

## Introduction to PHP

### Overview

This lab walks you through using PHP to create simple applications. PHP is popular for many Web applications, so becoming comfortable with the syntax of PHP will help you diagnose and identify potential security issues.

### Learning Outcomes:

At the completion of the lab you should be able to:

1. Execute PHP scripts at the shell prompt within the Ubuntu virtual machine
2. Create simple PHP applications comprised of basic syntax, variables, strings, selection statements and repetition statements.

### Lab Submission Requirements:

After completing this lab, you will submit a word (or PDF) document that meets all of the requirements in the description at the end of this document. In addition, your PHP file should be submitted. You can submit multiple files in a zip file.

### Virtual Machine Account Information

Your Virtual Machine has been preconfigured with all of the software you will need for this class. The default username and password are:

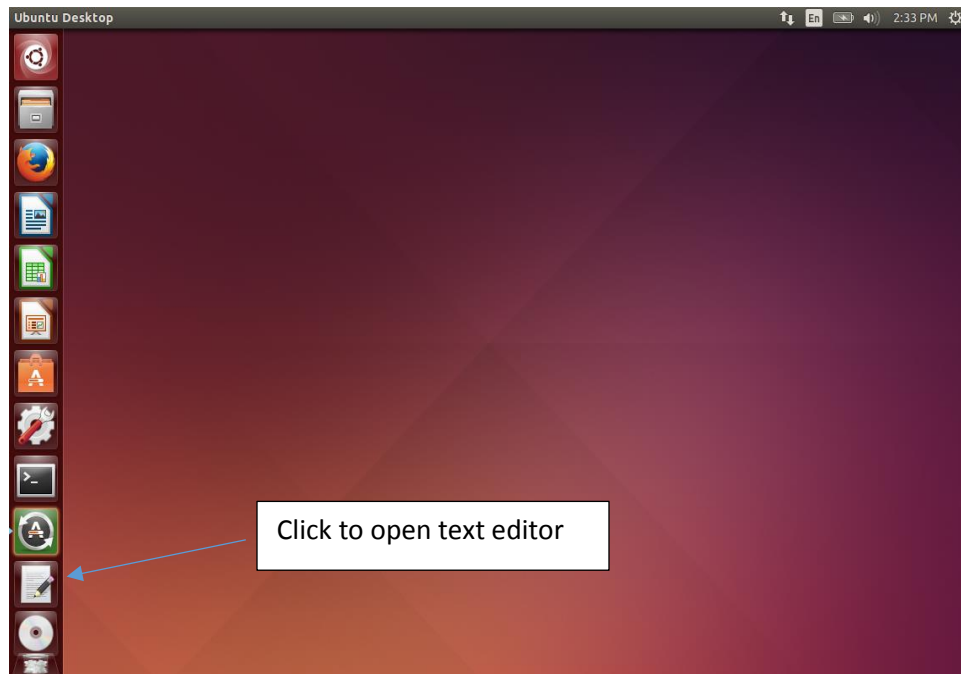
**Username :** umucsdev

**Password:** umuc\$d8v

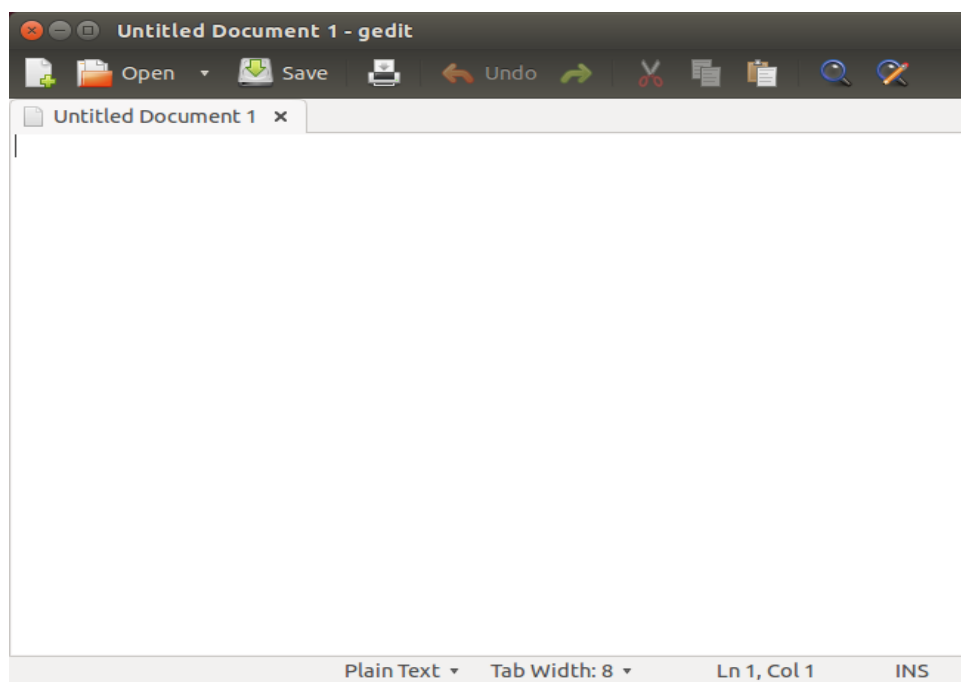
### Part 1 – Execute PHP scripts at the shell prompt within the Ubuntu virtual machine

The Virtual Machine already has PHP installed. It is also configured to run properly on your Apache2 web server. This exercise will walk through creating a simple PHP script and running it both at the shell prompt and from a Web browser. We will use the gedit text editor to create the PHP file. Running the script from the shell prompt is very useful for debugging as syntax errors will appear when code issues occur.

1. Assuming you have already launched and logged into your SDEV32Bit Virtual Machine (VM) from the Oracle VirtualBox, click on the gedit icon found on the left side of the screen of your VM.



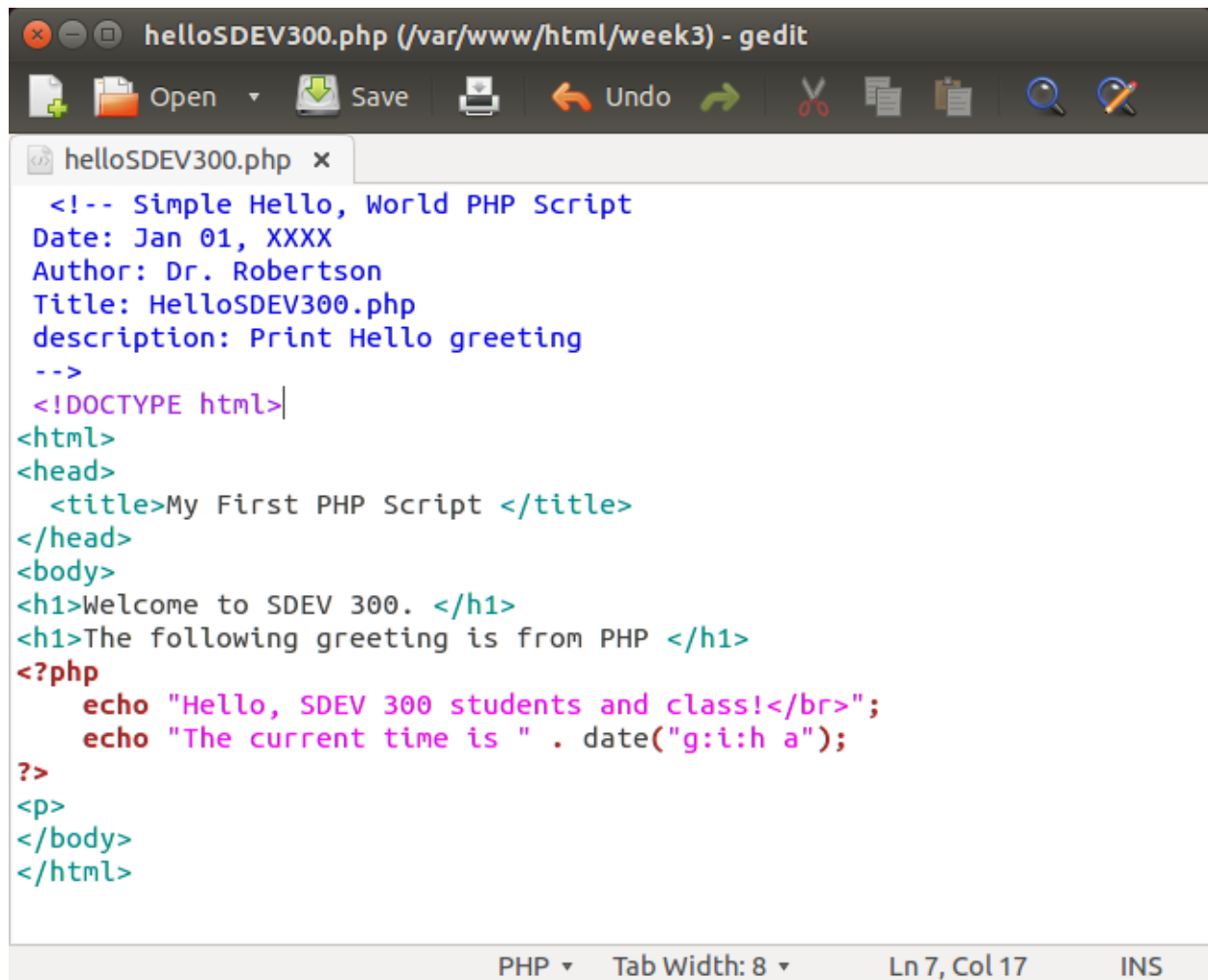
2. After clicking the terminal icon a terminal will appear



