CNT 4714: Enterprise Computing Fall 2009

Introduction to PHP – Part 2

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Form Processing and Business Logic

- XHTML forms enable web pages to collect data from users and send it to a web server for processing.
- Interaction of this kind between users and web servers is vital to e-commerce applications. Such capabilities allow users to purchase products, request information, send and receive web-based email, perform on-line paging and take advantage of various other online services.
- The XHTML document on the next few pages collects information from a user for the purposes of adding them to a mailing list.
- The PHP file on page 3 validates the data entered by the user through the form and "registers" them in the mailing list database.

form.html Example

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<!-- form.html                -->
<!-- Form for use with the form.php program -->

<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title>Sample form to take user input in XHTML</title>
  </head>
  <body>

    <h1>This is a sample registration form.</h1>

    Please fill in all fields and click Register.
    <!-- post form data to form.php -->
    <form method = "post" action = "form.php">
      <img src = "images/user.gif" alt = "User" /><br />
      <span style = "color: blue">
        Please fill out the fields below.<br />
      </span>
      <!-- create four text boxes for user input -->
      <img src = "images/fname.gif" alt = "First Name" />
      <input type = "text" name = "fname" /><br />
```

This XHTML document generates the form that the user will submit to the server via form.php

```
<img src = "images/lname.gif" alt = "Last Name" />
<input type = "text" name = "lname" /><br />
<img src = "images/email.gif" alt = "Email" />
<input type = "text" name = "email" /><br />
<img src = "images/phone.gif" alt = "Phone" />
<input type = "text" name = "phone" /><br />
<span style = "font-size: 10pt">
   Must be in the form (555)555-5555</span>
<br /><br />
<img src = "images/downloads.gif"
   alt = "Products" /><br />

<span style = "color: blue">
   Which publication would you like information about?
</span><br />

<!-- create drop-down list containing magazine names -->
<select name = "magazine">
   <option>Velo-News</option>
   <option>Cycling Weekly</option>
   <option>Pro Cycling</option>
   <option>Cycle Sport</option>
            <option>RadSport</option>
            <option>Mirror du Cyclisme</option>
</select>
<br /><br />
```

```
      <img src = "images/os.gif" alt = "Operating System" />
      <br /><span style = "color: blue">
        Which operating system are you currently using?
      <br /></span>
      <!-- create five radio buttons -->
      <input type = "radio" name = "os" value = "Windows XP"
        checked = "checked" />
        Windows XP
      <input type = "radio" name = "os" value =
        "Windows 2000" />
        Windows 2000
      <input type = "radio" name = "os" value =
        "Windows 98" />
        Windows 98<br />
      <input type = "radio" name = "os" value = "Linux" />
        Linux

      <input type = "radio" name = "os" value = "Other" />
        Other<br />

       <!-- create a submit button -->
      <input type = "submit" value = "Register" />
    </form>

  </body>
</html>
```

form.php Example

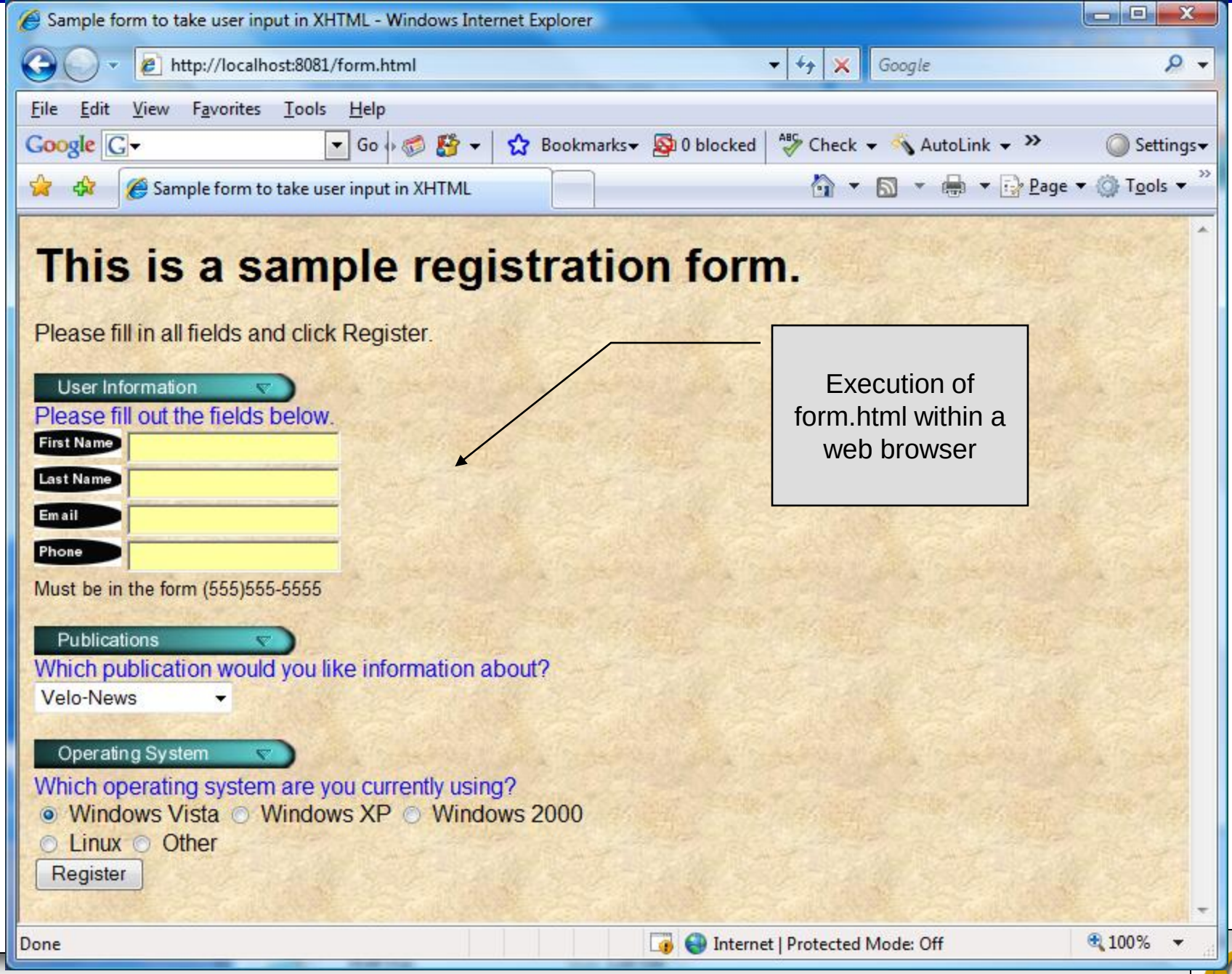
```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<!-- form.php     -->
<!-- Read information sent from form.html -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title>Form Validation</title>
  </head>
  <body style = "font-family: arial,sans-serif">

