
  - Data from forms with `method="post"` do into the `$_POST` array
    - The request method is post
    - We can check what is the current request method in the `$_SERVER` array
  - Both arrays are global and can be used as any other array

$_POST

- $_POST is associative array
  - The name attribute of form input becomes key in the array
  - If in the example form the user fills "John" and "mypass":

```
<form method="post" action="test.php">
    <input type="text" name="mname" />
    <input type="password" name="pass" />
</form>
```

  - test.php will start with built-in array $_POST" :
    - $_POST[`mname'] will be "John"
    - $_POST['pass"] will be "mypass"

POST

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$_GET

- $_GET is also associative array
  - If we open the URL:

```
http://phpcourse.com/test.php?page=1&user=john
```

  - The test2.php script will start with built-in array $_GET
    - $_GET['page'] will be 1
    - $_GET['user'] will be "john"

GET

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GET Array

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$_POST Versus $_GET

- The get requests passes the parameters trough the URL
  - Allows user to send link or bookmark the page as it is
  - URL is limited to 255 symbols
- The post request passes the parameters trough the request body
  - User cannot open the page without first filling the post data in the form
  - Allows sending files

Determine The Request Type

- `$_SERVER['REQUEST_METHOD']` holds the name of the request type
  - Can be one of 'GET', 'POST', 'HEAD', 'PUT'
  - Can be used to detect if user has submitted data or just opens the page from URL
  - Case sensitive!

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PHP Basics

http://academy.telerik.com