IF3110 – Web-based Application Development

PHP Programming

What is PHP?

- PHP (recursive acronym for *PHP: Hypertext Preprocessor*) is a widely-used open source general-purpose scripting language that is especially suited for web development and can be embedded into HTML.
- What distinguishes PHP from something like client-side JavaScript is that the code is executed on the server, generating HTML which is then sent to the client.

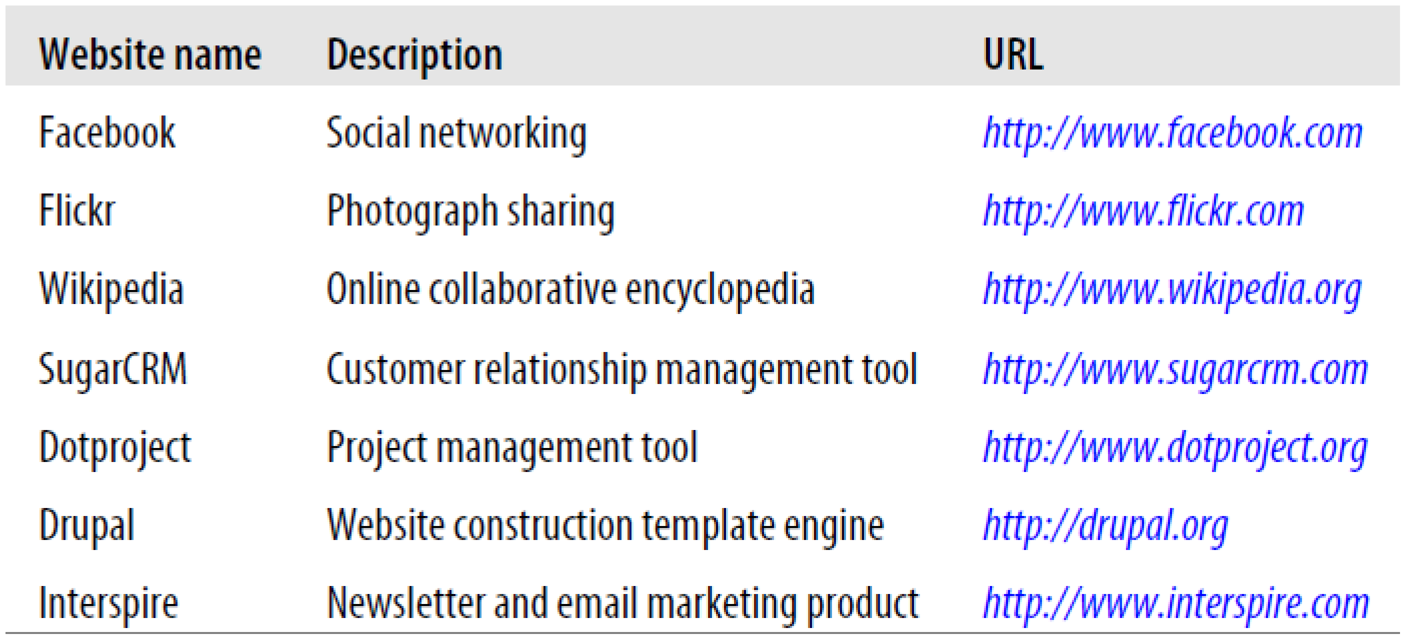
What is the relation between the versions?

- PHP/FI 2.0 is an early and no longer supported version of PHP. PHP 3 is the successor to PHP/FI 2.0 and is a lot nicer.
- PHP 5 uses the Zend engine 2 which, among other things, offers many additional OOP features.
- PHP 6 was experimental, and never released
- PHP 7 is the current generation of PHP, twice faster than PHP 5

What can PHP do?

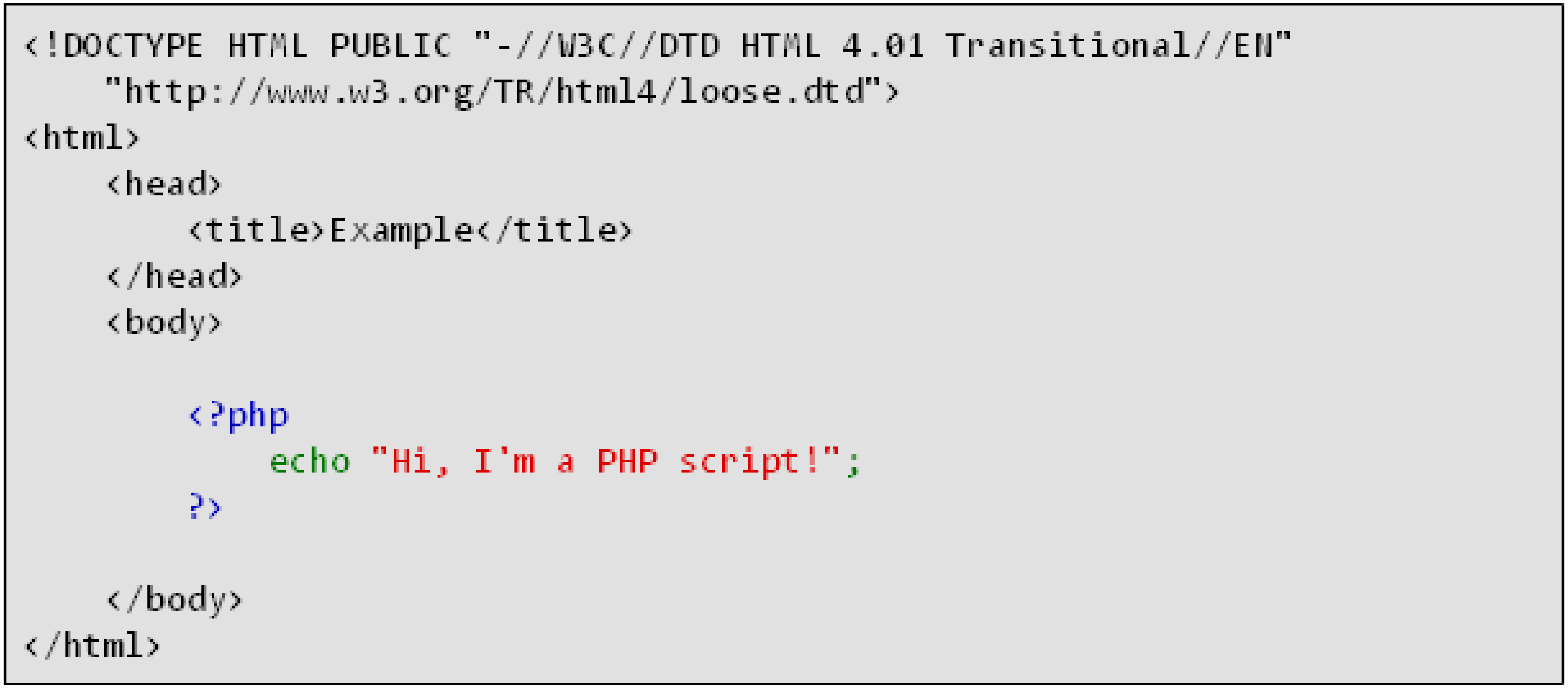
- Anything. PHP is mainly focused on server-side scripting, so you can do anything any other CGI program can do, such as collect form data, generate dynamic page content, or send and receive cookies. But PHP can do much more.

Table 1-1. Sampling of major websites that use PHP



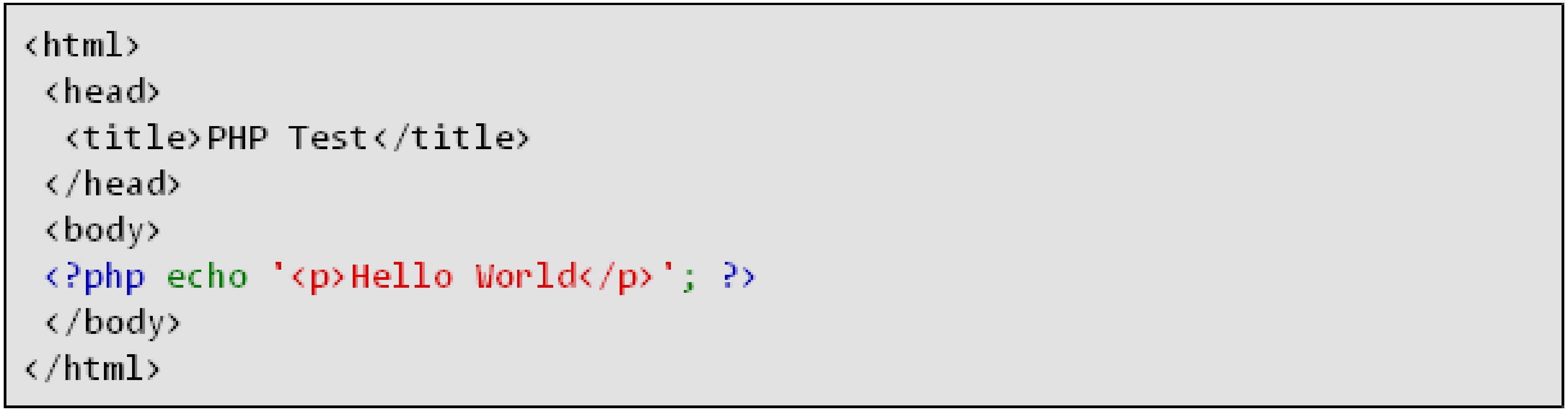
Website name	Description	URL
Facebook	Social networking	*http://www.facebook.com*
Flickr	Photograph sharing	*http://www.flickr.com*
Wikipedia	Online collaborative encyclopedia	*http://www.wikipedia.org*
SugarCRM	Customer relationship management tool	*http://www.sugarcrm.com*
Dotproject	Project management tool	*http://www.dotproject.org*
Drupal	Website construction template engine	*http://drupal.org*
Interspire	Newsletter and email marketing product	*http://www.interspire.com*

