Computer Engineering
Suan Sunandha Rajabhat University

PHP

CPE5013 - BACK-END PROGRAMMING

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Why PHP?

- HTML provides content.
- CSS controls layout and look.

They don't have these dynamic functionalities:

- **Calculation**, such as `a+b`
- **Condition**, such as `if..then..else`
- **Looping**, such as `for, while, ..`
- **Array, function, ...**
- **File operations**, such as `read, write, ..`
- **Database**

They exist in programming language, such as C, Java, Python, and JavaScript.

How to add dynamic functionalities to web pages.

Dynamic functionalities exist in programming languages, such as C, Java, Python, and JavaScript.

JavaScript

- Client-side scripts are embedded on HTML documents.
- Major web browsers have can execute JavaScript codes.
- More than 90% of websites has JavaScript.
- May contain harmful features.
- Database connection still requires server-side scripts (Node.js)

```
<html>
<body>

<p id="demo"></p>

<script>
let x = 5;
let y = 2;
let z = x + y;
document.getElementById("demo").innerHTML = z;
</script>

</body>
</html>
```

C, Java, Python

- These scripts can only run on a <u>server side</u>.
- Server needs the corresponding compiler/interpreter to run these scripts.
- These interpreters are often not installed on a server by default.

C

```
#include <stdio.h>
#include <stdlib.h>
#include <errno.h>
#include <time.h>
int main ()
{
  char *env_value;
  char *save_env;
  time_t current_time;

  printf("Content-type: text/html\n\n");
  printf("C Program Version\n");
  current_time = time(NULL);                  /* get current time */
  printf("It is now %s\n", ctime(&current_time));
  save_env = getenv("QUERY_STRING");   /* get environment variable */
  env_value = malloc(strlen(save_env) + 1);
  if (env_value == NULL)
  {
    printf("Major failure; please notify the webmaster\n");
    exit (2);
  }
  strcpy(env_value, save_env);    /* save environment variable */
printf("The query is %s\n", env_value);         /* and print it */
  printf("You are signed onto %s\n", getenv("REMOTE_HOST"));
  printf("Your IP Address is %s\n", getenv("REMOTE_ADDR"));
  fflush(stdout);           /* force physical write */
  exit (0);
}
```

Create a C program and compile into CGI using GCC.

```
<HTML>
<HEAD>
<TITLE> Test simple CGI Program</TITLE>
</HEAD>
<BODY>
<H2 ALIGN=CENTER> Test simple CGI program</H2>
<p>Click below to test the simple CGI program</P>
<ul>
<li><a href="/cgi-bin/simple?query=1"> Simple Program</a>
</ul>
</BODY>
</HTML>
```

HTML calls for GCI program, may submit data through form.

Web applications that request the **cgi-bin** directory are mostly written in C.

Modern programming languages, such as Java, PHP, and Python provides better library.

Java

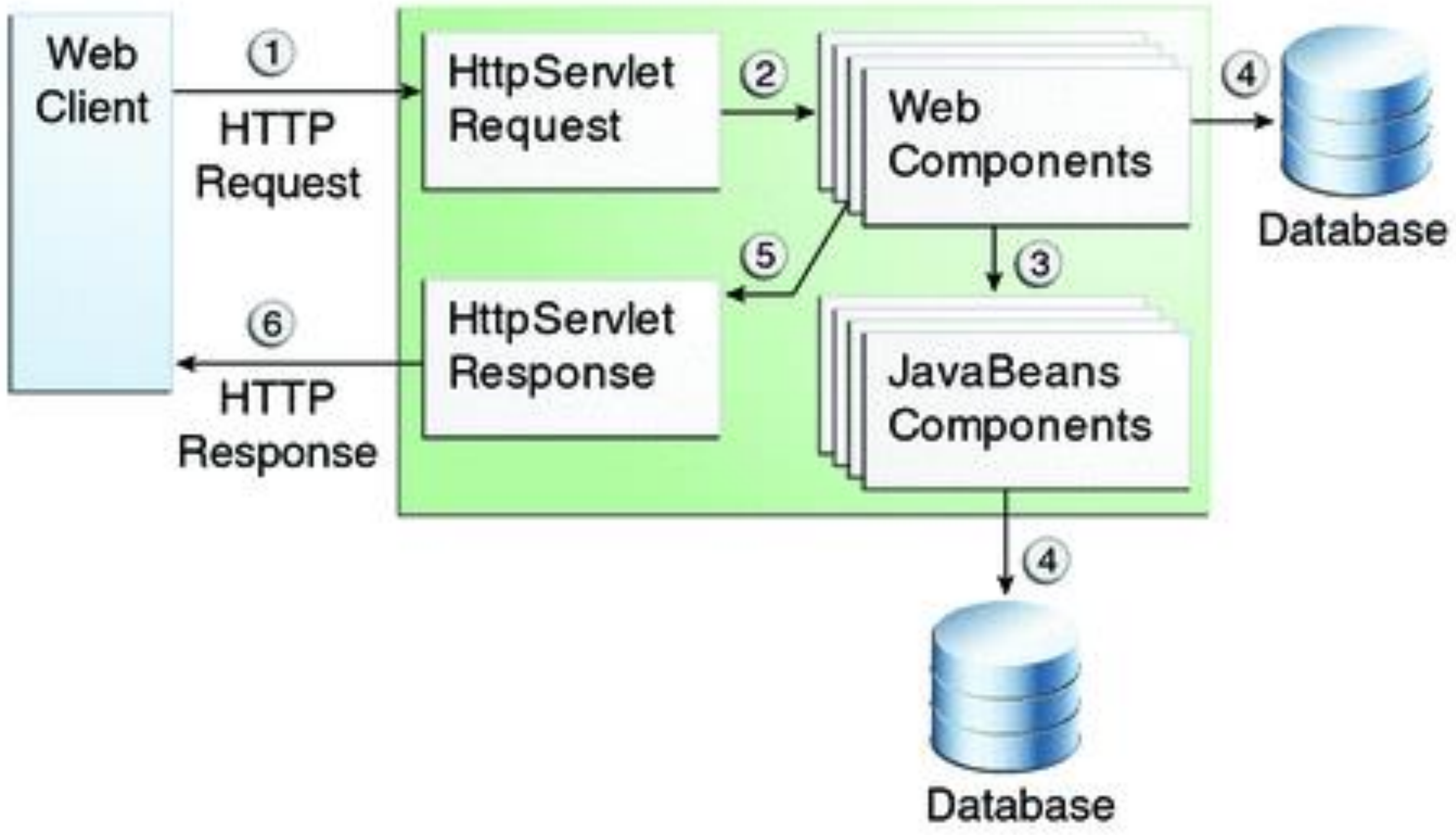
Java web applications are running inside a web container on the server.

The container provides a runtime environment for Java web applications.

