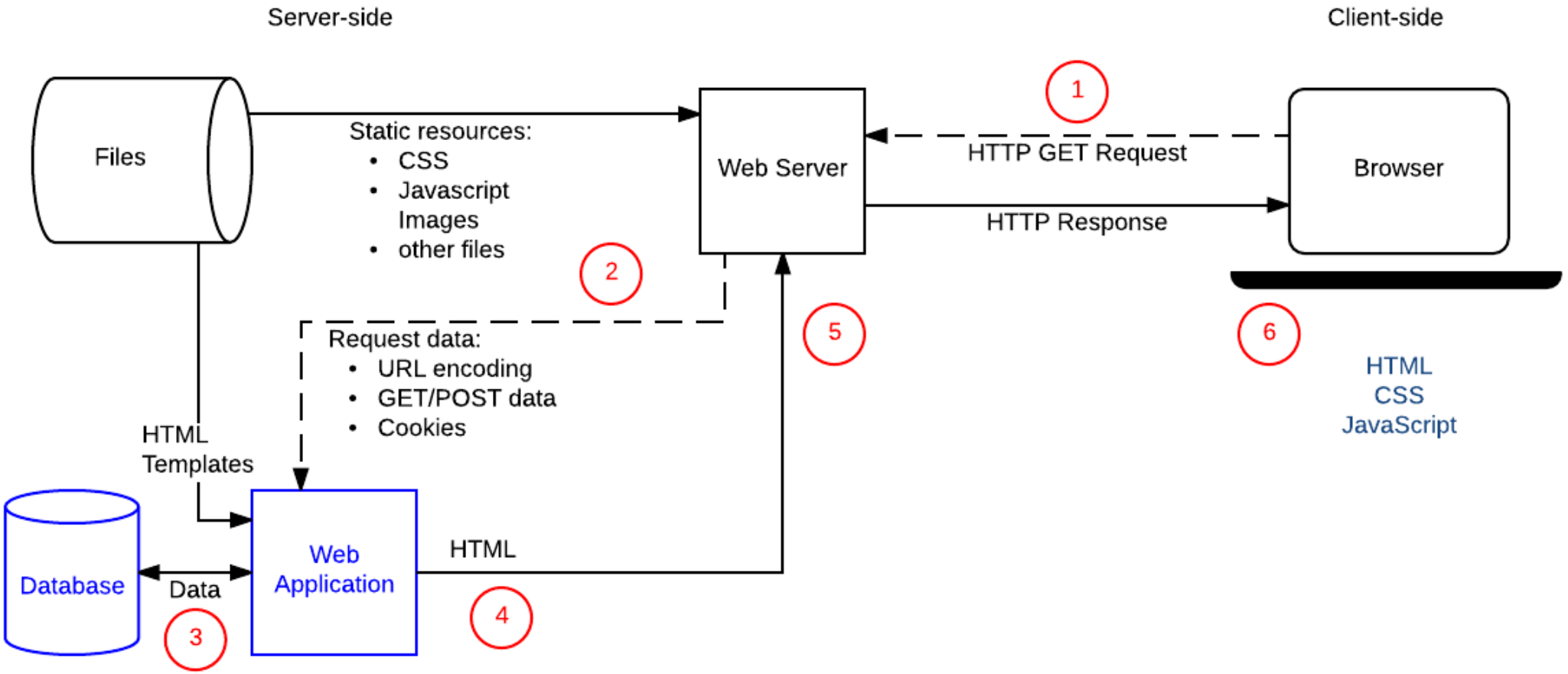
PHP

Content

PHP Basics:

- Introduction to PHP
  - a PHP file, PHP workings, running PHP.
- Basic PHP syntax
  - variables, operators, if...else...and switch, while, do while, and for.
- Some useful PHP functions
- How to work with
  - HTML forms, cookies, files, time and date.
- How to create a basic checker for user-entered data

Example of a dynamic website



src: https://developer.mozilla.org/en-US/docs/Learn/Server-side/First_steps/Introduction

Server-side vs Client-side programming

- Different purposes
  - Client-side code: improve apperance and behavior: UI, layout, form validation
  - Server-side code: choose which content is returned to client
- Different programming languages (except JavaScript)
  - Client-side code: HTML, CSS, JavaScript
  - Server-side code: PHP, Python, Ruby, C#, JavaScript
- Different operating system enviroments
  - Client-side code: run inside a browser and has limited access to underlying operating systems
  - Server-side code: full access to server operating systems