    <?php
      extract($_POST);
      // determine whether phone number is valid and print an error message if not
      if ( !ereg( "^\([0-9]{3}\)[0-9]{3}-[0-9]{4}$",
        $phone ) ){
        print( "<p><span style = \"color: red; font-size: 2em\">
          INVALID PHONE NUMBER:</span><br />
          A valid phone number must be in the form
          <strong>(555)555-5555</strong><br />
          <span style = \"color: blue\">
          Click the Back button, enter a valid phone number and resubmit.<br /><br />
          Thank You.</span></p></body></html>" );
        die(); // terminate script execution
      }
    ?>
```

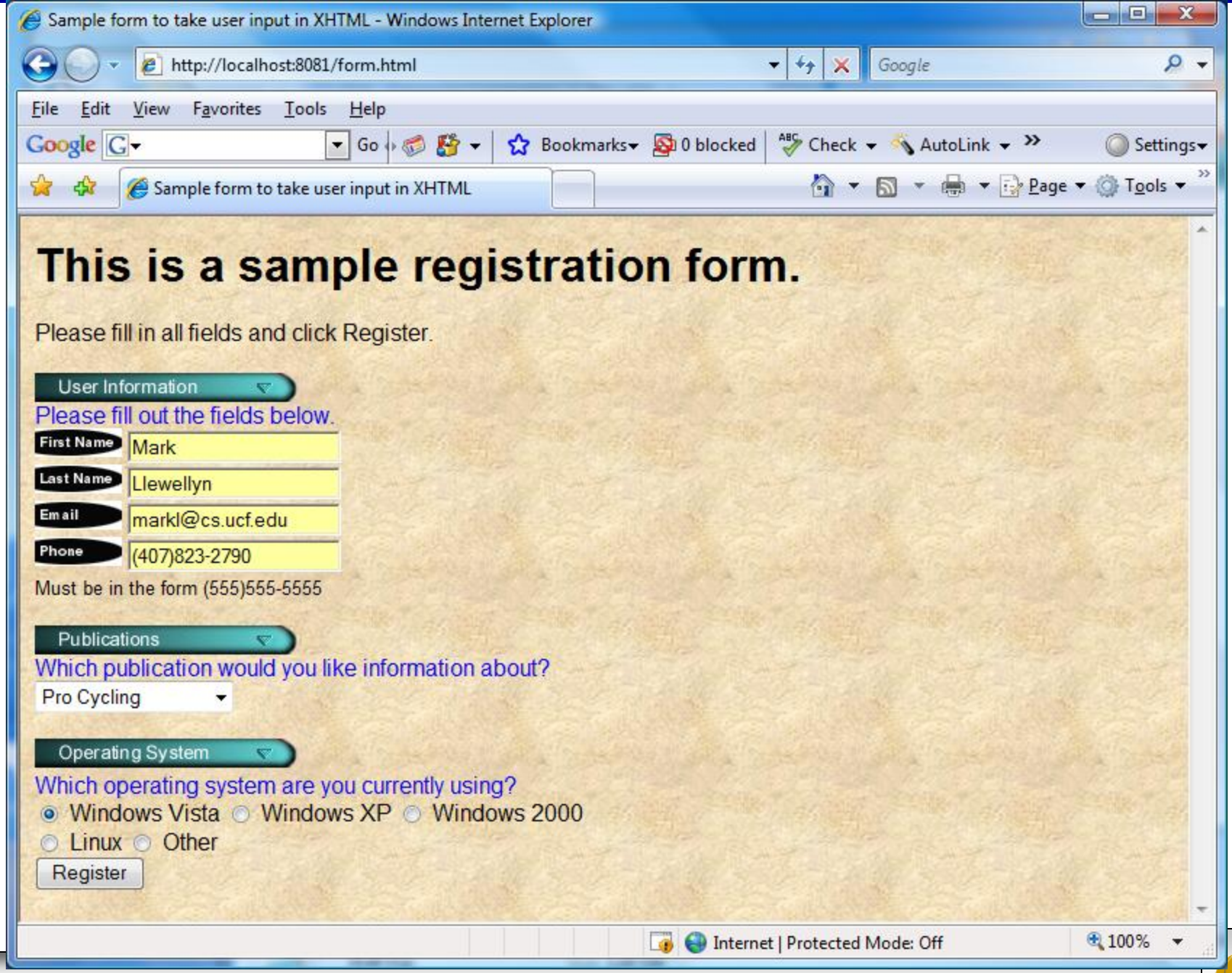
Function extract (associativeArray) creates a variable-value pair corresponding to each key-value pair in the associative array $_POST.

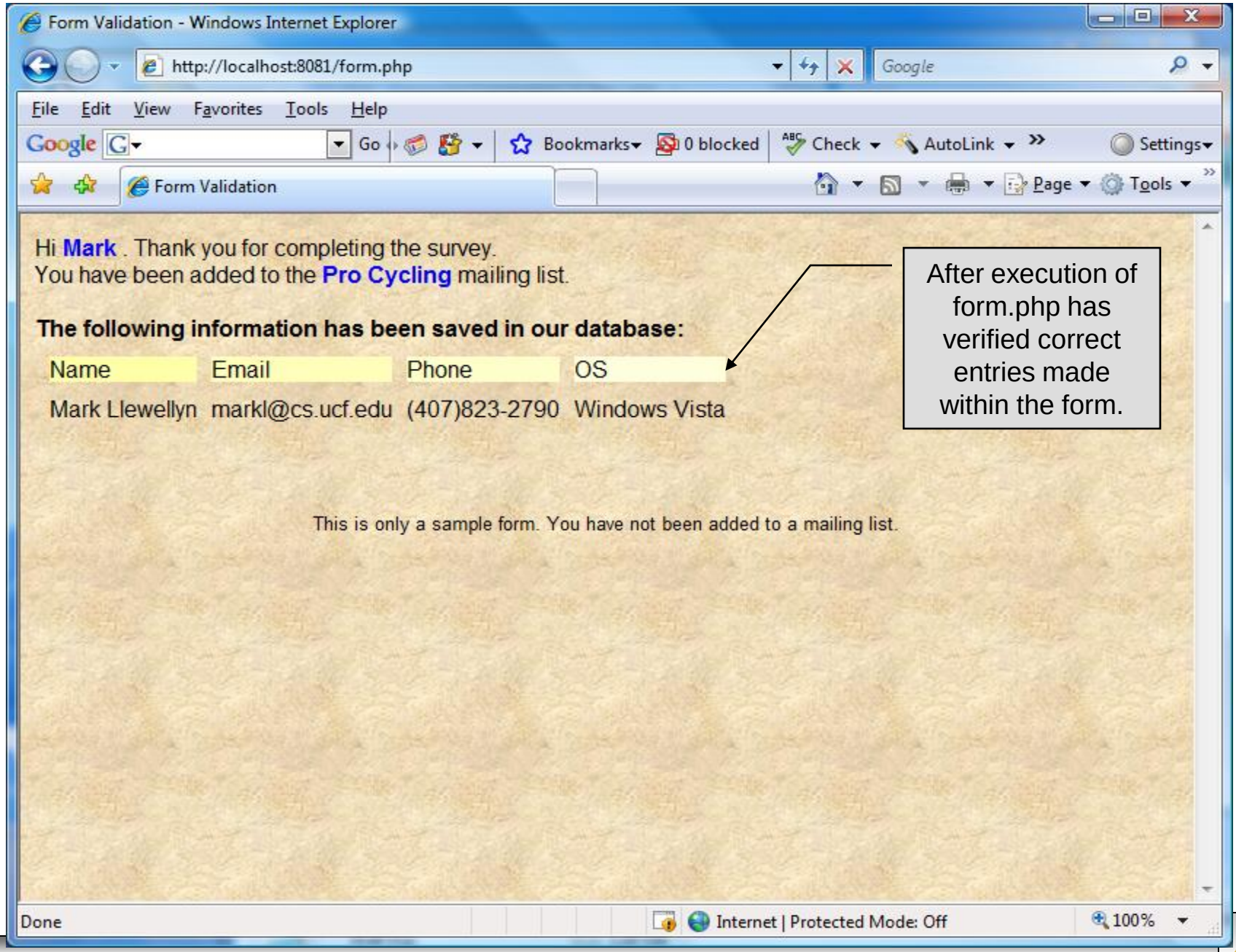
See page 17 for explanation of regular expressions.

Function die() terminates script execution. An error has occurred, no need to continue.

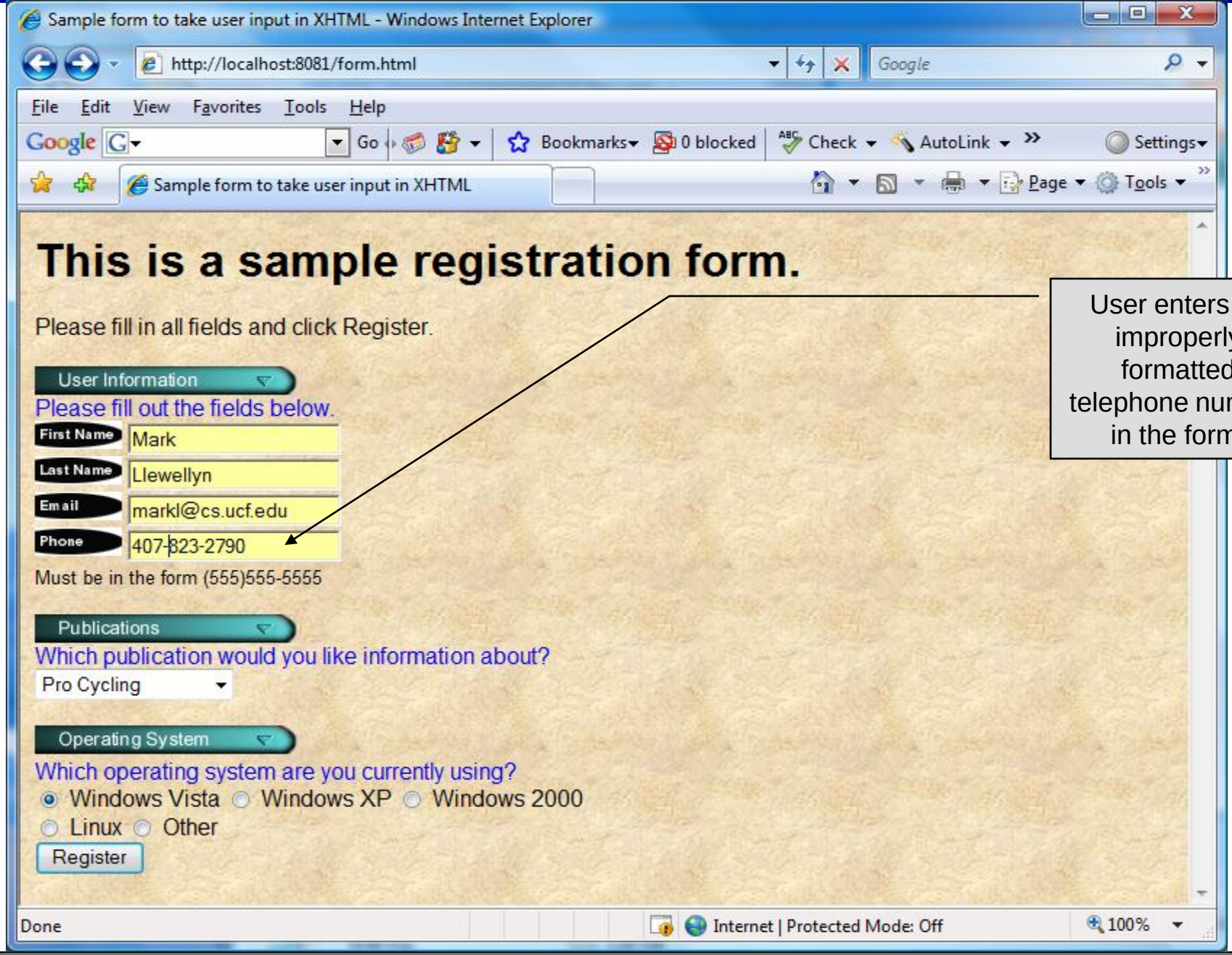
```
<p>Hi
   <span style = "color: blue"> <strong> <?php print( "$fname" ); ?>  </strong> </span>.
   Thank you for completing the survey.<br />
   You have been added to the  <span style = "color: blue">
      <strong>  <?php print( "$magazine " ); ?>  </strong> </span> mailing list.
</p>
<strong>The following information has been saved in our database:</strong><br />
  <table border = "0" cellpadding = "0" cellspacing = "10">
   <tr>
      <td bgcolor = "#ffffaa">Name </td>
      <td bgcolor = "#ffffbb">Email</td>
      <td bgcolor = "#ffffcc">Phone</td>
      <td bgcolor = "#ffffdd">OS</td>
   </tr>
   <tr>
      <?php
         // print each form field's value
         print( "<td>$fname $lname</td> <td>$email</td> <td>$phone</td> <td>$os</td>" );
      ?>
   </tr>
  </table>
 <br /><br /><br />
  <div style = "font-size: 10pt; text-align: center">
     This is only a sample form.   You have not been added to a mailing list.
  </div>
 </body>
</html>
```


Sample form to take user input in XHTML - Windows Internet Explorer
http://localhost:8081/form.html
Google
File Edit View Favorites Tools Help
Google Go Bookmarks 0 blocked Check AutoLink Settings
Sample form to take user input in XHTML
Page Tools
This is a sample registration form.
Please fill in all fields and click Register.
User Information
Please fill out the fields below.
First Name
Last Name
Email
Phone
Must be in the form (555)555-5555
Publications
Which publication would you like information about?
Velo-News
Operating System