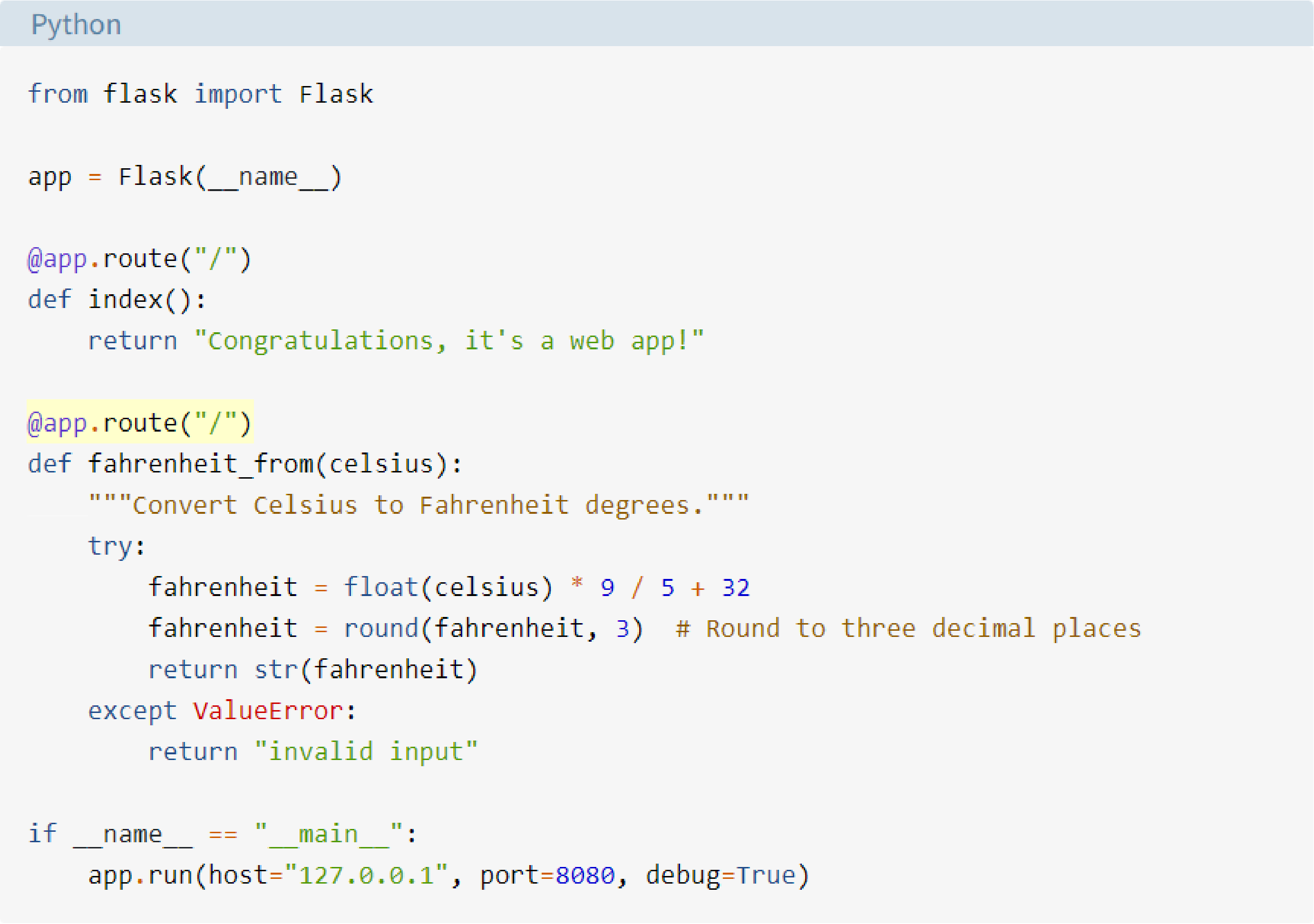
Typical web containers for Java are Tomcat or Jetty.

Servlet -- Java class which extends "HttpServlet" and answers a HTTP request within a web container.

JavaServer Pages (JSP) -- Files that contain HTML and Java code. The web container compiles the JSP into a servlet.



Python



Python

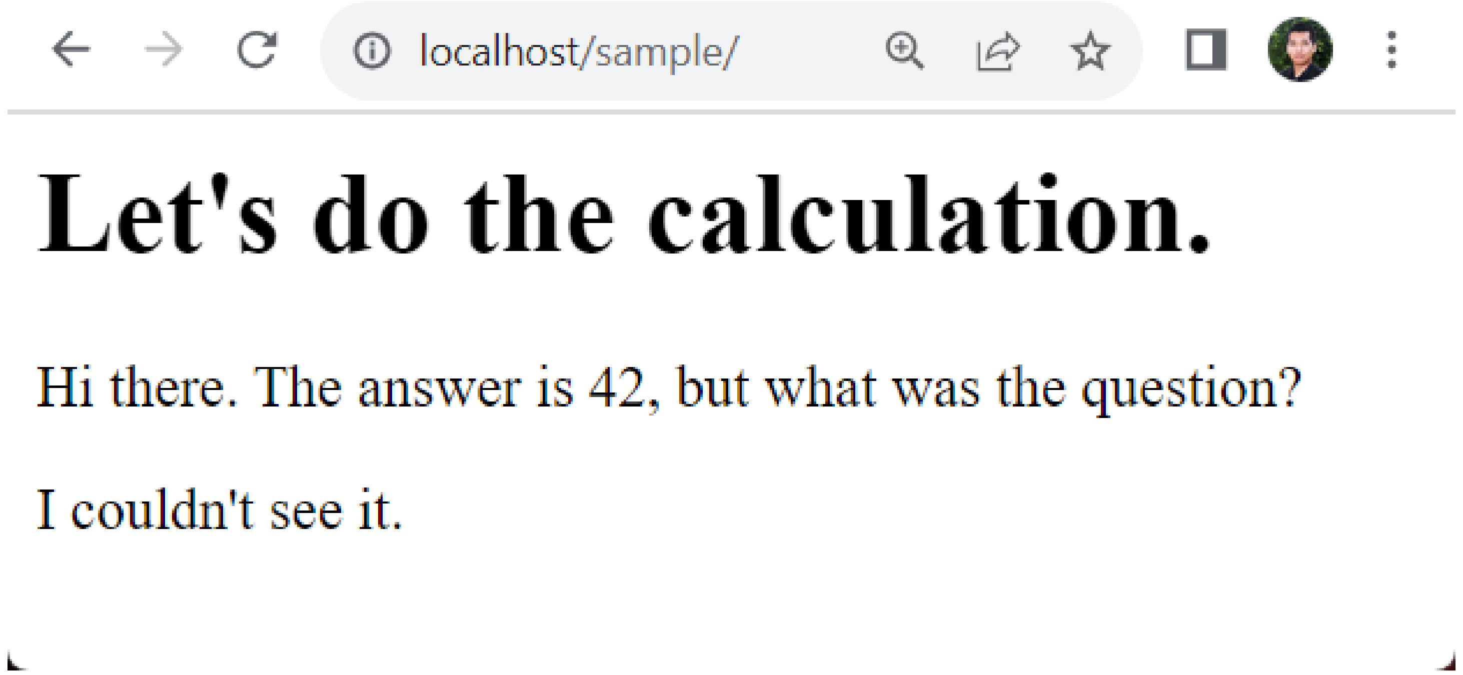
```python
from flask import Flask

app = Flask(__name__)

@app.route("/")
def index():
    return "Congratulations, it's a web app!"

@app.route("/")
def fahrenheit_from(celsius):
    """Convert Celsius to Fahrenheit degrees."""
    try:
        fahrenheit = float(celsius) * 9 / 5 + 32
        fahrenheit = round(fahrenheit, 3)  # Round to three decimal places
        return str(fahrenheit)
    except ValueError:
        return "invalid input"

if __name__ == "__main__":
    app.run(host="127.0.0.1", port=8080, debug=True)
```

- Create a Python script and compile into a function in a Flask app.
- Retrieves input from HTML (e.g., text input forms, device date/time, IP, etc.), perform calculation on the server side, and print the output into HTML.
- The web browser only retrieves output HTML. The Python script does not show up in the source.