Introduction to PHP

- Developed in 1995 by Rasmus Lerdorf (member of the Apache Group)
  - originally designed as a tool for tracking visitors at Lerdorf's Web site
  - within 2 years, widely used in conjunction with the Apache server
  - free, open-source
  - now fully integrated to work with mySQL databases
- PHP is similar to JavaScript, only it's a server-side language
  - PHP code is embedded in HTML using tags
  - when a page request arrives, the server recognizes PHP content via the file extension (.php or .phtml)
  - the server executes the PHP code, substitutes output into the HTML page
  - the resulting page is then downloaded to the client
  - user never sees the PHP code, only the output in the page
- The acronym PHP means (in a slightly recursive definition)
  - PHP: Hypertext Preprocessor

```
<html>
<!-- hello.php CS443 -->
<head><title>Hello World</title></head>
<body>
 <p>This is going to be ignored by the PHP interpreter.</p>
    <?php echo '<p>While this is going to be parsed.</p>';
?>
    <p>This will also be ignored by the PHP
preprocessor.</p>
   <?php print('<p>Hello and welcome to <i>my</i>
page!</p>');
     ?>
  <?php
   //This is a comment
  /*
   This is
   a comment
   block
  */
  ?>
</body>
</html>
```

view the output page

A PHP scripting block always starts with `<?php` and ends with `?>`. A PHP scripting block can be placed (almost) anywhere in an HTML document.

`print` and `echo` for output

`a semicolon (;)` at the end of each statement

// for a single-line comment

/* and */ for a large comment block.

The server executes the print and echo statements, substitutes output.

Scalars

```
<html><head></head>
<!-- scalars.php CS443 -->
<body>  <p>
<?php
$foo = true; if ($foo) echo "It is TRUE! <br /> \n";
$txt='1234'; echo "$txt <br /> \n";
$a = 1234; echo "$a <br /> \n";
$a = -123;
echo "$a <br /> \n";
$a = 1.234;
echo "$a <br /> \n";
$a = 1.2e3;
echo "$a <br /> \n";
$a = 7E-10;
echo "$a <br /> \n";
echo 'Arnold once said: "I\'ll be back"', "<br /> \n";
$beer = 'Heineken';
echo "$beer's taste is great <br /> \n";
$str = <<<EOD
Example of string
spanning multiple lines
using “heredoc” syntax.
EOD;
echo $str;
?>
</p>
</body>
</html>
```

view the output page

All variables in PHP start with a $ sign symbol. A variable's type is determined by the context in which that variable is used (i.e. there is no strong-typing in PHP).

Data types:

- string
- integer
- float
- boolean
- array
- object
- NULL
- Resource

Arrays

```php
<?php
$arr = array("foo" => "bar", 12 => true);
echo $arr["foo"]; // bar
echo $arr[12];    // 1
?>
```

```php
<?php
array(5 => 43, 32, 56, "b" => 12);
array(5 => 43, 6 => 32, 7 => 56, "b" => 12);
?>
```

```php
<?php
$arr = array(5 => 1, 12 => 2);
foreach ($arr as $key => $value) { echo $key, '=>',
                                   $value);  }
$arr[] = 56;    // the same as $arr[13] = 56;
$arr["x"] = 42; // adds a new element
unset($arr[5]); // removes the element
unset($arr);    // deletes the whole array
$a = array(1 => 'one', 2 => 'two', 3 => 'three');
unset($a[2]);
$b = array_values($a);
?>
```

view the output page

`array()` = creates arrays

`key` = either an integer or a string.

`value` = any PHP type.

if no key given (as in example), the PHP interpreter uses (maximum of the integer indices + 1).

if an existing key, its value will be overwritten.

`unset()` removes a key/value pair

`array_values()` makes reindexing effect (indexing numerically)

Constants

A constant is an identifier (name) for a simple value. A constant is case-sensitive by default. By convention, constant identifiers are always uppercase.

```
<?php

// Valid constant names
define("FOO",     "something");
define("FOO2",    "something else");
define("FOO_BAR", "something more");

// Invalid constant names  (they shouldn't start
//      with a number!)

define("2FOO",    "something");

// This is valid, but should be avoided:
// PHP may one day provide a "magical" constant
// that will break your script

define("__FOO__", "something");

?>
```

You can access constants anywhere in your script without regard to scope.

