PROCTECH 4IT3 INTERNET TECHNOLOGIES

An introduction to PHP

Feb 26, 2025

OVERVIEW – WEEK # 7

- An Introduction to PHP
  - Hello World in PHP
  - The PHP Language
  - The PHP Variables
  - PHP Mathematical Operators and Functions
  - Relational Expressions
  - Multiple Conditions
  - String
  - Control of execution
  - Integrating PHP on a web page

Web Scripting with PHP

- PHP is the most widely supported and used web scripting language and an excellent tool for building web database applications.

- https://trends.builtwith.com/websitelist/PHP
- https://trends.builtwith.com/websitelist/PHP/Canada
- https://trends.builtwith.com/websitelist/PHP/Historical

Web Scripting with PHP

- PHP Features:
  - **Open source**
    - Community efforts to maintain and improve it are unconstrained by commercial imperatives.
  - **Flexible for integration with HTML**
    - One or more PHP scripts can be embedded into static HTML files.
  - **Suited to complex projects**
    - It is a fully featured object-oriented programming language, with more than 110 libraries of programming functions for tasks as diverse as math, sorting, creating PDF documents, and sending email.
    - There are many libraries for native, fast access to the database tier.

Web Scripting with PHP

- PHP Features:
  - **Fast at running scripts**
    - PHP is generally very fast for scripting (interpreted on-the-fly) execution.
  - **Platform- and operating-system portable**
    - Apache and PHP run on many different platforms and operating systems.
    - PHP can also be integrated with other web servers (Microsoft IIS)
    - Many standalone fully integrated web servers can be run on simple desktop hardware.

Hello, PHP

- PHP is a scripting language that’s usually embedded or combined with the HTML of a web page. When the page is requested, the web server executes the PHP script and substitutes in the result back into the page.

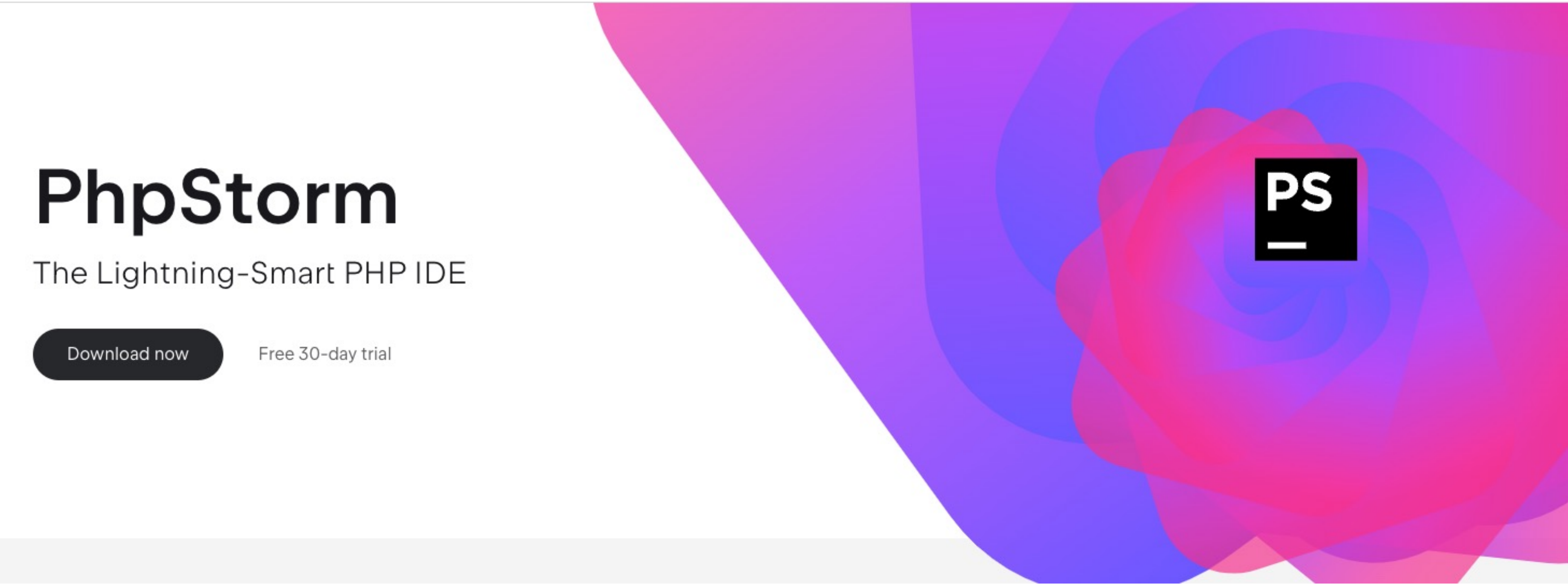
- Example1.Hello,world in PHP

```
<!DOCTYPE HTML>
<html><head>
<title>Hello, world</title>
</head><body>
<h1>
<?php echo "Hello, world"; ?>
</h1>
</body></html>
```

The PHP code is placed within the html content.
Note this file would be called **hello.php**
The **<?php** and **?>** are used to enclose the PHP code.
You will never see the PHP code in the browser source window.

