PHP Scripting language

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Introduction to PHP

- ***“PHP is a server-side scripting language designed specifically for the Web. Within an HTML page, you can embed PHP code that will be executed each time the page is visited. Your PHP code is interpreted at the Web server and generates HTML or other output that the visitor will see” (“PHP and MySQL Web Development”, Luke Welling and Laura Thomson, SAMS)***

PHP History

- 1994: Created by Rasmis Lesdorf, software engineer (part of Apache Team)
- 1995: Called Personal Home Page Tool, then released as version 2 with name PHP/FI (Form Interpreter, to analyze SQL queries)
- Half 1997: used by 50,000 web sites
- October 1998: used by 100,000 websites
- End 1999: used by 1,000,000 websites

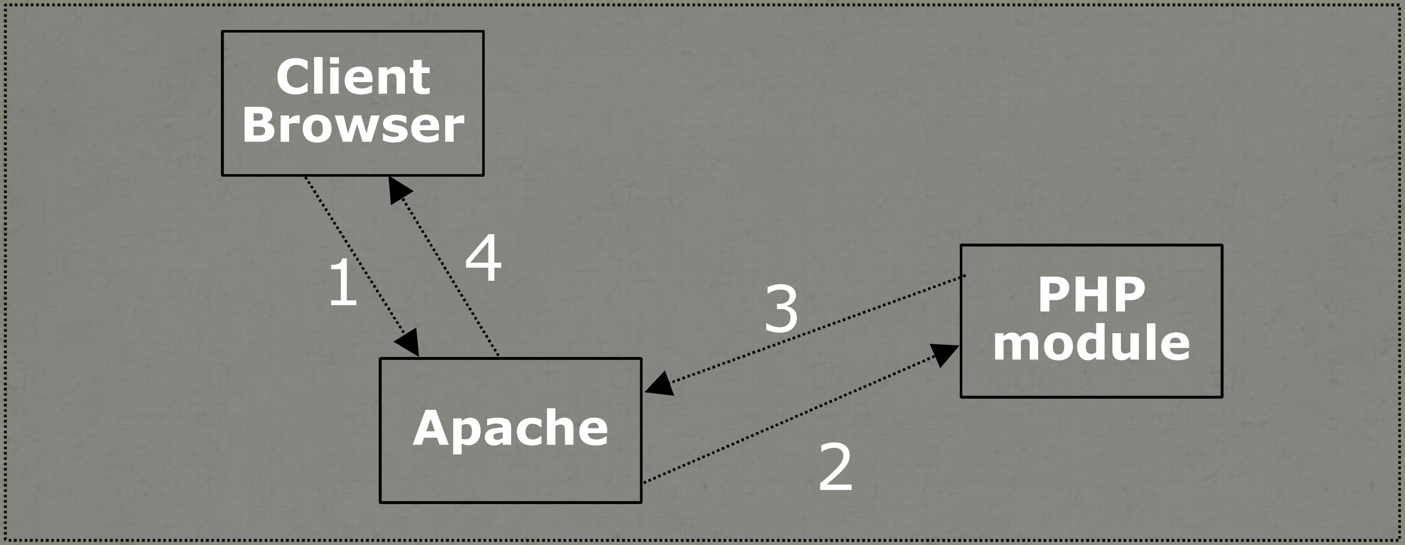
Alternatives to PHP

- Practical extraction and Report Language (Perl)
- Active Server Pages (ASP)
- Java server pages (JSP)
- Ruby

(Good) Topics about PHP

- Open-source
- Easy to use (C-like and Perl-like syntax)
- Stable and fast
- Multiplatform
- Many databases support
- Many common built-in libraries
- Pre-installed in Linux distributions

How PHP generates HTML/JS Web pages



1: Client from browser send HTTP request (with POST/GET variables)
2: Apache recognizes that a PHP script is requested and sends the request to PHP module
3: PHP interpreter executes PHP script, collects script output and sends it back
4: Apache replies to client using the PHP script output as HTML output

Hello World! (web oriented)

```
<html>
<head>
  <title>My personal Hello World! PHP script</title>
</head>
<body>
<?
 echo “Hello World!”;
?>
</html>
```

PHP tag, allow to insert PHP code. Interpretation by PHP module will substitute the code with code output

Variables (I)

- To use or assign variable $ must be present before the name of the variable
- The assign operator is '='
- There is no need to declare the type of the variable
- the current stored value produces an implicit type-casting of the variable.
- A variable can be used before to be assigned

```
$A = 1;
$B = “2”;
$C = ($A + $B); // Integer sum
$D = $A . $B; // String concatenation
echo $C; // prints 3
echo $D;//  prints 12
```