Which operating system are you currently using?
Windows Vista Windows XP Windows 2000
Linux Other
Register
Execution of form.html within a web browser
Done
Internet | Protected Mode: Off
100%

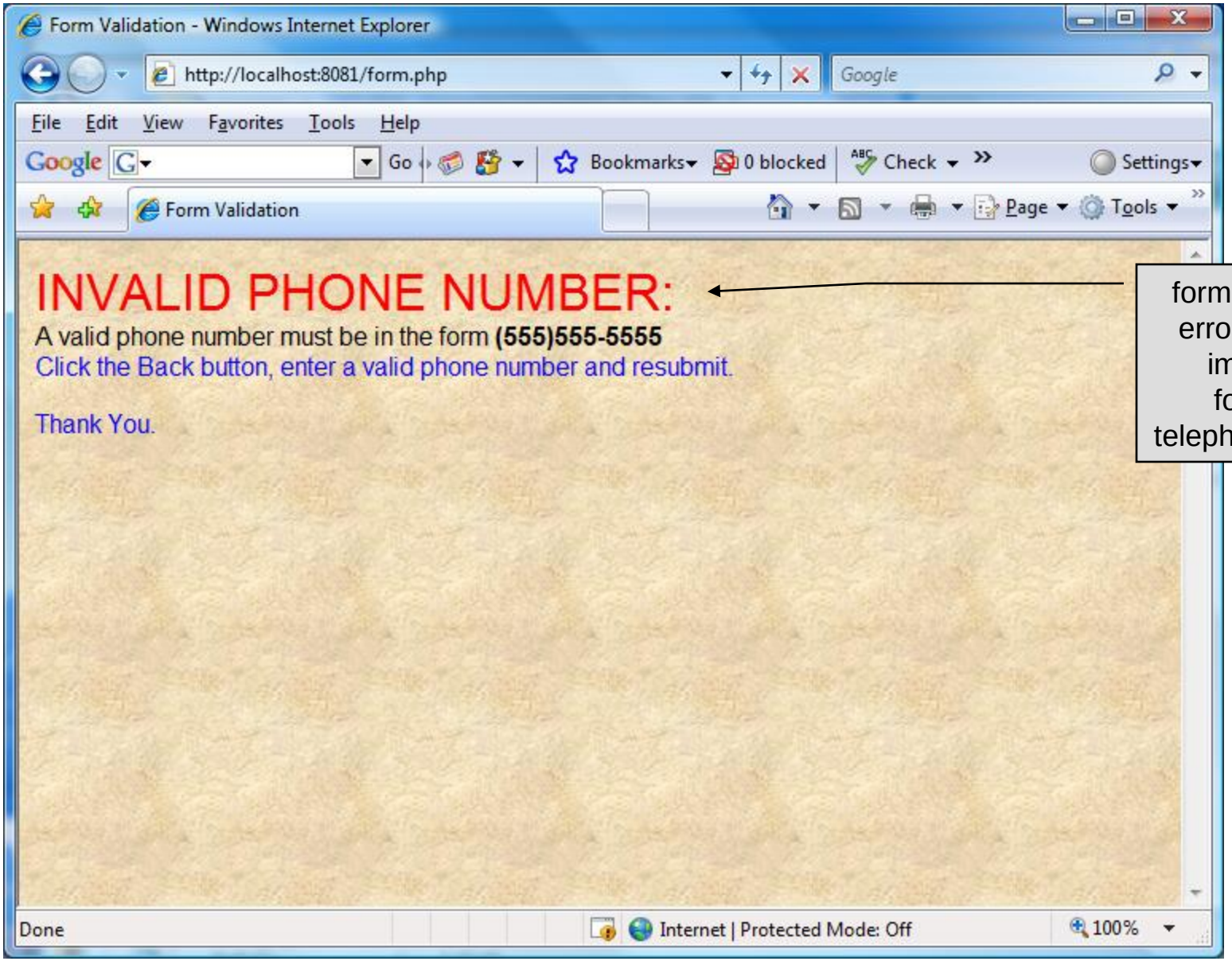

Sample form to take user input in XHTML - Windows Internet Explorer
http://localhost:8081/form.html
Google
File Edit View Favorites Tools Help
Google Go Bookmarks 0 blocked Check AutoLink Settings
Sample form to take user input in XHTML
Page Tools
This is a sample registration form.
Please fill in all fields and click Register.
User Information
Please fill out the fields below.
First Name Mark
Last Name Llewellyn
Email markl@cs.ucf.edu
Phone (407)823-2790
Must be in the form (555)555-5555
Publications
Which publication would you like information about?
Pro Cycling
Operating System
Which operating system are you currently using?
Windows Vista Windows XP Windows 2000
Linux Other
Register
Internet | Protected Mode: Off
100%



After execution of form.php has verified correct entries made within the form.



User enters an improperly formatted telephone number in the form.



form.php issues error regarding improperly formatted telephone number.

How the Form Example Works

- The `action` attribute of the `form` element, indicates that when the user clicks the `Register` button, the form data will be posted to `form.php` for processing.
- Using `method = "post"` appends the form data to the browser request that contains the protocol (i.e., HTTP) and the requested resource's URL. Scripts located on the web server's machine (or accessible through the network) can access the form data sent as part of the request.
- Each of the form's input fields are assigned a unique name. When `Register` is clicked, each field's `name` and `value` are sent to the web server.
- Script `form.php` then accesses the value for each specific field through the global array `$_POST`.

How the Form Example Works (cont.)

- The superglobal arrays are associative arrays predefined by PHP that hold variable acquired from the user input, the environment, or the web server and are accessible in any variable scope.
  - If the information from the form had been submitted via the HTTP method `get`, then the superglobal array `$_GET` would contain the name-value pairs.
- Since the HTML form and the PHP script "communicate" via the name-value pairs, it is a good idea to make the XHTML object names meaningful so that the PHP script that retrieves the data is easier to understand.

Register_globals

- In PHP versions 4.2 and higher, the directive `register_globals` is set to `Off` by default for security reasons.
