CACS-205
Web Technology
(BCA, TU)

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Chapter 4/5 : Web Server Concept

- Web Server Introduction
- Server Side Scripting with PHP
- PHP Variables
- PHP Types
- PHP Comments
- PHP Inbuilt Functions
- PHP Conditional Statements
- PHP Loops

Web Server

- is a computer or computer software that listens and responds to a client computer's request made through a web browser
- in other words, a web server is server software, or hardware dedicated to running said software, that can satisfy WWW client requests
- machine that hosts web pages and other web documents
- provides web documents and other online services using HTTP
- web server can, in general, contain one or more websites

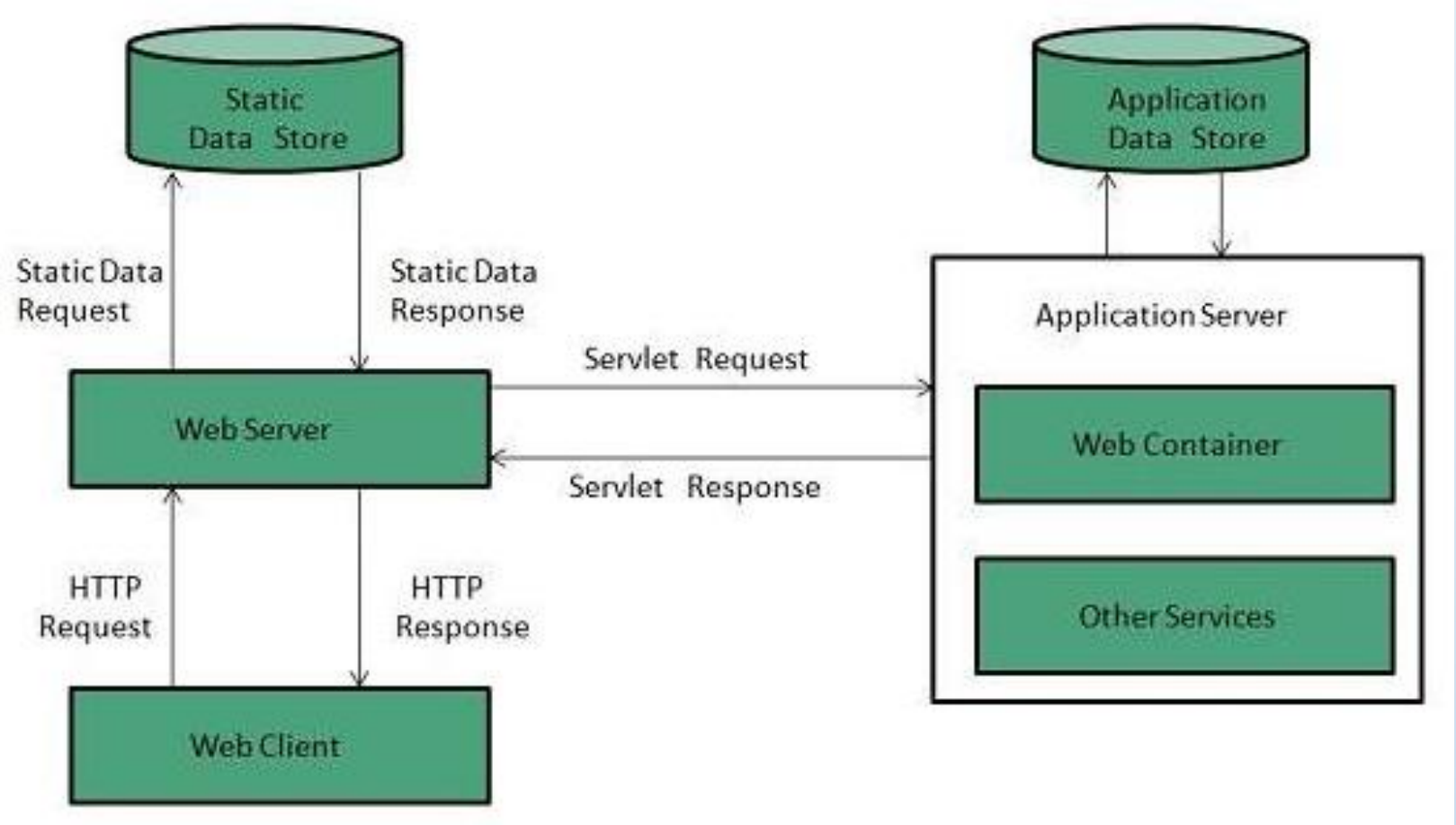
Web Server

Web Server

- processes incoming network requests over HTTP and several other related protocols
- primary function of a web server is to store, process and deliver web pages to web clients
- communication between client and server takes place using the Hypertext Transfer Protocol (HTTP)
- pages delivered are most frequently HTML documents, which may include images, style sheets and scripts in addition to the text content

Web Server

Web Server Working



Web Server Working

- Web server respond to the client request in either of the following two ways
  - Sending the file to the client associated with the requested URL
  - Generating response by invoking a script and communicating with database
- When client sends request for a web page, the web server search for the requested page if requested page is found then it will send it to client with an HTTP response
- If the requested web page is not found, web server will the send an HTTP response:Error 404 Not found
- If client has requested for some other resources then the web server will contact to the application server and data store to construct the HTTP response

Examples of Web Servers

- Apache Web Server
  - most popular web server in the world developed by Apache Software Foundation
  - open source software and can be installed on almost all operating systems including Linux, UNIX, Windows, Mac OS X and more
  - About 60% of the web server machines run the Apache Web Server
- Internet Information Servicer (IIS)
  - is a high performance Web Server from Microsoft
  - runs on Windows platform
  - is tightly integrated with the operating system so it is relatively easy to administer it.
- Lighttpd
  - this is fast, secure and consumes much less CPU power
  - can run on Windows, Mac OS X, Linux and Solaris operating systems
- Sun Java System Web Server
- Jigsaw Server