PHP

- These scripts can only run on a server side.
- PHP is often found on web servers that host websites or web applications.
- Many web hosting providers include PHP as part of their default setup.
- Hosting control panel, such as cPanel, Plesk, and DirectAdmin, including virtual machine like XAMPP, have dedicated tool to manage PHP.

```
<h1>Let’s do the calculation.</h1>
<p>
<?php
   echo "Hi there.\n";
   $answer = 6 * 7;
   echo "The answer is $answer, but ";
   echo “what was the question?\n";
?>
</p>
<p>I couldn’t see it.</p>
```



localhost/sample/

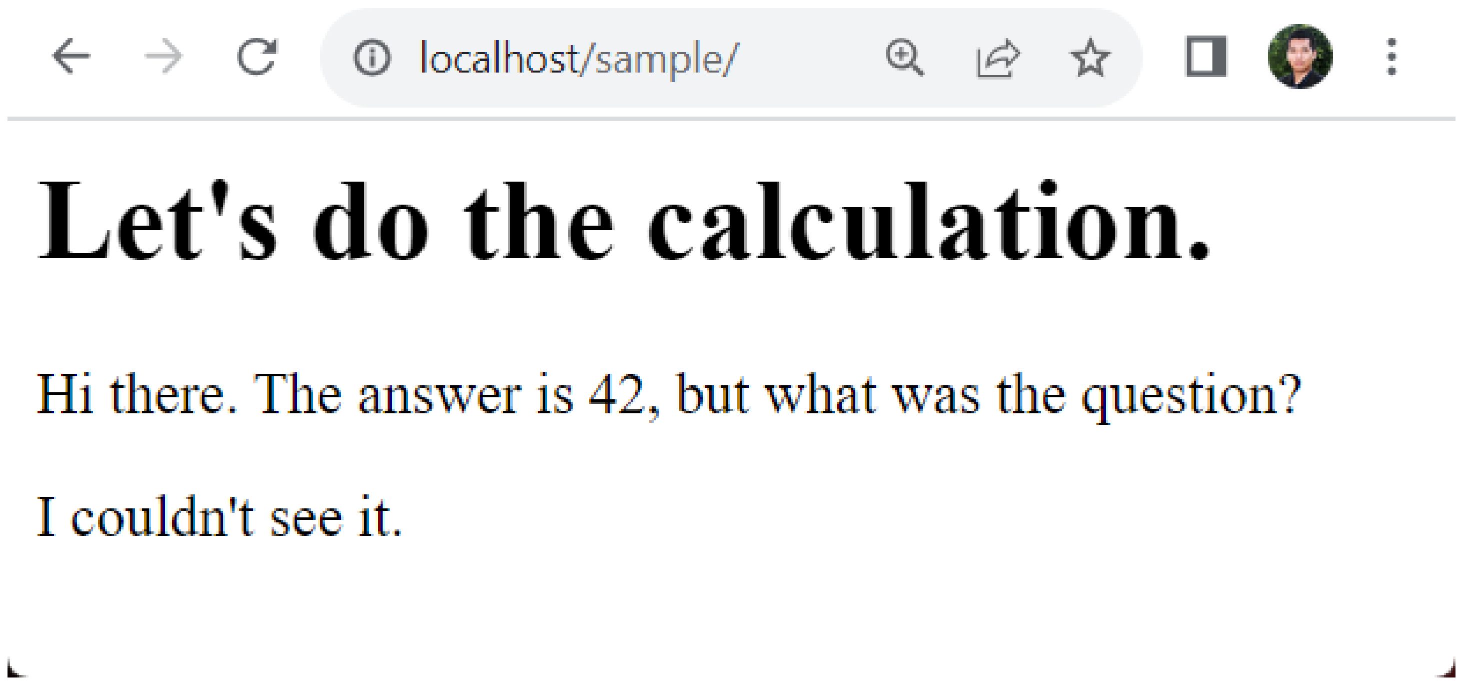
Let's do the calculation.

Hi there. The answer is 42, but what was the question?

I couldn't see it.

```
<h1>Let’s do the calculation.</h1>
<p>
<?php
   echo "Hi there.\n";
   $answer = 6 * 7;
   echo "The answer is $answer, but ";
   echo "what was the question?\n";
?>
</p>
<p>I couldn’t see it.</p>
```

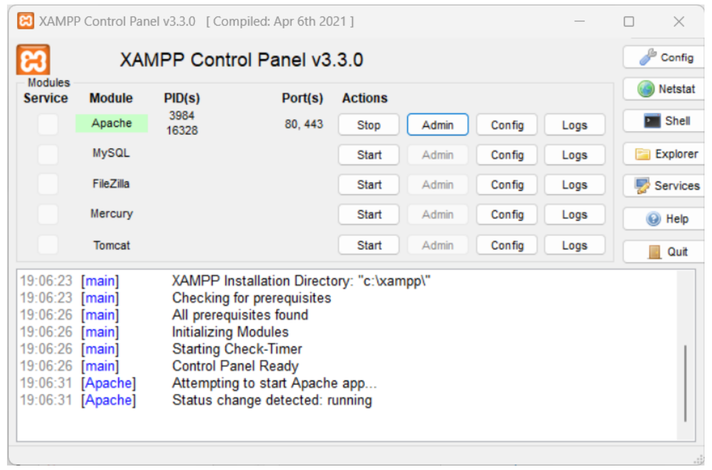
- PHP is part of the HTML document.
- The script contains dynamic features that need to be run on a server side (the math operation in this example).
- The file needs to be saved as .php and put on to a server environment (XAMPP localhost in this example).



Let's do the calculation.

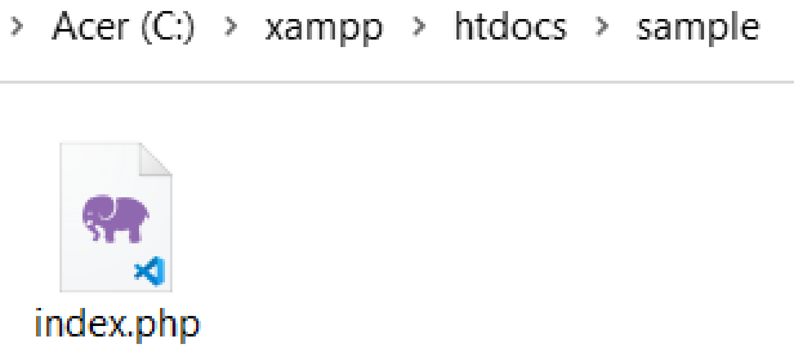
Hi there. The answer is 42, but what was the question?