3. To create a new document just begin typing or copying and pasting the PHP code shown below:

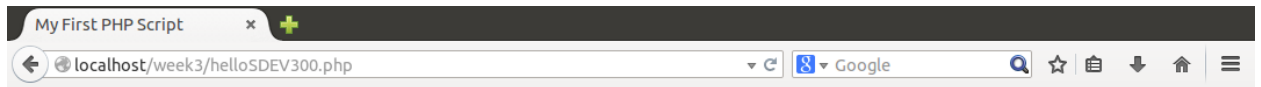
```
<!-- Simple Hello, World PHP Script
Date: Jan 01, XXXX
Author: Dr. Robertson
Title: HelloSDEV300.php
description: Print Hello greeting
-->
<!DOCTYPE html>
<!-- HelloPHP.html -->
<!-- Jan 22, XXXX -->
<html>
<head>
  <title>My First PHP Script </title>
</head>
<body>
<h1>Welcome to SDEV 300. </h1>
<h1>The following greeting is from PHP </h1>
<?php
  echo "Hello, SDEV 300 students and class!<br>";
  echo "The current time is " . date("g:i:h a"); ?>
<p>
</body>
</html>
```

Save the file in the `/var/www/html/week3` folder in a file named `helloSDEV300.php`. Note, you may need to create a folder named `week3`. Recall the `/var/www/html` is the location of the Apache2 web server html files. Creating separate folders for each week or application will help organize the server.



```
helloSDEV300.php (/var/www/html/week3) - gedit
Open Save Undo
helloSDEV300.php x
<!-- Simple Hello, World PHP Script
Date: Jan 01, XXXX
Author: Dr. Robertson
Title: HelloSDEV300.php
description: Print Hello greeting
-->
<!DOCTYPE html>
<html>
<head>
  <title>My First PHP Script </title>
</head>
<body>
<h1>Welcome to SDEV 300. </h1>
<h1>The following greeting is from PHP </h1>
<?php
  echo "Hello, SDEV 300 students and class!<br>";
  echo "The current time is " . date("g:i:h a");
?>
<p>
</body>
</html>
PHP Tab Width: 8 Ln 7, Col 17 INS
```

Launch the Firefox browser and run your home page by entering the following URL:  
localhost/helloSDEV300.php



**Welcome to SDEV 300.**

**The following greeting is from PHP**

Hello, SDEV 300 students and class!  
The current time is 2:25:02 pm

4. You can also run the php code directly from the shell prompt. To run from the shell prompt, open a shell prompt, change to the location of the helloSDEV300.php file and type:

```
php helloSDEV300.php
```

```
umucsdev@umucsdev-VirtualBox: /var/www/html/week3
umucsdev@umucsdev-VirtualBox: /var/www/html/week3$ php helloSDEV300.php
```