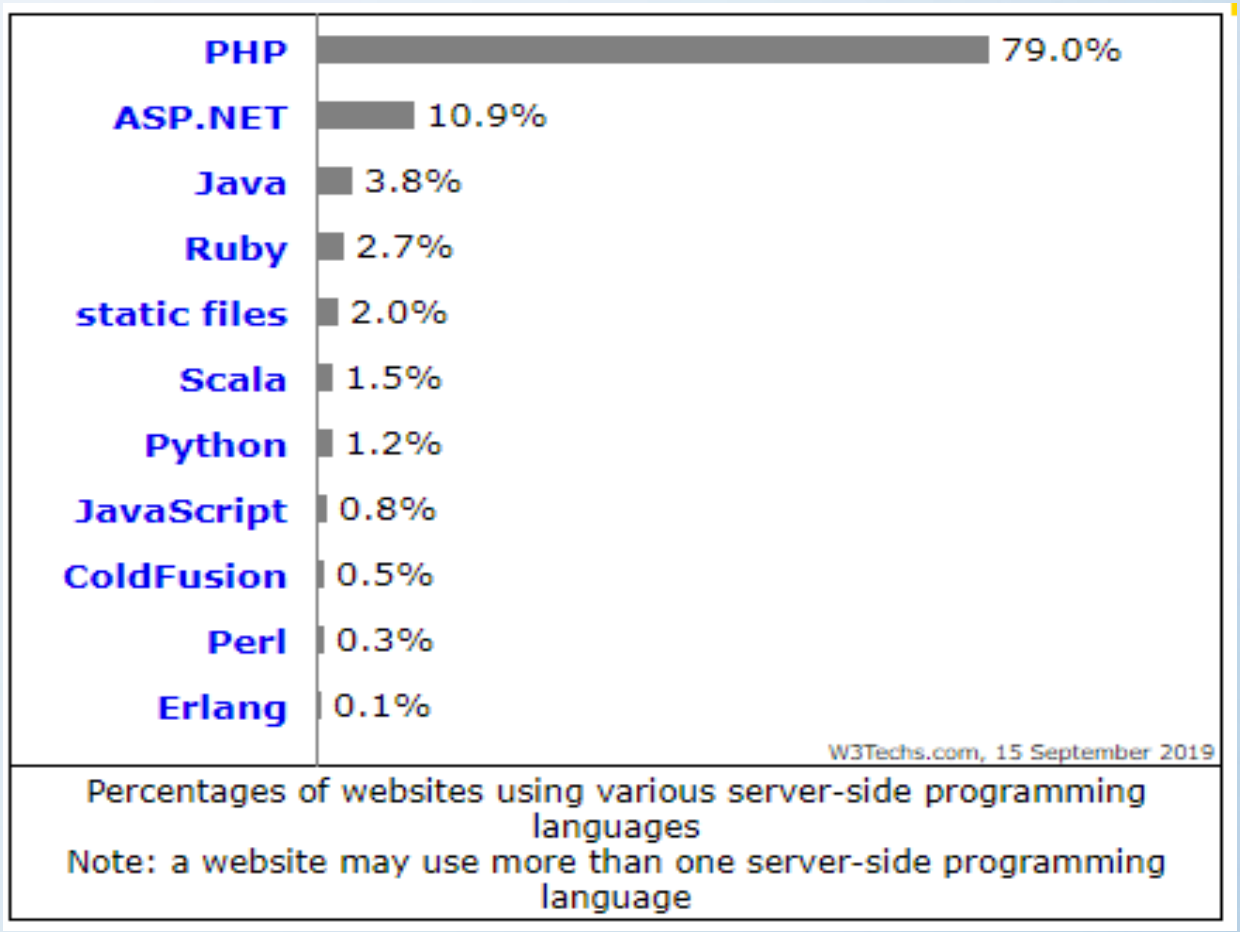
Server Side Scripting with PHP

- Stands for Hypertext Pre-Processor
- Script that run on server is called server side script
- ➢ There are several languages used for Server-Side Programming including
  - PHP
  - Python
  - Ruby
  - Java
  - C#
  - C
  - Perl
  - Javascript*

PHP Programming

- This module will be using PHP because
  - It is widely used in the industry

- (Source : https://w3techs.com) (Sep, 2019)



PHP Programming

- It's easy to find help
  - If you have a problem, someone else would have had it before and found a solution. Googling your problem will usually give you the solution!
- The documentation is very good
- It's free and open source + works on all operating systems.
- It's easy to learn compared with others

PHP Programming

- PHP is most often used to generate the HTML that is finally sent to the browser
- This can be things like:
  - Including information from a database
  - Performing calculations and inserting them into the HTML
  - Getting data from elsewhere (e.g. a database) and formatting the result as HTML

Running PHP Scripts

- PHP Scripts are generally run on a server and accessed via a web browser
- You can install PHP on your desktop/laptop machine and run PHP scripts via the command line
- For CSY2028 we want to view the result of PHP scripts in a browser
- This requires a web server

Web Server

- Your browser (e.g. Chrome, Firefox) will connect to the web server
- The server sends the HTML code for the requested file
- The browser displays the HTML it receives
- The HTML does not have to be a simple .html file, it can be generated by a program on the server

PHP Scripts

- You cannot run PHP scripts in a web browser!
- Web browsers do not understand PHP code
- You must connect the browser to a web server
- The server then runs the PHP code and sends the resulting HTML to the browser

Your Own Web Server

- It's possible to set up a web server on your desktop/laptop
- This involves installing and configuring PHP
- As well as installing a piece of software to serve the pages, listen to connections on HTTP and return the requested files
- The server we will use is Apache although others are available