Operators

- **Arithmetic Operators:** +, -, *,/ , %, ++, --
- **Assignment Operators:** =, +=, -=, *=, /=, %=

Example	Is the same as
x+=y	x=x+y
x-=y	x=x-y
x*=y	x=x*y
x/=y	x=x/y
x%=y	x=x%y

- **Comparison Operators:** ==, !=, >, <, >=, <=
- **Logical Operators:** &&, ||, !
- **String Operators**: . and .= (for string concatenation)

```
$a = "Hello ";
$b = $a . "World!"; // now $b contains "Hello World!"

$a = "Hello ";
$a .= "World!";
```

Conditionals: if else

```
<html><head></head>
<!-- if-cond.php CS443 -->
<body>

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

$x=10;
if ($x==10)
{
     echo "Hello<br />";
     echo "Good morning<br />";
}

?>

</body>
</html>
```

view the output page

Can execute a set of code depending on a condition

```
if (condition)
code to be executed if condition is true;
else
code to be executed if condition is false;
```

`date()` is a built-in PHP function that can be called with many different parameters to return the date (and/or local time) in various formats

In this case we get a three letter string for the day of the week.

Conditionals: switch

```
<html><head></head>
<body>
<!-- switch-cond.php CS443 -->
<?php
$x = rand(1,5);  // random integer
echo "x = $x <br/><br/>";
switch ($x)
{
case 1:
  echo "Number 1";
  break;
case 2:
  echo "Number 2";
  break;
case 3:
  echo "Number 3";
  break;
default:
  echo "No number between 1 and 3";
  break;
}
?>
</body>
</html>
```

view the output page

Can select one of many sets of lines to execute

```
switch (expression)
{
case label1:
  code to be executed if expression = label1;
  break;
case label2:
  code to be executed if expression = label2;
  break;
default:
  code to be executed
  if expression is different
  from both label1 and label2;
  break;
}
```

Looping: while and do-while

Can loop depending on a condition

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

<?php
$i=1;
while($i <= 5)
{
  echo "The number is $i <br />";
  $i++;
}
?>

</body>
</html>
```

view the output page

loops through a block of code if, and as long as, a specified condition is true

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

<?php
$i=0;
do
{
  $i++;
  echo "The number is $i <br />";
}
while($i <= 10);
?>

</body>
</html>
```

view the output page

loops through a block of code once, and then repeats the loop as long as a special condition is true (so will always execute at least once)

Looping: for and foreach

Can loop depending on a "counter"

```php
<?php
for ($i=1; $i<=5; $i++)
{
echo "Hello World!<br />";
}
?>
```

loops through a block of code
a specified number of times

view the output page

```php
<?php
$a_array = array(1, 2, 3, 4);
foreach ($a_array as $value)
{
   $value = $value * 2;
   echo "$value <br/> \n";
}
?>
```

```php
<?php
$a_array=array("a","b","c");
foreach ($a_array as $key => $value)
{
  echo $key . " = " . $value . "\n";
}
?>
```

loops through a block of code
for each element in an array

User Defined Functions

Can define a function using syntax such as the following:

```php
<?php
function foo($arg_1, $arg_2, /* ..., */ $arg_n)
{
    echo "Example function.\n";
    return $retval;
}
?>
```

Can also define conditional functions, functions within functions, and recursive functions.

Can return a value of any type

```php
<?php
function square($num)
{
    return $num * $num;
}
echo square(4);
?>
```

```php
<?php
function small_numbers()
{
    return array (0, 1, 2);
}
list ($zero, $one, $two) = small_numbers();
echo $zero, $one, $two;
?>
```

```php
<?php
function takes_array($input)
{
    echo "$input[0] + $input[1] = ", $input[0]+$input[1];
}
 takes_array(array(1,2));
?>
```

view the output page

Variable Scope

The scope of a variable is the context within which it is defined.

```
<?php
$a = 1; /* limited variable scope */
function Test()
{
   echo $a;
  /* reference to local scope variable */
}
Test();
?>
```

The scope is local within functions, and hence the value of $a is undefined in the “echo” statement.

```
<?php
$a = 1;
$b = 2;
function Sum()
{
   global $a, $b;
   $b = $a + $b;
}
Sum();
echo $b;
?>
```

`global`

refers to its global version.

view the output page

```
<?php
function Test()
{
   static $a = 0;
   echo $a;
   $a++;
}
Test1();
Test1();
Test1();
?>
```

`static`

does not lose its value.