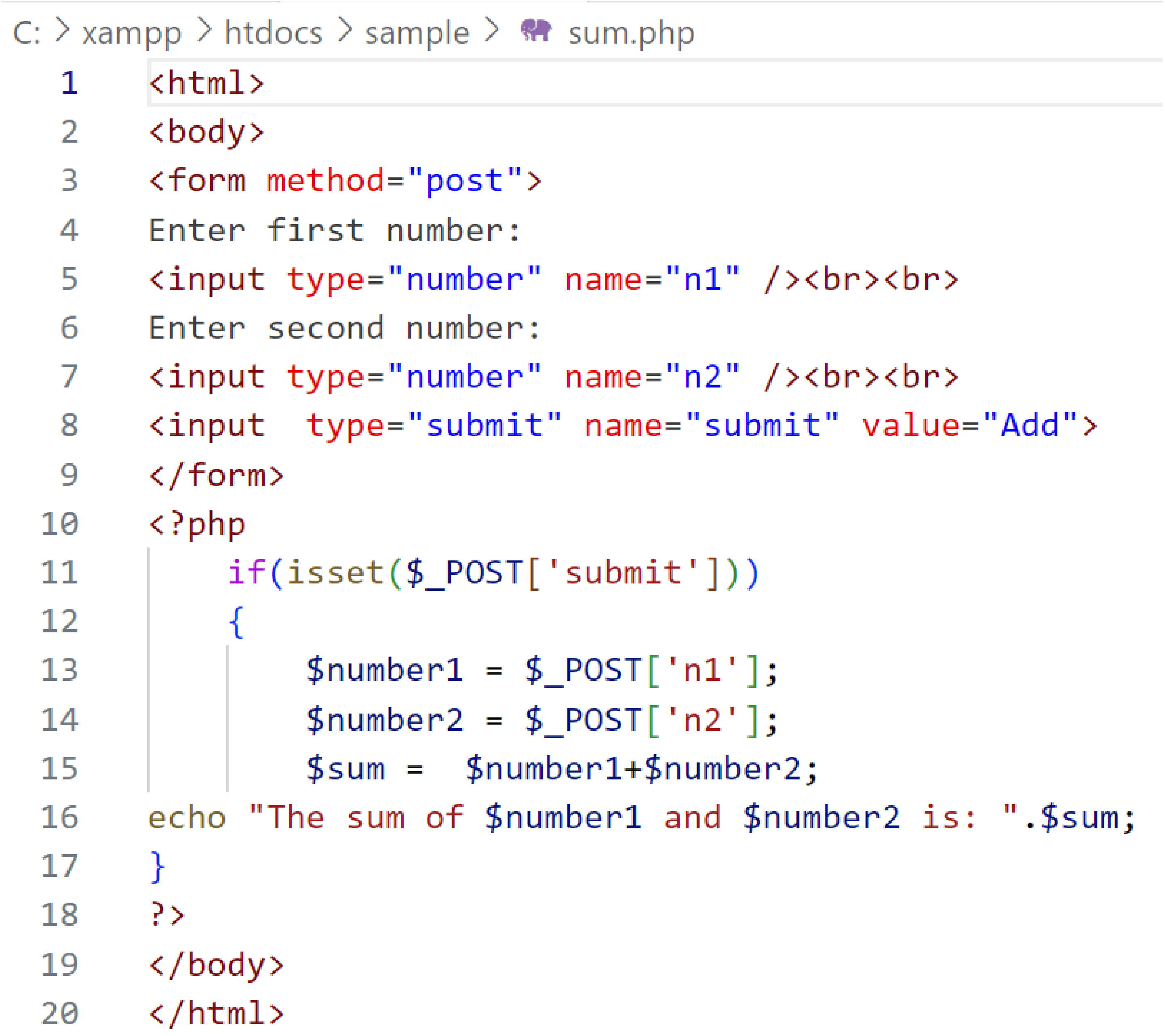
I couldn't see it.


XAMPP Control Panel v3.3.0 [Compiled: Apr 6th 2021]
XAMPP Control Panel v3.3.0
Modules
Config
Netstat
Shell
Explorer
Services
Help
Quit

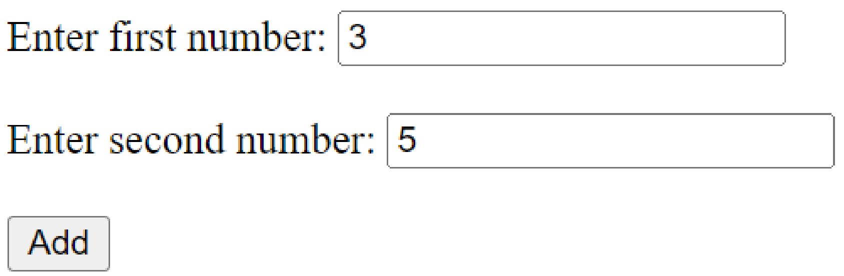
Service	Module	PID(s)	Port(s)	Actions			
□	Apache	3984 16328	80, 443	Stop	Admin	Config	Logs
□	MySQL			Start	Admin	Config	Logs
□	FileZilla			Start	Admin	Config	Logs
□	Mercury			Start	Admin	Config	Logs
□	Tomcat			Start	Admin	Config	Logs

```
19:06:23  [main]    XAMPP Installation Directory: "c:\xampp\"
19:06:23  [main]    Checking for prerequisites
19:06:26  [main]    All prerequisites found
19:06:26  [main]    Initializing Modules
19:06:26  [main]    Starting Check-Timer
19:06:26  [main]    Control Panel Ready
19:06:31  [Apache]  Attempting to start Apache app...
19:06:31  [Apache]  Status change detected: running
```

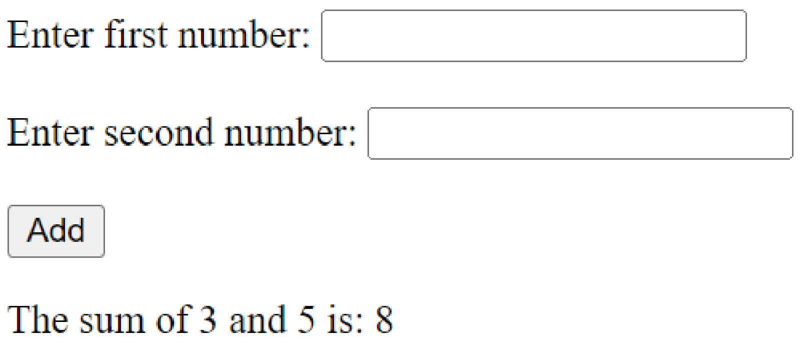




```
<html>
<body>
<form method="post">
Enter first number:
<input type="number" name="n1" /><br><br>
Enter second number:
<input type="number" name="n2" /><br><br>
<input  type="submit" name="submit" value="Add">
</form>
<?php
    if(isset($_POST['submit']))
    {
        $number1 = $_POST['n1'];
        $number2 = $_POST['n2'];
        $sum =  $number1+$number2;
echo "The sum of $number1 and $number2 is: ".$sum;
}
?>
</body>
</html>
```