This will result in the following output:

```
umucsdev@umucsdev-VirtualBox: /var/www/html/week3
umucsdev@umucsdev-VirtualBox: /var/www/html/week3$ php helloSDEV300.php
<!-- Simple Hello, World PHP Script
Date: Jan 01, XXXX
Author: Dr. Robertson
Title: HelloSDEV300.php
description: Print Hello greeting
-->
<!DOCTYPE html>
<html>
<head>
  <title>My First PHP Script </title>
</head>
<body>
<h1>Welcome to SDEV 300. </h1>
<h1>The following greeting is from PHP </h1>
Hello, SDEV 300 students and class!<br>The current time is 2:29:02 pm<p>
</body>
</html>
umucsdev@umucsdev-VirtualBox: /var/www/html/week3$
```

Notice, the output is html with the PHP output also converted to html code. This html is what is run by the browser in the previous step. Although it will take some time to get use to this process, any html and PHP code can be integrated together resulting in complex, functional, dynamic and interactive web sites.

5. We can take the Web page we created in week 2 and some additional PHP components. Copy and paste the following PHP file into your text editor and save the file as CNShome.php under the week3 directory.

```
<!DOCTYPE html>
<!-- CNShome.php -->
<!-- Jan 22, XXXX -->
<html>
<head>
    <title>Computer Security Home Page </title>
</head>
<body>
<h1>Welcome to Computer Security Consultants! </h1>
<p>
<?php
    echo "Hello, SDEV 300 students and class!</br>";
    echo "The current time is " . date("g:i:h a");
?>
<!-- Add Table of Hyperlinks -->
<p>
Click on any link in the table below to see some of our current customers:
</p>
<table border = "1">
<tr><td>Site</td><td>Web Address</td></tr>
<tr><td>UMUC</td><td><a href="http://umuc.edu">UMUC</a></td></tr>
<tr><td>Oracle</td><td><a href="http://oracle.com">Oracle</a></td></tr>
<tr><td>Microsoft</td><td><a href="http://www.
microsoft.com">Microsoft</a></td></tr>
<tr><td>Twitter</td><td><a href="http://www.
twitter.com">Twitter</a></td></tr>
</table>

<!-- Add some images in a table -->
<p>
Check out our latest Mars photos:
</p>
<table>
<tr><td>Description</td><td>Photo</td></tr>
<tr><td>Mars Near Darwin</td><td></td></tr>
<tr><td>Mars Parhump Hills</td><td></td></tr>
</table>

<p>
We offer the following products:
<ul>
<li>Security Consulting </li>
<li>Apache security monitoring</li>
<li>Software Penetration Testing</li>
```

```

<li>Threat Modeling and Risk Managements </li>
</ul>
</p>

<!-- Add a Form -->
<p> Tell us about yourself and what you are interested in doing:
<form action="" method="post">
Name: <input type="text" name="username"></br>
E-Mail: <input type="text" name="e-mail"><br/>
Interest: <select name="sport">
<option>Apache Security Monitoring</option>
<option>Security Consulting</option>
<option>Software Penetration Testing</option>
<option>Threat Modeling and Risk Management</option>
</select>
<br/><br/>

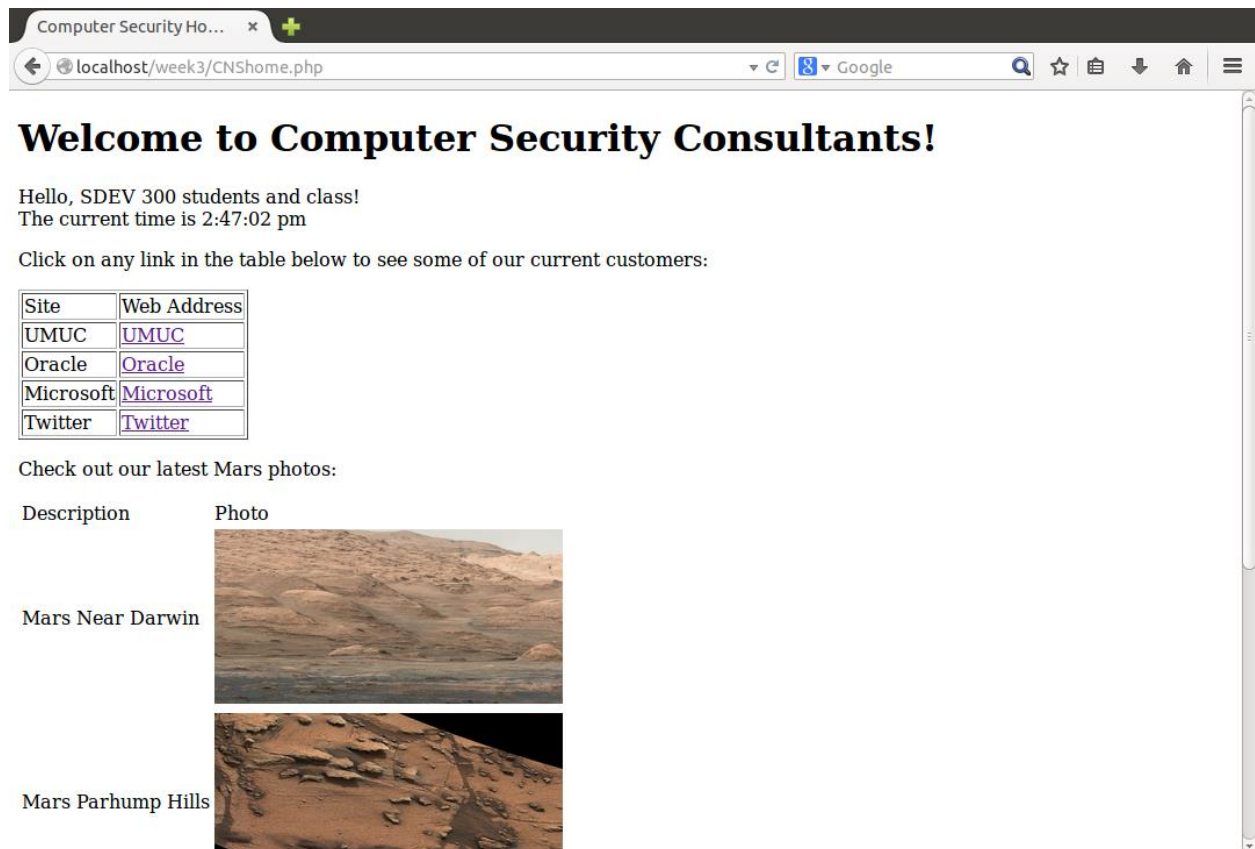
<input type="submit" value="Click to Submit"/>
<input type="reset" value="Reset"/>
</form>
</p>

</body>
</html>