Example

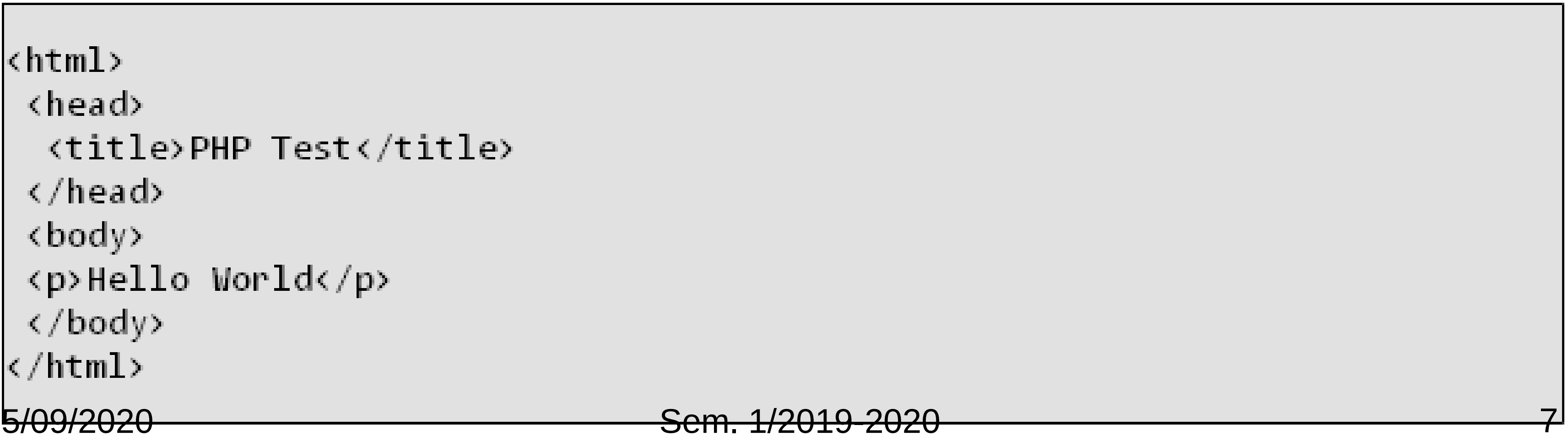


```
<!DOCTYPE HTML PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN"
    "http://www.w3.org/TR/html4/loose.dtd">
<html>
    <head>
        <title>Example</title>
    </head>
    <body>

        <?php
            echo "Hi, I'm a PHP script!";
        ?>

    </body>
</html>
```

hello.php

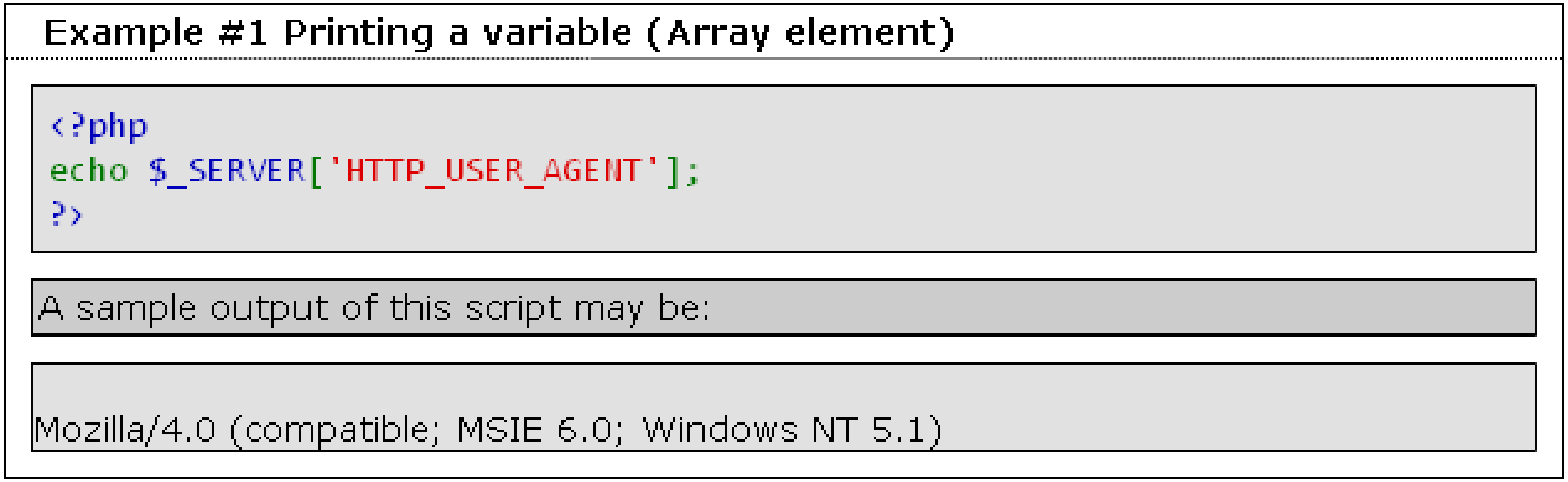


```
<html>
 <head>
  <title>PHP Test</title>
 </head>
 <body>
 <?php echo '<p>Hello World</p>'; ?>
 </body>
</html>
```



```
<html>
 <head>
  <title>PHP Test</title>
 </head>
 <body>
 <p>Hello World</p>
 </body>
</html>
```

Contoh

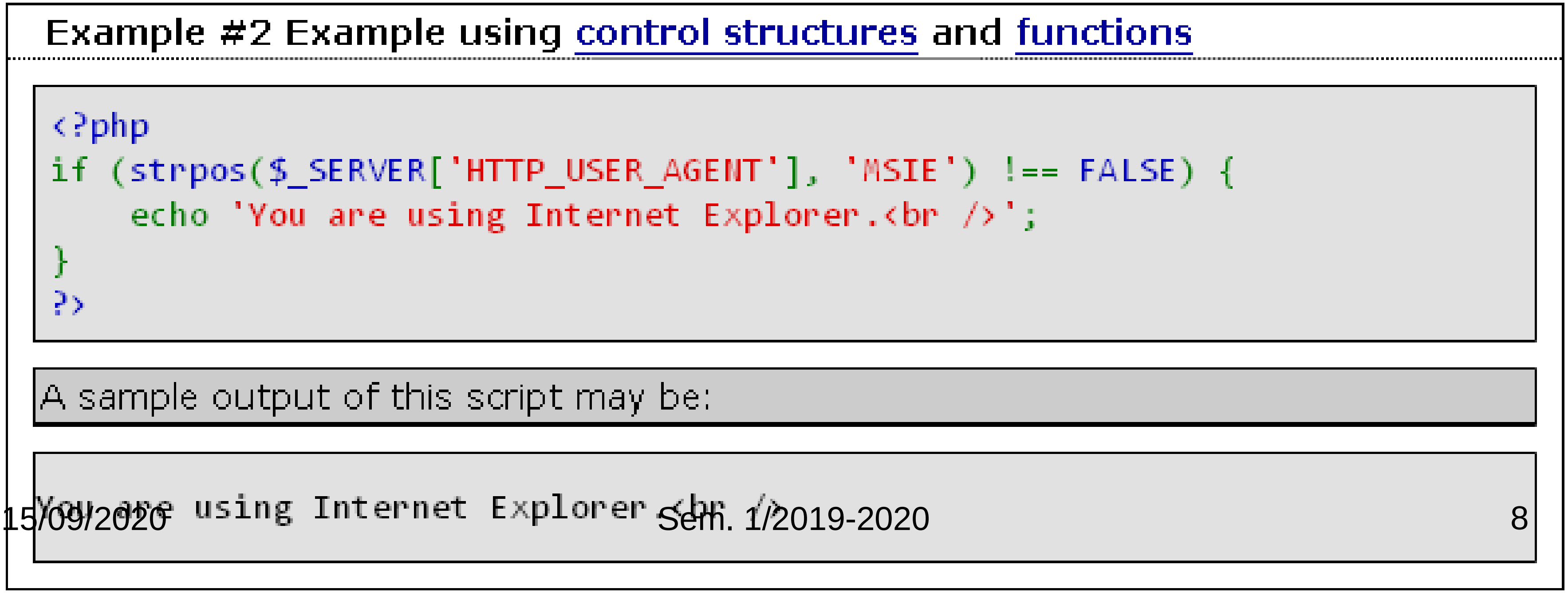


Example #1 Printing a variable (Array element)

```
<?php
echo $_SERVER['HTTP_USER_AGENT'];
?>
```

A sample output of this script may be:

```
Mozilla/4.0 (compatible; MSIE 6.0; Windows NT 5.1)
```

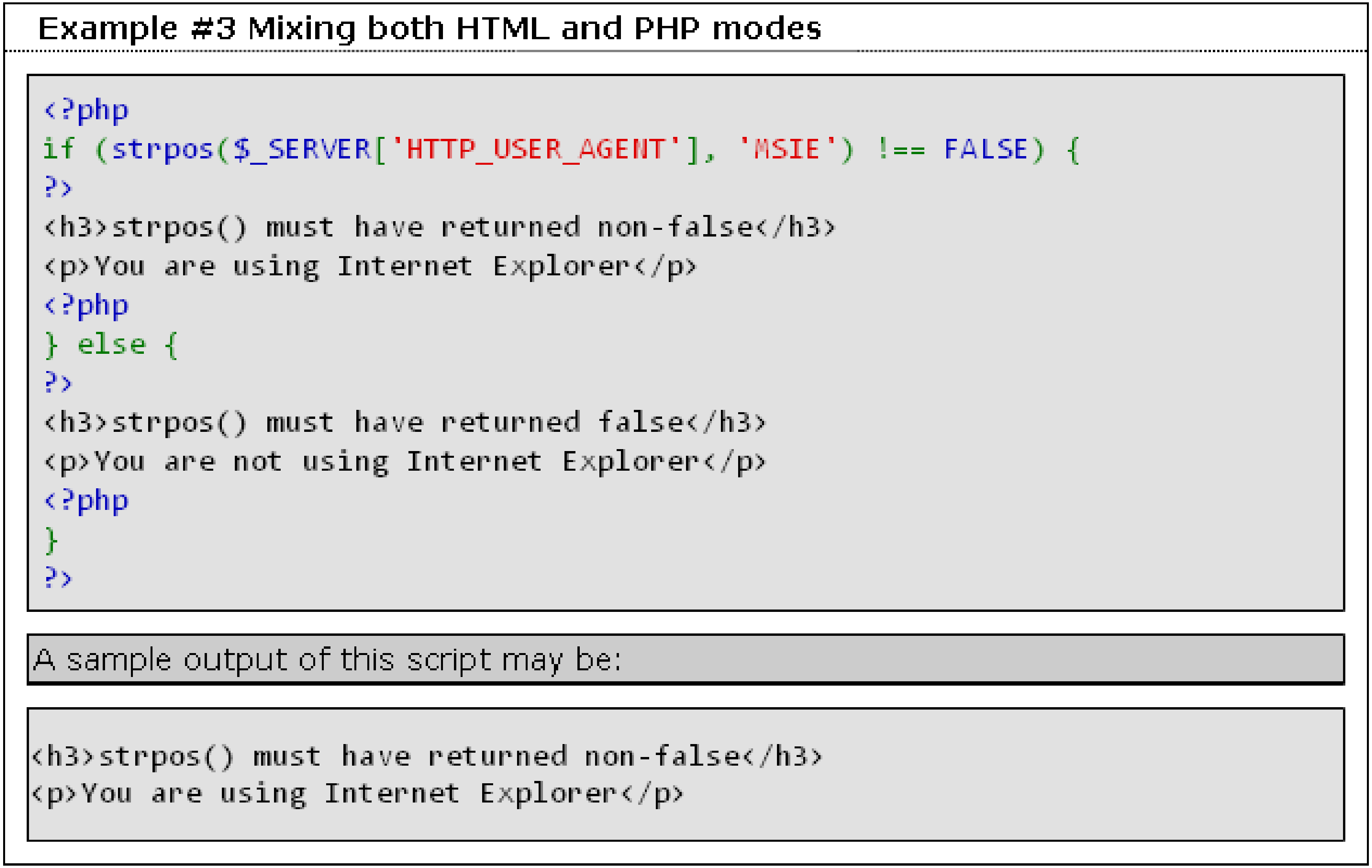


Example #2 Example using control structures and functions

```
<?php
if (strpos($_SERVER['HTTP_USER_AGENT'], 'MSIE') !== FALSE) {
    echo 'You are using Internet Explorer.<br />';
}
?>
```

A sample output of this script may be:

```
You are using Internet Explorer.<br />
```