Enter first number: 3

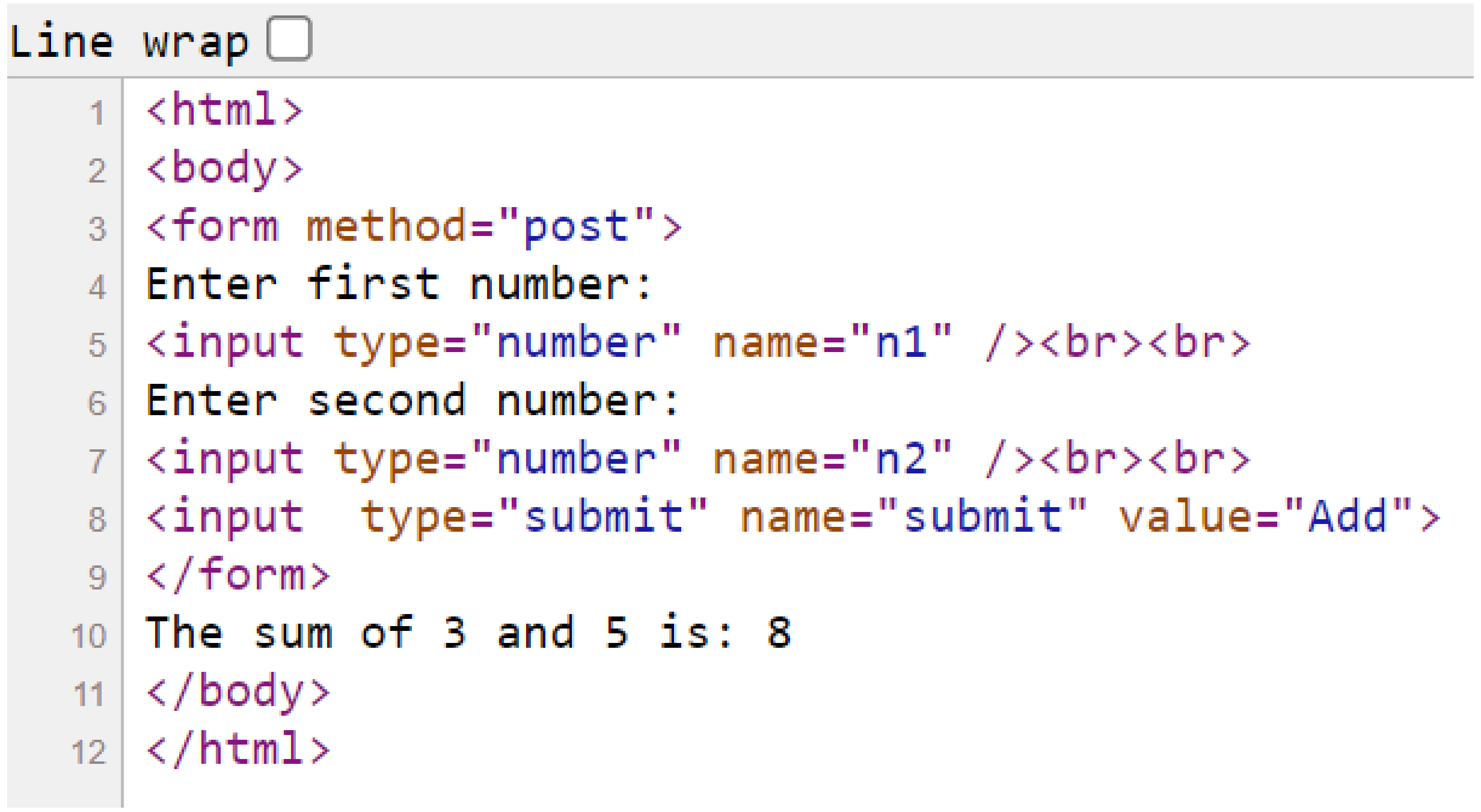
Enter second number: 5


Enter first number:

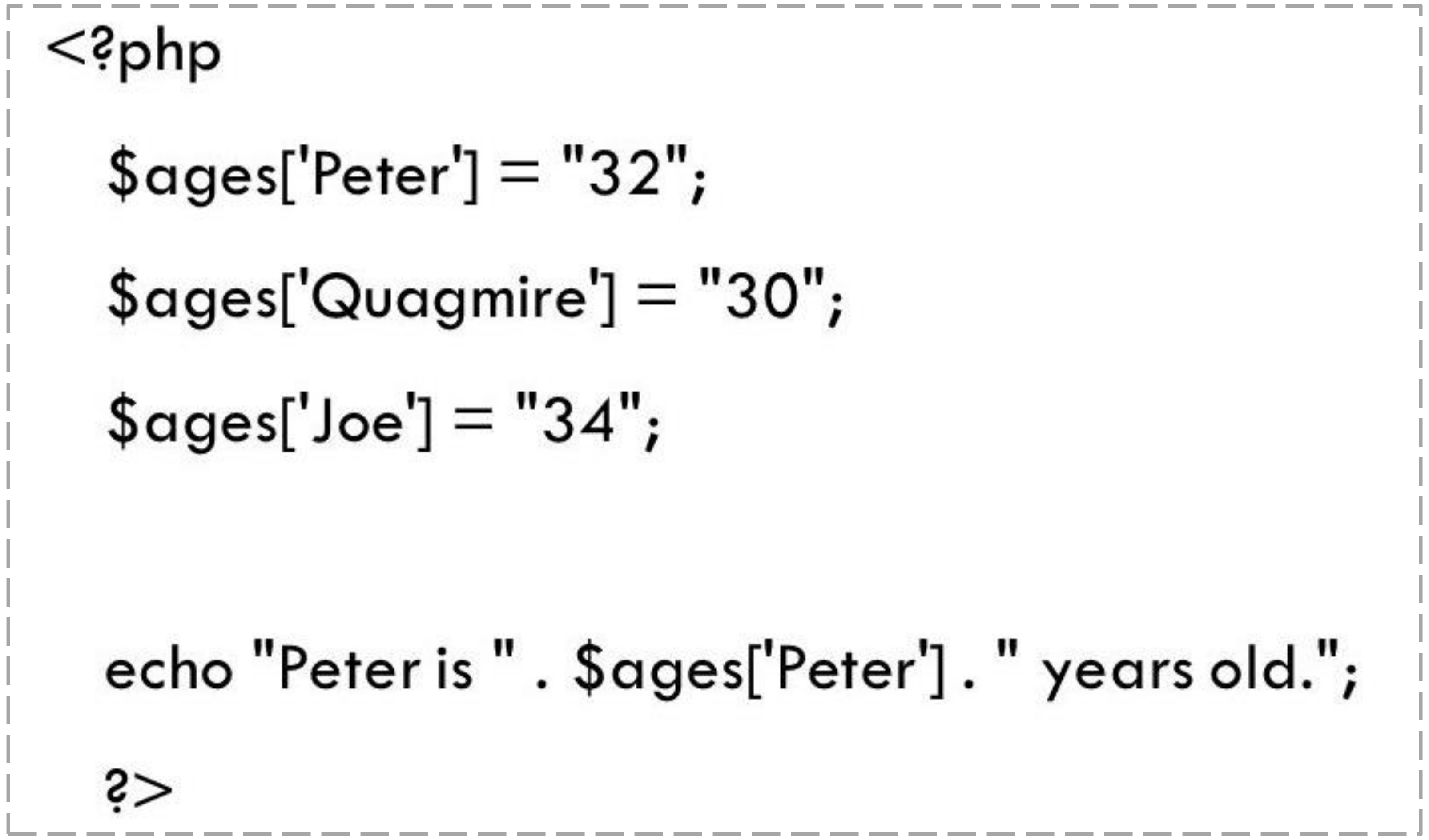
Enter second number:

The sum of 3 and 5 is: 8

- PHP retrieves input from HTML or JavaScript (e.g., text input forms, device date/time, IP, etc.), perform calculation on the server side, and print the output into HTML.
- The web browser only retrieves output HTML. The PHP script does not show up in the source.



```
<html>
<body>
<form method="post">
Enter first number:
<input type="number" name="n1" /><br><br>
Enter second number:
<input type="number" name="n2" /><br><br>
<input  type="submit" name="submit" value="Add">
</form>
The sum of 3 and 5 is: 8
</body>
</html>
```



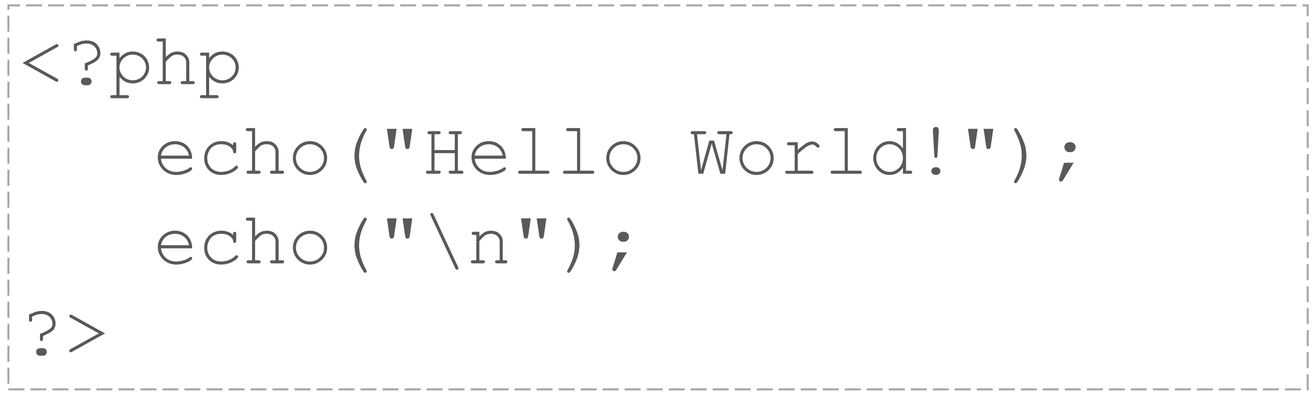
```
<?php
  $ages['Peter'] = "32";
  $ages['Quagmire'] = "30";
  $ages['Joe'] = "34";


  echo "Peter is " . $ages['Peter'] . " years old.";
  ?>
```

Similar to C

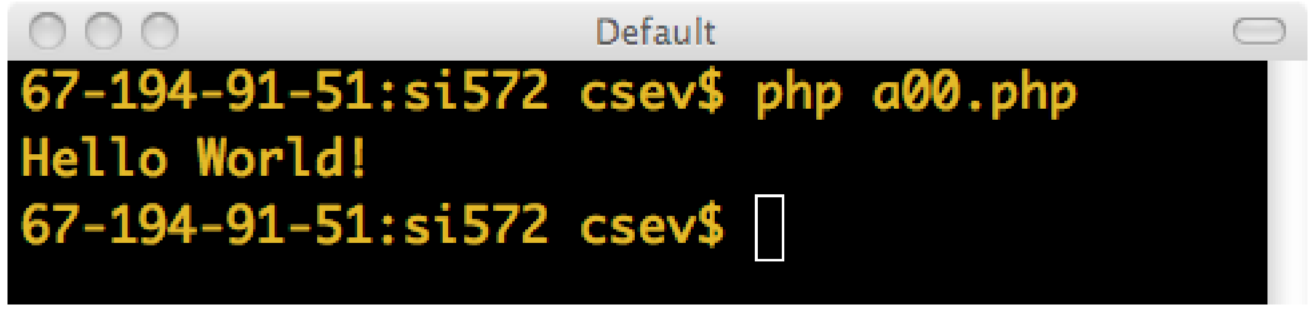
- Semicolons, no significant white space

Similar to Perl

- Dollar signs to start variable names, associative arrays



```
<?php
   echo("Hello World!");
   echo("\n");
?>
```



```
67-194-91-51:si572 csev$ php a00.php
Hello World!
67-194-91-51:si572 csev$ 
```

We can run PHP from the command line. The output will come out on the terminal.

It does not have to be part of a request-response cycle.

Variable names

Start with a dollar sign ($)

→ Followed by a letter or underscore

→ Followed by numbers, letters, or underscores

```
$abc = 12;
$total = 0;
$largest_so_far = 0;
```

Proper variables

```
abc = 12;
$2php = 0;
$bad-punc = 0;
```

Improper variables

Must start with a dollar sign.