Including Files

The include() **statement includes and evaluates the specified file.**

```
//  vars.php
<?php

$color = 'green';
$fruit = 'apple';

?>

// test.php
<?php

echo "A $color $fruit"; // A

include 'vars.php';

echo "A $color $fruit"; // A green apple

?>
```

view the output page

```
<?php

function foo()
{
   global $color;

   include ('vars.php');

   echo "A $color $fruit";
}

/* vars.php is in the scope of foo() so     *
 * $fruit is NOT available outside of this  *
 * scope.  $color is because we declared it *
 * as global.                                */

foo();                          // A green apple
echo "A $color $fruit";   // A green

?>
```

view the output page

*The scope of variables in “included” files depends on where the “include” file is added!

PHP Information

The `phpinfo()` function is used to output PHP information about the version installed on the server, parameters selected when installed, etc.

```
<html><head></head>
<!- info.php CS443
<body>
<?php
// Show all PHP information
phpinfo();
?>
<?php
// Show only the general information
phpinfo(INFO_GENERAL);
?>
</body>
</html>
```

view the output page

INFO_GENERAL	The configuration line, php.ini location, build date, Web Server, System and more
INFO_CONFIGURATION	Local and master values for php directives
INFO_MODULES	Loaded modules
INFO_ENVIRONMENT	Environment variable information
INFO_VARIABLES	All predefined variables from EGPCS
INFO_LICENSE	PHP license information
INFO_ALL	Shows all of the above (default)

Server Variables

The $_SERVER array variable is a reserved variable that contains all server information.

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

<?php
echo "Referer: " . $_SERVER["HTTP_REFERER"] . "<br />";
echo "Browser: " . $_SERVER["HTTP_USER_AGENT"] . "<br />";
echo "User's IP address: " . $_SERVER["REMOTE_ADDR"];
?>

<?php
echo "<br/><br/><br/>";
echo "<h2>All information</h2>";
foreach ($_SERVER as $key => $value)
  {
    echo $key . " = " . $value . "<br/>";
  }
?>

</body>
</html>
```

view the output page

$_SERVER info on php.net

The $_SERVER is a super global variable, i.e. it's available in all scopes of a PHP script.

File Open

The `fopen("file_name","mode")` function is used to open files in PHP.

r	Read only.	r+	Read/Write.
w	Write only.	w+	Read/Write.
a	Append.	a+	Read/Append.
x	Create and open for write only.	x+	Create and open for read/write.

```
<?php
$fh=fopen("welcome.txt","r");
?>
```

For w, and a, if no file exists, it tries to create it (use with caution, i.e. check that this is the case, otherwise you'll overwrite an existing file).

For x if a file exists, this function fails (and returns 0).

```
<?php
if
(
!($fh=fopen("welcome.txt","r"))
)
exit("Unable to open file!");
?>
```

If the fopen() function is unable to open the specified file, it returns 0 (false).

File Workings

```php
<?php
$myFile = "welcome.txt";
if (!($fh=fopen($myFile,'r')))
exit("Unable to open file.");
while (!feof($fh))
{
$x=fgetc($fh);
echo $x;
}
fclose($fh);
?>
```

view the output page

```php
<?php
$lines = file('welcome.txt');
foreach ($lines as $l_num => $line)
{
 echo "Line #{$l_num}:"
.$line."<br/>";
}
?>
```

view the output page

```php
<?php
$myFile = "welcome.txt";
$fh = fopen($myFile, 'r');
$theData = fgets($fh);
fclose($fh);
echo $theData;
?>
```

view the output page

```php
<?php
$myFile = "testFile.txt";
$fh = fopen($myFile, 'a') or
die("can't open file");
$stringData = "New Stuff 1\n";
fwrite($fh, $stringData);
$stringData = "New Stuff 2\n";
fwrite($fh, $stringData);
fclose($fh);
?>
```

view the output page

`fclose()` closes a file.

`fgetc()` reads a single character

`fwrite(), fputs ()` writes a string with and without \n

`feof()` determines if the end is true.

`fgets()` reads a line of data

`file()` reads entire file into an array

Form Handling

Any form element is automatically available via one of the built-in PHP variables (provided that HTML element has a “name” defined with it).