PhpStorm

- PhpStorm is a Lighting-Smart PHP IDE



PhpStorm

The Lightning-Smart PHP IDE

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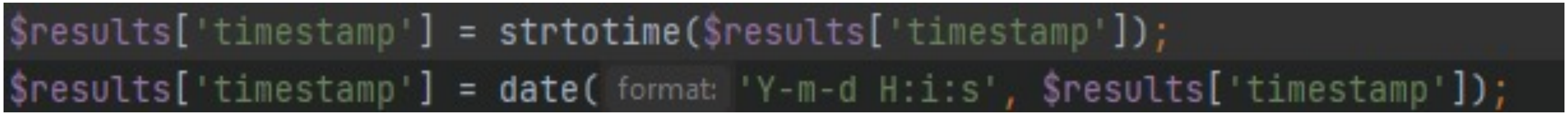
https://www.jetbrains.com/community/education/#students

PHP Language

- PHP is interpreted. It is a SCRIPT!
  - There is no compiling step.
    - When an error occurs, the code stops at that point in the file.
- PHP is case sensitive with var names, constants and array indexes.
  - Function names, keywords, classes are not
    - Best practice is to write all code in lower case
  - similar to C/C++/C# in commands and structure.
  - ; are used to terminate a statement
  - {} are used to group statements

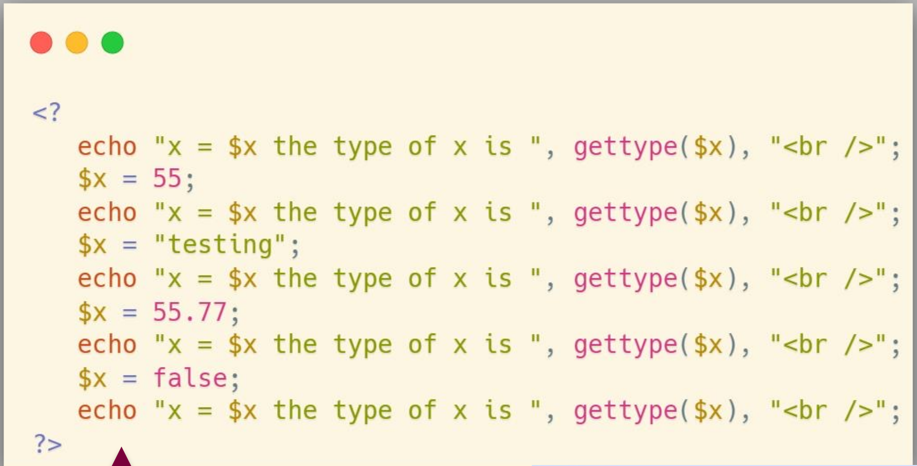
PHP Language

- Variable
  - All variables are declared by placing a $ symbol in front of the name.
  - Variables do not need to be declared of a type.
  - Variables come into being on first use.
  - Variables are initialized to NULL (or nothing) until assigned.
  - You simply assign a value to a symbol with a leading $ sign and it becomes that type until the data value changes to another type.
    - **Variables morph into new types based on content and CAN be dynamically assigned.**
      (Think Python)
    - **Good and Bad**

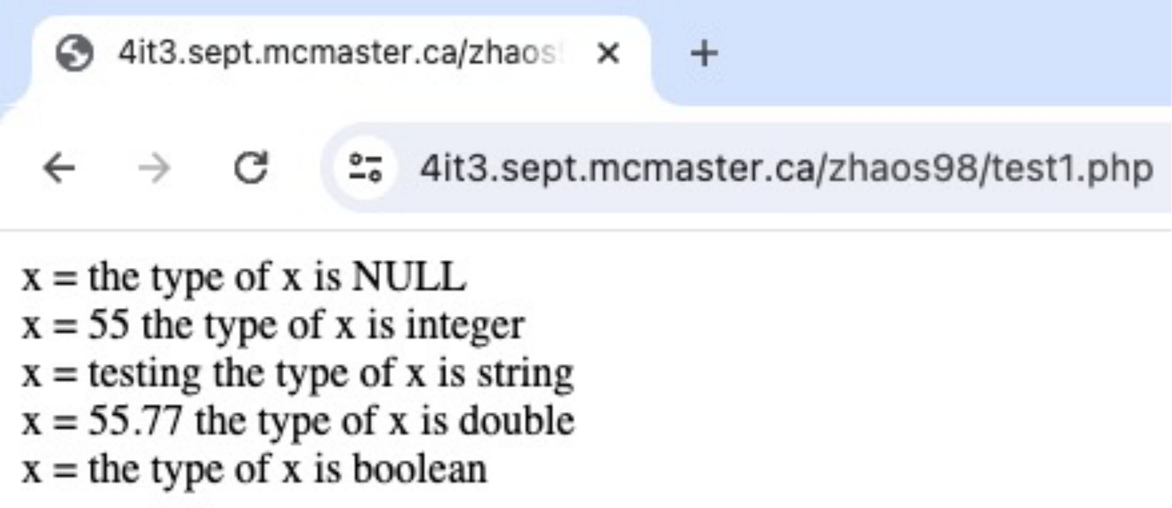


```
$results['timestamp'] = strtotime($results['timestamp']);
$results['timestamp'] = date( format: 'Y-m-d H:i:s', $results['timestamp']);
```