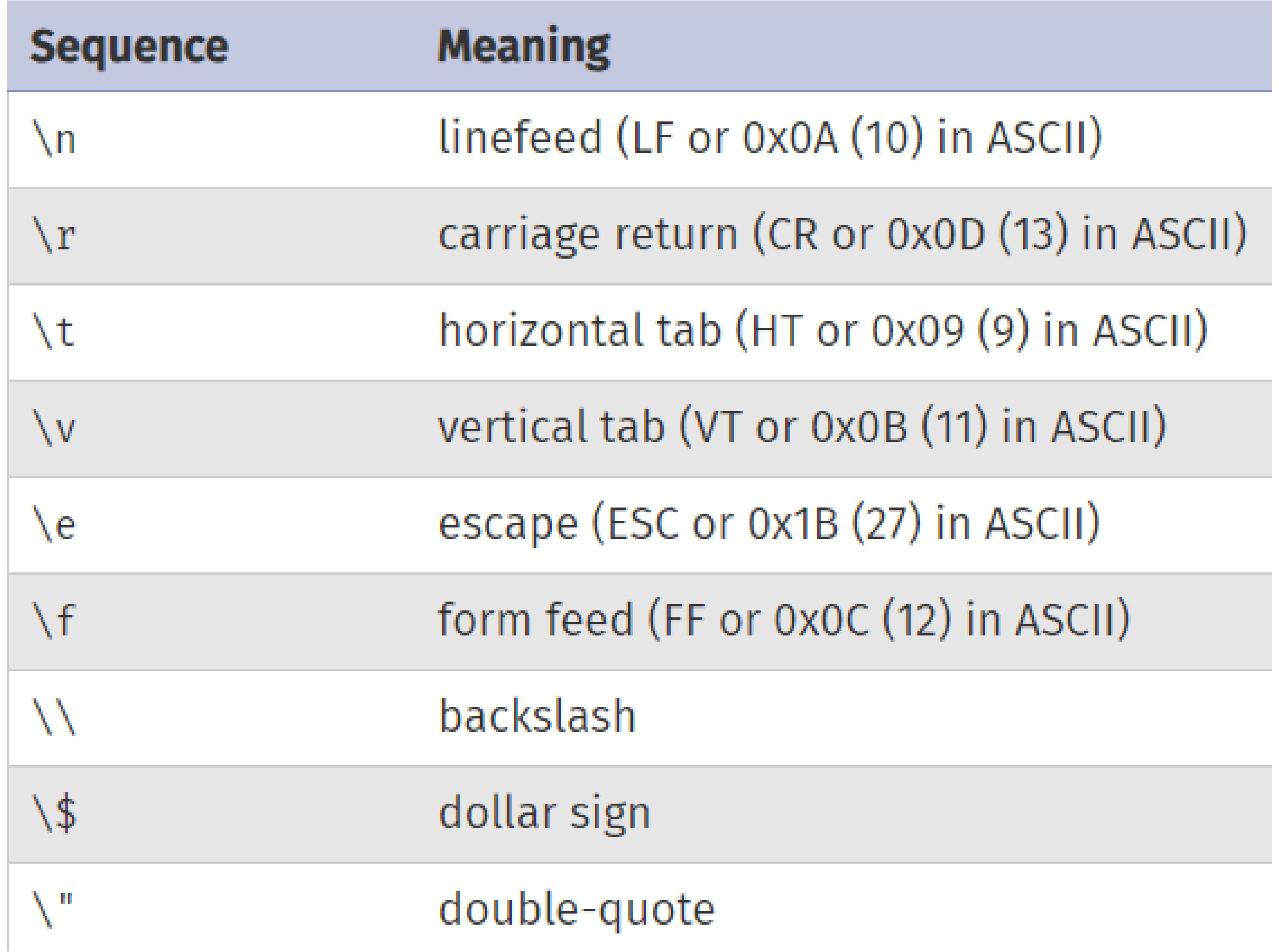
Cannot start with a number.

Cannot use a hyphen.

String

Strings enclosed in single quotes '…' will be printed as they were typed.

Strings enclosed in double quotes "…" will have escaped characters executed.

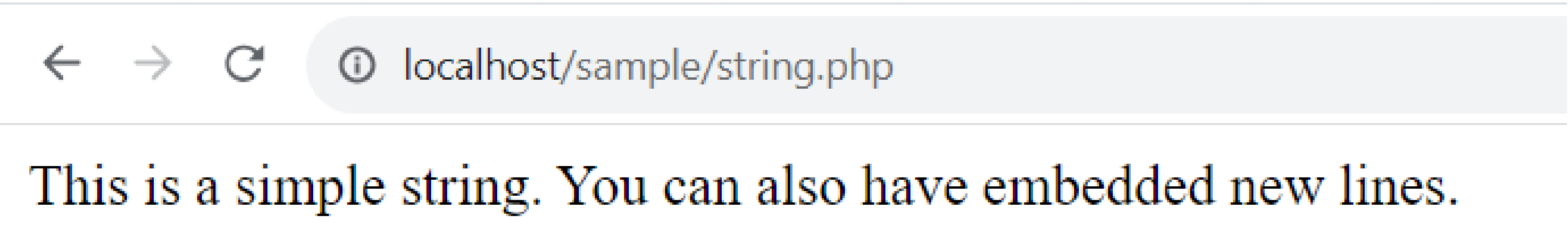


Sequence	Meaning
\n	linefeed (LF or 0x0A (10) in ASCII)
\r	carriage return (CR or 0x0D (13) in ASCII)
\t	horizontal tab (HT or 0x09 (9) in ASCII)
\v	vertical tab (VT or 0x0B (11) in ASCII)
\e	escape (ESC or 0x1B (27) in ASCII)
\f	form feed (FF or 0x0C (12) in ASCII)
\\	backslash
\$	dollar sign
\"	double-quote

These only work on terminals.

In HTML, you need HTML tags.

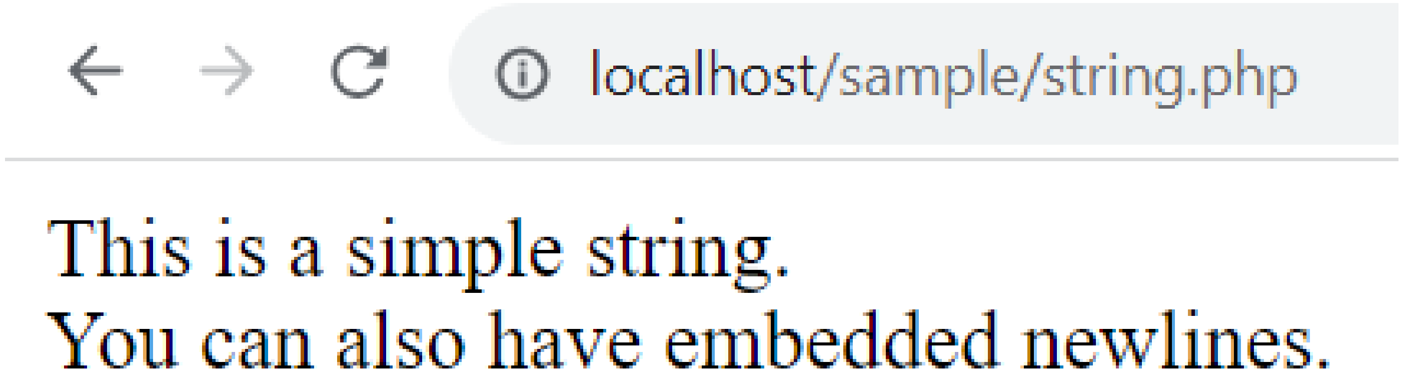
```
<?php
echo "This is a simple string. \n
You can also have embedded new lines.";
?>
```



This is a simple string. You can also have embedded new lines.

Line break (HTML)

```
<html>
<body>
<?php
echo 'This is a simple string. <br>
You can also have embedded newlines.';
?>
</body>
</html>
```



```
This is a simple string.
You can also have embedded newlines.
```

Curly quotes (‘…’ , “…”) sometimes cause an error.

You are supposed to use straight quotes ('…' , "…").