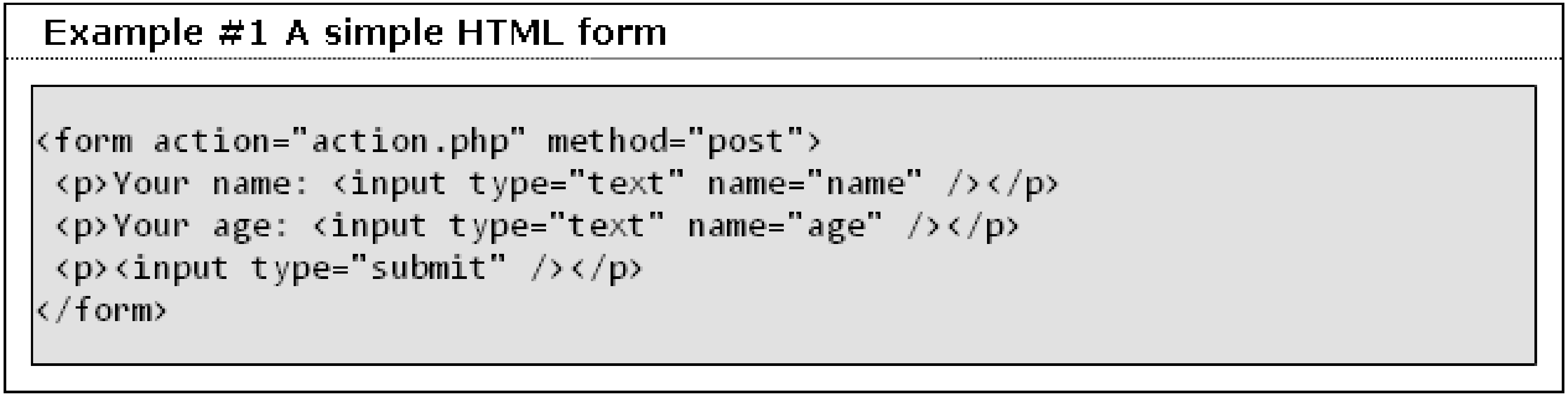


Example #3 Mixing both HTML and PHP modes

```
<?php
if (strpos($_SERVER['HTTP_USER_AGENT'], 'MSIE') !== FALSE) {
?>
<h3>strpos() must have returned non-false</h3>
<p>You are using Internet Explorer</p>
<?php
} else {
?>
<h3>strpos() must have returned false</h3>
<p>You are not using Internet Explorer</p>
<?php
}
?>
```

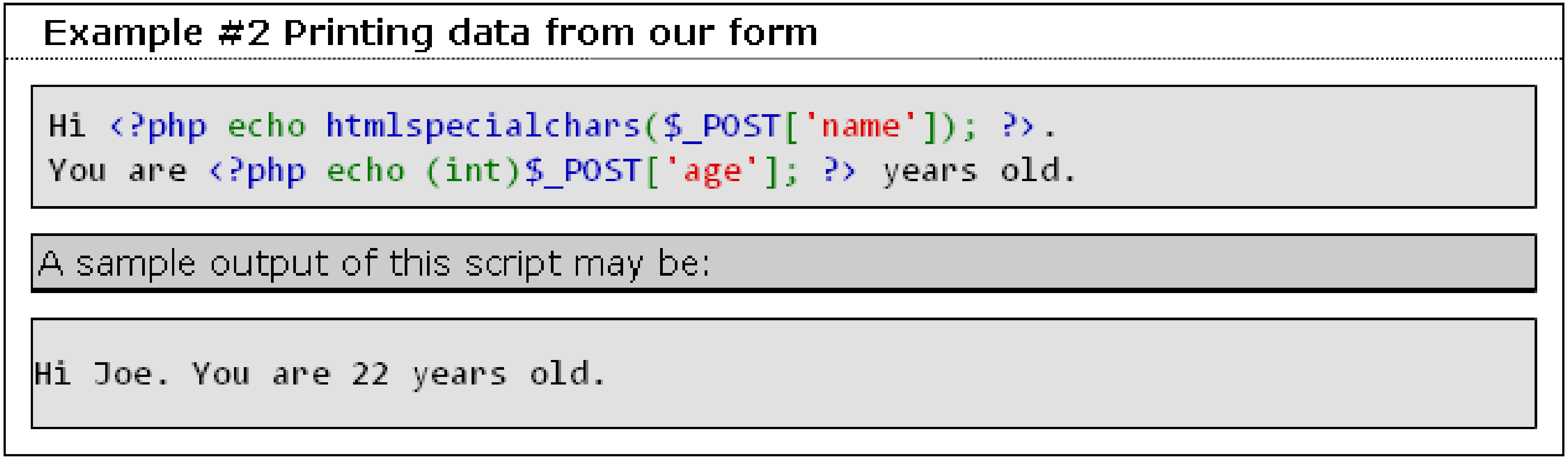
A sample output of this script may be:

```
<h3>strpos() must have returned non-false</h3>
<p>You are using Internet Explorer</p>
```



Example #1 A simple HTML form

```
<form action="action.php" method="post">
 <p>Your name: <input type="text" name="name" /></p>
 <p>Your age: <input type="text" name="age" /></p>
 <p><input type="submit" /></p>
</form>
```



Example #2 Printing data from our form

```
Hi <?php echo htmlspecialchars($_POST['name']); ?>.
You are <?php echo (int)$_POST['age']; ?> years old.
```

A sample output of this script may be:

```
Hi Joe. You are 22 years old.
```

Language Overview

- script tag

```
<?php  php_statements..  ?>
<? php_statements..  ?>
```

- comment

```
 // komentar
/* komentar */
# komentar
```

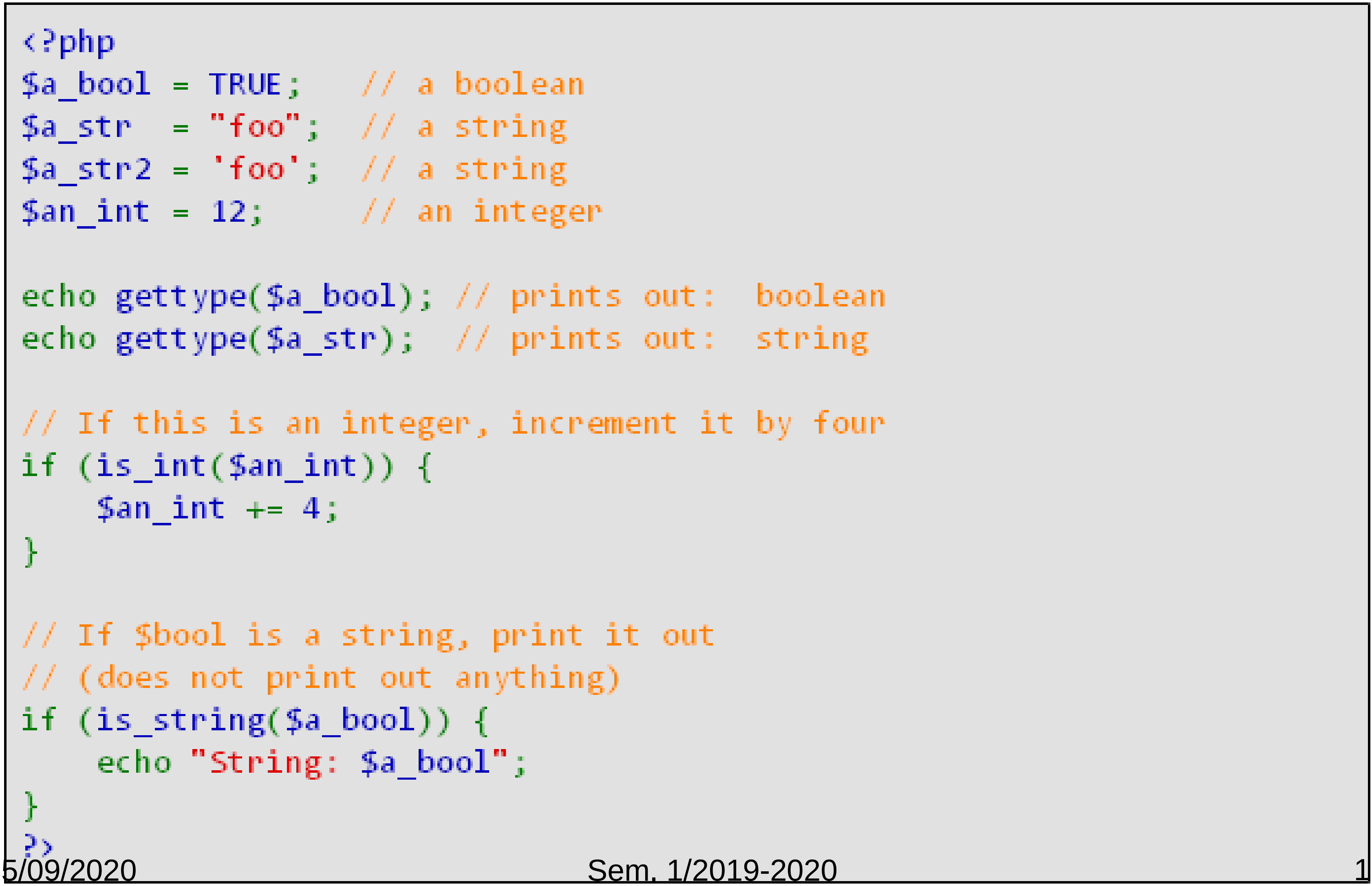
- statement
  - ended by “;”

```
$nama = "amir";
```

Types in PHP

- Scalar Type:
  - boolean, integer, float (or double), string
- Compound Type:
  - array, object
- Special Type:
  - resource, NULL
- pseudo-types:
  - mixed, number, callback

Example

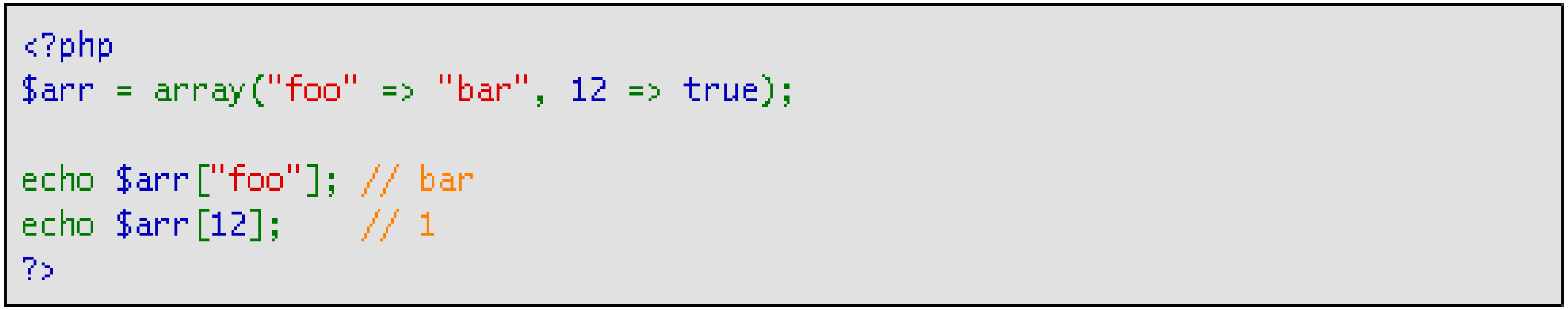


```
<?php
$a_bool = TRUE;   // a boolean
$a_str  = "foo";  // a string
$a_str2 = 'foo';  // a string
$an_int = 12;     // an integer

echo gettype($a_bool); // prints out:  boolean
echo gettype($a_str);  // prints out:  string

// If this is an integer, increment it by four
if (is_int($an_int)) {
    $an_int += 4;
}

// If $bool is a string, print it out
// (does not print out anything)
if (is_string($a_bool)) {
    echo "String: $a_bool";
}
?>
```