- Turning off `register_globals` means that all variables sent from an XHTML form to a PHP document now must be accessed using the appropriate superglobal array (either `$_POST` or `$_GET`).
- When this directive was turned `On`, as was the default case in PHP versions prior to 4.2, PHP created an individual global variable corresponding to each form field.

Validation of Form Generated Data

- The form example illustrates an important concept in the validation of user input. In this case, we simply checked the validity of the format of the telephone number entered by the client user.
- In general, it is crucial to validate information that will be entered into database or used in mailing lists. For example, validation can be used to ensure that credit-card numbers contain the proper number of digits before the numbers are encrypted to a merchant.
- In this case, the form.php script is implementing the business logic or business rules for our application.

Pattern Matching in PHP

- For powerful string comparisons (pattern matching), PHP provides functions `ereg` and `preg_match`, which use regular expressions to search a string for a specified pattern.
- Function `ereg` uses Portable Operating System Interface (POSIX) extended regular expressions.
  - POSIX-extended regular expressions are a standard to which PHP regular expression conform.
- Function `preg_match` provides Perl-compatible regular expressions.
- Perl-compatible regular expressions are more widely used that POSIX regular expressions. PHP's support for Perl-compatible regular expressions eases migration from Perl to PHP. The following examples illustrates these concepts.

expression.php - Example

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<!-- expression.php -->
<!-- Using regular expressions -->
<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title>Regular expressions</title>
  </head>
  <body>
    <?php
      $search = "Now is the time";
      print( "Test string is: '$search'<br /><br />" );
      // call function ereg to search for pattern 'Now'  in variable search
      if ( ereg( "Now", $search ) )
        print( "String 'Now' was found.<br />" );

      // search for pattern 'Now' in the beginning of  the string
      if ( ereg( "^Now", $search ) )
        print( "String 'Now' found at beginning of the line.<br />" );

      // search for pattern 'Now' at the end of the string
      if ( ereg( "Now$", $search ) )
        print( "String 'Now' was found at the end of the line.<br />" );
```