Case matters

Inline comment

```
<?php
$var = 'Bob';
$Var = 'Joe’;         // Case matters
echo "$var, $Var";    /* outputs "Bob, Joe" */
?>
```

Quote comment

`echo` has no return value while `print` has a return value of 1.

`echo` can take multiple parameters (rare) while print can take one argument.

Variable name weirdness

Things that look like variables but are missing a dollar sign can be confusing.

```
$x = 2;
$y = x + 5;
print $y;
```

```
    5
```

```
$x = 2;
y = $x + 5;
print $x;
```

```
Parse error
```

echo vs print

`echo` has no return value while `print` has a return value of 1.

`$ret = print "Hello World";` → `$ret` will be 1.

`echo` can take multiple parameters which get concatenated (rare) while `print` can take only one argument.

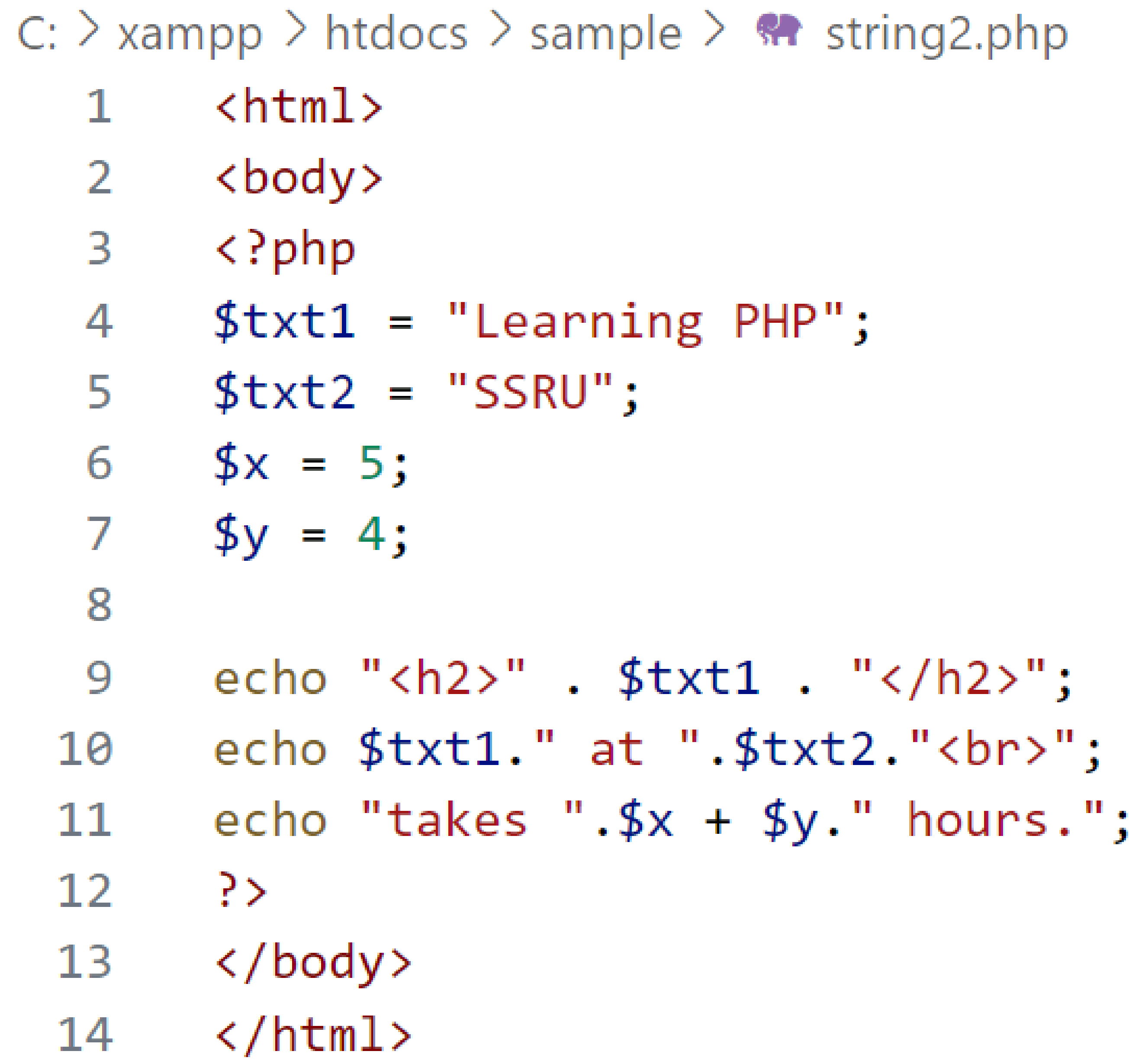
```
echo  "and a ", 1, 2, 3;   // comma-separated without parentheses
echo ("and a 123");        // just one parameter with parentheses
print ("and a 123");
print  "and a 123";
```

Both `echo` and `print` do not require parentheses.

`echo` is marginally faster than `print`.

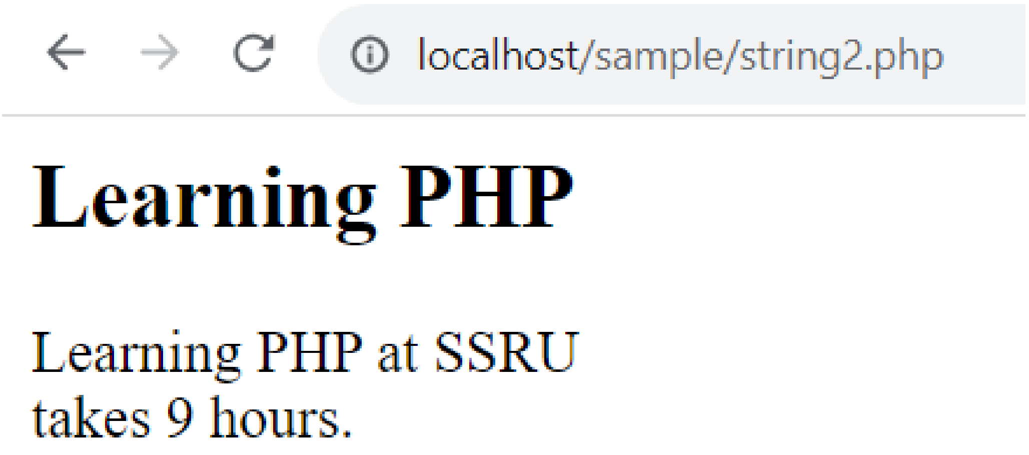
Concatenation

Concatenation uses the " . " not "+“ or “&” .



C: > xampp > htdocs > sample > string2.php

```
<html>
<body>
<?php
$txt1 = "Learning PHP";
$txt2 = "SSRU";
$x = 5;
$y = 4;

echo "<h2>" . $txt1 . "</h2>";
echo $txt1." at ".$txt2."<br>";
echo "takes ".$x + $y." hours.";
?>
</body>
</html>
```



```
Learning PHP

Learning PHP at SSRU
takes 9 hours.
```

A single space is OK.

Additional spaces require &nbsp; or CSS text alignment.

Check where spaces go.