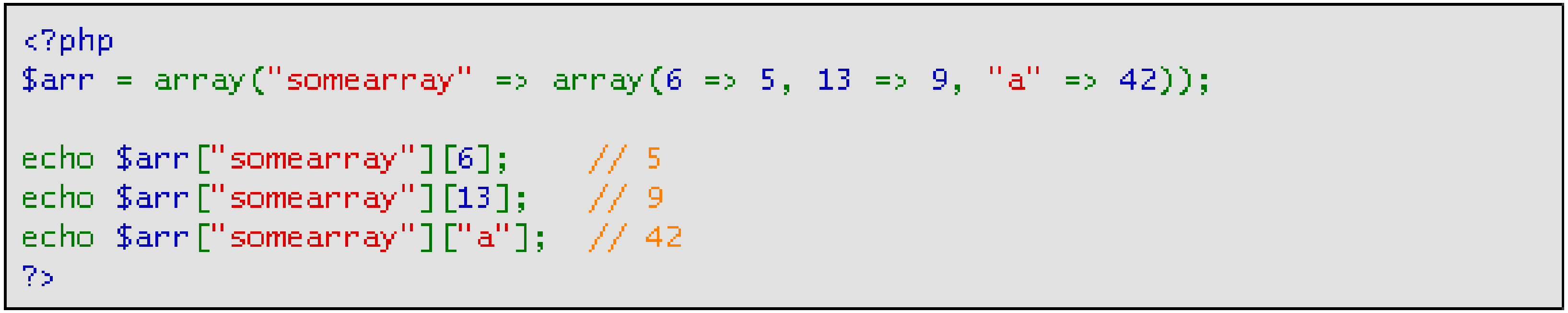
Array

- An array in PHP is actually an ordered map. A map is a type that associates ***values*** to ***keys***. This type is optimized for several different uses; it can be treated as an array, list (vector), hash table (an implementation of a map), dictionary, collection, stack, queue, and probably more. As array values can be other arrays, trees and multidimensional arrays are also possible.

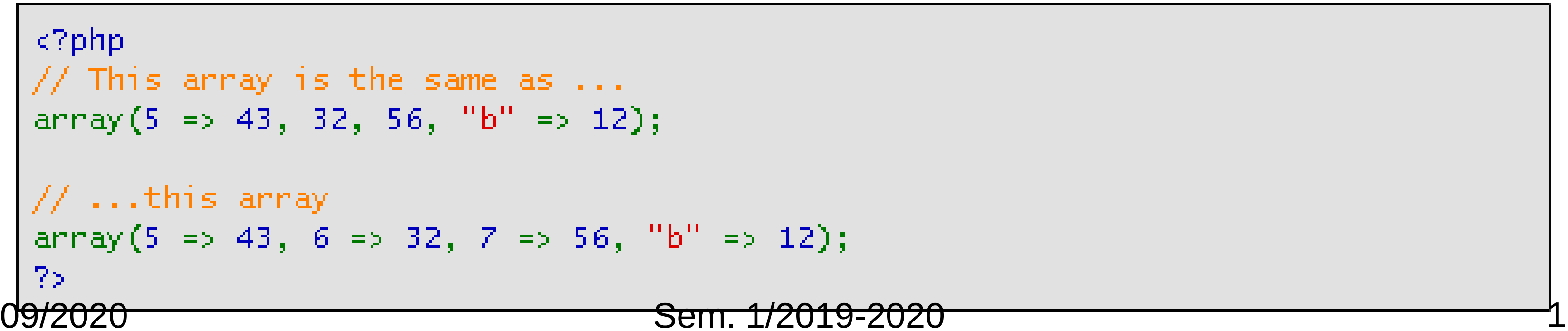
Example



```php
<?php
$arr = array("foo" => "bar", 12 => true);

echo $arr["foo"]; // bar
echo $arr[12];    // 1
?>
```



```php
<?php
$arr = array("somearray" => array(6 => 5, 13 => 9, "a" => 42));

echo $arr["somearray"][6];    // 5
echo $arr["somearray"][13];   // 9
echo $arr["somearray"]["a"];  // 42
?>
```



```php
<?php
// This array is the same as ...
array(5 => 43, 32, 56, "b" => 12);

// ...this array
array(5 => 43, 6 => 32, 7 => 56, "b" => 12);
?>
```

Array

Array access

```
$buah[0] = "apel";
$buah[1] = "mangga";
```

Adding array element

```
$buah[] = "apel";
$buah[] = "mangga";
```

length of array

```
$len = count( $buah );
```

associative array

```
$pengguna["nama"] = "amir";
$pengguna["alamat"] = "ganesha 10";
```

Array

- Intialization

```
 $hari = array("senin", "selasa", "rabu", "kamis",
"jumat", "sabtu", "minggu");

 $hari = array(1=>"senin", "selasa", "rabu", "kamis",
"jumat", "sabtu", "minggu");

 $days = array("mon"=>"monday", "tue"=>"tuesday",
   "wed"=>"wednesday", "thu"=>"thursday",
"fri"=>"friday",
   "sat"=>"saturday", "sun"=>"sunday");
```

Array multidimensi

```
<?php
    $Cities = array(
        "Jawa Barat"=>array(
            "Bandung",
            "Cianjur",
            "Cirebon"
            ),
        "Jawa Tengah"=>array(
            "Semarang",
            "Magelang"
            )
        );
    print($Cities["Jawa Barat"][1]);
?>
```

Example

```
<?php

  $buah[0] = "apel";
  $buah[1] = "mangga";
  $buah[2] = "jambu";
  $len = count( $buah );
  for( $i = 0; $i < $len; $i++) {
    echo $buah[$i], "<br>";
  }
?>
```

Example

```
<?php

$days = array("mon"=>"monday", "tue"=>"tuesday",
"wed"=>"wednesday", "thu"=>"thursday",
"fri"=>"friday", "sat"=>"saturday",
"sun"=>"sunday");

  foreach( $days as $key=>$value) {
    echo "key: ", $key, ", value: ", $value, "<br>";
  }
?>
```

Function

fungsi definition:

```
function f($param1, $param2 ..) { statements.. }
```

return value

```
return $val;
```

parameter by reference

```
function f(&$param1, &$param2 ..) { statements.. }
```

return by reference

```
function &f($param1, $param2 ..) { .. return $v }
```

dynamic parameter access

```
func_get_arg($i), func_num_args()
```

Function

- variable scope
  - use `global` to access global variable with in a function

```
<?php
  function assignName() {
    // // global $name;
   echo $nglobal $name = "Zeev";
 ame;
 }
  global $name;
  $name = "Leon";
  assignName();
  print($name);
?>
```

Function

- static variable
  - – store variable state with in a function

- dynamic function call
  - – function execution can be done dynamically, by store the function name in a variable and call the variable as a function

```
<?php
    function printBold($text)
    {
        print("<b>$text</b>");
    }

    print("This Line is not Bold<br>\n");
    printBold("This Line is Bold");
    print("<br>\n");
    print("This Line is not Bold<br>\n");
?>
```

```
<?php
    function makeBold($text)
    {
        $text = "<b>$text</b>";
        return($text);
    }

    print("This Line is not Bold<br>\n");
    print(makeBold("This Line is Bold") . "<br>\n");
    print("This Line is not Bold<br>\n");
?>
```

```
<?php
    function stripCommas(&$text)
    {
        $text = str_replace(",", "", $text);
    }

    $myNumber = "10,000";

    stripCommas($myNumber);
    print($myNumber);
?>
```

```
<?
    function useColor()
    {
        static $ColorValue = "#00FF00";

        if($ColorValue == "#00FF00"){
            $ColorValue = "#CCFFCC";
        } else {
            $ColorValue = "#00FF00";
        }

        return($ColorValue);
    }

    print("<table width=\"300\">\n");
    for($count=0; $count < 10; $count++) {
      $RowColor = useColor();

      print("<tr>" .
            "<td style=\"background: $RowColor\">" .
            "Row number $count" .
            "</td>" .
            "</tr>\n");
    }
    print("</table>\n");
?>
```

```php
<?php
    function write($text)
    {
        print($text);
    }

    function writeBold($text)
    {
        print("<b>$text</b>");
    }

    $myFunction = "write";
    $myFunction("Hello!");
    print("<br>\n");

    $myFunction = "writeBold";
    $myFunction("Goodbye!");
    print("<br>\n");
?>
```

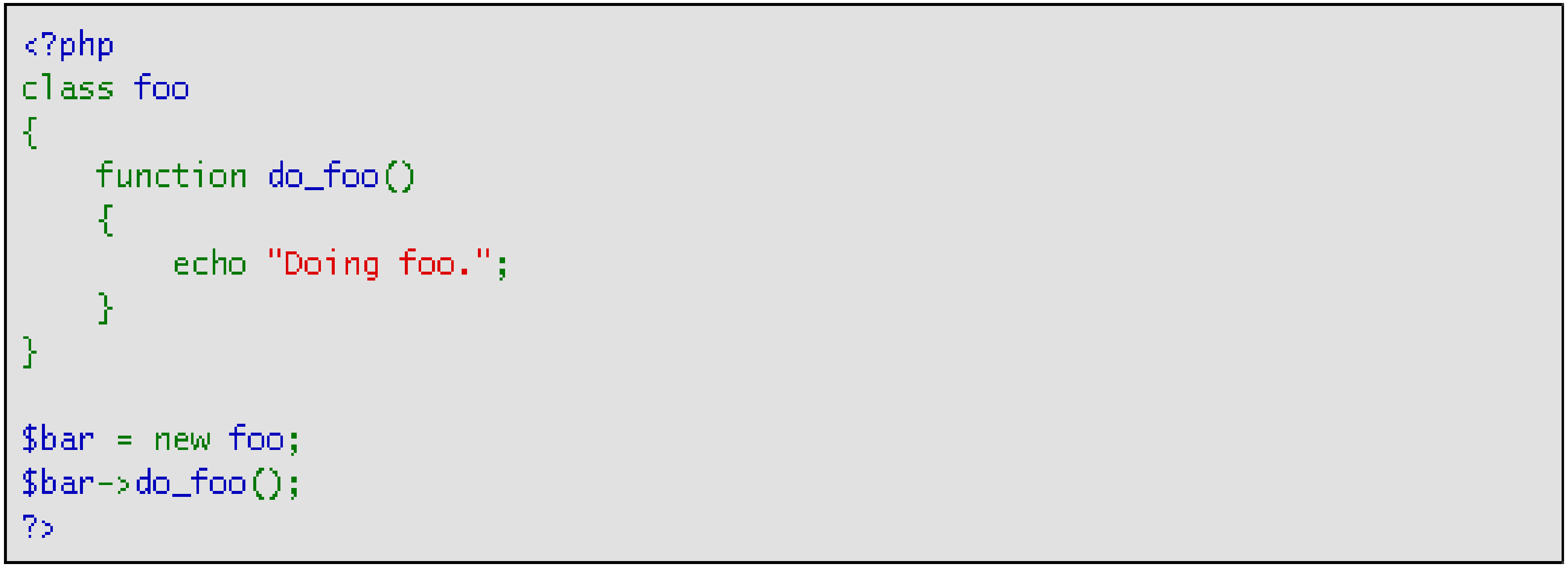
Object

- Starting with PHP 5, the object model was rewritten to allow for better performance and more features. This was a major change from PHP 4. PHP 5 has a full object model.
- Among the features in PHP 5 are the inclusions of visibility, abstract and final classes and methods, additional magic methods, interfaces, cloning and typehinting.