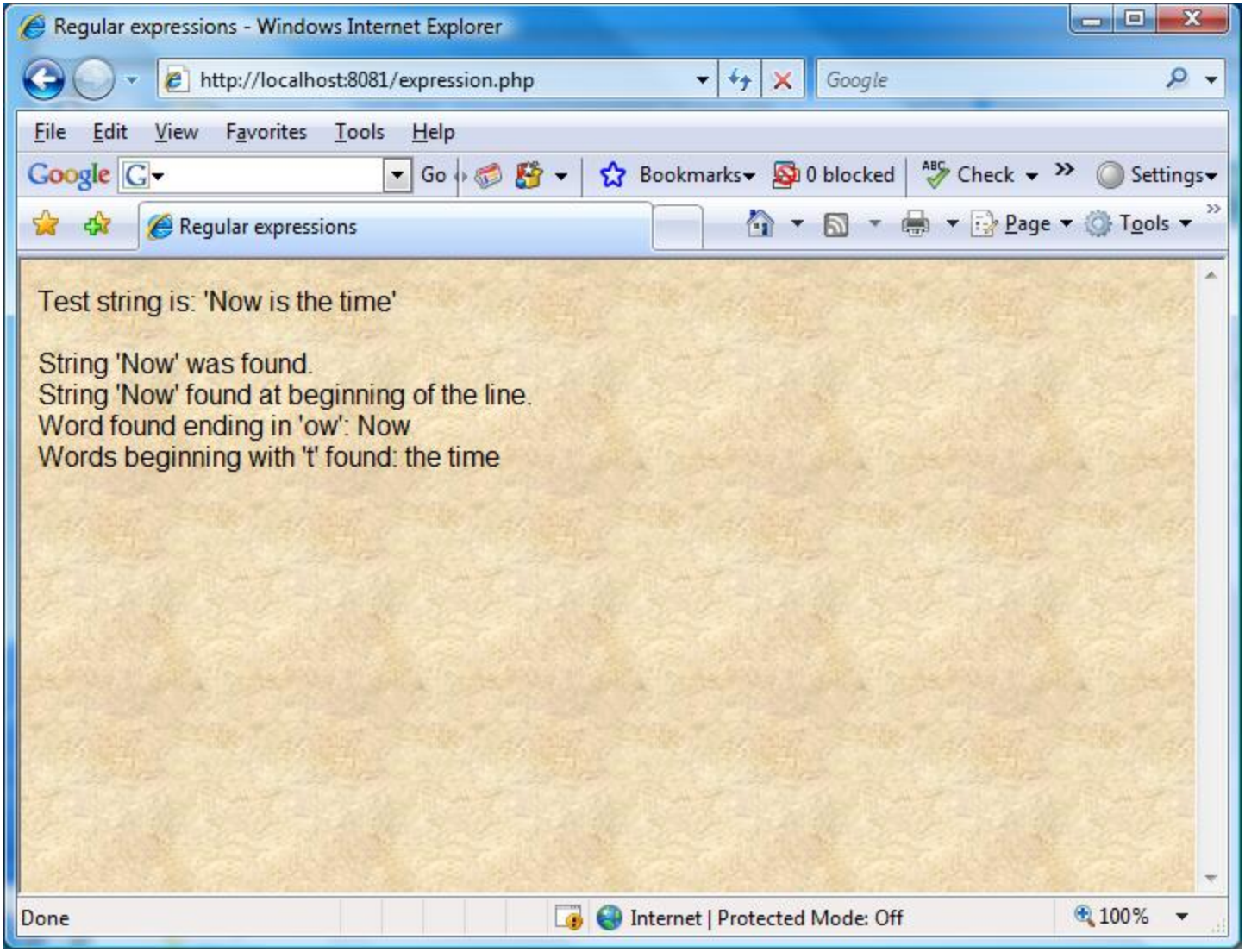
^ matches at beginning of a string

$ matches at end of a string

```
      // search for any word ending in 'ow'
      if ( ereg( "[[:<:]]([a-zA-Z]*ow)[[:>:]]", $search,
         $match ) )
         print( "Word found ending in 'ow': " .
            $match[ 1 ] . "<br />" );

      // search for any words beginning with 't'
      print( "Words beginning with 't' found: ");

      while ( eregi( "[[:<:]](t[[:alpha:]]+)[[:>:]]",
         $search, $match ) ) {
         print( $match[ 1 ] . " " );

        // remove the first occurrence of a word beginning
        // with 't' to find other instances in the string
        $search = ereg_replace( $match[ 1 ], "", $search );
      }

      print( "<br />" );
   ?>
  </body>
</html>
```

Uses a regular expression to match a word ending in "ow".

Output From `expression.php` - Example



Verifying a Username and Password Using PHP

- It is often the case that a private website is created which is accessible only to certain individuals.
- Implementing privacy generally involves username and password verification.
- In the next example, we'll see an XHTML form that queries a user for a username and password. The fields USERNAME and PASSWORD are posted to the PHP script `verify.php` for verification.
  - For simplicity, data is not encrypted before sending it to the server.
  - For more information on PHP encryption functions visit: http://www.php.net/manual/en/ref.mcrypt.php.

password.html – page 1

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<!-- password.html                    -->
<!-- XHTML form sent to password.php for verification -->

<html xmlns = "http://www.w3.org/1999/xhtml">
   <head>
      <title>Verifying a username and a password.</title>
      <style type = "text/css">