Variables (II)

- Function isset tests if a variable is assigned or not

```
$A = 1;
if (isset($A))
        print "A isset"
if (!isset($B))
        print "B is NOT set";
```

- Using $$

```
$help = "hiddenVar";
$$help = "hidden Value";
echo $$help; // prints  hidden Value
$$help = 10;
$help = $$help * $$help;
echo $help; // print 100
```

Strings (I)

- A string is a sequence of chars

```
$stringTest = “this is a sequence of chars”;
echo $stringTest[0]; output: t
echo $stringTest; output: this is a sequence of chars
```

- A single quoted strings is displayed “as-is”

```
$age = 37;
$stringTest = 'I am $age years old'; // output: I am $age years old
$stringTest = “I am $age years old”; // output: I am 37 years old
```

- Concatenation

```
$conc = ”is “.”a “.”composed “.”string”;
echo $conc; // output: is a composed string
$newConc = 'Also $conc '.$conc;
echo $newConc; // output: Also $conc is a composed string
```

Strings (II)

- Explode function

```
$sequence = “A,B,C,D,E,F,G”;
$elements = explode (“,”,$sequence);
// Now elements is an array with all substrings between “,” char
echo $elemets[0]; // output: A;
echo $elemets[1]; // output: B;
echo $elemets[2]; // output: C;
echo $elemets[3]; // output: D;
echo $elemets[4]; // output: E;
echo $elemets[5]; // output: F;
echo $elemets[6]; // output: G;
```

Arrays (I)

- Groups a set of variables, every element stored into an array as an associated key (index to retrieve the element)

```
$books = array( 0=>"php manual",1=>"perl manual",2=>"C manual");
$books = array( 0=>"php manual","perl manual","C manual");
$books = array ("php manual","perl manual","C manual");
echo $books[2]; output: C manual
```

- Arrays with PHP are associative

```
$books = array( "php manual"=>1,"perl manual"=>1,"C manual"=>1); // HASH
echo $books["perl manual"]; output: 1
$books["lisp manual"] = 1; // Add a new element
```

Arrays (II)

- Working on an arrays

```
$books = array( ”php manual”,”perl manual”,”C manual”);
```

- Common loop

```
for ($i=0; $i < count($books); $i++)
    print ($i+1).”-st book of my library: $books[$i]”;
```

- each

```
$books = array( “php manual”=>1,”perl manual”=>2,”C manual”=>3);
while ($item = each( $books )) // Retrieve items one by one
    print $item[“value”].”-st book of my library: ”.$item[“key”];
```

// **each** retrieve an array of two elements with key and value of current element

- each and list

```
while ( list($value,$key) = each( $books ))
    print “$value-st book of my library: $key”;
```

// **list** collect the two element retrieved by **each and store them in two different // variables**

Arrays (III)

- Multidimensional arrays

```
$books = array( array(“title”=>“php manual”,”editor”=>”X”,”author”=>”A”),
                array(“title”=>“perl manual”,”editor”=>”Y”,”author”=>”B”),
                array(“title=>“C manual”,”editor”=>”Z”,author=>”C”));
```

- Common loop

```
for ($i=0; $i < count($books); $i++ )
   print “$i-st book, title: ”.$books[$i][“title”].” author: “.$books[$i][“author”].
                     “ editor: “.$books[$i][“editor”];
// Add .”\n” for text new page or “.<BR>” for HTML new page;
```

- Use list and each

```
for ($i=0; $i < count($books); $i++)
{
   print “$i-st book is: “;
   while ( list($key,$value) = each( $books[$i] ))
        print “$key: $value ”;
  print “<BR>”; // or “\n”
}
```

Case study (small database I)

- You need to build one or more web pages to manage your library, but:
  - ***"You have no time or no knoledge on how to plan and design database"***
  - ***or "You have no time or knolwdge on how to install a free database"***
  - ***And "The database to implement is small" (about few thousands entries, but depends on server configuration)***

Case study (small database II)

```
#cat /usr/local/myDatabaseDirectory/library.txt
php manual   X     A     330
perl manual  Y     B     540
C manual           Z     C     480
```