Object

- PHP treats objects in the same way as references or handles, meaning that each variable contains an object reference rather than a copy of the entire object. See Objects and References

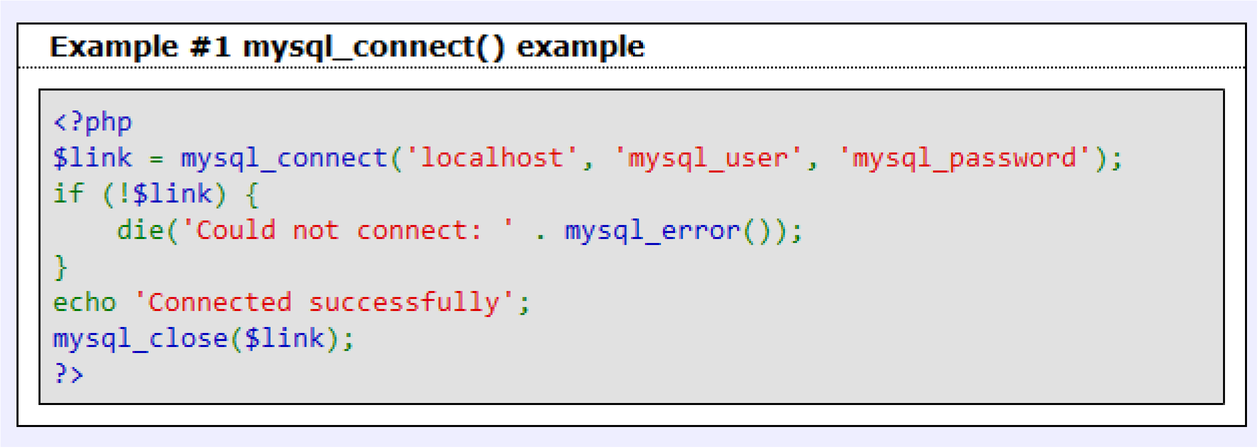
Example



```php
<?php
class foo
{
    function do_foo()
    {
        echo "Doing foo.";
    }
}

$bar = new foo;
$bar->do_foo();
?>
```

Resources

- A resource is a special variable, holding a reference to an external resource.
- Resources are created and used by special functions.
- As resource variables hold special handlers to opened files, database connections, image canvas areas and the like.



Example #1 mysql_connect() example

```php
<?php
$link = mysql_connect('localhost', 'mysql_user', 'mysql_password');
if (!$link) {
    die('Could not connect: ' . mysql_error());
}
echo 'Connected successfully';
mysql_close($link);
?>
```

NULL

- The special NULL value represents a variable with no value. NULL is the only possible value of type NULL.
- A variable is considered to be null if:
  - assigned the constant NULL
  - has not been set to any value yet
  - has been unset()

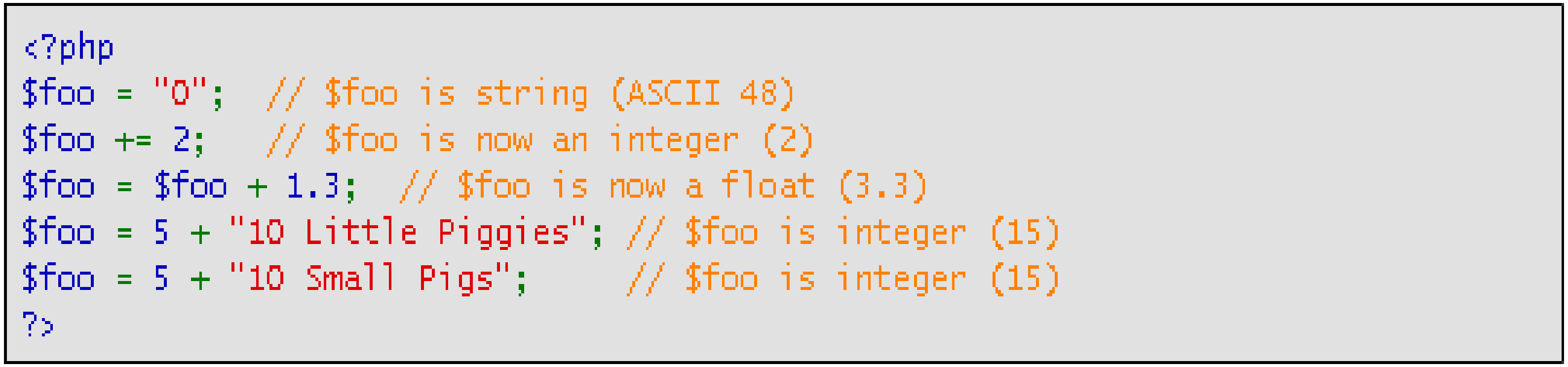
Pseudo-types

- mixed indicates that a parameter may accept multiple (but not necessarily all) types
- number indicates that a parameter can be either integer or float
- Some functions like call_user_func() or usort() accept user-defined callback functions as a parameter

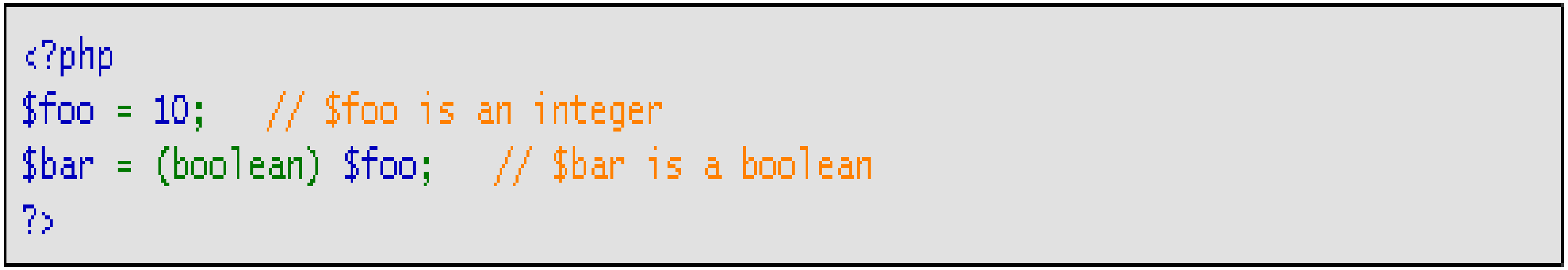
Type Juggling

- PHP does not require (or support) explicit type definition in variable declaration; a variable's type is determined by the context in which the variable is used. That is to say, if a string value is assigned to variable $var, $var becomes a string. If an integer value is then assigned to $var, it becomes an integer.

Example



```php
<?php
$foo = "0";  // $foo is string (ASCII 48)
$foo += 2;   // $foo is now an integer (2)
$foo = $foo + 1.3;  // $foo is now a float (3.3)
$foo = 5 + "10 Little Piggies"; // $foo is integer (15)
$foo = 5 + "10 Small Pigs";     // $foo is integer (15)
?>
```



```php
<?php
$foo = 10;   // $foo is an integer
$bar = (boolean) $foo;   // $bar is a boolean
?>
```

Variable

- Scope default: local
- To access global variable use **global** keyword
- Support **static** variable
- Can be variable of variable:
  $a=”hallo”;
  $$a=”world”;   // sama dg $hallo

Predefined Variabel

- $_REQUEST: variabel http request
- $_GET: variabel http GET
- $_POST: variabel http POST
- $_FILES: http file upload
- $_SESSION: variabel sesi
- $_COOKIE: http cookie
- $_ENV: variabel environment
- $_SERVER: variabel server

Input Data

- Alternative of data input source:
  - Parameter URL: $_GET, $_REQUEST
  - Form handling: $_POST, $_REQUEST, $_FILES
  - Cookie: $_COOKIE
  - Session: session_start(), $_SESSION
  - File: fopen(), fread(), fclose(), dll
  - Database: connect, select_db, query, fetch

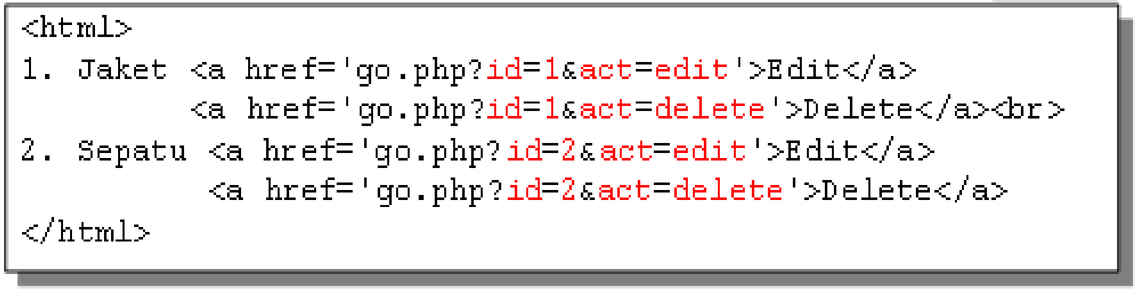
Output

- Output alternative:
  - HTML: echo
  - Image: imagejpeg(), imagegif(), imagepng()
  - File: fopen(), fwrite(), fclose()
  - Cookie: setcookie()
  - Session: session_start(), $_SESSION
  - Database: connect, select_db, query

Input from URL

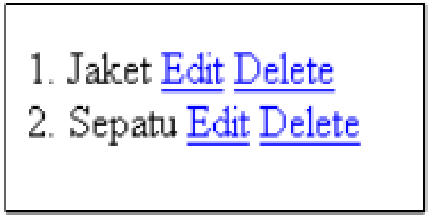
- Used to indicate which link is clicked by the user
- Each link represents data/action

HTML



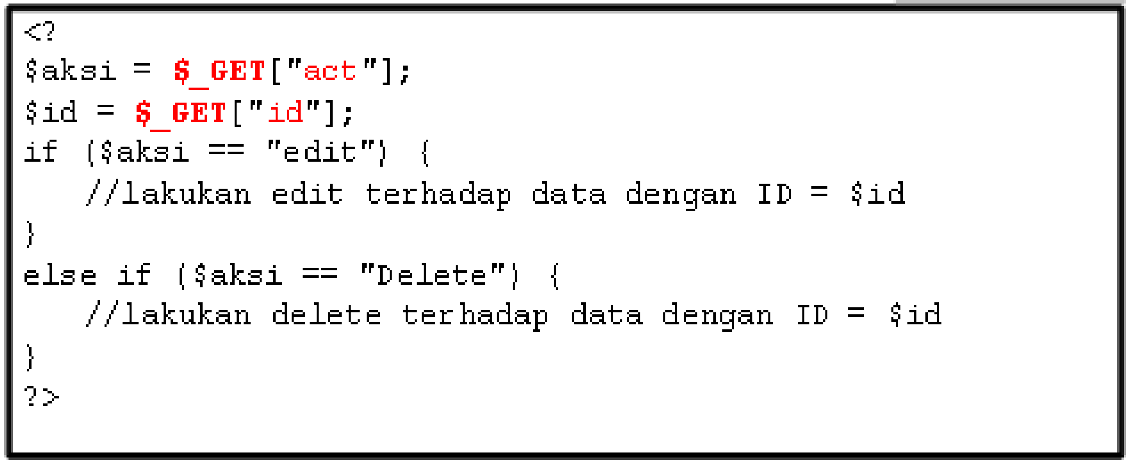
```
<html>
1. Jaket <a href='go.php?id=1&act=edit'>Edit</a>
         <a href='go.php?id=1&act=delete'>Delete</a><br>
2. Sepatu <a href='go.php?id=2&act=edit'>Edit</a>
          <a href='go.php?id=2&act=delete'>Delete</a>
</html>
```