```

6. Launching the php file from within Browser will result in the following output.





Notice the Web page we created from previous week has the PHP welcome message at the top of the page.

Prior to completing the submitted portion of the lab for this week, be sure you experiment with creating and running PHP pages that include both HTML and PHP components. You should run them from the shell prompt and the browser.

## Part 2 Create simple PHP applications

The reading for this week covered the basic syntax of PHP, variable definitions, operators and expressions, decision and loops and strings. As you review these readings, be sure to copy and paste code to create files to test functionality. Also, be sure to modify and enhance the code to better understand what each line of code is doing.

In this exercise we will create a PHP web page that displays the multiplication table using a nested, for loop. HTML table tags will be used to format the data values.

1. Copy and paste the following code into a file named MultiplicationTable.php in the /var/www/html/week3 folder on your Virtual Machine.

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" >
<html>
  <head>
    <title>Multiplication Table</title>
  </head>
  <body>
    <h1> Week 3 PHP and HTML Blending </h1>
    <h2>Multiplication Table</h2>

    <!-- First part of table -->
    <table border="1">
      <tr>
        <td>X</td>
        <td>1</td>
        <td>2</td>
        <td>3</td>
        <td>4</td>
        <td>5</td>
        <td>6</td>
        <td>7</td>
        <td>8</td>
        <td>9</td>
        <td>10</td>
      </tr>

      <!-- Notice interweaving of PHP and HTML -->
      <?php
        $iterations = 10;
        // Nested for loop to calculate product

        for ( $num1=1; $num1 <= $iterations; $num1++ ){
          ?>
          <tr><td><?php echo $num1;?></td>
            <?php
              for ( $num2=1; $num2 <= $iterations; $num2++ ){
                $product = $num1 * $num2;
                ?>