         td { background-color: #DDDDDD }
      </style>
   </head>
   <body style = "font-family: arial">
      <p style = "font-size: 18pt">
      <font color=red><B> Welcome to the COP 4610 High Security WebPage </B></font><HR>
      <p style = "font-size: 13pt">
         Type in your username and password below.
         <br />
         <span style = "color: #0000FF; font-size: 10pt;
            font-weight: bold">
            Note that password will be sent as plain text - encryption not used in this application
         </span>
      </p>
```

password.html – page 2

```
<!-- post form data to password.php -->
<form action = "password.php" method = "post">
  <br />
    <table border = "3" cellspacing = "3"  style = "height: 90px; width: 150px;
    font-size: 10pt" cellpadding = "1">
    <tr>
      <td colspan = "3">  <strong>Username:</strong>  </td>
    </tr>
    <tr>
      <td colspan = "3"> <input size = "40" name = "USERNAME"
          style = "height: 22px; width: 115px" />            </td>
    </tr>
    <tr>
      <td colspan = "3">  <strong>Password:</strong>    </td>
    </tr>
    <tr>
      <td colspan = "3">  <input size = "40" name = "PASSWORD"
          style = "height: 22px; width: 115px"  type = "password" /> <br/></td>
    </tr>
 <tr>
      <td colspan = "1">
        <input type = "submit" name = "Enter"  value = "Enter" style = "height: 23px;
          width: 47px" />       </td>
      <td colspan = "2">  <input type = "submit" name = "NewUser"   value = "New User"
          style = "height: 23px" />
      </td>
    </tr>
 </table>     </form>     <HR>   </body>    </html>
```

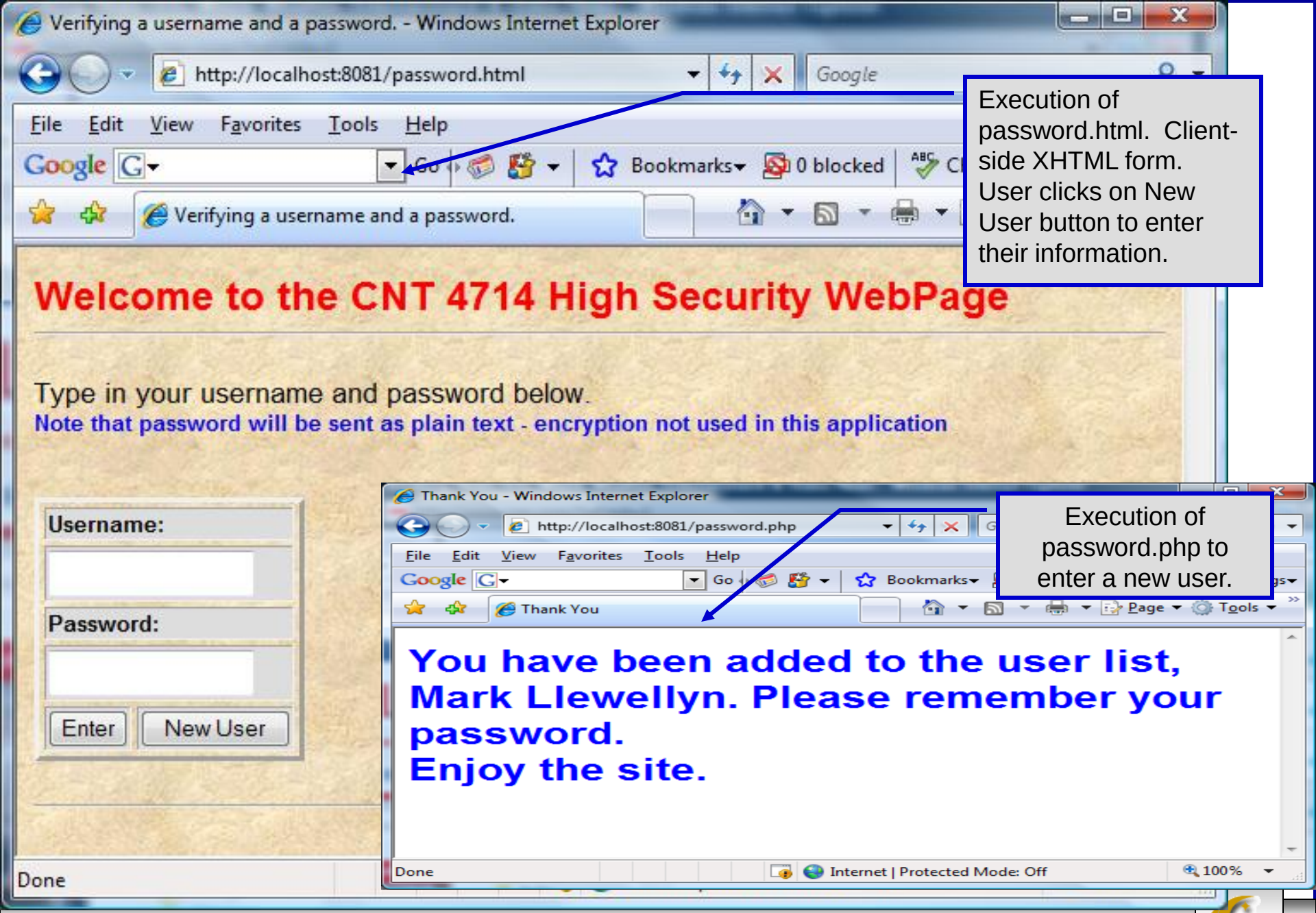
```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<!-- password.php      -->
<!-- Searching a database for usernames and passwords. -->