Your Own Web Server

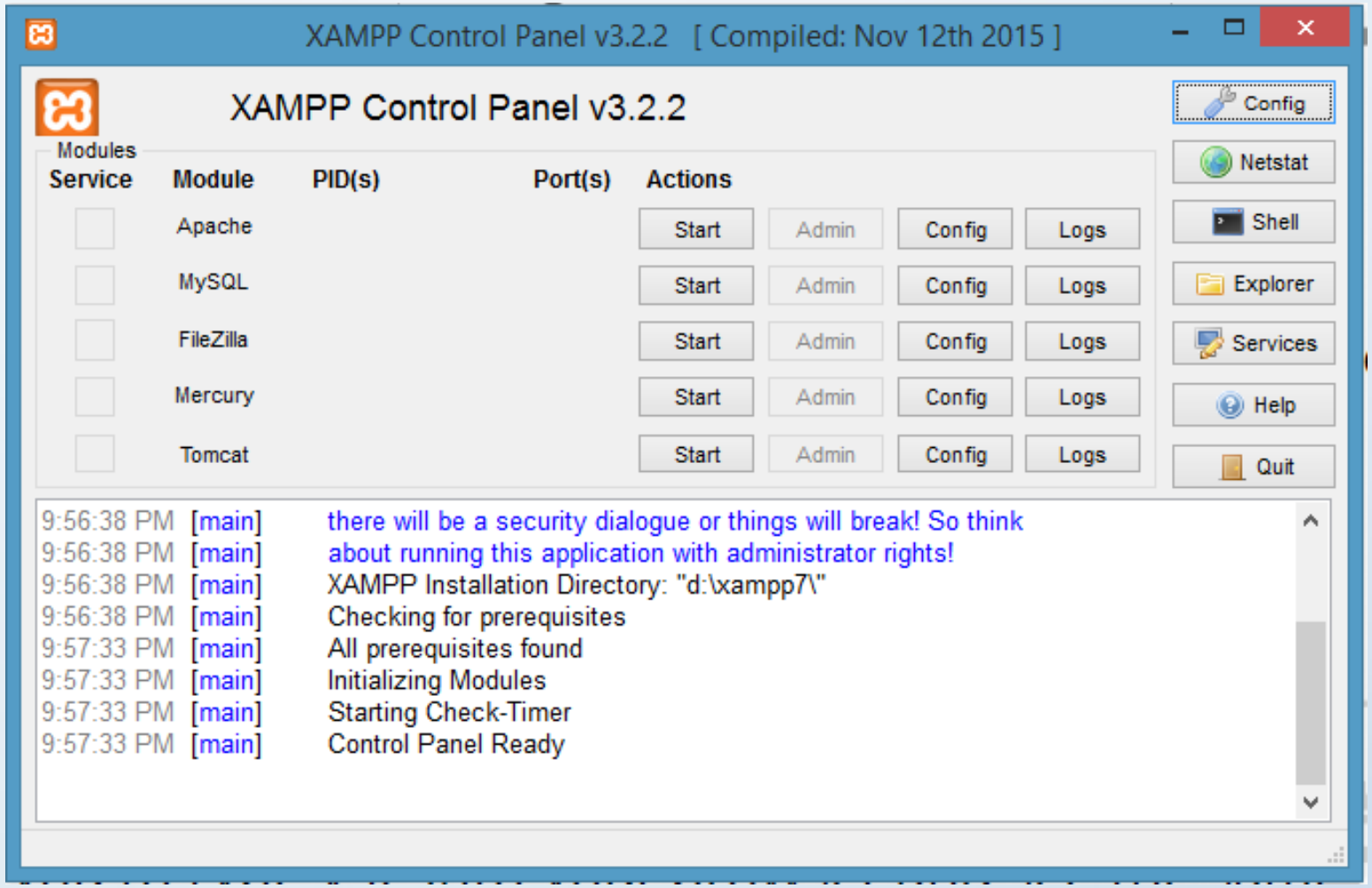
- There are several ways of getting a server installed on your machine
- Install PHP, Apache and MySQL manually and configure them yourself
  - Unless you know what you're doing, this can be difficult
  - There are a lot of different configuration options for both PHP and Apache, knowing how to set them up is art in itself