                <td><?php echo $product;?> </td>
              <?php
                }
              ?>
            </tr>
          <?php
            }
          ?>

        </table>

        <p>
        <h3>A quote from Edgar Allan Poe</h3>
        <?php
```

```
// Add a string for manipulation
$poquote = "I have no faith in human perfectability. I think
that human exertion will have no appreciable effect upon humanity.
Man is now only more active - not more happy - nor more wise, than
he was 6000 years ago.";
echo $poquote;
?>
<p>
<h3>Quote modified with ucwords </h3>
<?php
// Make Uppercase for first letter
$newquote = ucwords($poquote);
echo $newquote;
?>

</body>
</html>
```

2. Launch your Firefox browser and run the Web application. Assuming you placed the file in the /var/www/html/week3 folder you can run this by typing the following URL on your Virtual machine: localhost/week3/MultiplicationTable.php.

If successful, the resulting output will look similar to this:



## Week 3 PHP and HTML Blending

### Multiplication Table

X	1	2	3	4	5	6	7	8	9	10
1	1	2	3	4	5	6	7	8	9	10
2	2	4	6	8	10	12	14	16	18	20
3	3	6	9	12	15	18	21	24	27	30
4	4	8	12	16	20	24	28	32	36	40
5	5	10	15	20	25	30	35	40	45	50
6	6	12	18	24	30	36	42	48	54	60
7	7	14	21	28	35	42	49	56	63	70
8	8	16	24	32	40	48	56	64	72	80
9	9	18	27	36	45	54	63	72	81	90
10	10	20	30	40	50	60	70	80	90	100

### A quote from Edgar Allan Poe

I have no faith in human perfectability. I think that human exertion will have no appreciable effect upon humanity. Man is now only more active - not more happy - nor more wise, than he was 6000 years ago.

### Quote modified with ucwords

I Have No Faith In Human Perfectability. I Think That Human Exertion Will Have No Appreciable Effect Upon Humanity. Man Is Now Only More Active - Not More Happy - Nor More Wise, Than He Was 6000 Years Ago.

3. Reviewing the code you should note the following:
  - a. PHP codes start and stop with `<?php ?>`. This can get tricky to do by hand but for simple applications keeping track of the opening and closing braces is feasible.
  - b. HTML code is interleaved between the PHP code. Again tricky, but if you code from scratch to create tables, you will need to make sure you have a complete table structure between the PHP code. For example, the following HTML code is within a PHP loop to echo the data into just one cell. `<td><?php echo $product;?> </td>`
  - c. Adding ending braces for loops can be tricky. If you do this by hand, be sure to write your loops first, and then integrate the HTML tags. This will help you avoid infinite loops. The following is a typical listing for a table built using PHP loops. You should take your time walking through this code to see the complete structure and how PHP is used to provide for looping and dynamic programming.

```
<!-- First part of table -->
<table border="1">
<tr>
  <td>X</td>
  <td>1</td>
  <td>2</td>
  <td>3</td>
  <td>4</td>
  <td>5</td>
  <td>6</td>
  <td>7</td>
  <td>8</td>
  <td>9</td>
  <td>10</td>
</tr>

<!-- Notice interweaving of PHP and HTML -->
<?php
  $iterations = 10;
  // Nested for loop to calculate product

  for ( $num1=1; $num1 <= $iterations; $num1++ ){
    ?>
    <tr><td><?php echo $num1;?></td>
    <?php
      for ( $num2=1; $num2 <= $iterations; $num2++ ){
        $product = $num1 * $num2;
        ?>