<html xmlns = "http://www.w3.org/1999/xhtml">
   <head>
      <?php
         extract( $_POST );
         // check if user has left USERNAME or PASSWORD field blank
         if ( !$USERNAME || !$PASSWORD ) {
            fieldsBlank();
            die();
         }
         // check if the New User button was clicked
         if ( isset( $NewUser ) ) {
            // open password.txt for writing using append mode
            if ( !( $file = fopen( "password.txt", "a" ) ) ) {

               // print error message and terminate script
               // execution if file cannot be opened
               print( "<title>Error</title></head><body>
                  Could not open password file
                  </body></html>" );
               die();
            }
```

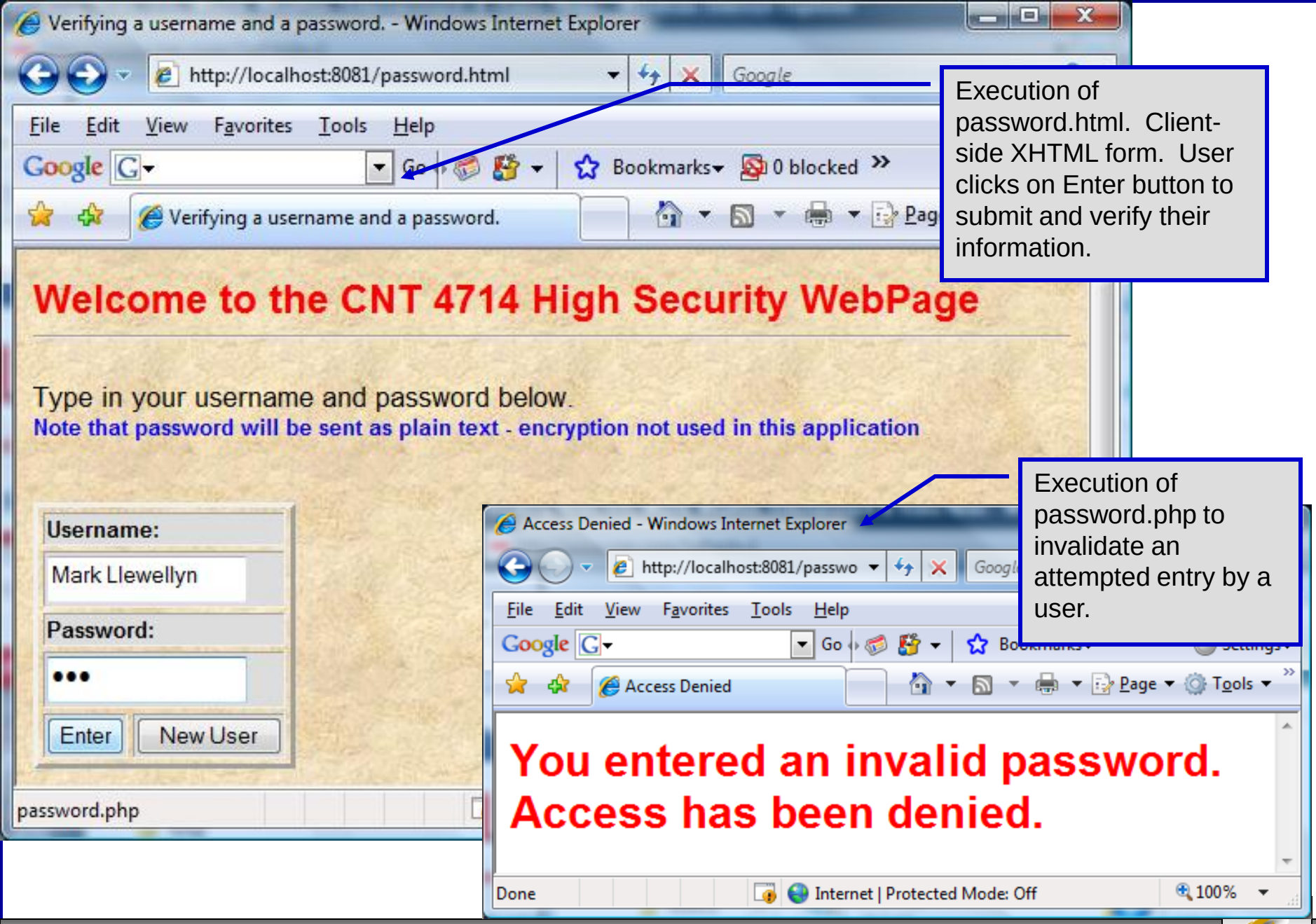
```
   // write username and password to file and call function userAdded
   fputs( $file, "$USERNAME,$PASSWORD\n" );
   userAdded( $USERNAME );
}
else {