```
<html>
<-- form.html CS443 -->
<body>
<form action="welcome.php" method="post">
Enter your name: <input type="text" name="name" /> <br/>
Enter your age: <input type="text" name="age" /> <br/>
<input type="submit" /> <input type="reset" />
</form>
</body>
</html>
```

```
<html>
<!-- welcome.php COMP 519 -->
<body>

Welcome <?php echo $_POST["name"]."."; ?><br />
You are <?php echo $_POST["age"]; ?> years old!

</body>
</html>
```

view the output page

`$_POST`
contains all POST data.

`$_GET`
contains all GET data.

Cookie Workings

`setcookie(name,value,expire,path,domain)` creates cookies.

```
<?php
setcookie("uname", $_POST["name"], time()+36000);
?>
<html>
<body>
<p>
Dear <?php echo $_POST["name"] ?>, a cookie was set on this
page! The cookie will be active when the client has sent the
cookie back to the server.
</p>
</body>
</html>
```

view the output page

NOTE:

`setcookie()` must appear BEFORE <html> (or any output) as it's part of the header information sent with the page.

```
<html>
<body>
<?php
if ( isset($_COOKIE["uname"]) )
echo "Welcome " . $_COOKIE["uname"] . "!<br />";
else
echo "You are not logged in!<br />";
?>
</body>
</html>
```

view the output page

$_COOKIE
contains all COOKIE data.

isset()
finds out if a cookie is set

use the cookie name as a variable

Getting Time and Date

`date()` and `time ()` **formats a time or a date.**

```
<?php
//Prints something like: Monday
echo date("l");

//Like: Monday 15th of January 2003 05:51:38 AM
echo date("l jS \of F Y h:i:s A");

//Like: Monday the 15th
echo date("l \\t\h\e jS");
?>
```

view the output page

date() returns a string formatted according to the specified format.

```
<?php
$nextWeek = time() + (7 * 24 * 60 * 60);
                    // 7 days; 24 hours; 60 mins; 60secs
echo 'Now:       '. date('Y-m-d') ."\n";
echo 'Next Week: '. date('Y-m-d', $nextWeek) ."\n";
?>
```

view the output page

time() returns current Unix timestamp

Required Fields in User-Entered Data

A multipurpose script which asks users for some basic contact information and then checks to see that the required fields have been entered.

```
<html>
<!-- form_checker.php CS443 -->
<head>
<title>PHP Form example</title>
</head>
<body>
<?php
/*declare some functions*/
```

Print Function

```
function print_form($f_name, $l_name, $email, $os)
{
?>

 <form action="form_checker.php" method="post">
 First Name: <input type="text" name="f_name" value="<?php echo $f_name?>" /> <br/>
 Last Name <b>*</b>:<input type="text" name="l_name" value="<?php echo $l_name?>" /> <br/>
 Email Address <b>*</b>:<input type="text" name="email" value="<?php echo $email?>" /> <br/>
 Operating System: <input type="text" name="os" value="<?php echo $os?>" /> <br/><br/>
 <input type="submit" name="submit" value="Submit" /> <input type="reset" />
 </form>

<?php
}  //**  end of "print_form" function
```

Check and Confirm Functions

```
function check_form($f_name, $l_name, $email, $os)
{
  if (!$l_name||!$email){
  echo "<h3>You are missing some required fields!</h3>";
  print_form($f_name, $l_name, $email, $os);
  }
  else{
   confirm_form($f_name, $l_name, $email, $os);
  }
}  //** end of "check_form" function
```

```
function confirm_form($f_name, $l_name, $email, $os)
{
?>

<h2>Thanks! Below is the information you have sent to us.</h2>
<h3>Contact Info</h3>

<?php
echo "Name: $f_name $l_name <br/>";
echo "Email: $email <br/>";
echo "OS: $os";
}   //** end of "confirm_form" function
```

Main Program

```
/*Main Program*/

if (!$_POST["submit"])
{
?>

 <h3>Please enter your information</h3>
 <p>Fields with a "<b>*</b>" are required.</p>

<?php
 print_form("","","","");
}
else{
 check_form($_POST["f_name"],$_POST["l_name"],$_POST["email"],$_POST["os"]);
}
?>


</body>
</html>
```

view the output page

Learning Outcomes

In the lecture you have learned

What is PHP and what are some of its workings.

Basic PHP syntax

- variables, operators, if...else...and switch, while, do while, and for.

Some useful PHP functions

How to work with

- HTML forms, cookies, files, time and date.

How to create a basic checker for user-entered data.