Browser



1. Jaket Edit Delete
2. Sepatu Edit Delete

PHP: go.php



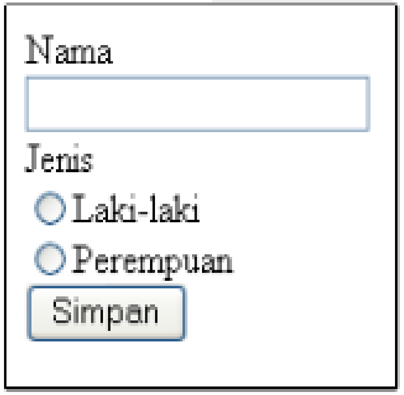
```
<?
$aksi = $_GET["act"];
$id = $_GET["id"];
if ($aksi == "edit") {
   //lakukan edit terhadap data dengan ID = $id
}
else if ($aksi == "Delete") {
   //lakukan delete terhadap data dengan ID = $id
}
?>
```

Input from HTML form

HTML

```
<html>
 <form action='save.php' method='POST'>
   Nama<br>
     <input type='text' name='nama'><br>
   Jenis<br>
     <input type='radio' name='jenis' value='L'>Laki-laki<br>
     <input type='radio' name='jenis' value='P'>Perempuan<br>
   <input type='submit' value='Simpan'>
 </form>
</html>
```

Browser



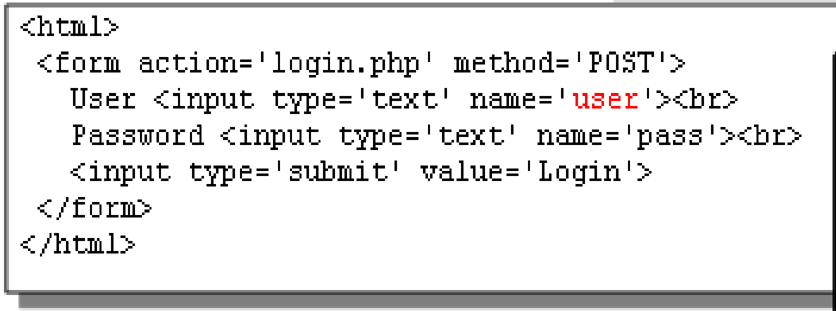
PHP: save.php

```
<?
$nama = $_POST["nama"];  //berisi string nama
$jenis = $_POST["jenis"];  //berisi "L" atau "P"

//simpan data $nama dan $jenis

?>
```

Input from Cookie

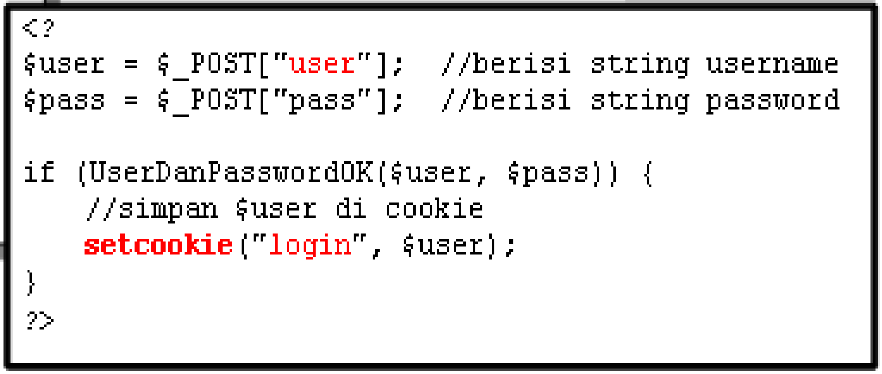
- Dapat digunakan untuk mendapatkan data yang dimasukkan oleh user pada halaman sebelumnya

HTML: login.html



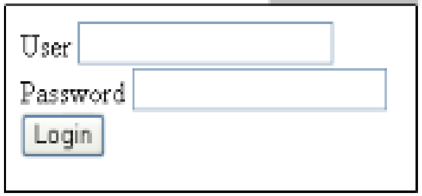
```
<html>
 <form action='login.php' method='POST'>
   User <input type='text' name='user'><br>
   Password <input type='text' name='pass'><br>
   <input type='submit' value='Login'>
 </form>
</html>
```

PHP: login.php

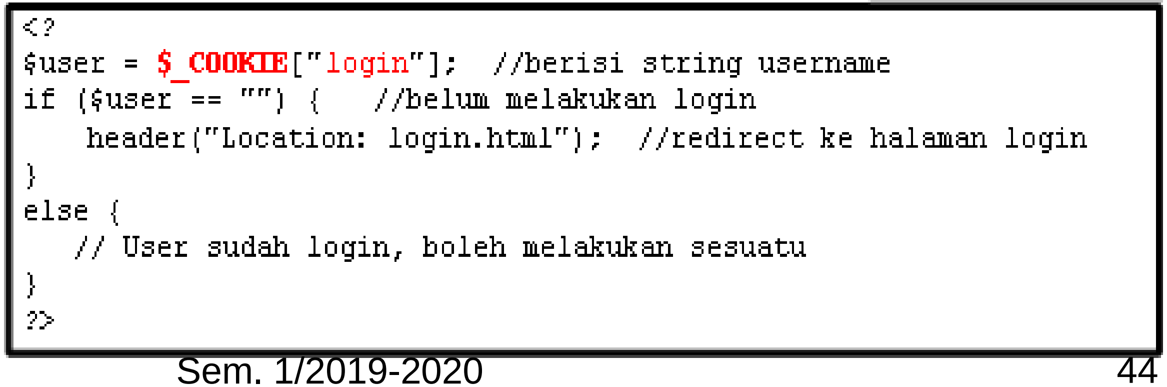


```
<?
$user = $_POST["user"];  //berisi string username
$pass = $_POST["pass"];  //berisi string password

if (UserDanPasswordOK($user, $pass)) {
    //simpan $user di cookie
    setcookie("login", $user);
}
?>
```

Browser

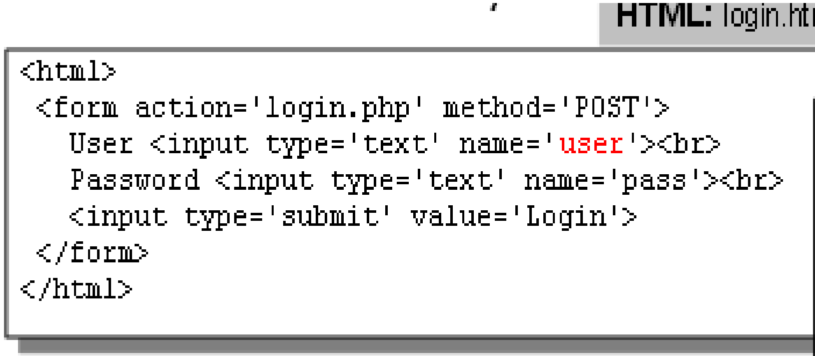


PHP: anypage.php



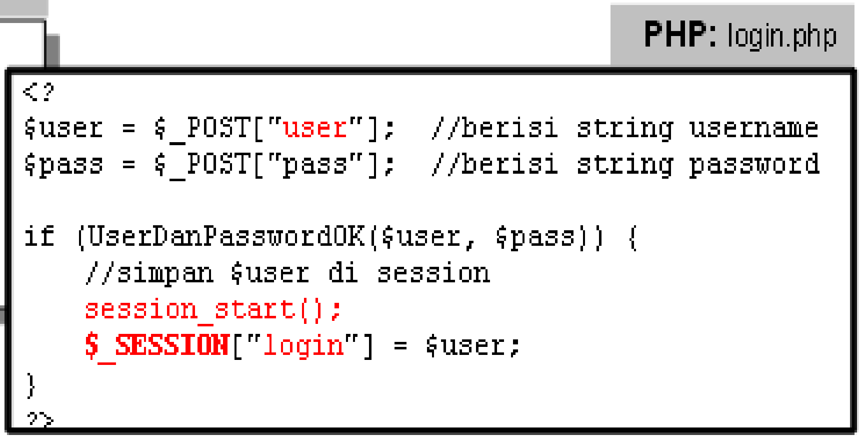
```
<?
$user = $_COOKIE["login"];  //berisi string username
if ($user == "") {    //belum melakukan login
    header("Location: login.html");  //redirect ke halaman login
}
else {
   // User sudah login, boleh melakukan sesuatu
}
?>
```

Input from Session



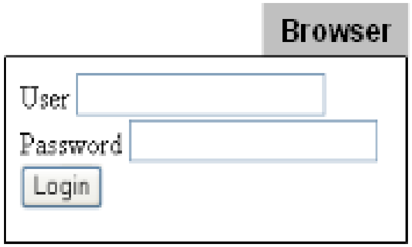
HTML: login.html

```
<html>
 <form action='login.php' method='POST'>
   User <input type='text' name='user'><br>
   Password <input type='text' name='pass'><br>
   <input type='submit' value='Login'>
 </form>
</html>
```

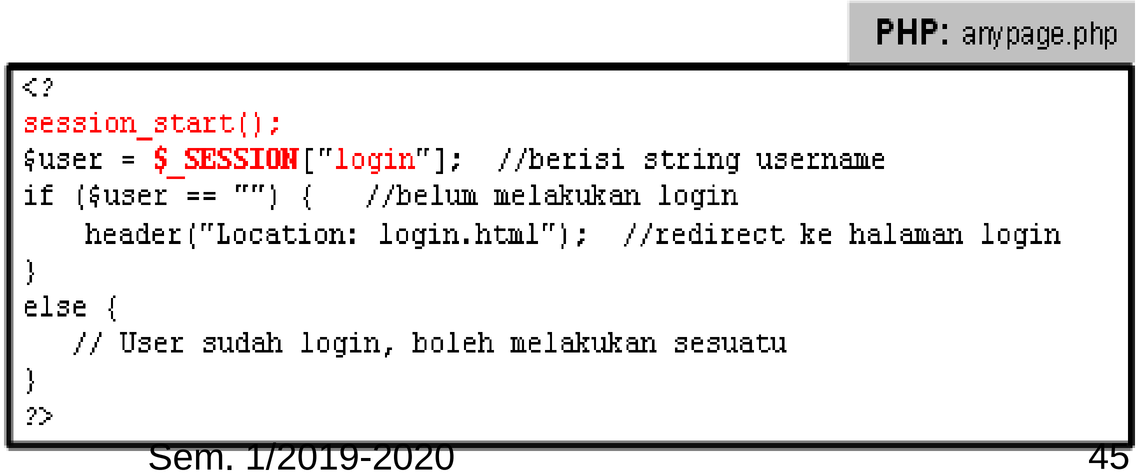


PHP: login.php

```
<?
$user = $_POST["user"];  //berisi string username
$pass = $_POST["pass"];  //berisi string password

if (UserDanPasswordOK($user, $pass)) {
    //simpan $user di session
    session_start();
    $_SESSION["login"] = $user;
}
?>
```