   // if a new user is not being added, open file
   // for reading
   if ( !( $file = fopen( "password.txt",  "r" ) ) ) {
      print( "<title>Error</title></head>
         <body>Could not open password file
         </body></html>" );
      die();
   }

   $userVerified = 0;

   // read each line in file and check username and password
   while ( !feof( $file ) && !$userVerified ) {

      // read line from file
      $line = fgets( $file, 255 );

      // remove newline character from end of line
      $line = chop( $line );

      // split username and password using comma delimited string
      $field = split( ",", $line, 2 );
```

```
      // verify username
      if ( $USERNAME == $field[ 0 ] ) {
         $userVerified = 1;

         // call function checkPassword to verify user's password
         if ( checkPassword( $PASSWORD, $field ) == true )
            accessGranted( $USERNAME );
         else
            wrongPassword();
      }
   }

   // close text file
   fclose( $file );

   // call function accessDenied if username has not been verified
   if ( !$userVerified )
      accessDenied();
}

 // verify user password and return a boolean
function checkPassword( $userpassword, $filedata )
{
   if ( $userpassword == $filedata[ 1 ] )
      return true;
   else
      return false;
}
```

```
// print a message indicating the user has been added
function userAdded( $name )  {
   print( "<title>Thank You</title></head>
      <body style = \"font-family: arial;
      font-size: 1em; color: blue\">
      <strong>You have been added
      to the user list, $name.  Please remember your password.
      <br />Enjoy the site.</strong>" );
}

 // print a message indicating permission has been granted
function accessGranted( $name )  {
   print( "<title>Thank You</title></head>
      <body style = \"font-family: arial;
      font-size: 1em; color: blue\">
      <strong>Permission has been
      granted, $name. <br />
      Enjoy the site.</strong>" );
}
// print a message indicating password is invalid
function wrongPassword()   {
   print( "<title>Access Denied</title></head>
      <body style = \"font-family: arial;
      font-size: 1em; color: red\">
      <strong>You entered an invalid
      password.<br />Access has
      been denied.</strong>" );
}
```

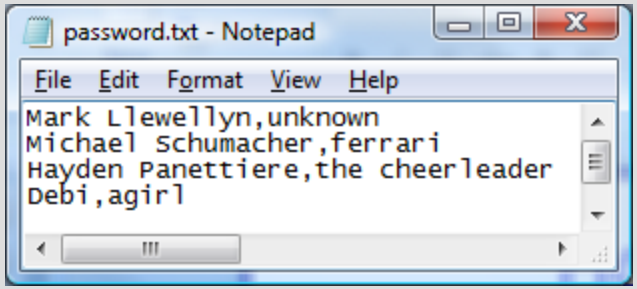
```
// print a message indicating access has been denied
        function accessDenied()   {
           print( "<title>Access Denied</title></head>
              <body style = \"font-family: arial;
              font-size: 1em; color: red\">
              <strong>
              You were denied access to this server.
              <br /></strong>" );
        }

         // print a message indicating that fields
         // have been left blank
        function fieldsBlank()   {
           print( "<title>Access Denied</title></head>
              <body style = \"font-family: arial;
              font-size: 1em; color: red\">
              <strong>
              Please fill in all form fields.
              <br /></strong>" );
        }
     ?>
  </body>
</html>
```


Verifying a username and a password. - Windows Internet Explorer
http://localhost:8081/password.html
File Edit View Favorites Tools Help
Bookmarks
0 blocked
Verifying a username and a password.
Welcome to the CNT 4714 High Security WebPage
Type in your username and password below.
Note that password will be sent as plain text - encryption not used in this application
Username:
Password:
Enter
New User
Done
Execution of password.html. Client-side XHTML form. User clicks on New User button to enter their information.
Thank You - Windows Internet Explorer
http://localhost:8081/password.php
Thank You
You have been added to the user list, Mark Llewellyn. Please remember your password.
Enjoy the site.
Done
Internet | Protected Mode: Off
100%
Execution of password.php to enter a new user.


Verifying a username and a password. - Windows Internet Explorer
http://localhost:8081/password.html
File Edit View Favorites Tools Help
Bookmarks
0 blocked
Verifying a username and a password.
Welcome to the CNT 4714 High Security WebPage
Type in your username and password below.
Note that password will be sent as plain text - encryption not used in this application
Username:
Mark Llewellyn
Password:
Enter
New User
password.php
Execution of password.html. Client-side XHTML form. User clicks on Enter button to submit and verify their information.
Access Denied - Windows Internet Explorer
http://localhost:8081/passwo
File Edit View Favorites Tools Help
Access Denied
Page
Tools
You entered an invalid password.
Access has been denied.
Done
Internet | Protected Mode: Off
100%
Execution of password.php to invalidate an attempted entry by a user.

How password.php Works

- The PHP script `password.php` verifies the client's username and password by querying a database. For this example, the "database" of usernames and passwords is just a text file (for simplicity). Existing users are validated against this file, and new users are appended to it.



The password.txt "database"

- Whether we are dealing with a new user is determined by calling function `isset` to test if variable `$NewUser` has been set.
- When the user submits the password.html form to the server, they click either Enter or New User button. After calling function extract, either variable `$NewUser` or `$Enter` is created depending on which button was selected. If `$NewUser` has not been set, we assume the user clicked Enter.