Getting Started

- Download latest version of XAMPP from https://www.apachefriends.org
- Install it on any drive (like C, D, E etc)
- Open xampp-control.exe file located inside installed “xampp” folder.
- Start Apache and MYSQL servers
- Create a project folder(any name : project) inside htdocs folder
- project is the website root directory and create a file “index.php”
- Now run the project in browser by typing “localhost/project”

Getting Started

- XAMPP Control looks like this :



PHP Programming

- Once you have your server running you can write your first PHP script
- PHP code must be saved in files with a .php extension
- If you put PHP code in .html files it will not work
- However, you can include HTML in PHP files

PHP Programming

- All PHP code is written between PHP tags
- PHP has start and end tags <?php and ?>

```
<?php
// your code here
?>
```

PHP Print

- To print to the screen use the echo command followed by your text in single quotes
- All statements must end with a semicolon (;)

```php
<?php
echo 'hello world';
?>
```

Single Vs Double Quotes

- PHP supports the use of single and double quotes
- They are mostly interchangeable
- However, by convention single quotes (apostrophes) are used in PHP
- Single quotes make it easier to work with HTML

```php
<?php
echo '<div class="content">My content</div>';
echo "<div class=\"content\">My Content</div>";
?>
```

Frirst PHP File

- By saving a file with a .php extension e.g. test.php inside the project directory, it will be accessible on http://localhost/project/test.php
- When you connect to the page, the server processes the code and anything output using echo is displayed in the browser
- You can use echo to print HTML
- Anything inside PHP tags (<?php … ?>) is processed on the server before being sent to the browser
- If you view the source of the page in the browser, you will not see PHP code, only the HTML that has been printed

PHP Variables

- Variables must start with a dollar symbol ($)
- A variable is an identifier for a piece of information
- You can save something under a label that you choose and retrieve it later in the program

```
$num = 123;

echo $num;
```

Comments

- Comments can be included in your code to explain what it is doing
- Comments are not processed by the computer
- The contents of comments don't have a strict structure and can contain any text
- Comments do not have an impact on the program. It will run exactly the same whether they are included or not

Comments

```
// this is a single line comment

/*
        This is a multi-line comment
*/
```

```
// echo 'test';
```

This code will not be run even though it is valid

Types

- PHP is a loosely typed language
- This means you do not have to declare variables with a type
- In Java, for instance, you have to declare a variable before you can use it: You must declare what type that variable will store, and that variable can then only store a value of that type

```
String myVariable;
myVariable = "hello";
```

Java Code, not PHP

Types

- In PHP, you can create a variable without giving it a type
- That variable can later store other types:

```php
//Create a variable to store an integer
$myIntVariable = 123;

//Create a variable to store a string,
$myStringVariable = 'A string';

//However, the type is not fixed: You can store any type in any variable:
$myIntVariable = 'A string';

$myStringVariable = 456;
```

PHP Inbuilt Functions

- The rand() function can be used to generate a random number:
- Each time you run the script it will generate a random number

```php
<?php
echo rand();
?>
```

```
Output:
185902316
```

PHP Inbuilt Functions

- The pi() function calculates mathematical PI to 14 decimal places

```php
<?php
echo pi();
?>
```

```
Output:
3.1415926535898
```

PHP Inbuilt Functions

- Functions can take arguments
- The rand() function will generate a random number from 0 – 2147483647

```php
<?php
echo rand();
?>
```

```
Output:
727321813
```

- You can give functions arguments these are values which change the way the function works

Arguments

- You can supply a min/max value to the rand function by providing two numbers inside the brackets:

```php
<?php
echo rand(1, 10);
?>
```

```
Output:
6
```