(fields separated by tabs: 'php manual<tab>X<tab>A', new line at the end of each entry)

```
<? // script to show all book in my library
$books = file("/usr/local/myDatabaseDirectory/library.txt"); // retrieve library "database"
for ($i=0; $i<count($books), $i++ )
     $books_array[$i] = explode( "\t", $books[$i]); // Extract elements from line
...
for ($i=0; $i<count($books_array), $i++ )
     print "$i-st book, title: ".$books_array[$i]["title"]." author:
     ".$books_array[$i]["author"].
                              " editor: ".$books_array[$i]["editor"]."<BR>";
```

Case study

A way to reuse code (I)

Using functions is possible to write more general code, to allow us to reuse it to add feature:

- For the same project (always try to write reusable code, also you will work for a short time on a project)
- For new projects

```
<? // config.php, is a good idea to use configuration files
$tableFiles = array ( “books”=>”/usr/local/myDatabaseDirectory/books.txt”);
$bookTableFields = array (“title”,”author”,”editor”,”pages”);
// future development of the library project (add new tables)
$tableFiles = array ( “users”=>”/usr/local/myDatabaseDirectory/users.txt”);
$userTableFields = array (“code”,“firstName”,”lastName”,”age”,”institute”);
?>
```

Case study
A way to reuse code (II)

```
<? // script to show all book in my library
$books = file("/usr/local/myDatabaseDirectory/library.txt");
// retrieve library "database"
for ($i=0; $i<count($books), $i++ )
    $books_array[$i] = explode( "\t", $books[$i]); // Extract elements from line
…
for ($i=0; $i<count($books_array), $i++ )
    print "$i-st book, title: ".$books_array[$i]["title"]." author:
    ".$books_array[$i]["author"].
                            " editor: ".$books_array[$i]["editor"]."<BR>";
```

Functions in details (I)

The syntax to implement a user-defined function is :

function function_name([parameters-list]opt)

{……*implementation code*……}

parameters-list is a sequence of variables separated by “,”

- it’s not allowed to overload the name of an existing function;
- Function names aren’t case-sensitive;
- To each parameter can be assigned a default value;
- arguments can be passed by value or by reference
- It’s possible using a variable number of parameters
-

Object Oriented PHP

- Encapsulation
- Polymorphism
- Inheritance
- Multiple Inheritance: actually unsupported

Encapsulation

```
<?
class dayOfWeek {
  var $day,$month,$year;
  function dayOfWeek($day,$month,$year) {
    $this->day = $day;
    $this->month = $month;
    $this->year = $year;
  }
   function calculate(){
     if ($this->month==1){
        $monthTmp=13;
        $yearTmp = $this->year - 1;
     }
     if ($this->month == 2){
        $monthTmp = 14;
        $yearTmp = $this->year - 1;
     }
  $val4 = (($month+1)*3)/5;
  $val5 = $year/4;
  $val6 = $year/100;
  $val7 = $year/400;
  $val8 = $day+($month*2)+$val4+$val3+$val5-
      $val6+$val7+2;
  $val9 = $val8/7;
  $val0 = $val8-($val9*7);
  return $val0;
  }
}
// Main
$instance =
  new dayOfWeek($_GET["day"],$_GET["week"],$_GET["
      month"]);
print "You born on ".$instance->calculate()."\n";
?>
```

Inheritance

- *Allow the creation of a hierarchy of classes*

```
Class reuseMe {

    function
      reuseMe(){…}

    function
      doTask1(){…}

    function
      doTask2(){…}

    function
      doTask3(){…}
}
```

```
Class  extends reuseMe {

    function example(){
      … // local initializations
      // call super constructor
      reuseMe::reuseMe();
    }

    function doTask4(){…}

    function doTask5(){…}

    function doTask6(){…}
}
```

Polymorphism

A member function can override superclass implementation. Allow each subclass to reimplement a common interfaces.

```
class reuseMe {

     function
       reuseMe(){…}

     function
       doTask1(){…}

     function
       doTask2(){…}

     function
       doTask3(){…}
   }
```

```
Class  extends reuseMe {

     function example(){
       … // local initializations
       // call super constructor
       reuseMe::reuseMe();
     }

     function doTask4(){…}

     function doTask5(){…}

     function doTask6(){…}

     function doTask3(){…}
   }
```

Multiple Inheritance not actually supported by PHP

```
class reuseMe1 {
function reuseMe1(){...}
function  doTask1(){...}
function  doTask2(){...}
function  doTask3(){...}
}
```

```
class reuseMe2 {
function reuseMe2(){...}
function  doTask3(){...}
function  doTask4(){...}
function  doTask5(){...}
}
```

class extends reuseMe1,reuseMe2 {...}

Bibliography

[1] *"PHP and MySQL Web Development", Luke Welling and Laura Thomson, SA*

THANK YOU