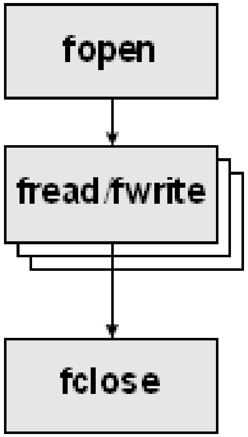
Browser

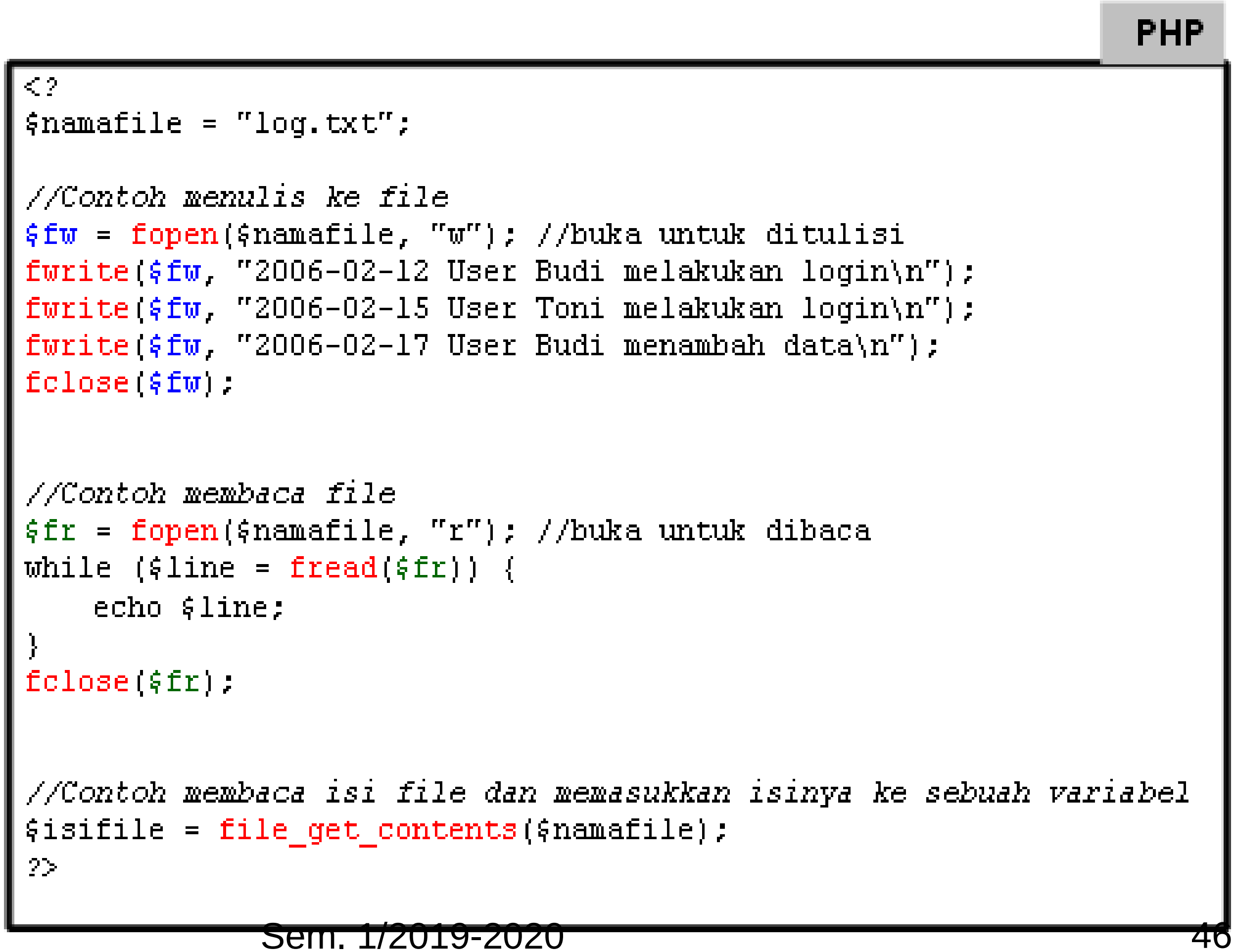


PHP: anypage.php

```
<?
session_start();
$user = $_SESSION["login"];  //berisi string username
if ($user == "") {   //belum melakukan login
    header("Location: login.html");  //redirect ke halaman login
}
else {
   // User sudah login, boleh melakukan sesuatu
}
?>
```

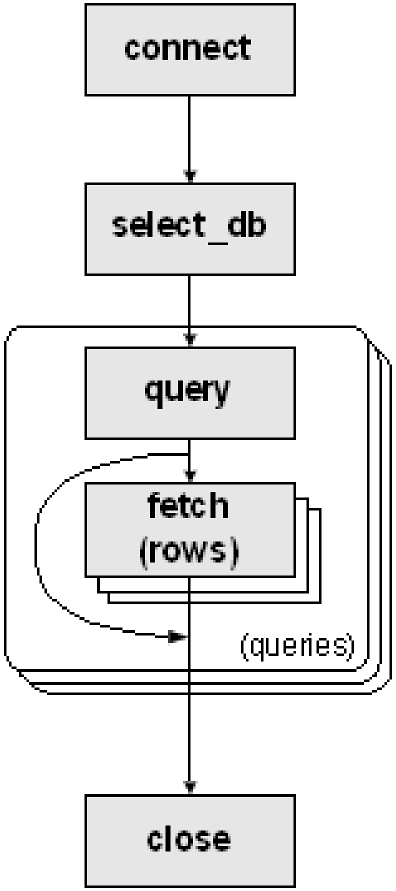
File Access

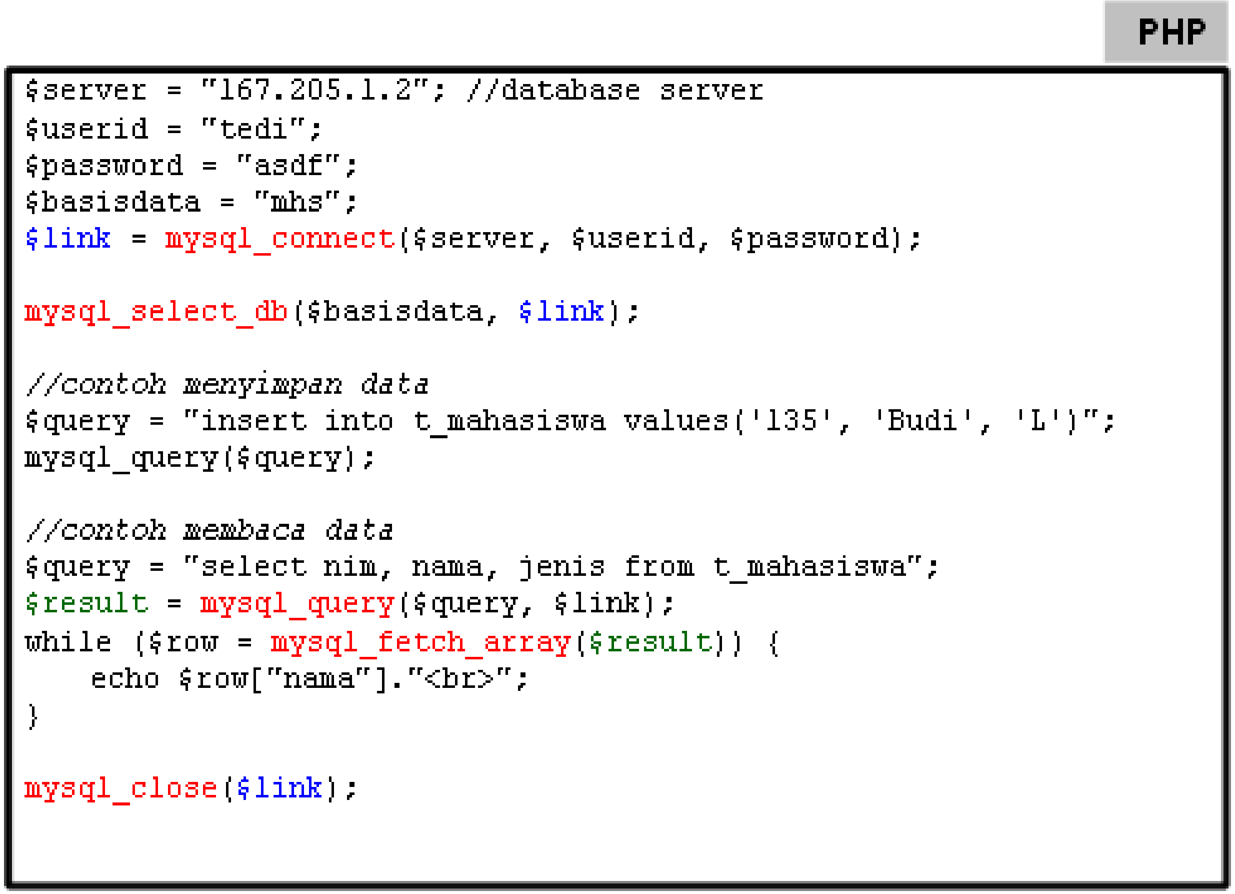




```
<?
$namafile = "log.txt";

//Contoh menulis ke file
$fw = fopen($namafile, "w"); //buka untuk ditulisi
fwrite($fw, "2006-02-12 User Budi melakukan login\n");
fwrite($fw, "2006-02-15 User Toni melakukan login\n");
fwrite($fw, "2006-02-17 User Budi menambah data\n");
fclose($fw);


//Contoh membaca file
$fr = fopen($namafile, "r"); //buka untuk dibaca
while ($line = fread($fr)) {
    echo $line;
}
fclose($fr);


//Contoh membaca isi file dan memasukkan isinya ke sebuah variabel
$isifile = file_get_contents($namafile);
?>
```