PHP Variables – Change on the fly



```
<?
   echo "x = $x the type of x is ", gettype($x), "<br />";
   $x = 55;
   echo "x = $x the type of x is ", gettype($x), "<br />";
   $x = "testing";
   echo "x = $x the type of x is ", gettype($x), "<br />";
   $x = 55.77;
   echo "x = $x the type of x is ", gettype($x), "<br />";
   $x = false;
   echo "x = $x the type of x is ", gettype($x), "<br />";
?>
```



4it3.sept.mcmaster.ca/zhaos98/test1.php

```
x = the type of x is NULL
x = 55 the type of x is integer
x = testing the type of x is string
x = 55.77 the type of x is double
x = the type of x is boolean
```

Echo is used to output at this point in the file as part of the response

PHP mathematical operators

- PHP arithmetic operators are the same as C/C++.
    - +,-,/,*,%,=
    - ++, -- (increment/decrement)
    - +=, -=, /= ... (short form assignments)
        - x += 4; is the same as x = x + 4;
    - () are used to change order of operations

PHP mathematical functions

- Some common PHP math functions
  - **pow** – raise number to a power – pow($x,3.3);
  - **sqrt** – take square root – sqrt($x);
  - **min($x, $y, ...)** – find minimum of a list of values. [same for **max()**]
  - **abs** – absolute value
  - **sin, cos, tan, log, log10, exp** – really same as C++
  - **rand(start,finish)** – generate a random number between start and finish

- There are a number of functions that can be useful for specific applications
  - see http://www.php.net/manual/en/ref.math.php

Relational Expressions

- Comparing values is done by using the standard comparison operators in PHP
  - Same as C/C++ with a couple of additions
  - Supports <> as well as != for not equals
  - Note that == will compare content regardless of data type

```
$x = 5.4; // double
$y = "5.4"; // string
if ($x == $y) // will be true
```

- To enforce a data type match as well the === and !== can be used to ensure that data is of the correct type.
- Relational expressions can be used on strings
  - Ordering is governed by the lexical order (alphabetical order) of the character set being used. In most cases this will be UTF-8.
  - You can assume alphabetical order for any English strings.

Multiple conditions

- Multiple conditions can be grouped using:
  - **and / && -** both conditions must be true
  - **or / || -** either or both conditions must be true
  - **xor –** one of the two conditions must be true but not both.
  - **! –** invert the value of the variable (all non-zero values are considered true).
    - Note :
      The precedence of the **and/or** is lower than **&& ||**. It is best to use one style or the other and not to mix within the same expression.

Strings

- To concatenate two strings together the "." operator is used between the two strings.
  - You can directly concatenate a string with a number
    - $day = 12;
    - **$x = "today is February" . $day;**
      - No type conversion is required.
      - Neither operand needs to be a string for this to work, but the result will be a string
      - **$y = 12 . "12"; *// result is "1212" (there is a space after the first 12)***
  - To get a character out of a string you can use brackets [] with an index number (starting from 0)
    - **echo $x[3]; // would print ‘a’**
  - Many functions.
    - see http://ca3.php.net/manual/en/book.strings.php

Control of execution

- PHP supports that same control structures as C/C++
  - conditional
  - if, if-else, else
  - switch-case-default
- Looping
  - For
  - While
  - do .. while
- {} are used to group statements in the same way as C/C++
- ; placement is the same as C/C++

Integrating PHP on a web page

- PHP code sections can be embedded any where on a web page.
  - must be placed between **<?php** and **?>** markers or **<?** and **?>** .
    - Recommend you use <?php and ?> - Not all servers support shorthand
    - Can have multiple script sections in a file.
  - Most requires the filename extension .php.
    - Servers can be configured to allow different extensions.
  - The php processor will evaluate all the PHP sections from top to bottom in order with all output being directed to the Browser.
    - Any failure by the interpreter in understanding the PHP code will result in an error message.
    - Generally, only one error message will be generated at a time.

Example application (Do In Class)

- Write a program to produce a 12 x 12 times table in PHP
  1. Use an HTML table element to contain the output
  2. Make the top row and first column headings
  3. Bonus:
     Add some formatting to make the table attractive.

Getting input into our application

- All input to a PHP application must be supplied by FORM variables from an HTML page or through parameters attached to the URL after the ? on an HTML page.
  - The **echo.php** script simply processes all the data on a form and outputs the contents in a table.
  - Reminder: **Lab3**
  - <form action="https://4it3.sept.mcmaster.ca/zhaos98/echo.php" method="post">
- A PHP script will process the data from a standard webpage in HTML.
  - The html directs the processing to the PHP page.
  - The output of the PHP page is directed back to the browser.