- Each argument is separated by a comma
- Different functions take different numbers of arguments
- Those arguments are specific to that function

if Statement

- You can use an if statement to inspect the value of a variable and run some code when that condition is met
- The == operator inspects two values to see if they are equal

```php
$num = 123;


if ($num == 124) {
    echo 'num is equal to 124';
}

if ($num == 123) {
    echo 'num is equal to 123';
}
```

```
Output:
num is equal to 123
```

else Statement

- You can combine and if statement and an else statement to run one piece of code if the condition is met, and another if it is not:

```php
$num = 123;

if ($num == 124) {
        echo 'num is equal to 124';
}
else {
        echo 'num is not equal to 124';
}
```

```
Output:
num is not equal to 124
```

Concatenation

- String concatenation is a fancy term for joining strings together
- In PHP you can join strings with the . Operator
- This can be useful to reduce the number of echo commands required

```php
$num = rand(1,6);
$num2 = rand(1,6);

echo 'You rolled a ';
echo $num;
echo ' and a ';
echo $num2;
echo '. ';
if ($num == 6 && $num2 == 6) {
     echo 'You win!';
}
else {
   echo 'You lose';
}

echo '<a href="dice.php">Roll again</a>';
```

```php
$num = rand(1,6);
$num2 = rand(1,6);

echo 'You rolled a ' . $num . ' and a ' . $num2 . '. ';

if ($num == 6 && $num2 == 6) {
     echo 'You win!';
}
else {
   echo 'You lose';
}

echo '<a href="dice.php">Roll again</a>';
```

Comparison Operators in PHP

- There are several comparison operators in PHP
- $a == $b equality, $a and $b are equal
- $a != $b not equals, $a and $b are not equal
- $a > $b true if $a is greater than $b
- $a < $b true if $a is less than $b
- For a complete list see
  - https://www.php.net/manual/en/language.operators.comparison.php

PHP Types

- The types in PHP are:
  - Double
  - Boolean
  - String
  - Integer
  - Array
  - Object
  - Resource
  - Null

Loops

- There are 2 main types of loop in PHP
  - For
  - While
- For loops for a predefined number of iterations. The number of times that the loop will occur is known upfront
- While loops while a condition is being met

Loops

- Loops can be used to run the same code a number of times.
- A for loop is used when you know the number of iterations (a posh word for the number of times the loop will run!)
- This code will print “Text” ten times
- Any code between the opening and closing brace will be run

for Loop

- It's possible to make use of the loop counter inside the loop
- The variable declared in the first part of the for statement (in this example called i) will store the number of the current iteration
- This variable can be used like any variable, calculations, printing it

```
for ($i = 0; $i < 10; $i++) {
        echo $i;
}
```

```
Output:
0123456789
```

while Loop

- While loops will keep looping while a predefined condition is true
- You must affect the condition inside the loop to halt it!

```php
$loop = true;
$counter = 0;

while ($loop === true) {

        $counter++;

        echo '<p>' . $counter . '</p>';

        if ($counter === 5) {
                $loop = false;
        }
}
```

```
Output in browser:
1
2
3
4
5
```

Exercise 1

1. Using a loop, print out a list of all the numbers from 1-10 inside a an unordered list using <ul> and <li> tags
2. Change the exercise to print out the textual representation “One”, “Two”, “Three”, “Four”, etc
3. Write a program that uses a loop to display all the odd numbers from 21 to 99
    - **Grade A: Can you do this without an if statement?**
4. Write a program that prints the nine times table up to 12 x 9 (9, 18, 27, etc)
    - **Grade A: Can you do this without an if statement and without using the multiplication operator?**
5. For this exercise you may (and probably should!) use the multiplication operator. Print the nine times table from 9 – 900 in the format
    - 1 x 9 = 9
    - 2 x 9 = 18
    - 3 x 9 = 27