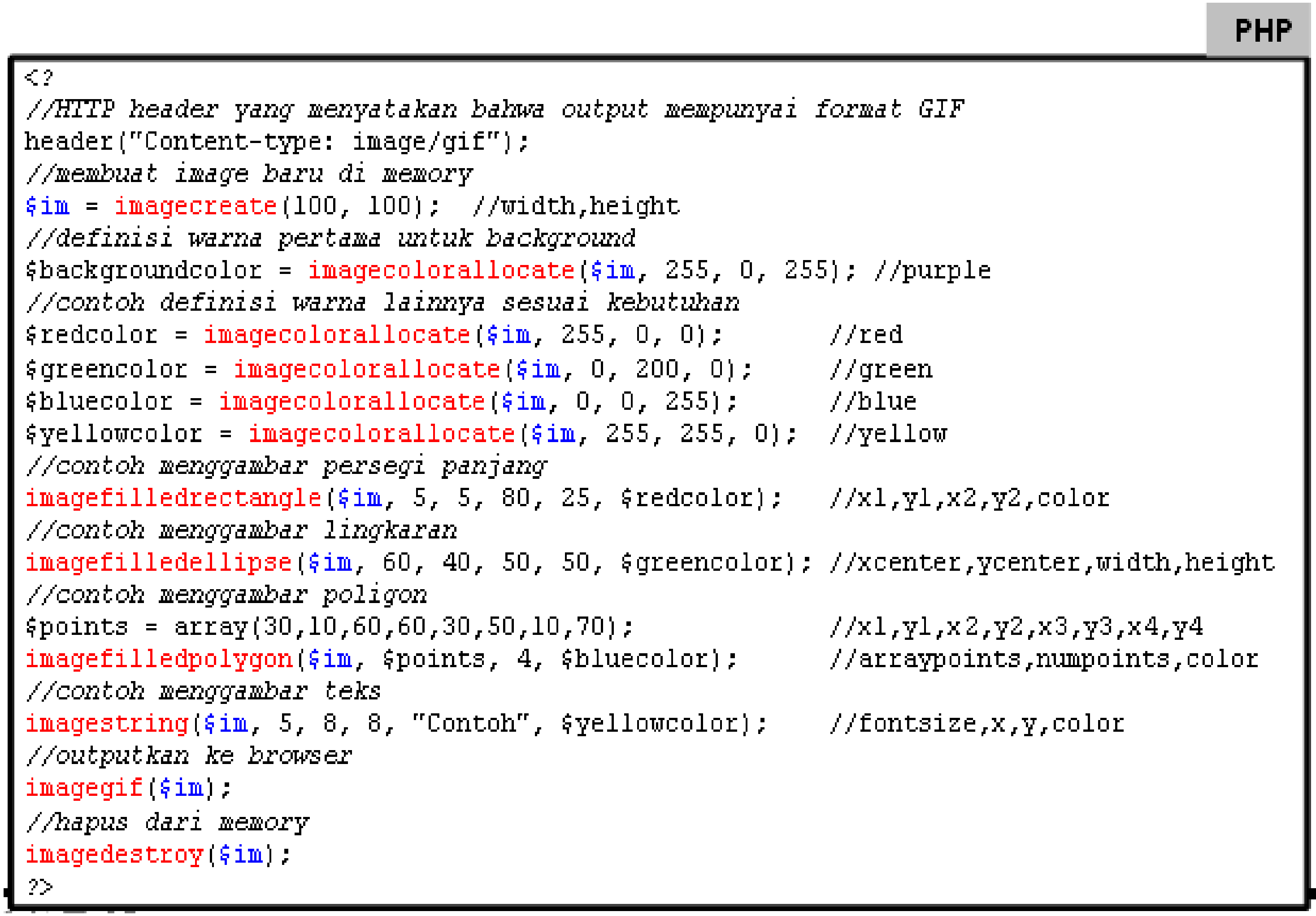
Database Access




PHP

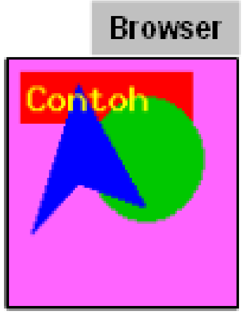
```
$server = "167.205.1.2"; //database server
$userid = "tedi";
$password = "asdf";
$basisdata = "mhs";
$link = mysql_connect($server, $userid, $password);

mysql_select_db($basisdata, $link);

//contoh menyimpan data
$query = "insert into t_mahasiswa values('135', 'Budi', 'L')";
mysql_query($query);

//contoh membaca data
$query = "select nim, nama, jenis from t_mahasiswa";
$result = mysql_query($query, $link);
while ($row = mysql_fetch_array($result)) {
    echo $row["nama"]."<br>";
}

mysql_close($link);
```

Image

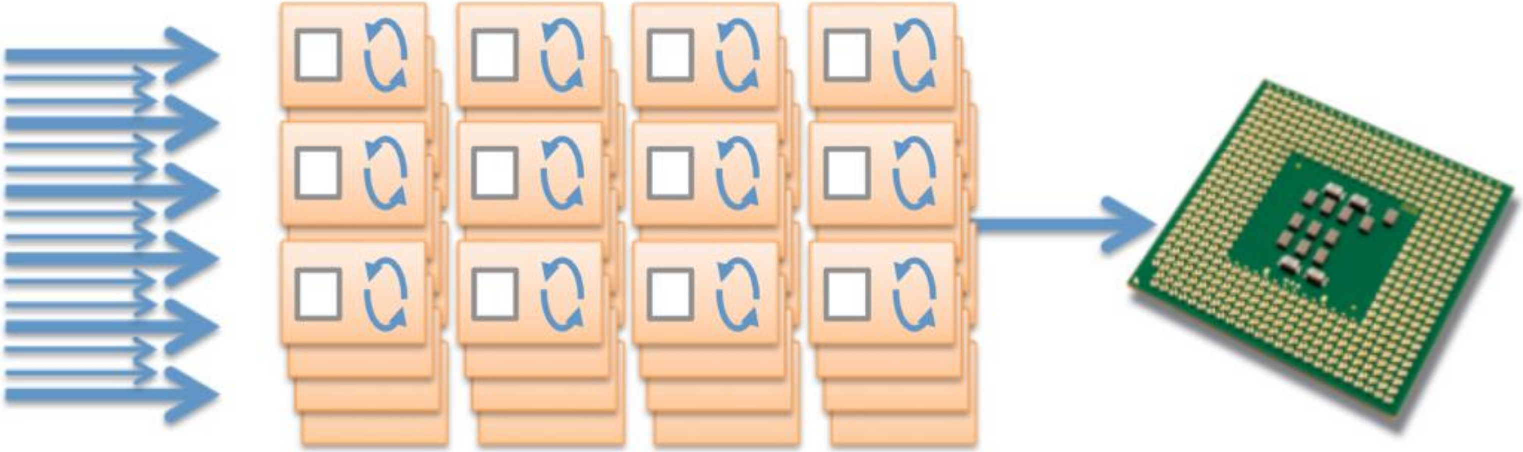


PHP

```
<?
//HTTP header yang menyatakan bahwa output mempunyai format GIF
header("Content-type: image/gif");
//membuat image baru di memory
$im = imagecreate(100, 100);  //width,height
//definisi warna pertama untuk background
$backgroundcolor = imagecolorallocate($im, 255, 0, 255); //purple
//contoh definisi warna lainnya sesuai kebutuhan
$redcolor = imagecolorallocate($im, 255, 0, 0);        //red
$greencolor = imagecolorallocate($im, 0, 200, 0);      //green
$bluecolor = imagecolorallocate($im, 0, 0, 255);       //blue
$yellowcolor = imagecolorallocate($im, 255, 255, 0);   //yellow
//contoh menggambar persegi panjang
imagefilledrectangle($im, 5, 5, 80, 25, $redcolor);    //x1,y1,x2,y2,color
//contoh menggambar lingkaran
imagefilledellipse($im, 60, 40, 50, 50, $greencolor); //xcenter,ycenter,width,height
//contoh menggambar poligon
$points = array(30,10,60,60,30,50,10,70);              //x1,y1,x2,y2,x3,y3,x4,y4
imagefilledpolygon($im, $points, 4, $bluecolor);       //arraypoints,numpoints,color
//contoh menggambar teks
imagestring($im, 5, 8, 8, "Contoh", $yellowcolor);     //fontsize,x,y,color
//outputkan ke browser
imagegif($im);
//hapus dari memory
imagedestroy($im);
?>
```



Execution Model PHP in Apache HTTPD



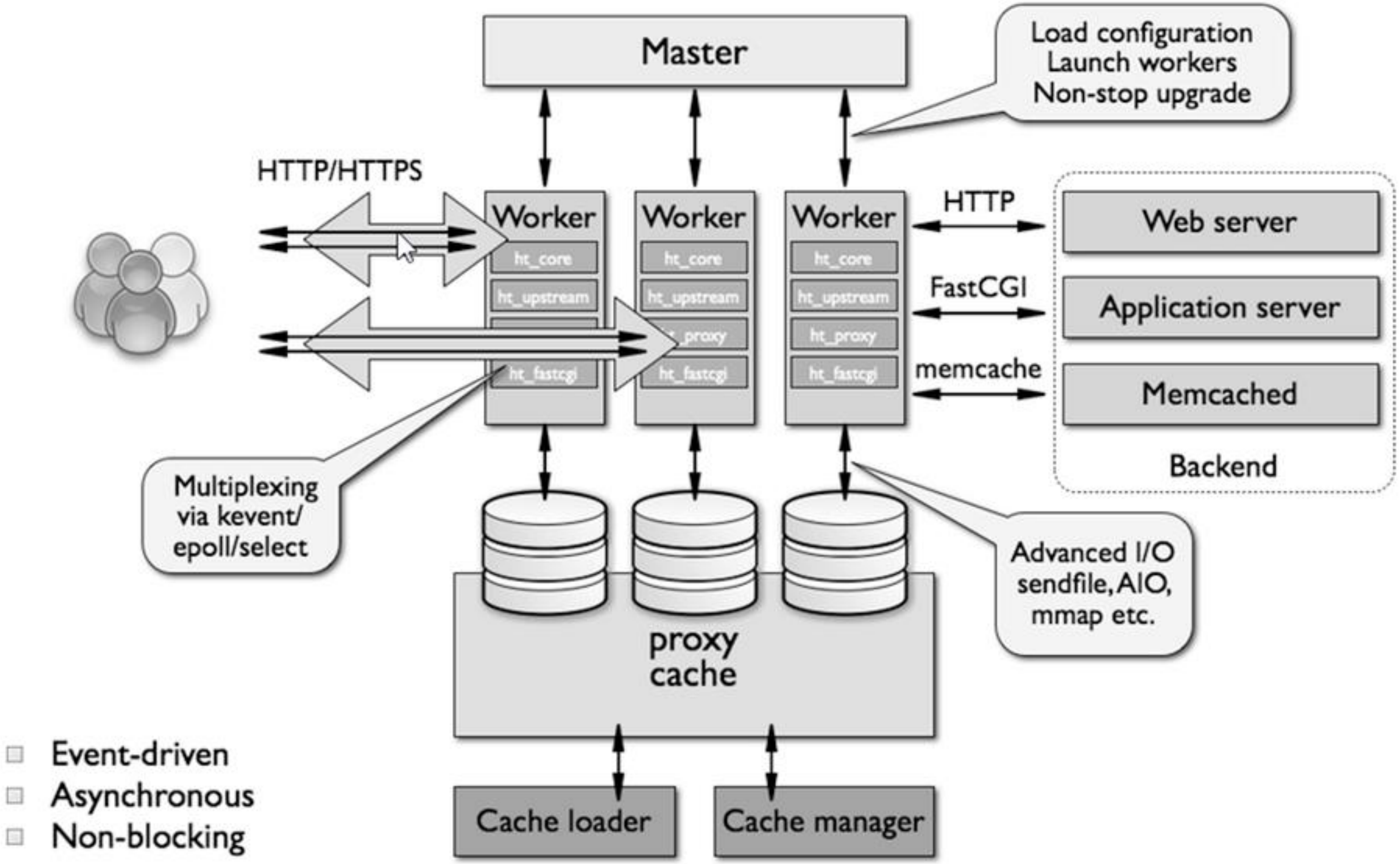
Hundreds of concurrent connections...

require hundreds of heavyweight threads or processes...

competing for limited CPU and memory

Process-driven Approach
Create a new thread for each request

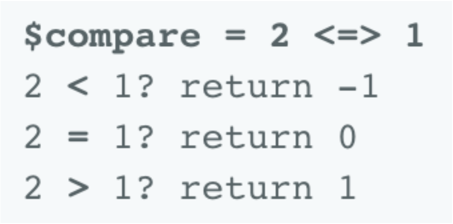
Execution Model PHP in NGINX



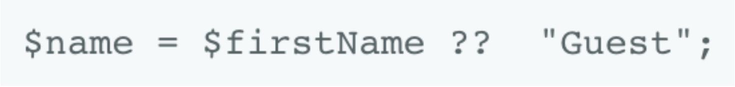
- Event-driven
- Asynchronous
- Non-blocking

PHP 7

- Speed: benchmarks for PHP 7 consistently show speeds twice as fast as PHP 5.6, and even faster
- Optional strict typing
- Error/exception handling
- New operators
  - ”Spaceship” operator
  - Null coalesce operator



```
$compare = 2 <=> 1
2 < 1? return -1
2 = 1? return 0
2 > 1? return 1
```



```
$name = $firstName ??  "Guest";
```