        <td><?php echo $product;?> </td>
      <?php
      }
    ?>
  </tr>
  <?php
  }
  ?>
</table>
```

### Lab submission details:





As part of the submission for this Lab, you will create your own Web page that uses both HTML and PHP to create several different tables providing specific information. You will get a chance to use most of the concepts you studied so far in this course as you will apply both HTML and PHP code to this exercise.

Specifically, you will create a Web application that provides 3 different tables. Each table will consist of at least 2 rows and 2 columns. You may need to add more cells depending upon how you subdivide your display.

The first table should include the results of using PHP to calculate the area and circumference of a circle, the area and perimeter of a rectangle, the area and perimeter of a right triangle and the area and perimeter of a square. The values used for dimensions are as follows:

Shape	Values and parameters
Circle	radius = 2.65 meters
Rectangle	length = 4.2 meters; width = 5.6 meters
Right Triangle	base = 10.2 meters; height = 5.4 meters
Square	length = 5.3 meters

The geometric shape table should include an image of each shape along with the calculated values. Note, you must use PHP and formulas to calculate the results in the application. No hard-coding of results is allowed. The following is a reasonable representation of the first table:

<div>Circle </div> <div>Area = XX square meters Circumference = XX meters</div>	<div>Rectangle </div> <div>Area = XX square meters Perimeter = XX meters</div>
<div>Right Triangle </div> <div>Area = XX square meters Perimeter = XX meters</div>	<div>Square </div> <div>Area = XX square meters Perimeter = XX meters</div>

Hint: Use an existing image on the web or create our own. Scaling of images to recommended size is **not** needed.

The second table should include a famous quote (or quote that you like) and three slightly modified versions of that quote. You should use existing PHP functionality to modify the quote. The modifications are described below:

Modification	Description
Original	Original quote as is
Replace “we” with “me”	Replace all occurrences of we with me (Note: you can choose a string of your choice instead of using we and me.)
The location of all letters that are equal to ‘t’	Find and display the location of all t’s in your string quote.
All Upper Case	Display all characters in upper case.

The following is a reasonable representation of the second table:

<p><b>Original</b></p> <p>You know, when we fought the Cylons, we did it to save ourselves from extinction. But we never answered the question 'Why?' Why are we as a people worth saving? We still commit murder because of greed and spite, jealousy, and we still visit all of our sins upon our children. We refuse to accept the responsibility for anything that we've done, like we did with the Cylons. We decided to play God, create life. And when that life turned against us, we comforted ourselves in the knowledge that it really wasn't our fault, not really. You cannot play God then wash your hands of the things that you've created. Sooner or later, the day comes when you can't hide from the things that you've done anymore.</p>	<p><b>Replace we with me</b></p> <p>You know, when me fought the Cylons, me did it to save ourselves from extinction. But me never answered the question 'Why?' Why are me as a people worth saving? We still commit murder because of greed and spite, jealousy, and me still visit all of our sins upon our children. We refuse to accept the responsibility for anything that me've done, like me did with the Cylons. We decided to play God, create life. And when that life turned against us, me comforted ourselves in the knowledge that it really wasn't our fault, not really. You cannot play God then wash your hands of the things that you've created. Sooner or later, the day comes when you can't hide from the things that you've done anymore.</p>
<p><b>Location of t's</b></p> <p>The letter 't' was found at position: 23  The letter 't' was found at position: 25  The letter 't' was found at position: 45  The letter 't' was found at position: 47  The letter 't' was found at position: 72  The letter 't' was found at position: 76  The letter 't' was found at position: 84  The letter 't' was found at position: 104  The letter 't' was found at position: 112  The letter 't' was found at position: 150  The letter 't' was found at position: 165  The letter 't' was found at position: 175  The letter 't' was found at position: 208  ...</p>	<p><b>All Upper Case</b></p> <p>YOU KNOW, WHEN WE FOUGHT THE CYLONS, WE DID IT TO SAVE OURSELVES FROM EXTINCTION. BUT WE NEVER ANSWERED THE QUESTION 'WHY?' WHY ARE WE AS A PEOPLE WORTH SAVING? WE STILL COMMIT MURDER BECAUSE OF GREED AND SPITE, JEALOUSY, AND WE STILL VISIT ALL OF OUR SINS UPON OUR CHILDREN. WE REFUSE TO ACCEPT THE RESPONSIBILITY FOR ANYTHING THAT WE'VE DONE, LIKE WE DID WITH THE CYLONS. WE DECIDED TO PLAY GOD, CREATE LIFE. AND WHEN THAT LIFE TURNED AGAINST US, WE COMFORTED OURSELVES IN THE KNOWLEDGE THAT IT REALLY WASN'T OUR FAULT, NOT REALLY. YOU CANNOT</p>

	PLAY GOD THEN WASH YOUR HANDS OF THE THINGS THAT YOU'VE CREATED. SOONER OR LATER, THE DAY COMES WHEN YOU CAN'T HIDE FROM THE THINGS THAT YOU'VE DONE ANYMORE.
--	---

Note: the ... in the Location of t's cells is present only to demonstrate there are more t's in the quote. In your example, you should list all positions.

For the third and final table, you need to use **PHP loops** to display the following 4 patterns in each of the table cells:

1 1 2 1 2 3 1 2 3 4 1 2 3 4 5 1 2 3 4 5 6 1 2 3 4 5 6 7 1 2 3 4 5 6 7 8	1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 1 2 3 4 5 6 1 2 3 4 5 1 2 3 4 1 2 3 1 2 1
<div> <div>1</div> <div>2 1</div> <div>3 2 1</div> <div>4 3 2 1</div> <div>5 4 3 2 1</div> <div>6 5 4 3 2 1</div> <div>7 6 5 4 3 2 1</div> <div>8 7 6 5 4 3 2 1</div> </div>	<div> <div>1 2 3 4 5 6 7 8</div> <div>1 2 3 4 5 6 7</div> <div>1 2 3 4 5 6</div> <div>1 2 3 4 5</div> <div>1 2 3 4</div> <div>1 2 3</div> <div>1 2</div> <div>1</div> </div>

Feel free to add additional HTML and PHP elements to enhance your web application. Create screen shots showing the successful running of your application.

Each cell within the tables is properly labeled indicating what is contained in the cell.

For your deliverables, you should submit a zip file containing your word document (or PDF file) with screen shots of the application running successfully along with your PHP web application file.

Include your full name, class number and section and date in the document.

#### Grading Rubric:

Attribute	Meets	Does not meet
HTML and PHP	<b>8 points</b> Creates a Web application that provides 3 different tables	<b>0 points</b> Does not create a Web application that provides 3 different tables consisting of at least 2 rows and 2 columns.

	<p>consisting of at least 2 rows and 2 columns. (1 point)</p> <p>The geometric shape table includes an image of each shape along with the calculated values for the area and circumference of a circle, the area and perimeter of a rectangle, the area and perimeter of a right triangle and the area and perimeter of a square. Uses PHP and formulas to calculate the results in the application. (2 points)</p> <p>Quote table includes a famous quote (or quote that you like) and three slightly modified versions of that quote – String replacement, Letter replacement and Upper case. Uses existing PHP functionality to modify the quote. (2 points)</p> <p>Includes <b>PHP loops</b> to display 4 provided patterns in each of the table cells. (2 points)</p> <p>Each cell within the table is properly labeled indicating what is contained in the cell. (1 point)</p>	<p>The geometric shape table does not include an image of each shape along with the calculated values for the area and circumference of a circle, the area and perimeter of a rectangle, the area and perimeter of a right triangle and the area and perimeter of a square. Does not use PHP and formulas to calculate the results in the application.</p> <p>Quote table does not include a famous quote (or quote that you like) and three slightly modified versions of that quote – String replacement, Letter replacement and Upper case. Does not use existing PHP functionality to modify the quote.</p> <p>Does not Include <b>PHP loops</b> to display 4 provided patterns in each of the table cells.</p> <p>Each cell within the table is not properly labeled indicating what is contained in the cell.</p>
Documentation and submission	<p><b>2 points</b></p> <p>Submits a zip file containing your word document with screen shots and access.log analysis, html files, image files and access.log file. (1 point)</p> <p>Includes labeled, screen shots of the Virtual Machine running the Web/php page on your host machine for each command used. (0.5)</p> <p>Title page includes your full name, class number and section and date. Document is neat, well-organized and free from spelling and grammar errors. (0.5 points)</p>	<p><b>0 points</b></p> <p>Does not submit a zip file containing your word document with screen shots and access.log analysis, html files, image files and access.log file.</p> <p>Does not Include labeled, screen shots of the Virtual Machine running the Web/php page on your host machine for each command used.</p> <p>Title page does not include your full name, class number and section and date. Document is not neat, well-organized and free from spelling and grammar errors.</p>